



UNIVERSITY OF MINNESOTA  
**Driven to Discover**<sup>SM</sup>

## University of Minnesota Twin Cities 2020-22 Graduate Programs

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- Program search: [z.umn.edu/publicprogramsearch](https://z.umn.edu/publicprogramsearch)
- Course search: [z.umn.edu/publiccoursecatalog](https://z.umn.edu/publiccoursecatalog)
- University policies: [policy.umn.edu](https://policy.umn.edu)

University of Minnesota Twin Cities  
3 Morrill Hall, 100 Church St. S.E., Minneapolis MN 55455

# Table of contents

\*Indicates a free-standing minor

College of Biological Sciences	
Ecology, Evolution and Behavior M.S.	1
Ecology, Evolution and Behavior Minor	4
Microbial Ecology Minor*	8
Microbial Engineering M.S.	10
Plant and Microbial Biology M.S.	13
Plant and Microbial Biology Minor	16
Plant and Microbial Biology Ph.D.	17
College of Continuing and Professional Studies	
Addictions Counseling M.P.S.	20
Addictions Minor	23
Applied Sciences Leadership M.P.S	25
Arts and Cultural Leadership M.P.S.	27
Biological Sciences M.B.S.	30
Biological Sciences Minor	32
Civic Engagement M.P.S.	33
Horticulture M.P.S.	36
Human Sexuality Post-baccalaureate Certificate	39
Integrated Behavioral Health M.P.S.	41
Leadership for Science Professionals Postbaccalaureate Certificate	44
College of Design	
Advanced Wearable Products Post-Baccalaureate Certificate	46

Architecture M.Arch.	47
Architecture M.S.	50
Design M.A.	56
Design M.F.A.	63
Design M.S.	66
Design Minor	74
Design Ph.D.	75
Ecological Restoration in Landscape Architecture Minor*	80
Heritage Studies and Public History M.H.S.P.H.	81
Heritage Studies and Public History Minor	83
Housing Studies Postbaccalaureate Certificate	85
Human Factors and Ergonomics M.S.	87
Human Factors and Ergonomics Minor	91
Human Factors and Ergonomics Ph.D.	93
Landscape Architecture M.L.A.	96
Landscape Architecture M.S.	99
Landscape Architecture Minor	101
Lighting Design Minor*	103
Museum Studies Minor*	106
Product Design Minor*	108
College of Education and Human Development	
Additional Licensure Other	111
Additional Licensure Teaching	113
Adult Education M.Ed.	116
Adult Education Postbaccalaureate Certificate	118

Adult Literacy Postbaccalaureate Certificate	120
Advanced Practices in Second Language Teaching Postbaccalaureate Certificate	122
Applied Child and Adolescent Development M.A.	124
Autism Spectrum Disorder Postbaccalaureate Certificate	127
Clinical Physiology and Movement Science Minor	129
Clinical Physiology and Movement Science Postbaccalaureate Certificate	133
Curriculum and Instruction M.Ed.	136
Developmental Psychology MA	143
Developmental Psychology Minor	145
Developmental Psychology PhD	146
Disability Policy and Services Postbaccalaureate Certificate	149
Dual Language and Immersion Education Postbaccalaureate Certificate	151
Early Childhood Education M.Ed.	153
Education, Curriculum, and Instruction M.A.	156
Education, Curriculum, and Instruction Minor	165
Education, Curriculum, and Instruction Ph.D.	167
Educational Psychology M.A.	179
Educational Psychology Minor	189
Educational Psychology Ph.D.	191
Educational Psychology Specialist Certificate in Education and School Psychological Services	200
Educational Psychology Specialist Certificate in Education and Special Education	203
Family Education M.Ed.	206

Family Social Science M.A.	208
Family Social Science Minor	212
Family Social Science Ph.D.	214
Human Resource Development M.Ed.	217
Human Resource Development Postbaccalaureate Certificate	219
Infant and Early Childhood Mental Health Graduate Minor*	221
Infant and Early Childhood Mental Health Postbaccalaureate Certificate	223
Integrative Leadership Minor*	225
International Education Minor*	228
Interpersonal Relationships Research Minor*	230
K-12 Technology Integration Postbaccalaureate Certificate	231
Kinesiology M.S.	233
Kinesiology Minor	239
Kinesiology Ph.D.	240
Leadership in Education M.Ed.	248
Literacy Education M.Ed.	250
Multimedia Design and Development Postbaccalaureate Certificate	252
Online Distance Learning Postbaccalaureate Certificate	254
Organizational Leadership, Policy, and Development Ed.D.	256
Organizational Leadership, Policy, and Development M.A.	259
Organizational Leadership, Policy, and Development Ph.D.	266
Parent Education Postbaccalaureate Certificate	271
Physical Activity and Health M.Ed.	273
PK-12 Administration Postbaccalaureate Certificate	276

Prevention Science Minor*	279
Private College Leadership Postbaccalaureate Certificate	281
Professional Development Postbaccalaureate Certificate	283
Program Evaluation Minor*	285
Program Evaluation Postbaccalaureate Certificate	287
Social Work M.S.W.	289
Social Work Ph.D.	294
Sociocultural Studies in Education Minor*	296
Special Education Initial License M.Ed.	300
Special Education M.Ed.	306
Specialist in Education and General Education Administration Certificate	313
Sport and Exercise Science M.Ed.	314
Sport Management M.A.	317
Sport Management M.Ed.	320
Sport Management Minor	322
Talent Development and Gifted Education Postbaccalaureate Certificate	323
Teaching M.Ed.	325
Teaching Writing and Critical Literacy Postbaccalaureate Certificate	336
Work and Human Resource Education M.Ed.	340
Youth Development Leadership M.Ed.	343
College of Food, Agriculture and Natural Resource Sciences	
Agricultural Education M.S.	345
Animal Sciences M.S.	347
Animal Sciences Minor	349

Animal Sciences Ph.D.	350
Applied Economics M.S.	352
Applied Economics Minor	355
Applied Economics Ph.D.	357
Applied Plant Sciences M.S.	360
Applied Plant Sciences Minor	366
Applied Plant Sciences Ph.D.	368
Bioproducts and Biosystems Science, Eng and Mgmt M.S.	374
Bioproducts and Biosystems Science, Engineering and Management Minor	377
Bioproducts and Biosystems Science, Engineering and Management Ph.D.	379
Conservation Sciences M.S.	381
Conservation Sciences Minor	386
Conservation Sciences Ph.D.	388
Entomology M.S.	393
Entomology Minor	395
Entomology Ph.D.	397
Food Science M.S.	399
Food Science Minor	401
Food Science Ph.D.	403
Land and Atmospheric Science M.S.	405
Land and Atmospheric Science Minor	409
Land and Atmospheric Science Ph.D.	411
Natural Resources Science and Management M.S.	415
Natural Resources Science and Management Minor	433

Natural Resources Science and Management Ph.D.	435
Nutrition M.S.	453
Nutrition Minor	456
Nutrition Ph.D.	458
Nutritional Sciences M.P.S.	461
Plant Pathology M.S.	463
Plant Pathology Minor	466
Plant Pathology Ph.D.	468
Risk Analysis for Introduced Species and Genotypes Minor*	471
Sustainable Agriculture Systems Minor*	473
School of Dentistry	
Advanced Dental Therapy Postbaccalaureate Certificate	475
Dental Hygiene M.S.D.H.	477
Dental Therapy M.D.T.	480
Dentistry M.S.	482
Oral Biology M.S.	485
Oral Biology Minor	487
Oral Biology Ph.D.	489
Graduate School	
Biochemistry, Molecular Biology and Biophysics M.S.	491
Biochemistry, Molecular Biology and Biophysics Minor	494
Biochemistry, Molecular Biology and Biophysics Ph.D.	496
Bioethics M.A.	499
Bioethics Minor	501
Biomedical Informatics and Computational Biology M.S.	503



Biomedical Informatics and Computational Biology Minor	505
Biomedical Informatics and Computational Biology Ph.D.	507
Biophysical Sciences and Medical Physics Minor	509
Clinical Ethics Postbaccalaureate Certificate	510
Health Care Design and Innovation Postbaccalaureate Certificate	512
Health Informatics M.H.I.	514
Health Informatics M.S.	518
Health Informatics Minor	523
Health Informatics Ph.D.	525
Health Journalism and Communication M.A.	532
Health Journalism and Communication Minor	534
History of Science, Technology, and Medicine M.A.	535
History of Science, Technology, and Medicine Minor	539
History of Science, Technology, and Medicine Ph.D.	541
Human Rights M.H.R.	545
Integrated Biosciences M.S.	550
Integrated Biosciences Ph.D.	552
Integrated Food Systems Leadership Post-baccalaureate Certificate	554
Integrative Health & Wellbeing Coaching M.A.	556
Integrative Therapies and Healing Practices Minor	560
Integrative Therapies and Healing Practices Postbaccalaureate Certificate	563
Molecular, Cellular, Developmental Biology and Genetic M.S.	567
Molecular, Cellular, Developmental Biology and Genetics Minor	570
Molecular, Cellular, Developmental Biology and Genetics Ph.D.	572

Water Resources Science M.S.	576
Water Resources Science Minor	582
Water Resources Science PhD	584
Hubert H. Humphrey School of Public Affairs	
Development Practice M.D.P.	590
Early Childhood Policy Postbaccalaureate Certificate	593
Election Administration Postbaccalaureate Certificate	595
Human Services Leadership Postbaccalaureate Certificate	597
Nonprofit Management Postbaccalaureate Certificate	599
Policy Issues on Work and Pay Postbaccalaureate Certificate	601
Public Affairs leadership Postbaccalaureate Certificate	603
Public Affairs M.P.A.	605
Public Affairs, Ph.D.	607
Public Policy M.P.P.	610
Public Policy Minor	613
Science, Technology, Environmental Policy M.S.	615
Science, Technology, Environmental Policy Minor	616
Urban and Regional Planning M.U.R.P.	620
College of Liberal Arts	
American Indian and Indigenous Studies Minor*	624
American Studies M.A.	626
American Studies Minor	628
American Studies Ph.D.	630
Anthropology M.A.	632
Anthropology Minor	636

Anthropology Ph.D.	638
Art History M.A.	644
Art History Minor	646
Art History Ph.D.	648
Art M.F.A.	651
Art Minor	653
Asian Literatures, Cultures, and Media M.A.	655
Asian Literatures, Cultures, and Media Minor	657
Asian Literatures, Cultures, and Media Ph.D.	659
Asian Studies MA	661
Audiology Au.D.	664
Classical and Near Eastern Studies M.A.	668
Classical and Near Eastern Studies Minor	672
Classical and Near Eastern Studies Ph.D.	674
Cognitive Science M.S.	678
Cognitive Science Minor	681
Cognitive Science Ph.D.	683
Communication Studies M.A.	686
Communication Studies Minor	689
Communication Studies Ph.D.	691
Comparative Literature M.A.	695
Comparative Literature Minor	697
Comparative Literature Ph.D.	699
Comparative Studies in Discourse and Society M.A.	701
Comparative Studies in Discourse and Society Minor	703

Comparative Studies in Discourse and Society Ph.D.	705
Creating Writing M.F.A.	707
Developmental Studies and Social Change Minor*	710
Early Modern Studies Minor*	716
Economics M.A.	719
Economics Minor	722
Economics Ph.D.	724
English M.A.	727
English Minor	730
English Ph.D.	732
Feminist and Critical Sexuality Studies Minor	735
Feminist Studies M.A.	737
Feminist Studies Ph.D.	740
French M.A.	744
French Minor	746
French Ph.D.	748
Geographic Information Science M.G.I.S.	750
Geographic Information Science Minor	753
Geograph M.A.	755
Geography Minor	758
Geography Ph.D.	760
Gemanic Studies M.A.	763
Germanic Studies Minor	766
Germanic Studies Ph.D.	768
Health Communication M.A.	771

Hispanic and Lusophone Literatures, Cultures, and Linguistic M.A.	774
Hispanic and Lusophone Literatures, Cultures, and Linguistic Minor	779
Hispanic and Lusophone Literatures, Cultures, and Linguistic Ph.D.	781
History M.A.	787
History Minor	791
History Ph.D.	793
Human Rights Minor*	797
Italian Studies Minor*	799
Linguistics M.A.	801
Linguistics Minor	803
Linguistics Ph.D.	805
Literacy and Rhetorical Studies Minor*	807
Mass Communication M.A.	809
Mass Communication Minor	813
Mass Communication Ph.D.	815
Medieval Studies Minor*	820
Moving Image Studies Minor*	823
Music D.M.A.	825
Music Education Post-Baccalaureate Licensure Certificate	831
Music M.A.	834
Music M.M.	839
Music Minor	850
Music Ph.D.	852
Philosophy M.A.	856
Philosophy Minor	858

Philosophy Ph.D.	860
Political Psychology Minor*	862
Political Science M.A.	864
Political Science Ph.D.	868
Population Studies Minor*	872
Psycholog M.A.	874
Psychology Minor	876
Psycholog Ph.D.	877
Race, Indigeneity, Gender, and Sexuality Minor*	886
Religious Studies Minor*	888
Rhetoric, Scientific and Technical Communication M.A.	890
Rhetoric, Scientific and Technical Communication Minor	893
Rhetoric, Scientific and Technical Communication Ph.D.	895
Scientific and Technical Communication M.S.	898
Scientific and Technical Communication Minor	901
Sociology M.A.	903
Sociology Minor	906
Sociology Ph.D.	908
Speech-Language-hearing Science M.A.	912
Speech-Language-hearing Science Minor	917
Speech-Language-hearing Science Ph.D.	919
Statistics M.S.	923
Statistics Minor	925
Statistics Ph.D.	927
Strategic Communication M.A.	929

Studies in Africa and African Diaspora Minor*	931
Studies of Science and Technology Minor*	933
Technical Communication Postbaccalaureate Certificate	935
Theatre Arts M.A.	937
Theatre Arts M.F.A.	939
Theatre Arts Minor	942
Theatre Arts Ph.D.	944
Translational Sensory Science Minor*	946
Law School	
Juridical Science S.J.D.	946
Law Minor*	950
Master of Science Patent Law	951
Curtis L. Carlson School of Management	
Accountancy M.Acc	953
Applied Business Analytics M.A.B.A.	956
Asset Management Postbaccalaureate Certificate	958
Business Administration M.B.A.	960
Business Administration Minor	970
Business Administration Ph.D.	973
Business Analytics M.S.	981
Business Analytics Postbaccalaureate Certificate	984
Business Management Minor*	986
Business Research M.S.	991
Business Taxation M.B.T.	999
Closely-Held Business Taxation Postbaccalaureate Certificate	1002

Corporate Financial Management Postbaccalaureate Certificate	1004
Doctor of Business Administration D.B.A.	1006
Finance M.S.	1008
High Net-Worth Individual Postbaccalaureate Certificate	1011
Human Resources and Industrial Relations M.H.R.I.R.	1013
International Taxation Postbaccalaureate Certificate	1017
Leadership for Managers Postbaccalaureate Certificate	1019
Medical Industry Postbaccalaureate Certificate	1021
Strategic Management Postbaccalaureate Certificate	1023
Strategic Marketing Postbaccalaureate Certificate	1025
Supply Chain Management for the Medical and Health Sector Postbaccalaureate Certificate	1027
Supply Chain Management M.S.	1029
Tax Executive Postbaccalaureate Certificate	1031
Taxation Postbaccalaureate Certificate	1033
Medical School	
Integrative Biology and Physiology M.S.	1035
Integrative Biology and Physiology Minor	1037
Integrative Biology and Physiology Ph.D.	1039
Medical Physics M.S.	1042
Medical Physics Ph.D.	1044
Microbiology, Immunology, and Cancer Biology M.S.	1046
Microbiology, Immunology, and Cancer Biology Minor	1049
Microbiology, Immunology, and Cancer Biology Ph.D.	1051
Neuroscience M.S.	1054



Neuroscience Minor	1056
Neuroscience Ph.D.	1058
Orthoptics Post-baccalaureate Certificate	1060
Otolaryngology Ph.D. Otol.	1062
Pharmacology M.S.	1064
Pharmacology Minor	1066
Pharmacology Ph.D.	1068
Physical Therapy D.P.T.	1070
Rehabilitation Science M.S.	1073
Rehabilitation Science Ph.D.	1076
Stem Cell Biology M.S.	1079
Stem Cell Biology Minor	1082
Surgery M.S. Surg.	1084
School of Nursing	
Adult Health/Gerontological Clinical Nurse Specialist Postgraduate Certificate	1086
Adult Health/Gerontological Primary Care Nurse Practitioner Postgraduate Certificate	1088
Doctor of Nursing Practice D.N.P.	1090
Leadership in Health Information Technology for Health Professionals Postbaccalaureate Certificate	1101
Master of Nursing M.N.	1103
Nurse Midwifery Postgraduate Certificate	1105
Nursing Ph.D.	1107
Pediatric Clinical Nurse Specialist Postgraduate Certificate	1110
Pediatric Nurse Practitioner - Primary Care Postgraduate Certificate	1112

Psychiatric Mental Health Nurse Practitioner Postgraduate Certificate	1114
Women's Health/Gender Related Nurse Practitioner Postgraduate Certificate	1116
College of Pharmacy	
Experimental and Clinical Pharmacology M.S.	1118
Experimental and Clinical Pharmacology Ph.D.	1123
Medicinal Chemistry M.S.	1127
Medicinal Chemistry Ph.D.	1129
Pharmaceutics M.S.	1131
Pharmaceutics Ph.D.	1134
Social and Administrative Pharmacy M.S.	1137
Social and Administrative Pharmacy Minor	1139
Social and Administrative Pharmacy Ph.D.	1141
School of Public Health	
Advanced Management Training for Clinician Leaders Postbaccalaureate Certificate	1143
Aging Studies Postbaccalaureate Certificate	1145
American Indian Public Health and Wellness Minor	1147
American Indian Public Health and Wellness Post-Baccalaureate Certificate	1149
Applied Biostatistics Postbaccalaureate Certificate	1151
Biostatistics M.P.H.	1153
Biostatistics M.S.	1156
Biostatistics Minor	1159
Biostatistics Ph.D.	1161
Clinical Research M.S.	1164

Clinical Research Postbaccalaureate Certificate	1167
Community Health Promotion M.P.H.	1170
Environmental Health M.P.H.	1180
Environmental Health M.S.	1200
Environmental Health Minor	1209
Environmental Health Ph.D.	1211
Epidemiology M.P.H.	1218
Epidemiology M.S.	1227
Epidemiology Minor	1229
Epidemiology Ph.D.	1231
Gerontology Minor*	1234
Global Health Postbaccalaureate Certificate	1235
Global Public Health Minor*	1237
Health Care Administration M.H.A.	1239
Health Equity Minor*	1244
Health Services Research, Policy, and Administration M.S.	1246
Health Services Research, Policy, and Administration Minor	1249
Health Services Research, Policy, and Administration Ph.D.	1252
Management Fundamentals Postbaccalaureate Certificate	1259
Maternal and Child Health M.P.H.	1261
Public Health Administration and Policy M.P.H.	1272
Public Health Core Concepts Postbaccalaureate Certificate	1277
Public Health Food Protection Postbaccalaureate Certificate	1279
Public Health Informatics M.P.H.	1281
Public Health Informatics Post-Baccalaureate Certificate	1284

Public Health Minor*	1286
Public Health Nutrition M.P.H.	1289
Public Health Postbaccalaureate Certificate in Performative Improvement	1300
Public Health Practice M.P.H.	1302
Public Health Preparedness, Response, and Recovery Postbaccalaureate Certificate	1306
Sexual Health Minor*	1308
College of Science and Engineering	
Aerospace Engineering and Mechanics M.S.	1310
Aerospace Engineering and Mechanics Minor	1314
Aerospace Engineering and Mechanics Ph.D.	1316
Astrophysics M.S.	1319
Astrophysics Minor	1321
Astrophysics Ph.D.	1323
Biomedical Engineering M.S.	1325
Biomedical Engineering Minor	1331
Biomedical Engineering Ph.D.	1336
Chemical Engineering M.Ch.E.	1342
Chemical Engineering M.S.Ch.E.	1347
Chemical Engineering Minor	1352
Chemical Engineering Ph.D.	1354
Chemical Physics M.S.	1359
Chemical Physics Minor	1363
Chemical Physics Ph.D.	1366
Chemistry M.S.	1369

Chemistry Minor	1372
Chemistry Ph.D.	1374
Civil Engineering M.C.E.	1377
Civil Engineering M.S.	1382
Civil Engineering Minor	1387
Civil Engineering Ph.D.	1390
Computer Science M.C.S.	1394
Computer Science M.S.	1399
Computer Science Minor	1405
Computer Science Ph.D.	1408
Cyber Security Minor*	1413
Data Science Certificate	1415
Data Science in Astrophysics Minor	1417
Data Science M.S.	1419
Data Science Minor	1423
Earth Sciences M.S.	1426
Earth Sciences Minor	1431
Earth Sciences Ph.D.	1433
Electrical and Computer Engineering MS.E.C.E.	1437
Electrical Engineering Minor	1446
Electrical Engineering Ph.D.	1449
Financial Mathematics M.F.M.	1458
Fundamentals of Quantitative Finance Postbaccalaureate Certificate	1460
Geoengineering M.GeoE.	1462
Geoengineering M.S.	1466

Geoengineering Minor	1471
Industrial and Systems Engineering M.S.I.S.Y.E.	1473
Industrial and Systems Engineering Minor	1479
Industrial and Systems Engineering Ph.D.	1481
Management of Technology M.S.M.O.T.	1484
Management of Technology Minor	1486
Materials Science and Engineering M.Mat.S.E.	1488
Materials Science and Engineering M.S.Mat.S.E.	1493
Materials Science and Engineering Minor	1498
Materials Science and Engineering Ph.D.	1500
Mathematics M.S.	1505
Mathematics Minor	1507
Mathematics Ph.D.	1509
Mechanical Engineering M.S.M.E.	1511
Mechanical Engineering Minor	1515
Mechanical Engineering Ph.D.	1517
Medical Device Innovation M.S.	1520
Neuroengineering Minor*	1524
Physics M.S.	1526
Physics Minor	1529
Physics Ph.D.	1532
Quaternary Paleoecology Minor*	1535
Robotics M.S.	1538
Robotics Minor	1541
Security Technologies M.S.S.T.	1543

Security Technologies Minor	1546
Software Engineering M.S.S.E.	1548
Stream Restoration Science and Engineering Postbaccalaureate Certificate	1550
College of Veterinary Medicine	
Comparative and Molecular Biosciences M.S.	1552
Comparative and Molecular Biosciences Ph.D.	1555
Veterinary Medicine M.S.	1558
Veterinary Medicine Ph.D.	1561



### **Twin Cities Campus**

## **Ecology, Evolution and Behavior M.S.**

*Ecology, Evolution & Behavior*

### **College of Biological Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Ecology, Evolution, and Behavior Graduate Program, 100 Ecology, 1987 Upper Buford Circle, St. Paul, MN 55108 (612-624-6770, fax: 612-624-6777)

Email: [eebgrad@umn.edu](mailto:eebgrad@umn.edu)

Website: <http://www.cbs.umn.edu/explore/departments/eeb/graduate/about-program>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in ecology, evolution, and behavior (EEB) links faculty and students interested in the biology of organisms from molecules to ecosystems. Studies address questions from molecular mechanisms of evolution, the interactions of organisms in social groups and populations, the distributions and abundances of species in communities and ecosystems, to global biogeochemical processes. The program provides broad training in the general areas of ecology, evolution, and animal behavior, and specialized courses and research in vertebrate and invertebrate zoology; behavior and ethology; evolution; population genetics; molecular evolution; systematics; population, community, and ecosystem ecology; global ecology; limnology; ecology of vegetation; and theoretical ecology. Opportunities for field research are available in Africa, Central America, and other parts of the world, as well as in local ecosystems, including the Cedar Creek Ecosystem Science Reserve and Itasca Biological Station. Seminars and individually designed tutorials are an important part of student programs and provide an exciting intellectual environment.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Courses in inorganic chemistry, organic chemistry, biochemistry, general physics, one year of college calculus, animal biology, genetics, physiology, and plant biology are strongly recommended and provide an important background to pursue graduate work in EEB. Proficiency in a foreign language is not required but is strongly recommended for students who expect to pursue field work in a country where English is not the native language. Deficiencies must be made up early in the graduate program.

#### **Special Application Requirements:**

Students are admitted only in fall semester, and only with an acceptance by a faculty adviser and a master's project identified. Deadline for application is December 1. Refer to the EEB website for more details.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).





For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

The MS is offered under both Plan A (with thesis) and Plan B (without thesis). Plan A requires 20 course credits in the major and 10 thesis credits. Plan B requires 30 course credits and a research paper. Students pursuing the joint JD/MS degree have the exception that some Law courses can be "cross counted" for credit. Degree programs are planned by the student and an advisory committee of three faculty members to meet the student's interests and needs.

### EEB Foundations course: EEB 8201-8202

All students are expected to complete EEB 8201-8202 their first year. The goal of this course is to provide students in their first year with foundation of knowledge in ecology, evolution, and behavior.

[EEB 8201](#) - Graduate Foundations in Ecology, Evolution and Behavior Semester 1 (4.0 cr)

[EEB 8202](#) - Graduate Foundations in Ecology, Evolution and Behavior - Semester 2 (4.0 cr)

### Electives/Supporting Courses

Plan A students select a minimum of 12 coursework credits and Plan B students select a minimum of 22 elective credits, in consultation with the advisor. Electives may include courses in statistics or history of science if additional background is needed.

[EEB 5042](#) - Quantitative Genetics (3.0 cr)

or [EEB 5053](#) - Ecology: Theory and Concepts (4.0 cr)

or [EEB 5068](#) - Plant Physiological Ecology (3.0 cr)

or [EEB 5221](#) - Molecular Evolution (3.0 cr)

or [EEB 5371](#) - Principles of Systematics (3.0 cr)

or [EEB 5407](#) - Ecology (3.0 cr)

or [EEB 5409](#) - Evolution (3.0 cr)

or [EEB 5601](#) - Limnology (3.0 cr)

or [EEB 5605](#) - Limnology Laboratory (2.0 cr)

or [EEB 5609](#) - Ecosystem Ecology (3.0 cr)

or [EEB 8150](#) - EEB Lab Tours (1.0 cr)

or [EEB 8151](#) - EEB Lab Tours (1.0 cr)

or [EEB 8200](#) - Sustainability Science Distributed Graduate Seminar (3.0 cr)

or [EEB 8301](#) - Prelim Proposal Writing Seminar (1.0 cr)

or [EEB 8302](#) - EEB Written Prelim Workshop (1.0 cr)

or [EEB 8360](#) - Behavioral Biology Seminar (1.0 cr)

or [EEB 8500](#) - NSF GRF Graduate Research Fellowship Proposal Writing Seminar (1.0 cr)

or [EEB 8601](#) - Introduction to Stream Restoration (3.0 cr)

or [EEB 8602](#) - Stream Restoration Practice (2.0 cr)

or [EEB 8641](#) - Spatial Ecology (3.0 cr)

or [EEB 8980](#) - Seminar on Current Topics (1.0 - 3.0 cr)

or [EEB 8990](#) - Graduate Seminar (1.0 - 3.0 cr)

or [EEB 8991](#) - Independent Study: Ecology, Evolution, and Behavior (1.0 - 10.0 cr)

#### or Courses Outside of EEB

Students may select graduate-level courses outside of EEB in consultation with their advisor.

[AGRO 5121](#) - Applied Experimental Design (4.0 cr)

or [BIOL 8100](#) - Improvisation for Scientists (1.0 cr)

or [DSSC 8111](#) - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)

or [EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)

or [FW 8051](#) - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)



or [HSCI 5211](#) - Biology and Culture in the 19th and 20th Centuries [CIV] (3.0 cr)  
or [HSCI 5242](#) - Navigating a Darwinian World (3.0 cr)  
or [HSCI 5244](#) - Nature's History: Science, Humans, and the Environment (3.0 cr)  
or [HSCI 8920](#) - Seminar: History of Biological Sciences (3.0 cr)  
or [PA 5701](#) - Science and State (3.0 cr)  
or [PA 5721](#) - Energy Systems and Policy (3.0 cr)  
or [PHIL 5602](#) - Scientific Representation and Explanation (3.0 cr)  
or [PUBH 6450](#) - Biostatistics I (4.0 cr)  
or [STAT 5021](#) - Statistical Analysis (4.0 cr)  
or [STAT 5101](#) - Theory of Statistics I (4.0 cr)  
or [STAT 5201](#) - Sampling Methodology in Finite Populations (3.0 cr)  
or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)  
or [STAT 5303](#) - Designing Experiments (4.0 cr)  
or [STAT 5601](#) - Nonparametric Methods (3.0 cr)  
or [BIOL 5272](#) - Applied Biostatistics (4.0 cr)  
or [HSCI 5401](#) - Ethics in Science and Technology (3.0 cr)  
or [HSCI 8112](#) - Historiography of Science, Technology, and Medicine (3.0 cr)  
or [FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)

#### **Ethics Requirement**

A four-session ethics seminar offered during the Friday Noon Seminar series. Required areas of ethics include: Academic and Research Community; Authorship; Peer Review and Research Conduct.

#### **Plan A**

#### **Plan A Thesis**

Take exactly 10 credit(s) from the following:

- [EEB 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

**Joint- or Dual-degree Coursework:** JD/MS-Ecology, Evolution, and Behavior Student may take a total of 12 credits in common among the academic programs.



### **Twin Cities Campus**

## **Ecology, Evolution and Behavior Minor**

*Ecology, Evolution & Behavior*

### **College of Biological Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

140 Gortner Laboratory, 1479 Gortner Ave, St. Paul, MN 55108 (612-624-6770, fax: 612-624-6777)

Email: [eebgrad@umn.edu](mailto:eebgrad@umn.edu)

Website: <http://www.cbs.umn.edu/explore/departments/eeb/graduate/about-program>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in Ecology, Evolution, and Behavior (EEB) links faculty and students interested in the biology of organisms from molecules to ecosystems. Studies address questions from molecular mechanisms of evolution, the interactions of organisms in social groups and populations, the distributions and abundances of species in communities and ecosystems, to global biogeochemical processes. The program provides broad training in the general areas of ecology, evolution, and animal behavior, and specialized courses and research in vertebrate and invertebrate zoology; behavior and ethology; evolution; population genetics; molecular evolution; systematics; population, community, and ecosystem ecology; global ecology; limnology; ecology of vegetation; and theoretical ecology. Opportunities for field research are available in Africa, Central America, and other parts of the world, as well as in local ecosystems, including the Cedar Creek Ecosystem Science Reserve and Itasca Biological Station. Seminars and individually designed tutorials are an important part of student programs and provide an exciting intellectual environment.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **Master's Course List**

Take 6 or more credit(s) from the following:

- EEB 5xxx
- EEB 8xxx

#### **Doctoral**

##### **Doctoral Course List**

Take 12 or more credit(s) from the following:

- EEB 5xxx
- EEB 8xxx



### **Twin Cities Campus**

## **Ecology, Evolution and Behavior Ph.D.**

*Ecology, Evolution & Behavior*

### **College of Biological Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Ecology, Evolution, and Behavior Graduate Program, 140 Gortner Laboratory, 1479 Gortner Avenue, St. Paul, MN 55108 (612-624-6770, fax: 612-624-6777)

Email: [eebgrad@umn.edu](mailto:eebgrad@umn.edu)

Website: <http://www.cbs.umn.edu/explore/departments/eeb/graduate/about-program>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in ecology, evolution, and behavior (EEB) links faculty and students interested in the biology of organisms from molecules to ecosystems. Studies address questions from molecular mechanisms of evolution, the interactions of organisms in social groups and populations, the distributions and abundances of species in communities and ecosystems, to global biogeochemical processes. The program provides broad training in the general areas of ecology, evolution, and animal behavior, and specialized courses and research in vertebrate and invertebrate zoology; behavior and ethology; evolution; population genetics; molecular evolution; systematics; population, community, and ecosystem ecology; global ecology; limnology; ecology of vegetation; and theoretical ecology. Opportunities for field research are available in Africa, Central America, and other parts of the world, as well as in local ecosystems, including the Cedar Creek Ecosystem Science Reserve and Itasca Biological Station. Seminars and individually designed tutorials are an important part of student programs and provide an exciting intellectual environment.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Courses in inorganic chemistry, organic chemistry, biochemistry, general physics, one year of college calculus, animal biology, genetics, physiology, and plant biology are strongly recommended and provide an important background to pursue graduate work in EEB. Proficiency in a foreign language is not required but is strongly recommended for students who expect to pursue field work in a country where English is not the native language. Deficiencies must be made up early in the graduate program.

#### **Special Application Requirements:**

Students are admitted only in fall semester. Deadline for application is December 1. Refer to the EEB website for more details.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

24 credits are required in the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Significant field or laboratory experience, proficiency in using computers in research, and competence in advanced statistics are required. Students are expected to gain some appreciation of history or philosophy of science and are required to teach a minimum of two semesters at 50 percent time. Completion of training in ethics via a seminar series is required. Course plans are discussed and agreed upon by the student and an advisory committee of four to five faculty members.

### Required EEB Coursework

Take the following courses for a total of 12 credits:

- [EEB 8150](#) - EEB Lab Tours (1.0 cr)
- [EEB 8151](#) - EEB Lab Tours (1.0 cr)
- [EEB 8201](#) - Graduate Foundations in Ecology, Evolution and Behavior Semester 1 (4.0 cr)
- [EEB 8202](#) - Graduate Foundations in Ecology, Evolution and Behavior - Semester 2 (4.0 cr)
- [EEB 8301](#) - Prelim Proposal Writing Seminar (1.0 cr)
- [EEB 8302](#) - EEB Written Prelim Workshop (1.0 cr)

### Elective Coursework

Select at least 12 elective credits, in consultation with the advisor. Electives may include courses in statistics or history of science if additional background is needed.

Take 0 - 24 course(s) totaling 12 - 24 credit(s) including 0 - 24 sub-requirements(s) from the following:

- [EEB 5068](#) - Plant Physiological Ecology (3.0 cr)
- [EEB 5221](#) - Molecular Evolution (3.0 cr)
- [EEB 5371](#) - Principles of Systematics (3.0 cr)
- [EEB 5407](#) - Ecology (3.0 cr)
- [EEB 5409](#) - Evolution (3.0 cr)
- [EEB 5601](#) - Limnology (3.0 cr)
- [EEB 5605](#) - Limnology Laboratory (2.0 cr)
- [EEB 5609](#) - Ecosystem Ecology (3.0 cr)
- [EEB 8100](#) - EEB Department Seminar (1.0 cr)
- [EEB 8200](#) - Sustainability Science Distributed Graduate Seminar (3.0 cr)
- [EEB 8360](#) - Behavioral Biology Seminar (1.0 cr)
- [EEB 8601](#) - Introduction to Stream Restoration (3.0 cr)
- [EEB 8602](#) - Stream Restoration Practice (2.0 cr)
- [EEB 8641](#) - Spatial Ecology (3.0 cr)
- [EEB 8980](#) - Seminar on Current Topics (1.0 - 3.0 cr)
- [EEB 8990](#) - Graduate Seminar (1.0 - 3.0 cr)
- [EEB 8991](#) - Independent Study: Ecology, Evolution, and Behavior (1.0 - 10.0 cr)
- [EEB 8994](#) - Directed Research (1.0 - 5.0 cr)

#### •Courses outside of EEB

Courses from the following, or other coursework selected in consultation with the advisor, may be used to fulfill the 24-credit minimum requirement.

Take 0 - 24 course(s) totaling 0 - 24 credit(s) including exactly 0 sub-requirements(s) from the following:

- [AGRO 5121](#) - Applied Experimental Design (4.0 cr)
- [BIOL 5272](#) - Applied Biostatistics (4.0 cr)
- [BIOL 8100](#) - Improvisation for Scientists (1.0 cr)
- [DSSC 8111](#) - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)
- [EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)
- [FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- [FW 8051](#) - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)
- [HSCI 5211](#) - Biology and Culture in the 19th and 20th Centuries [CIV] (3.0 cr)
- [HSCI 5242](#) - Navigating a Darwinian World (3.0 cr)



- [HSCI 5244](#) - Nature's History: Science, Humans, and the Environment (3.0 cr)
- [HSCI 5401](#) - Ethics in Science and Technology (3.0 cr)
- [HSCI 8112](#) - Historiography of Science, Technology, and Medicine (3.0 cr)
- [HSCI 8920](#) - Seminar: History of Biological Sciences (3.0 cr)
- [PA 5701](#) - Science and State (3.0 cr)
- [PA 5721](#) - Energy Systems and Policy (3.0 cr)
- [PHIL 5602](#) - Scientific Representation and Explanation (3.0 cr)
- [PHIL 8620](#) - Seminar: Philosophy of the Biological Sciences (3.0 cr)
- [PUBH 6450](#) - Biostatistics I (4.0 cr)
- [STAT 5101](#) - Theory of Statistics I (4.0 cr)
- [STAT 5201](#) - Sampling Methodology in Finite Populations (3.0 cr)
- [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- [STAT 5303](#) - Designing Experiments (4.0 cr)
- [STAT 5601](#) - Nonparametric Methods (3.0 cr)
- [TH 5950](#) - Topics in Theatre (1.0 - 4.0 cr)

#### **Ethics requirement**

A four-session ethics seminar offered during the Friday Noon Seminar series. Required areas of ethics include: Academic and Research Community; Authorship; Peer Review and Research Conduct.

#### **Thesis Credits**

Take 24 doctoral thesis credits.

[EEB 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:** JD/PhD-Ecology, Evolution, and Behavior Student may take a total of 12 credits in common among the academic programs.



### *Twin Cities Campus*

## Microbial Ecology Minor

College of Biological Sciences - Adm

### College of Biological Sciences

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Microbial Ecology Minor Program, University of Minnesota, 439 Borlaug Hall, 1991 Upper Buford Circle, Saint Paul, MN 55108 (612-624-2706)

Email: [micecol@umn.edu](mailto:micecol@umn.edu)

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This minor is available to master's (M.S.) and doctoral (Ph.D.) students. Microbial ecology is an interdisciplinary research area concerned with the relationships between microorganisms and their natural environment. The microbial ecology minor offers core coursework in microbiology, microbial physiology, microbial genetics, microbial genomics, microbial ecology, ecology, and theoretical ecology. Additional courses and opportunities to interact with others interested in microbial ecology are also part of the minor. The microbial ecology/biotechnology seminar series allows students and faculty to interact with microbial ecologists from other universities. The curriculum encourages interdisciplinary interaction, communication, and synthesis.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

Other requirements to be completed before admission:

To be admitted to the minor, a student must be admitted to a master's or doctoral degree-granting program within the Graduate School, should have broad training in the biological sciences, and must be accepted by the director of graduate studies of the microbial ecology minor program. All students are expected to have had the equivalent of introductory microbiology (MICB 3301) and general ecology, but may fulfill deficiencies in these areas by taking these courses while in the program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

The master's minor requires 6 graduate credits, all of which must be outside the student's major department and must include at least one laboratory course in microbiology (e.g., MICB 4215) and one ecology (EEB) course chosen from the list below. The remaining courses also are chosen from this list with the guidance and approval of the director of graduate studies.

The doctoral minor requires 12 graduate credits, 9 credits of which must come from the core courses listed below (contact the director of graduate studies for potential alternatives to these courses). The remaining credits must come from at least two courses chosen from this list, but may not be in the student's major.

Core courses:

EEB 5053 (4 cr)

MICB 4111 (3 cr)

MICB 4121 (3 cr)

MICA 8002 (4 cr)



Additional courses

CE 8541

CE 8542

CE 8551

EEB 4601

EEB 4609

PLPA 8102

PLPA 8103

SOIL 5515

SOIL 5611





### **Twin Cities Campus**

## **Microbial Engineering M.S.**

*BioTechnology Institute*

### **College of Biological Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

M.S. Program in Microbial Engineering, University of Minnesota, 1479 Gortner Avenue, Suite 140, Saint Paul, MN 55108 (612-624-6774; fax 612-625-5780)

Email: [mice@umn.edu](mailto:mice@umn.edu)

Website: <http://www.bti.umn.edu/MicE>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Microbial engineering allows students to pursue an interdisciplinary program that combines microbiology, biochemistry, molecular biology, bioinformatics, chemical engineering, and related sciences. Students perform brief rotations in faculty laboratories to choose an independent project, and tailor their coursework to support and complement their research. Projects can span modern basic microbiology, applied industrial engineering, as well as include computer science and informatics disciplines. After graduation, many students choose to continue on to a PhD program in a related discipline or work directly in biotechnology research and development. Supporting courses are chosen from fields including biochemistry, microbiology, food science, genetics and cell biology, and computer science. The program is coordinated by the BioTechnology Institute (BTI) and involves faculty from 10 departments and 5 institutes of the University.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Science or Engineering Discipline

N/A

Other requirements to be completed before admission:

Typically, applicants with a bachelor's degree in biological sciences, biochemistry, chemistry, or chemical engineering or related engineering disciplines apply. Recommended academic preparation includes one year each of calculus, organic chemistry, physics, microbiology, and a background in a field such as basic chemical engineering, biology, physical chemistry, or genetics. Background deficiencies can be made up during the first year of graduate work. Most students enter the program with a GPA of 3.00 or higher.

#### **Special Application Requirements:**

Three letters of recommendation, scores from the General Test of the GRE, the TOEFL score for international applicants, transcripts, Curriculum Vitae, and an autobiographical statement including occupational goals must be submitted to the director of graduate studies. Applications are accepted for fall semester only. To receive full consideration for financial aid, students must apply for fall semester admission by January 14.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21



- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80
  - Speaking test score: 0

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

### MicE Requirements

All students are required to sign up for the following courses:

MicE 5355 (1 Credit during winter break with special registration) and MicE 8990 (1 Credit per semester) Attendance is MANDATORY for two semesters. Two credits are needed for graduation.

[MICE 5355](#) - Advanced Fermentation and Biocatalysis Laboratory (1.0 cr)

[MICE 8990](#) - Biotechnology Seminar (1.0 - 3.0 cr)

### Computer Proficiency Requirement

Students are required to show evidence of competence in using computers and a practical working knowledge of at least one computer language such as Pascal, Fortran, python, scripting, or statistical packages appropriate to their area of interest. Experience and competence may be obtained by passing a semester of basic computer use and programming courses, or submitting evidence that Equivalent courses of study have been completed elsewhere. (One course upper level required.)

[BIOL 5272](#) - Applied Biostatistics (4.0 cr)

or [CSCI 5421](#) - Advanced Algorithms and Data Structures (3.0 cr)

### Plan Options

#### Plan A

Take at least 14 additional course credits, in consultation with the advisor, and 10 thesis credits (MICE 8777).

#### Thesis Credits

Take at least 10 master's thesis credits.

[MICE 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

#### RELATED ELECTIVES

A maximum of 9 credits of 4000-level coursework is allowed. Additional courses can be used with the approval of the director of graduate studies.

Take 14 or more credit(s) from the following:

- [BBE 4713](#) - Biological Process Engineering (3.0 cr)
- [BBE 5713](#) - Biological Process Engineering (3.0 cr)
- [BIOC 4125](#) - Laboratory in Molecular Biology and Biotechnology (3.0 cr)
- [BIOC 4331](#) - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)
- [BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)
- [BIOC 4521](#) - Introduction to Physical Biochemistry (3.0 cr)
- [BIOC 5309](#) - Biocatalysis and Biodegradation (3.0 cr)
- [BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)
- [BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)
- [BIOC 5527](#) - Introduction to Modern Structural Biology (4.0 cr)
- BIOC 5xxx
- [BIOC 8084](#) - Research and Literature Reports (1.0 cr)



- BIOL 4003 - Genetics (3.0 cr)
- BIOL 4004 - Cell Biology (3.0 cr)
- CHEN 5751 - Biochemical Engineering (3.0 cr)
- CHEN 5xxx
- CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)
- CHEN 8xxx
- FSCN 4121 - Food Microbiology (3.0 cr)
- FSCN 4122 - Food Fermentations and Biotechnology (2.0 cr)
- FSCN 4332 - Food Processing Operations (3.0 cr)
- GCD 5036 - Molecular Cell Biology (3.0 cr)
- GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)
- GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
- MICB 4131 - Immunology (3.0 cr)
- MICB 4151 - Molecular and Genetic Bases for Microbial Diseases (3.0 cr)
- MICB 4171 - Biology, Genetics, and Pathogenesis of Viruses (3.0 cr)
- MICB 4215 - Advanced Laboratory: Microbial Physiology and Diversity (3.0 cr)
- MICB 4235 - Advanced Laboratory: Virology, Immunology, and Microbial Genetics (3.0 cr)
- MICE 5035 - Personal Microbiome Analysis (3.0 cr)
- MICE 5xxx
- MICE 8920 - Teaching Practicum (1.0 cr)
- MICE 8xxx
- PMB 8123 - Research Ethics in the Plant and Environmental Sciences (0.5 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)

-OR-

#### Plan B

Take 24 additional credits, in consultation with the advisor.

#### RELATED ELECTIVES

Take 24 or more credit(s) from the following:

- BBE 4713 - Biological Process Engineering (3.0 cr)
- BBE 5713 - Biological Process Engineering (3.0 cr)
- BIOC 4125 - Laboratory in Molecular Biology and Biotechnology (3.0 cr)
- BIOC 4331 - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)
- BIOC 4332 - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)
- BIOC 4521 - Introduction to Physical Biochemistry (3.0 cr)
- BIOC 5352 - Biotechnology and Bioengineering for Biochemists (3.0 cr)
- BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)
- BIOC 5527 - Introduction to Modern Structural Biology (4.0 cr)
- BIOC 5xxx
- BIOC 8084 - Research and Literature Reports (1.0 cr)
- BIOL 4003 - Genetics (3.0 cr)
- BIOL 4004 - Cell Biology (3.0 cr)
- CHEN 5751 - Biochemical Engineering (3.0 cr)
- CHEN 5xxx
- CHEN 8xxx
- FSCN 4121 - Food Microbiology (3.0 cr)
- FSCN 4122 - Food Fermentations and Biotechnology (2.0 cr)
- FSCN 4332 - Food Processing Operations (3.0 cr)
- GCD 5036 - Molecular Cell Biology (3.0 cr)
- GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)
- GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
- MICB 4131 - Immunology (3.0 cr)
- MICB 4151 - Molecular and Genetic Bases for Microbial Diseases (3.0 cr)
- MICB 4215 - Advanced Laboratory: Microbial Physiology and Diversity (3.0 cr)
- MICB 4235 - Advanced Laboratory: Virology, Immunology, and Microbial Genetics (3.0 cr)
- MICE 5xxx
- MICE 8xxx
- BIOC 5309 - Biocatalysis and Biodegradation (3.0 cr)
- CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)
- MICE 5035 - Personal Microbiome Analysis (3.0 cr)
- MICE 8920 - Teaching Practicum (1.0 cr)
- PMB 8123 - Research Ethics in the Plant and Environmental Sciences (0.5 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)



### **Twin Cities Campus**

## **Plant and Microbial Biology M.S.**

*Plant and Microbial Biology*

### **College of Biological Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Plant and Microbial Biology Graduate Program, 1479 Gortner Avenue, Suite 140, St. Paul, MN 55108 (612-625-4222; fax: 612-625-1738)

Email: [pmb@umn.edu](mailto:pmb@umn.edu)

Website: <https://cbs.umn.edu/academics/departments/pmb/graduate-education>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Plant and microbial biology encompasses all aspects of plant and microbial life, from molecular biology to genomics to ecosystem science. Students study plants from the subcellular and molecular to the whole plant and community levels of biological organization. They also have opportunities for laboratory and field research at state, national, and international levels. Each student's program is planned to meet individual requirements within the framework of a multidisciplinary core of coursework.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Students are admitted to the M.S. program only under special arrangement with a faculty advisor. The deadline to apply is December 1. Refer to the Plant and Microbial Biology website for full details on application requirements and procedures:

<https://cbs.umn.edu/academics/departments/pmb/graduate-education>.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B requires one to three research papers, which may be written in conjunction with graduate courses.



This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Significant field or laboratory experience and competence in statistics, to include hypothesis testing, regression, and correlation are required.

Degree programs are planned by the student and an advisory committee of three faculty members to meet the student's interests and needs.

#### **Core Coursework (6 credits)**

Take the following required courses. Take 1 credit of PMB 8900 3 times for a total of 3 credits: section 001 (PMB colloquium), section 002 (Itasca orientation seminar), and section 003 (PMB graduate students seminar).

[PMB 8081](#) - Succeeding in Graduate School: Skills, Ethics, and Beyond (3.0 cr)

[PMB 8900](#) - Seminar (1.0 - 2.0 cr)

#### **Professional development requirement**

Participate in at least one professional development activity. Options to fulfill this requirement include, but are not limited to: courses (e.g., GRAD 8101 Preparing Future Faculty, BIOL 8100 Improvisation for Scientists), workshops (e.g., career planning, research group management, teaching skills, leadership development), internships in industry.

#### **Plan Options**

##### **Plan A**

Select at least 14 credits from the following in consultation with the academic advisor and advisory committee, and with director of graduate studies approval, to complete the 20 course credits required. A maximum of 2 4xxx-level courses is allowed.

Take 14 or more credit(s) from the following:

- AGRO 5xxx
- AGRO 8xxx
- [BBE 5302](#) - Biodegradation of Bioproducts (3.0 cr)
- [BBE 5608](#) - Environmental and Industrial Microbiology (3.0 cr)
- [BIOC 4331](#) - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)
- [BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)
- [BIOC 4521](#) - Introduction to Physical Biochemistry (3.0 cr)
- BIOC 5xxx
- [BIOL 4003](#) - Genetics (3.0 cr)
- [BIOL 4004](#) - Cell Biology (3.0 cr)
- BIOL 5xxx
- [BIOL 8100](#) - Improvisation for Scientists (1.0 cr)
- CSCI 5xxx
- [EEB 4611](#) - Biogeochemical Processes (3.0 cr)
- EEB 5xxx
- EEB 8xxx
- [ESCI 8801](#) - Geomicrobiology (3.0 cr)
- [ESPM 5071](#) - Ecological Restoration (4.0 cr)
- FNRM 5xxx
- FNRM 8xxx
- [FW 8051](#) - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)
- GCD 5xxx
- GCD 8xxx
- [GEOG 8260](#) - Seminar: Physical Geography (2.0 cr)
- GRAD 5xxx
- GRAD 8xxx
- HORT 5xxx
- HORT 8xxx
- [LAAS 5311](#) - Soil Chemistry and Mineralogy (3.0 cr)
- [LAAS 5621](#) - Soil and Environmental Genomics (3.0 cr)
- MICB 4xxx



- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- PLPA 5xxx
- PLPA 8xxx
- PMB 4xxx
- PMB 5xxx
- PMB 8xxx
- STAT 5xxx
- STAT 8xxx

**Thesis Credits**

Take 10 master's thesis credits.

PMB 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan B**

Select at least 24 credits from the following in consultation with the academic advisor and advisory committee, and with director of graduate studies approval, to complete the 30-credit minimum. A maximum of 2 4xxx-level courses is allowed.

Take 24 or more credit(s) from the following:

- AGRO 5xxx
- AGRO 8xxx
- BBE 5302 - Biodegradation of Bioproducts (3.0 cr)
- BBE 5608 - Environmental and Industrial Microbiology (3.0 cr)
- BIOC 4331 - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)
- BIOC 4332 - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)
- BIOC 4521 - Introduction to Physical Biochemistry (3.0 cr)
- BIOC 5xxx
- BIOL 4003 - Genetics (3.0 cr)
- BIOL 4004 - Cell Biology (3.0 cr)
- BIOL 5xxx
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CSCI 5xxx
- EEB 4611 - Biogeochemical Processes (3.0 cr)
- EEB 5xxx
- EEB 8xxx
- ESCI 8801 - Geomicrobiology (3.0 cr)
- ESPM 5071 - Ecological Restoration (4.0 cr)
- FNRM 5xxx
- FNRM 8xxx
- FW 8051 - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)
- GCD 5xxx
- GCD 8xxx
- GEOG 8260 - Seminar: Physical Geography (2.0 cr)
- GRAD 5xxx
- GRAD 8xxx
- HORT 5xxx
- HORT 8xxx
- LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)
- LAAS 5621 - Soil and Environmental Genomics (3.0 cr)
- MICB 4xxx
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- PLPA 5xxx
- PLPA 8xxx
- PMB 4xxx
- PMB 5xxx
- PMB 8xxx
- STAT 5xxx
- STAT 8xxx



### **Twin Cities Campus**

## **Plant and Microbial Biology Minor**

*Plant and Microbial Biology*

**College of Biological Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Plant and Microbial Biology Graduate Program, 1479 Gortner Avenue, Suite 140, St. Paul, MN 55108 (612-625-4222)

Email: [pmb@umn.edu](mailto:pmb@umn.edu)

Website: <https://cbs.umn.edu/academics/departments/pmb/graduate-education>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Plant and microbial biology encompasses all aspects of plant and microbial life, from molecular biology to genomics to ecosystem science. Students study plants from the sub-cellular and molecular to the whole plant and community levels of biological organization. They also have opportunities for laboratory and field research at state, national, and international levels. Each student's program is planned to meet individual requirements within the framework of a multidisciplinary core of coursework.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

### **Special Application Requirements:**

Refer to the Plant and Microbial Biology website for full details on application requirements and procedures:

<https://cbs.umn.edu/academics/departments/pmb/graduate-education>.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters-level Minor**

Take at least 6 credits, chosen in consultation with the Plant and Microbial Biology director of graduate studies.

#### **Doctoral-level Minor**

Take at least 12 credits, chosen in consultation with the Plant and Microbial Biology director of graduate studies.



### **Twin Cities Campus**

## **Plant and Microbial Biology Ph.D.**

*Plant and Microbial Biology*

### **College of Biological Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Plant and Microbial Biology Graduate Program, 1479 Gortner Avenue, Suite 140, St. Paul, MN 55108 (612-625-4222; fax: 612-625-1738)

Email: [pmb@umn.edu](mailto:pmb@umn.edu)

Website: <https://cbs.umn.edu/academics/departments/pmb/graduate-education>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 54
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Plant and Microbial Biology encompasses all aspects of plant and microbial life, from molecular biology to genomics to ecosystem science. Students study plants and microbes from the subcellular and molecular to the whole plant and community levels of biological organization. They also have opportunities for laboratory and field research at state, national, and international levels. Each student's program is planned to meet individual requirements within the framework of a multidisciplinary core of coursework.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Students are admitted only in fall semester. The deadline to apply is December 1. Refer to the Plant and Microbial Biology website for full details on application requirements and procedures: <https://cbs.umn.edu/academics/departments/pmb/graduate-education>.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

10 to 18 credits are required in the major.

12 to 20 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.





Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Course plans are discussed and agreed upon by the student and an advisory committee of at least four faculty members.

Students are expected to teach at least one semester at 50-percent time.

#### **Core Coursework (9 credits)**

Complete the following required courses. Take 1 credit of PMB 8900 3 times for a total of 3 credits: section 001 (PMB colloquium), section 002 (Itasca orientation seminar), and section 003 (PMB graduate students seminar). Take 1 credit of PMB 8994 in fall semester of the first year.

[PMB 8081](#) - Succeeding in Graduate School: Skills, Ethics, and Beyond (3.0 cr)

[PMB 8900](#) - Seminar (1.0 - 2.0 cr)

[PMB 8901](#) - Preparation of Research Proposals (2.0 cr)

[PMB 8994](#) - Research (1.0 - 5.0 cr)

#### **Electives/Supporting Courses (21 credits)**

Select at least 21 credits in consultation with the academic advisor and advisory committee, and with director of graduate studies approval, to complete the 30 course credits required. A maximum of 2 4xxx-level courses is allowed.

Take 21 or more credit(s) from the following:

•AGRO 5xxx

•AGRO 8xxx

•[BBE 5302](#) - Biodegradation of Bioproducts (3.0 cr)

•[BBE 5608](#) - Environmental and Industrial Microbiology (3.0 cr)

•[BIOC 4331](#) - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)

•[BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)

•[BIOC 4521](#) - Introduction to Physical Biochemistry (3.0 cr)

•BIOC 5xxx

•[BIOL 4003](#) - Genetics (3.0 cr)

•[BIOL 4004](#) - Cell Biology (3.0 cr)

•BIOL 5xxx

•[BIOL 8100](#) - Improvisation for Scientists (1.0 cr)

•CSCI 5xxx

•[EEB 4611](#) - Biogeochemical Processes (3.0 cr)

•EEB 5xxx

•EEB 8xxx

•[ESCI 8801](#) - Geomicrobiology (3.0 cr)

•[ESPM 5071](#) - Ecological Restoration (4.0 cr)

•FNRM 5xxx

•FNRM 8xxx

•[FW 8051](#) - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)

•GCD 5xxx

•GCD 8xxx

•[GEOG 8260](#) - Seminar: Physical Geography (2.0 cr)

•GRAD 5xxx

•GRAD 8xxx

•HORT 5xxx

•HORT 8xxx

•[LAAS 5311](#) - Soil Chemistry and Mineralogy (3.0 cr)

•[LAAS 5621](#) - Soil and Environmental Genomics (3.0 cr)

•MICB 4xxx

•[NR 5021](#) - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)

•PLPA 5xxx

•PLPA 8xxx

•PMB 4xxx

•PMB 5xxx

•PMB 8xxx

•STAT 5xxx

•STAT 8xxx

#### **Professional development requirement**



Participate in at least one professional development activity. Options to fulfill this requirement include, but are not limited to: courses (e.g., GRAD 8101 Preparing Future Faculty, BIOL 8100 Improvisation for Scientists), workshops (e.g., career planning, research group management, teaching skills, writing skills, leadership development), internships in industry.

**Thesis Credits**

Take at least 24 doctoral thesis credits.

[PMB 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Addictions Counseling M.P.S.**

*CCAPS Addiction Studies*

### **College of Continuing and Professional Studies**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Continuing and Professional Studies Information Center, 20 Ruttan Hall, 1994 Buford Ave, St Paul, MN 55108, (612-624-4000)

Email: [ccapsinfo@umn.edu](mailto:ccapsinfo@umn.edu)

Website: <https://ccaps.umn.edu/addictions-counseling-masters-degree>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Professional Studies

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Addictions Counseling MPS offers rigorous, evidence-informed, applied clinical preparation for individuals new to the helping profession, as well as those with allied licenses (MSW, LP, LPC, LMFT) seeking an additional credential. The curriculum reflects specific licensure preparation content for the State of Minnesota's Licensed Alcohol and Drug Counselor (MNLADC) license, and includes evidence-based practices and evaluation; individual and group counseling skills; professional ethics; diversity and cultural sensitivity training; co-occurring assessment and treatment interventions; and an applied field placement experience. For additional information regarding MNLADC requirements, please refer to the State of Minnesota's LADC website.

Students can choose to complete the MPS on a full- or part-time basis. Full-time students can complete the degree in five semesters (two academic years and one summer session). Part-time students have up to five years to complete the degree.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Bachelor's degree from an accredited institution - Transcripts - Personal statement - Two letters of reference - Updated resume or CV

#### **Special Application Requirements:**

International applicants should contact the University's International Student and Scholar Service Office ([www.issu.umn.edu](http://www.issu.umn.edu)) for information on visa status and academic requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 84
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 563
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 84

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and 0 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The ADDS 5996 Internship Seminar serves as a capstone experience where students apply the knowledge and skills learned in their previous courses in a real world clinical setting. The 880-hour internship seminar includes close clinical supervision from both a site and faculty supervisors, participation in formal on-campus clinical supervision meetings, and active engagement in weekly required postings and practice assignments. The capstone experience concludes with an extensive formal written and oral evaluation process to ensure ethical and competent clinical practice.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

Application of coursework from other institutions is allowed on an exception basis. Refer to the Addictions Counseling MPS website at <https://ccaps.umn.edu/addictions-counseling-masters-degree> for additional information and assistance.

Courses applied to the MPS degree must be graded B- or higher. All courses offered A/F or S/N must be taken A/F.

Full-time students complete coursework requirements on a specified schedule to support degree completion in five semesters. Refer to the Addictions Counseling MPS website and confer with the advisor for more information.

### Foundation Courses (9 credits)

Take the following courses, in consultation with the advisor, the first year of study:

- [ADDS 5011](#) - Foundations in Addiction Studies (2.0 cr)
- [ADDS 5021](#) - Introduction to Evidence Based Practices and the Helping Relationship (3.0 cr)
- [ADDS 5031](#) - Applied Psychopharmacology (2.0 cr)
- [ADDS 5071](#) - Foundations of Co-occurring Disorders (2.0 cr)

### Required Courses (14 credits)

Take the following courses in consultation with the advisor. ADDS 5041, 5061, 5091, and 5121 must be taken prior to the internship (ADDS 5996). ADDS 5081 may be taken concurrently with the internship.

- [ADDS 5041](#) - Methods and Models I: Motivational Counseling (2.0 cr)
- [ADDS 5051](#) - Methods and Models II: Cognitive Behavioral Therapy (2.0 cr)
- [ADDS 5061](#) - Foundations of Group Work (3.0 cr)
- [ADDS 5081](#) - Multicultural Foundations of Behavioral Health (3.0 cr)
- [ADDS 5091](#) - Assessment and Treatment Planning I (3.0 cr)
- [ADDS 5121](#) - Professional Seminar 1: Internship Prep (1.0 cr)

### Elective Courses (3 credits)

Select 3 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with advisor approval.

- [HSEX 6001](#) - Foundations of Human Sexuality (3.0 cr)
- [HSEX 6012](#) - Sexual Function and Dysfunction (3.0 cr)
- [HSEX 6013](#) - Perspectives and Practices in Sexuality Education (3.0 cr)
- [IBH 6021](#) - Methods and Models III: Synthesis Seminar in Client Centered Care (2.0 cr)
- [IBH 6071](#) - Advanced Professional Issues: Ethics (3.0 cr)
- [IBH 6081](#) - Human Lifespan Development and Behavioral Health (3.0 cr)
- [IBH 6091](#) - Intersection of Career and Mental Health (2.0 cr)
- [IBH 6101](#) - Family Dynamics and Therapy (3.0 cr)
- [IBH 6111](#) - Research and Evaluation Methods (3.0 cr)
- [IBH 6221](#) - Applications of Counseling Theories (3.0 cr)
- [IBH 6222](#) - Adolescents and Co-occurring Substance Use and Mental Health Disorders (3.0 cr)
- [IBH 6233](#) - DBT Skills Training: Group Practices and Treatment Modalities (2.0 cr)
- [IBH 6234](#) - Counseling Grief and Loss (2.0 cr)

### Internship (4 credits)

Take the following internship. The internship includes 880 hours of field experience.

- [ADDS 5996](#) - Internship in Behavioral Health (1.0 cr)



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### **Twin Cities Campus**

## **Addictions Minor**

CCAPS Addiction Studies

### **College of Continuing and Professional Studies**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Continuing and Professional Studies  
20 Ruttan Hall  
19994 Buford Ave  
St Paul, MN 55108

612-624-4000

Email: [ccapsibh@umn.edu](mailto:ccapsibh@umn.edu)

Website: <https://ccaps.umn.edu/degrees-and-minors>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 12
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The addictions minor expands access to courses in the MPS in addictions counseling and MPS in integrated behavioral health programs courses to the wider graduate student population, meeting a need for addictions-related coursework for students in related graduate and professional programs. Students in other disciplines may also find value in expanding their foundational knowledge of addictions for their own research and post-graduation career development. Finally, students in allied professional programs wishing to seek licensure can take this ADDS coursework in addition to specific host program coursework and internship requirements toward the Minnesota Licensed Alcohol and Drug Counselor (MNLADC) credential.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Students must be admitted to a graduate degree program at the University of Minnesota and be in good standing.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Students working toward allied licensure in counseling/therapy are required to meet specific internship requirements in addition to this coursework. Students interested in the LADC will need to work with their home program advisors to ensure they meet licensing-specific internship requirements.

All courses must be completed with a minimum grade of B-.

#### **Required Courses - 12 credits**

Students admitted to a graduate program at the university must take the following courses to earn the 12 credit Minor. ADDS 5091 is the only course with a prerequisite: ADDS 5021. Students in the Minor will be permitted to waive this prerequisite.

[ADDS 5011](#) - Foundations in Addiction Studies (2.0 cr)

[ADDS 5031](#) - Applied Psychopharmacology (2.0 cr)

[ADDS 5071](#) - Foundations of Co-occurring Disorders (2.0 cr)

[ADDS 5081](#) - Multicultural Foundations of Behavioral Health (3.0 cr)



[ADDS 5091](#) - Assessment and Treatment Planning I (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Applied Sciences Leadership M.P.S.**

CCAPS Graduate Programs Instruction

### **College of Continuing and Professional Studies**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

CCAPS - Degree and Credit Programs Room 20 RuttanH 6045B 1994 Buford Ave St. Paul, MN 55108

Email: [ccapsinfo@umn.edu](mailto:ccapsinfo@umn.edu)

Website: <https://ccaps.umn.edu/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Professional Studies

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Applied Sciences Leadership MPS degree provides working, non-traditional students the opportunity to enhance the qualitative human-centered and quantitative data-focused professional skills integral to workplace success and advancement. Through coursework and a capstone project, graduates will gain the crucial broad, cross-competency leadership skills and deep knowledge of their selected scientific focus that emphasized by employers.

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelors degree in a related sciences field from an accredited post-secondary US institution is required

Other requirements to be completed before admission:

A minimum 3.0 GPA is preferred.

Online University application

Online application fee

Resume or CV

Professional Statement (1-2 pages)

Two letters of recommendation from academic or professional referees

#### **Special Application Requirements:**

International applicants are strongly encouraged to contact the University's International Student and Scholar Services office ([www.iss.umn.edu](http://www.iss.umn.edu)) for visa requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 84
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 563
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 84
- MN Batt





Key to [test abbreviations](#)(TOEFL, IELTS, MELAB, MN Batt).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.  
**Capstone Project:** APS 6005, completed in consultation with the advisor, comprises the application of knowledge gained through program coursework to the investigation of a scientific question in the students selected focus area.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Students must earn a grade of B- or better (or S) in all courses.

### Bookend Courses (6 credits)

Take the following courses:

[APS 6003](#) - Perspectives in Integrated Applied Sciences (3.0 cr)

[APS 6005](#) - Applied Sciences Leadership Capstone (3.0 cr)

### Core Courses (12 credits)

Take the following courses:

[APS 6312](#) - Finance for Non-financial Managers (3.0 cr)

[APS 6313](#) - Data for Decision Making (3.0 cr)

[APS 6314](#) - Leading Projects and Teams (3.0 cr)

[APS 6315](#) - Legal and Ethical Issues in Business Sciences (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Integrated Food Systems Leadership

Students interested in completing the University's Integrated Food Systems Leadership (IFSL) post-baccalaureate certificate may apply the following required masters coursework to IFSL certificate requirements. Refer to the Integrated Food Systems Leadership certificate website for more information.

### Integrated Food Systems Leadership Track (12 credits)

Take the following courses to complete the 30-credit requirement:

[IFSL 7000](#) - Keys to Effective Leadership (1.0 cr)

[IFSL 7011](#) - Food Production, Processing, and Supply Chains (2.0 cr)

[IFSL 7021](#) - Food Governance, Policy, and Regulation (2.0 cr)

[IFSL 7031](#) - Food Security, Safety, and Defense (2.0 cr)

[IFSL 7041](#) - Food Business, Marketing, and Product Development (2.0 cr)

[IFSL 7051](#) - Leading Across Integrated Food Systems (2.0 cr)

[IFSL 7070](#) - Communications and Critical Thinking (1.0 cr)



### **Twin Cities Campus**

## **Arts and Cultural Leadership M.P.S.**

CCAPS Graduate Programs Instruction

### **College of Continuing and Professional Studies**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College Continuing and Professional Studies, M.P.S. in Arts and Cultural Leadership, 20 Ruttan Hall, 1994 Buford Avenue, St. Paul, MN 55108 (612-624-4000; fax: 612- 626-2800)

Email: [ccapsacl@umn.edu](mailto:ccapsacl@umn.edu)

Website: <https://ccaps.umn.edu/arts-and-cultural-leadership-masters-degree>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Professional Studies

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Arts and Cultural Leadership (ACL) program is designed for students who have at least three years of professional, volunteer, and/or advocacy work in the arts and cultural field. Required curriculum, blended with flexible course work, allows students to build a program around their current strengths, experiences, and career direction. Courses in leadership and nonprofit management, along with seminars and directed studies in arts and cultural studies, provide working adults a degree with a clear, career-related focus.

The ACL program is designed to help students:

Gain insight and develop approaches to creating and stewarding the relationships and interdependencies necessary for sustaining a vibrant arts community

Refine strategic planning and communications skills in order to better lead organizations in complex environments

Advocate for the arts and culture sector by promoting better understanding and integrating the economic, political, ethical, technological, and diverse social environments in which it functions

Understand and convey the international context for the arts and the impact of the global economy

Appreciate and nurture the creative process, recognizing how art and the artist function in society

The ACL program uses a foundation of 18 credits (out of 30 that are required for the degree), with latitude built in to pursue elective coursework in support areas such as nonprofit management, leadership, education, public affairs/policy, urban planning, strategic planning, etc. Using an applied learning approach, students receive a high-quality education that draws on the expertise of University faculty and community-based faculty.

By the end of the program, students will be knowledgeable in:

Critical and strategic thinking, and effective communication

The intersection, navigation, and impact of cultural and creative practices within local and global dynamics

Policy formation, implementation, and application relevant to culture, creativity, and the arts

Leadership practices in a variety of contexts

How to implement expertise, improve relationships, and optimize resources

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

To be admitted, students must have a bachelor's degree from an accredited post-secondary US institution or its foreign equivalent.

Other requirements to be completed before admission:

At least 3 years of professional, volunteer, and/or advocacy work in the arts and cultural field is required. Factors of academic



preparation, relevant experience, evidence of readiness and maturity, writing ability, and reasons for seeking the degree will be taken into account as part of the admissions review. GRE scores may be submitted, but are not required.

**Special Application Requirements:**

The application package must include official transcripts of all baccalaureate and post-baccalaureate work, a current resume, two letters of recommendation, a two- to three-page written statement of purpose in which the student elaborates on his or her interest in the program, and an additional writing sample of approximately 10 pages. Application deadlines are in spring for fall semester admission, and fall for spring semester admission. Please refer to the program website for further details.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 84
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 563
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 84

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam. A capstone project is required. **Capstone Project:** The final project provides students with an opportunity to focus on the needs of a particular organization or community as they identify and carry out, in consultation with the leadership of that group and their academic advisor(s), a project that meets a need within that group and reflects both the interest of the students and their academic achievement. See the department for more details.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

Required courses must be taken A/F and earn a B- or better. Elective courses taken A/F must earn a B- or better.

### Required Courses (15 credits)

Take the following courses:

- [ACL 8001](#) - Introduction to Critical and Cultural Inquiry in Arts and Culture (2.0 cr)
- [ACL 5211](#) - Trends and Impacts in Arts and Cultural Leadership and Management (3.0 cr)
- [ACL 5221](#) - Creative Entrepreneurship and Resource Development (3.0 cr)
- [ACL 5231](#) - Ethical Dilemmas and Legal Issues for Cultural Leaders (3.0 cr)
- [ACL 8201](#) - Creative Leadership in Practice (2.0 cr)
- [ACL 8202](#) - Service Leadership and Board Practicum (2.0 cr)

### Electives (12 credits)

Select 12 credits from the following in consultation with the advisor. Other courses, from related academic departments including ACL, MST, OLPD, and PA, can be applied to this requirement with advisor approval. Electives should relate to the professional tasks required of arts and cultural leaders or enhance the student's understanding of the arts within a broader cultural context.

- [ACL 5100](#) - Topics in Arts and Cultural Leadership (1.0 - 4.0 cr)
- [ACL 5241](#) - Financial Management for Arts Nonprofits (2.0 cr)
- [ACL 5251](#) - Courageous Imagination in Action: Art and Culture as Forces and Resources of Change (3.0 cr)
- [ACL 5261](#) - Culture, Place, and Community: Ways of Living Together in the 21st Century (3.0 cr)
- [ACL 5950](#) - Special Topics (1.0 - 4.0 cr)
- [ACL 5993](#) - Directed Studies (1.0 - 4.0 cr)
- [APS 6001](#) - Critical Approaches to Civic Engagement (3.0 cr)



APS 6311 - Facilitating Community Driven Leadership (3.0 cr)  
APS 6312 - Finance for Non-financial Managers (3.0 cr)  
APS 6313 - Data for Decision Making (3.0 cr)  
DES 5165 - Design and Globalization (3.0 cr)  
Other electives chosen in consultation with student's adviser.  
GCC 5005 - Innovation for the Public Good: Post-Pandemic Venture Design [GP] (3.0 cr)  
GEOG 8106 - Seminar: Social and Cultural Geography (3.0 cr)  
JOUR 4263 - Strategic Communication Campaigns (3.0 cr)  
JOUR 5251 - Strategic Communication Theory (3.0 cr)  
LA 5413 - Introduction to Landscape Architectural History (3.0 cr)  
MST 5011 - Museum History and Philosophy (3.0 cr)  
MST 5012 - Museum Practices (3.0 cr)  
PA 5003 - Introduction to Financial Analysis and Management (1.5 cr)  
PA 5011 - Management of Organizations (3.0 cr)  
PA 5101 - Management and Governance of Nonprofit Organizations (3.0 cr)  
PA 5102 - Organization Performance and Change (3.0 cr)  
PA 5103 - Leadership and Change (1.5 - 3.0 cr)  
PA 5104 - Strategic Human Resource Management (3.0 cr)  
PA 5111 - Financing Public and Nonprofit Organizations (3.0 cr)  
PA 5190 - Topics in Public and Nonprofit Leadership and Management (1.0 - 3.0 cr)  
PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)  
PA 5211 - Land Use Planning (3.0 cr)  
PA 5251 - Strategic Planning and Management (3.0 cr)  
PA 5253 - Designing Planning and Participation Processes (3.0 cr)

**Final Project (3 credits)**

Take the following courses:

ACL 8002 - Capstone: Applied Research Project (1.0 cr)  
ACL 8003 - Capstone: Reflections and Presentation (2.0 cr)



### **Twin Cities Campus**

## **Biological Sciences M.B.S.**

CCAPS Graduate Programs Instruction

### **College of Continuing and Professional Studies**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Continuing and Professional Studies, Master of Biological Sciences Program, 20 Ruttan Hall, 1994 Buford Avenue, St. Paul, MN 55108 (612-624-4000; fax: 612-626-2800)

Email: [ccapsmbs@umn.edu](mailto:ccapsmbs@umn.edu)

Website: <https://ccaps.umn.edu/biological-sciences-masters-degree>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Biological Sciences

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of biological sciences (MBS) degree is a highly flexible graduate-level program designed to meet the needs of members of the working community who wish to increase their knowledge in areas of modern biology. Students focus their studies in one of three broad areas: molecular biosciences, cellular and organismal biology, or environmental and population biology. Limited elective credits in areas, such as education, business, and public health can be used to support a student's individual career goals and program focus. The degree enables recipients to learn new job skills, change professional emphasis, or provide added value to their present job and may be completed on a part-time basis.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

To be admitted, students must have a bachelor's degree from an accredited post-secondary US institution or its foreign equivalent.

Other requirements to be completed before admission:

Evidence of knowledge of current, college-level concepts of basic chemistry, organic chemistry, and some biology coursework is required. Transcripts showing equivalent coursework combined with professional experience will be considered for application toward fulfillment of the prerequisites for admission. Two years of relevant experience in the workforce is preferred for admission.

#### **Special Application Requirements:**

A statement of career goals, letters of reference, transcripts for all undergraduate and post-baccalaureate degrees or coursework, and an updated resume must accompany the application. Application deadlines are in the spring for fall semester admission, and in the fall for spring semester admission. Please refer to the program website for further details.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 84
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 563
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 84



Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project is carried out under the direction of a faculty member. It can be literature-based or lab-based with a testable hypothesis and a final paper of 30-50 pages in length, which is an in-depth examination and analysis of a particular area, problem, technique, etc.

**Plan C:** Plan C requires 30 major credits and 0 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The Plan C requirement is the Capstone course MBS 8003.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

The program includes coursework, independent study, and a project for Plan B master's students or capstone course for Plan C master's students. With guidance from program advisors, students complete 30 credits. MBS candidates may transfer up to 12 credits into the program. Foundation credits may be waived or substituted if the student can show proficiency in the subject area. A bioethics requirement may be met with a credit or non-credit course. Coursework is taken from the regular graduate-level coursework. An overall GPA of 3.00 is required for the degree to be awarded.

### Introductory Course (1 credit)

[MBS 8001](#) - Introduction to Research in the Biological Sciences (1.0 cr)

### Biochemistry Foundation (3 credits)

[BIOC 6021](#) - Biochemistry (3.0 cr)

### Biological Sciences Courses (17 - 23 credits)

Courses in the student's area of concentration within the biological sciences chosen in consultation with student's advisor. One course in at least two of the following areas should be taken: Molecular Biosciences, Cellular and Organismal Biology, Environmental and Population Biology. Up to 7 credits of directed research or directed study courses can be included. Plan C students MUST take at least 1 credit of MBS 8110.

Take 17 - 23 credit(s) from the following:

- Courses in the student's area of concentration within the biological sciences chosen in consultation with student's advisor.

### Electives (0 - 6 credits)

Elective courses outside the biological sciences chosen with student's advisor.

Take 0 - 6 credit(s) from the following:

- Electives courses outside the biological sciences chosen with student's advisor.

### Final Project or Capstone (3 credits)

Plan B students take MBS 8002 in their final semester.

Plan C students take MBS 8003 in their final semester.

[MBS 8002](#) - Final Project Course for Plan B MBS Students (2.0 - 3.0 cr)

or [MBS 8003](#) - Capstone Course for Plan C MBS Students (2.0 - 3.0 cr)



**Twin Cities Campus**

## Biological Sciences Minor

CCAPS Graduate Programs Instruction

### College of Continuing and Professional Studies

Link to a [list of faculty](#) for this program.

#### Contact Information:

College of Continuing and Professional Studies, Master of Biological Sciences Program, 20 Ruttan Hall, 1994 Buford Ave, St. Paul, MN 55108 (612-624-4000, fax: 612-626-2800)

Email: [ccapsmbs@umn.edu](mailto:ccapsmbs@umn.edu)

Website: <https://ccaps.umn.edu/biological-sciences-masters-degree>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: This program is not currently accepting students. Please contact the College of Continuing and Professional Studies for more information about the status of this program.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.



### **Twin Cities Campus**

## **Civic Engagement M.P.S.**

CCAPS Graduate Programs Instruction

### **College of Continuing and Professional Studies**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Continuing and Professional Studies Information Center, 20 Ruttan Hall, 1994 Buford Avenue, St. Paul, MN, 55108 (612-624-4000)

Email: [ccapsinfo@umn.edu](mailto:ccapsinfo@umn.edu)

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Professional Studies

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Civic Engagement MPS meets the unique needs of working adult students looking to enhance their knowledge and credentials as T-shaped professionals. The T-shaped professional has a combination of broad applied managerial skills complemented by disciplinary knowledge in a focused area. Students in this major will benefit from exposure to the qualitative human-centered and quantitative data-focused applied professional skills that have become integral to workplace success. They will be well-positioned to take on challenges in the ever-changing global workforce. Graduates of this degree program will:

- Analyze and implement applied business practices and graduate level inquiry within interdisciplinary civic engagement frameworks
- Develop managerial and advanced communications skills
- Enhance critical thinking and creative problem-solving skills to develop collaborative solutions for professional goals
- Synthesize and apply the larger ethical framework of the profession to the communities served -Amalgamate their disciplinary expertise with their individual passion for a specific cause within the larger scope of civic engagement

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Bachelor's degree from an accredited institution - Transcripts - Personal statement - Two letters of recommendation from academic or professional referees - Updated resume or CV

#### **Special Application Requirements:**

International students interested in the M.P.S. in Civic Engagement should contact the International Student and Scholar Service ([www.iss.umn.edu](http://www.iss.umn.edu)) for information on visa status and academic requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 84
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 563
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 84
- MN Batt





Key to [test abbreviations](#)(TOEFL, IELTS, MELAB, MN Batt).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The capstone course (APS 6002) synthesizes the completed disciplinary and applied business coursework, and facilitates completion of an individualized, applied project based on the student's community-engagement career focus. This culminating experience, taken in the final year of the program, provides students with an opportunity to engage in creative problem solving to address pressing real-world needs.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

Students must earn a grade of B- or better for courses taken on the A/F grade basis.

### Required Courses (18 credits)

Take the following courses:

[APS 6001](#) - Critical Approaches to Civic Engagement (3.0 cr)

[APS 6311](#) - Facilitating Community Driven Leadership (3.0 cr)

[APS 6312](#) - Finance for Non-financial Managers (3.0 cr)

[APS 6313](#) - Data for Decision Making (3.0 cr)

[APS 6314](#) - Leading Projects and Teams (3.0 cr)

[APS 6002](#) - Civic Engagement Capstone (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Civic Life and Social Justice

This sub-plan is limited to students completing the program under Plan C.

Students who pursue the Civic Life and Social Justice track have a passion for improving the world around them, serving the community, and enacting social justice. Whether they are activists hoping to bring business or people management skills to their organizations, or they work in nonprofits or non-governmental organizations, this track offers exposure to contemporary civic and social issues.

### Civic Life and Social Justice (12 credits)

Take the following courses to complete the 30-credit requirement. Other courses may be applied to this requirement with prior program approval.

[GCC 5001](#) - Can We Feed the World Without Destroying It? [ENV] (3.0 cr)

[SOC 8551](#) - Life Course Inequality & Health (3.0 cr)

[PA 8312](#) - Analysis of Discrimination (4.0 cr)

[ENGL 8300](#) - Seminar in American Minority Literature (3.0 cr)

[COMM 5231](#) - Media Outlaws (3.0 cr)

[ACL 5211](#) - Trends and Impacts in Arts and Cultural Leadership and Management (3.0 cr)

[HSEX 6011](#) - Policy in Human Sexuality: Cutting Edge Analyses (3.0 cr)

### Perspectives in Global Citizenship

This sub-plan is limited to students completing the program under Plan C.



Students who pursue the Perspectives in Global Citizenship track seek a broad knowledge of what it means to be a global citizen, and the inherent opportunities and tensions that arise from living in a global society. Students may seek jobs in healthcare and health disparity nonprofits, non-governmental organizations focused on climate change, wealth inequalities, maternal and child health, or diversity and equity issues.

#### **Perspectives in Global Citizenship - (12 credits)**

Take the following courses to complete the 30-credit requirement. A maximum of 6 GCC credits may be selected. Other courses may be applied to this requirement with prior program approval.

- BTHX 5710 - Ethical Issues in Global Health (3.0 cr)
- CSPH 5118 - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)
- ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)
- GCC 5001 - Can We Feed the World Without Destroying It? [ENV] (3.0 cr)
- GCC 5005 - Innovation for the Public Good: Post-Pandemic Venture Design [GP] (3.0 cr)
- GCC 5007 - Toward Conquest of Disease [ENV] (3.0 cr)
- GCC 5008 - Policy and Science of Global Environmental Change [ENV] (3.0 cr)
- GCC 5011 - Pathways to Renewable Energy [TS] (3.0 cr)
- GCC 5013 - Making Sense of Climate Change - Science, Art, and Agency [CIV] (3.0 cr)
- GCC 5014 - The Future of Work and Life in the 21st Century [TS] (3.0 cr)
- GCC 5015 - Bioinspired Approaches to Sustainability: Greening Technologies and Lives [TS] (3.0 cr)
- GCC 5017 - World Food Problems: Agronomics, Economics and Hunger [GP] (3.0 cr)
- GCC 5031 - The Global Climate Challenge: Creating an Empowered Movement for Change [CIV] (3.0 cr)
- HSEX 6011 - Policy in Human Sexuality: Cutting Edge Analyses (3.0 cr)
- PA 5161 - Redesigning Human Services (3.0 cr)
- PA 5422 - Diversity and Public Policy (3.0 cr)
- PA 5601 - Global Survey of Gender and Public Policy (3.0 cr)
- PA 5724 - Climate Change Policy (3.0 cr)

#### **Election Administration**

Students who pursue the Election Administration track are involved in election administration at the local, state, or national level. The online curriculum completes the 30-credit minimum for the MPS degree. Students who also choose to pursue and are admitted to the Election Administration post-baccalaureate certificate offered by the Humphrey School of Public Affairs can apply the following courses to that credentials credit requirements.

#### **Required Courses (7 credits)**

Take the following courses:

- PA 5971 - Survey of Election Administration (3.0 cr)
- PA 5972 - Elections and the Law (2.0 cr)
- PA 5973 - Strategic Management of Election Administration (2.0 cr)

#### **Electives (5 credits)**

Select at least 5 credits from the following:

- PA 5975 - Election Design (2.0 cr)
- PA 5976 - Voter Participation (1.0 cr)
- PA 5982 - Data Analysis for Election Administration (2.0 cr)
- PA 5983 - Introduction to Election Security (1.0 cr)
- PA 5984 - Elections Security: How to Protect America's Elections (2.0 cr)

#### **Self Designed Track**

This sub-plan is limited to students completing the program under Plan C.

Students interested in a disciplinary area outside the three defined tracks select 12 credits of electives to complete the MPS 30-credit minimum, in consultation with their advisor, that explores a specific area of interest. Selected coursework must be approved by the director of graduate studies.



### **Twin Cities Campus**

## **Horticulture M.P.S.**

*CCAPS Graduate Programs Instruction*

### **College of Continuing and Professional Studies**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Continuing and Professional Studies, Master of Professional Studies in Horticulture Program, 20 Ruttan Hall, 1994 Buford Avenue, St. Paul, MN 55108 (612-624-4742; fax: 612-626-2800)

Email: [ccapshort@umn.edu](mailto:ccapshort@umn.edu)

Website: <https://ccaps.umn.edu/horticulture-masters-degree>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Professional Studies

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of professional studies in horticulture is designed to enhance the capacity of those currently working in the horticulture industry and to provide the knowledge base needed by others interested in beginning new careers, starting their own business, or pursuing personal interests in horticulture. The degree provides a solid foundation of contemporary horticultural knowledge, yet is flexible enough to allow individuals to focus on the specific skills they wish to hone.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

To be admitted, students must have a bachelor's degree from an accredited post-secondary US institution or its foreign equivalent.

Other requirements to be completed before admission:

Evidence of knowledge of current, introductory, college-level concepts of algebra, chemistry, biology, botany, or plant propagation is required for admission to the program. Prerequisite coursework may be completed at the University of Minnesota or at other educational institutions subject to transfer review. In all cases, documentation of completed, equivalent coursework combined with professional experience will be considered for application toward fulfillment of the prerequisites for admission to the M.P.S. in Horticulture. A minimum grade of C will be the standard for admission for all prerequisite coursework. Undergraduate prerequisite coursework must come from the following areas: algebra, chemistry, biology, botany, or plant propagation. Please refer to the program website for further details.

#### **Special Application Requirements:**

The application package must include official transcripts of all baccalaureate and post-baccalaureate work, a current resume, two letters of reference, a written statement of purpose (no more than two pages) which addresses pertinent aspects of the student's background and academic qualifications as related to admission to the program and demonstrates a strong interest in horticultural science including documentation of any relevant experiences in the field of horticulture. Application deadlines are in spring for fall semester admission, and in fall for spring semester admission. Refer to the program website for further details.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 84
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 563
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5



- Writing Score: 6.5
- MELAB
- Final score: 84

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** See department for more details.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

Students who have not completed relevant introductory coursework in soils, plant pathology, and entomology, either during or subsequent to completion of their bachelor's degree, may be required to complete courses in these areas as part of their M.P.S. degree requirements in consultation with the M.P.S. in Horticulture Director of Graduate Studies. These courses are not prerequisites for admission. Depending on the specific courses included in the student's program, some additional coursework may also be required over and above the 30 graduate credits required for the degree.

All prerequisites associated with courses included in the student's course program must be completed as part of the student's degree requirements, unless exempted in writing by the instructor for the course and approved by the student's advisor and the program director of graduate studies (DGS) prior to taking the course.

Excluding the capstone course, a maximum of 3 credits taken S/N may be applied toward the minimum requirements for the degree.

The student's course program must be approved by the DGS and M.P.S. Steering Committee.

Only coursework for which the student has earned a grade of B- or better will be counted toward the minimum of 30 semester credits required for the degree.

### Horticulture Coursework (15 credits)

15 credits of Horticulture (HORT) courses are required. A maximum of 9 credits total at the 4xxx level may be applied to the program in consultation with student's advisor. A maximum of 3 credits of HORT 5090 Directed Studies may be used.

Take 15 or more credit(s) from the following:

- HORT 4xxx
- HORT 5xxx
- **HORT 6003** - Masters of Professional Studies in Horticulture Professional Experience Program: Internship (1.0 - 3.0 cr)
- **HORT 6011** - Plant Propagation (4.0 cr)
- HORT 8xxx

### Related Fields (12 credits)

Select at least 12 credits, such as the following, from related fields coursework offered across the University. Other courses can be selected in consultation with the advisor. A maximum of 9 total credits at the 4xxx level, in consultation with the advisor, can be applied to program requirements.

Take 12 or more credit(s) from the following:

- **AGRO 5321** - Ecology of Agricultural Systems (3.0 cr)
- **APS 5103** - Integration of Sustainable Agriculture Concepts (3.0 cr)
- **APS 5101** - Ecological Design for Horticulture (3.0 cr)
- **APS 5102** - Garden Design: Theory and Application (2.0 cr)
- **ENT 5011** - Insect Structure and Function (4.0 cr)
- **ENT 5021** - Insect Biodiversity and Evolution (4.0 cr)
- **ENT 5051** - Scientific Illustration of Insects (3.0 cr)
- **ENT 5081** - Insects, Aquatic Habitats, and Pollution (3.0 cr)
- **ENT 5121** - Applied Experimental Design (4.0 cr)
- **ENT 5341** - Biological Control of Insects and Weeds (3.0 - 4.0 cr)
- **ENT 5361** - Aquatic Insects (4.0 cr)
- HORT 4xxx



- HORT 5xxx
- [PLPA 5103](#) - Plant-Microbe Interactions (3.0 cr)
- [PLPA 5202](#) - Field Plant Pathology (2.0 cr)
- [PLPA 5203](#) - Introduction to Fungal Biology (3.0 cr)
- [PLPA 5300](#) - Current Topics in Molecular Plant Pathology (1.0 cr)
- [PLPA 5301](#) - Large Scale Omic Data in Plant Biology (3.0 cr)
- [PLPA 5444](#) - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)
- [PLPA 5480](#) - Principles of Plant Pathology (3.0 cr)
- [PLPA 5660](#) - Plant Disease Resistance and Applications (3.0 cr)
- [PLPA 8005](#) - Supervised Classroom or Extension Teaching Experience (1.0 - 2.0 cr)
- [PLPA 8103](#) - Plant-Microbe Interactions (3.0 cr)
- SOIL 4xxx
- SOIL 5xxx
- [HORT 6011](#) - Plant Propagation (4.0 cr)
- HORT 8xxx

**Capstone: HORT 6002 (3 credits)**

Intended as a capstone experience that integrates the knowledge gained from coursework, personal research, and the student's academic and professional experiences. Enrollment is limited to students who have completed 18 or more credit hours. Students should register for 3 credits.

[HORT 6002](#) - Problem Solving in Horticulture (3.0 cr)



### **Twin Cities Campus**

## **Human Sexuality Post-baccalaureate Certificate**

CCAPS Graduate Programs Instruction

### **College of Continuing and Professional Studies**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Continuing and Professional Studies, Human Sexuality Certificate, 20 Ruttan Hall, 1994 Buford Ave, St. Paul, MN, 55108.

Phone: 612-624-4000

Email: [ccapsinfo@umn.edu](mailto:ccapsinfo@umn.edu)

Website: <https://ccaps.umn.edu/human-sexuality-certificate>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Human Sexuality Postbacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Human sexuality and associated gender roles and sexual behavior are an integral part of health care, clinical and social sciences, biological sciences, and a determinant of population dynamics and population science. The HIV pandemic, and the prevalence of sexually transmitted infections (STIs) worldwide, make training in human sexuality an essential component of international development, reproductive and population health, and social policy. Sexual health issues are often part of a clinically oriented medical curriculum, and this online certificate broadens human sexuality education to a wider audience across the US and internationally. Completing this coursework will fulfill part of the requirements towards AASECT certification for sex educators in the components of core knowledge and sexuality education training.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must have a bachelors degree from an accredited post-secondary US institution or an international equivalent.

Other requirements to be completed before admission:

Online Application through Apply Yourself

Online application fee of \$75 (\$95 for international students)

Resume or CV

Personal Statement (1-2 pages)

Two letters of recommendation from academic or professional references

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 84
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 84

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

### Foundations of Human Sexuality (3 credits)

Required foundations of human sexuality course.

[HSEX 6001](#) - Foundations of Human Sexuality (3.0 cr)

### Electives (9 credits)

Elective coursework in human sexuality. Under exceptional circumstances and with the permission of the director of graduate studies, students may substitute elective credits from other graduate level coursework in human sexuality.

[HSEX 6011](#) - Policy in Human Sexuality: Cutting Edge Analyses (3.0 cr)

[HSEX 6012](#) - Sexual Function and Dysfunction (3.0 cr)

[HSEX 6013](#) - Perspectives and Practices in Sexuality Education (3.0 cr)



### ***Twin Cities Campus***

## **Integrated Behavioral Health M.P.S.**

*CCAPS Addiction Studies*

### **College of Continuing and Professional Studies**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Continuing and Professional Studies Information Center, 20 Ruttan Hall, 1994 Buford Avenue, St. Paul, MN, 55108 (612-624-4000)

Email: [ccapsinfo@umn.edu](mailto:ccapsinfo@umn.edu)

Website: <https://ccaps.umn.edu/integrated-behavioral-health-masters-degree>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Master of Professional Studies

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The high prevalence of co-occurring mental health and substance use disorders virtually guarantees that counselors, no matter the treatment setting, will encounter clients struggling with not one, but two or more disorders.

The master of professional studies in integrated behavioral health (IBH) prepares counselors for this clinical reality. The IBH degree merges mental health and substance abuse education and training into a single, comprehensive and cohesive program. This synthesis represents an important and pioneering shift in the preparation of clinicians.

The IBH is designed to fulfill education and training requirements for two licenses: Licensed Professional Clinical Counselor (LPCC) and Licensed Alcohol and Drug Counselor (LADC).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Bachelor's degree from an accredited institution

Transcripts

Personal statement

Two letters of reference

Updated resume or CV

#### **Special Application Requirements:**

International students interested in the master of professional studies in integrated behavioral health should contact the International Student and Scholar Service (<http://www.iss.umn.edu>) for information on visa status and academic requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 84
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 563
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB





- Final score: 84

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 60 major credits and 0 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Satisfactory completion of a portfolio demonstrates the student's clinical conceptualization and practice skills through the following:

A client case study that includes an assessment and treatment plan

A videotaped treatment session with a mock client

A philosophy of counseling statement outlining the student's theoretical orientation to counseling and specific applications of his/her counseling philosophy to the population she/he intends to serve

Evaluations outlining areas of competence and skill as assessed by internship site supervisor

Self-selected papers and projects from program coursework that demonstrate the student's mastery of knowledge and skills

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

In addition to course work, an 880-hour field placement is required to complete the degree. The credit and field placement requirements are designed to fulfill licensing requirements as defined in the Minnesota Statutes, section 148B.54, subdivision 2; and Minnesota Rules, part 2150.2500 to 2150.2660. As noted in the statute, "The national trend for master's programs in counseling is towards 60 semester credits." In order for a practitioner to be eligible for third party reimbursement for services, the practitioner must demonstrate a minimum of 60 semester graduate level credits in counseling coursework.

Students may take one or more courses per term and have up to five years to complete a master's degree. Students who wish to transfer graduate-level coursework from other institutions should contact the Graduate Programs office at [ccapsinfo@umn.edu](mailto:ccapsinfo@umn.edu) for information and assistance.

Only coursework for which the student has earned a grade of B- or better will be counted toward the minimum of 60 semester credits required for the degree.

### Foundation Courses (10 credits)

These courses are prerequisites for most other courses in the program and the first internship. They should be the first courses students complete.

[ADDS 5011](#) - Foundations in Addiction Studies (2.0 cr)

[ADDS 5021](#) - Introduction to Evidence Based Practices and the Helping Relationship (3.0 cr)

[ADDS 5071](#) - Foundations of Co-occurring Disorders (2.0 cr)

[IBH 6111](#) - Research and Evaluation Methods (3.0 cr)

### Prerequisites for First Internship (16 credits)

These courses (along with "Foundation Courses" [ADDS 5011](#), [5021](#), [5071](#), and [IBH 6111](#)) must be completed before students can register for the first internship [ADDS 5996](#).

Exception: [ADDS 5081](#) may be taken concurrently with the internship.

[ADDS 5031](#) - Applied Psychopharmacology (2.0 cr)

[ADDS 5041](#) - Methods and Models I: Motivational Counseling (2.0 cr)

[ADDS 5051](#) - Methods and Models II: Cognitive Behavioral Therapy (2.0 cr)

[ADDS 5061](#) - Foundations of Group Work (3.0 cr)

[ADDS 5081](#) - Multicultural Foundations of Behavioral Health (3.0 cr)

[ADDS 5091](#) - Assessment and Treatment Planning I (3.0 cr)

[ADDS 5121](#) - Professional Seminar 1: Internship Prep (1.0 cr)

### First Internship (2 credits)

Two credits (440 field hours) of [ADDS 5996](#) must be completed near the program's mid-way point.

[ADDS 5996](#) - Internship in Behavioral Health (1.0 cr)

### Prerequisites for Second Internship (16 credits)

All [ADDS](#) courses, [ADDS 5996](#), and these courses must be completed before students can register for the second internship [IBH](#)



6996.

[IBH 6011](#) - Foundations in Differential Diagnosis (3.0 cr)

[IBH 6022](#) - Foundations of Psychological Assessment (2.0 cr)

[IBH 6061](#) - Applied Advanced Diagnostics I (2.0 cr)

[IBH 6081](#) - Human Lifespan Development and Behavioral Health (3.0 cr)

[IBH 6121](#) - Professional Seminar 2: Portfolio Development (1.0 cr)

[IBH 6221](#) - Applications of Counseling Theories (3.0 cr)

Take either [IBH 6031](#) or [IBH 6036](#).

[IBH 6031](#) - Methods and Models IV: Trauma and Anxiety, Assessment and Treatment Intervention (2.0 cr)

or [IBH 6036](#) - Trauma Focused Approaches and Crisis Intervention (2.0 cr)

### Second Internship (2 credits)

Two credits (440 field hours) of [IBH 6996](#) must be completed near the end of the program.

[IBH 6996](#) - Internship for Integrated Behavioral Health (1.0 cr)

### Additional Required Courses (8 credits)

Additional required courses. Can be taken any time.

[IBH 6071](#) - Advanced Professional Issues: Ethics (3.0 cr)

[IBH 6091](#) - Intersection of Career and Mental Health (2.0 cr)

[IBH 6101](#) - Family Dynamics and Therapy (3.0 cr)

### Electives (5 credits)

Electives not on this list must be preapproved.

Take 5 or more credit(s) from the following:

•[ADDS 5996](#) - Internship in Behavioral Health (1.0 cr)

•[HSEX 6001](#) - Foundations of Human Sexuality (3.0 cr)

•[HSEX 6012](#) - Sexual Function and Dysfunction (3.0 cr)

•[HSEX 6013](#) - Perspectives and Practices in Sexuality Education (3.0 cr)

•[IBH 6021](#) - Methods and Models III: Synthesis Seminar in Client Centered Care (2.0 cr)

•[IBH 6031](#) - Methods and Models IV: Trauma and Anxiety, Assessment and Treatment Intervention (2.0 cr)

•[IBH 6032](#) - Advanced Multicultural Practice (1.0 cr)

•[IBH 6036](#) - Trauma Focused Approaches and Crisis Intervention (2.0 cr)

•[IBH 6041](#) - Prolonged Exposure Therapy for PTSD (2.0 cr)

•[IBH 6051](#) - Advanced Group Practice (2.0 cr)

•[IBH 6062](#) - Applied Advanced Diagnostics II (2.0 cr)

•[IBH 6222](#) - Adolescents and Co-occurring Substance Use and Mental Health Disorders (3.0 cr)

•[IBH 6227](#) - Supervision Models and Methods in Integrated Behavioral Health (3.0 cr)

•[IBH 6228](#) - Mental Health and Addiction Program Administration (2.0 cr)

•[IBH 6230](#) - Clinical Application in Prolonged Exposure Therapy (3.0 cr)

•[IBH 6232](#) - Sexual Health and Gender (3.0 cr)

•[IBH 6233](#) - DBT Skills Training: Group Practices and Treatment Modalities (2.0 cr)

•[IBH 6234](#) - Counseling Grief and Loss (2.0 cr)

•[IBH 6910](#) - Topics in Integrated Behavioral Health (1.0 - 4.0 cr)

•[IBH 6993](#) - Directed Study in Integrated Behavioral Health (1.0 - 3.0 cr)

•[IBH 6996](#) - Internship for Integrated Behavioral Health (1.0 cr)

### Portfolio (1 credit)

Required portfolio course.

[IBH 8002](#) - Portfolio Review (1.0 cr)



### **Twin Cities Campus**

## **Leadership for Science Professionals Postbaccalaureate Certificate**

CCAPS Graduate Programs Instruction

### **College of Continuing and Professional Studies**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

CCAPS - Degree and Credit Programs Room 20 Ruttan Hall 6045B 1994 Buford Ave St Paul, MN 55108

Email: [ccapsinfo@umn.edu](mailto:ccapsinfo@umn.edu)

Website: <http://www.ccaps.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Leadership for Science Professionals PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Leadership for Science Professionals (LSP) certificate is designed for individuals whether career starters or career advancers seeking the strong foundation in leadership skills necessary for advancement in a wide range of professional science and science-adjacent careers in government, non-profit agencies, international organizations, and corporations. The LSP certificate can be completed as a standalone credential or in conjunction with other University graduate degrees.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Bachelors degree from an accredited post-secondary US institution

A 3.0 minimum GPA is preferred

Applicants will need to submit the following:

Online University application

Online application fee

Resume or CV

Professional Statement (1-2 pages) identifying and articulating career goals as related to the certificate

Two letters of recommendation from academic or professional referees

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 84
  - Internet Based - Writing Score: 21
  - Paper Based - Total Score: 563
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 84
- MN Batt

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB, MN Batt).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Courses (12 credits)

Take the following courses:

[APS 6312](#) - Finance for Non-financial Managers (3.0 cr)

[APS 6313](#) - Data for Decision Making (3.0 cr)

[APS 6314](#) - Leading Projects and Teams (3.0 cr)

[APS 6315](#) - Legal and Ethical Issues in Business Sciences (3.0 cr)



### **Twin Cities Campus**

## **Advanced Wearable Products Post-Baccalaureate Certificate**

*Design, Housing & Apparel*

### **College of Design**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

240 McNeal Hall, 1985 Buford Ave, St. Paul, MN 55108

Email: [dhagrad@umn.edu](mailto:dhagrad@umn.edu)

Website: <http://dha.design.umn.edu/programs/grad/index.html>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- N/A
- Degree: Advanced Wearable Products PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Advanced Wearable Products certificate is a supplemental curriculum intended to provide and deepen interdisciplinary skills and knowledge related to the design, development, and assessment of wearable functional products including wearable technology, functional clothing, and personal protective equipment.

### **Accreditation**

This program is accredited by N/A

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Required: undergraduate degree in a related discipline.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

#### **Coursework (12 credits)**

Select at least 12 credits, in consultation with the director of graduate studies, from the following list. DES 5901 can be taken as a stand-alone course; however, if DES 5902 is chosen, it must be taken concurrently with DES 5901.

[DES 5185](#) - Human Factors in Design (3.0 cr)

[APST 5224](#) - Functional Clothing Design (4.0 cr)

[DES 8151](#) - Product Development: Theory and Practice (3.0 cr)

[ADES 4196](#) - Internship in Apparel Design (1.0 - 4.0 cr)

[DES 5188](#) - Anthropometrics, Sizing & Fit (4.0 cr)

[DES 5901](#) - Principles of Wearable Technology (2.0 cr)

[DES 5902](#) - Wearable Technology Laboratory Practicum (2.0 cr)



### **Twin Cities Campus**

## **Architecture M.Arch.**

School of Architecture

College of Design

Link to a [list of faculty](#) for this program.

### **Contact Information:**

School of Architecture, College of Design, University of Minnesota, 145 Rapson Hall, 89 Church Street S.E., Minneapolis, MN 55455  
(612-624-7866; fax: 624-5743)

Website: <http://arch.design.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 59 to 90
- This program does not require summer semesters for timely completion.
- Degree: Master of Architecture

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Architecture encompasses the making and study of the buildings and environments that we inhabit. The concerns of architecture involve a wide variety of areas of study, including the art of representing built projects through drawings and computer graphics; the technology of building structure, building materials, and natural and mechanical systems; the history, theory, and art of making, using, and understanding buildings as cultural artifacts for human use; and the practice of architecture in the context of sustainable environmental systems, urban form, and business economics.

The master's of architecture degree is the accredited three-year professional program that prepares students for licensure and practice in the discipline of architecture as a speculative, analytic, and investigative endeavor. Through rigorous methods of inquiry developed in the design studio, lectures, and seminars students acquire the breadth of knowledge required of the professional architect, including: the techniques and processes of representation, communication, and analysis; the history and theory of making architecture and urban form for human use; and the technology, systems, processes, and economics of construction and practice. The 90-credit M.Arch. professional degree program is accredited by the National Architectural Accrediting Board (NAAB). A portfolio for admission is required.

The M.Arch. program is designed to provide rigorous training in the areas of materials and media literacy, stewardship of the built and natural environment, and systemic, urban-scale thinking. M.Arch. students take required coursework in the areas of design studio, building technology, building structures (statics), structural engineering systems (applications), environmental systems, advanced building technology/integrated building systems, technical applications in design, architectural history, design theory, and catalyst workshops. The required curriculum includes integrated design/technology coursework such as the second year graduate design studio + building structures; a net-positive design studio with a focus on daylighting, solar design, and energy conservation in buildings; an advanced studio focused on urban and landscape systems; a two-part global and cultural history sequence; and a Masters Final Project developed independently by the student. Computer tools and applications as well as analog modes of critical representation are incorporated into the design studio sequence.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS



- Total Score: 6.5
- MELAB
- Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 59 to 90 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The Master's Final Project is a 10-credit studio-based design exploration under the supervision of a studio faculty mentor.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

Advanced placement into the second year is possible for students with a Bachelor of Science or other pre-professional degree and excellent English language proficiency.

### Required Coursework (61 credits)

Take the following required courses for a total of 61 credits:

- [ARCH 5411](#) - Principles of Design Theory (3.0 cr)
- [ARCH 5412](#) - Architecture: A Global and Cultural History (3.0 cr)
- [ARCH 5561](#) - Tech 1, Structures for Building (3.0 cr)
- [ARCH 5562](#) - Tech 2, Intro to Building Technology (3.0 cr)
- [ARCH 5563](#) - Tech 3: Advanced Building Technology Integrated Building Systems (3.0 cr)
- [ARCH 5564](#) - Tech 4: Building Structural Systems (3.0 cr)
- [ARCH 5621](#) - Professional Practice in Architecture (3.0 cr)
- [ARCH 8251](#) - Graduate Architectural Design I (9.0 cr)
- [ARCH 8253](#) - Graduate Architectural Design III (6.0 cr)
- [ARCH 8255](#) - Graduate Architectural Design V (6.0 cr)
- [ARCH 8299](#) - Master's Final Project (10.0 cr)
- [ARCH 5518](#) - Environmental Technology: Integrative Ecological Design for Responsive Architecture (3.0 cr)
- [ARCH 5413](#) - Modern and Contemporary Global Architecture (3.0 cr)
- [ARCH 8254](#) - Technical Applications in Design (3.0 cr)

### Project Modules (9 credits)

Take 9 credits (3 courses) from the following:

- [ARCH 5250](#) - Advanced Topics in Design (1.0 - 6.0 cr)
- or [ARCH 8250](#) - Advanced Topics in Design (1.0 - 6.0 cr)

### Catalysts (2 credits)

Take the following course twice for a total of 2 credits:

- [ARCH 5110](#) - Architecture as Catalyst (1.0 cr)

### Electives (18 credits)

Take 18 credits of Architecture electives. At least 3 credits must be in ARCH 54xx or 84xx.

- Arch 5xxx
- or Arch 8xxx

### Advanced Standing (59 credits)

Students with a bachelor of science in architecture may be eligible for a waiver of the required first-year coursework.

### Required Courses (40 credits)

Take the following courses for 40 credits:

- [ARCH 5563](#) - Tech 3: Advanced Building Technology Integrated Building Systems (3.0 cr)
- [ARCH 5564](#) - Tech 4: Building Structural Systems (3.0 cr)
- [ARCH 5621](#) - Professional Practice in Architecture (3.0 cr)



[ARCH 8253](#) - Graduate Architectural Design III (6.0 cr)  
[ARCH 8255](#) - Graduate Architectural Design V (6.0 cr)  
[ARCH 8299](#) - Master's Final Project (10.0 cr)  
[ARCH 8254](#) - Technical Applications in Design (3.0 cr)  
[ARCH 5411](#) - Principles of Design Theory (3.0 cr)  
[ARCH 5413](#) - Modern and Contemporary Global Architecture (3.0 cr)

**Project Modules (3 credits)**

Take one of the following courses once for 3 credits:

[ARCH 5250](#) - Advanced Topics in Design (1.0 - 6.0 cr)  
or [ARCH 8250](#) - Advanced Topics in Design (1.0 - 6.0 cr)

**Catalysts (1 credit)**

Take the following course for 1 credit:

[ARCH 5110](#) - Architecture as Catalyst (1.0 cr)

Take 15 credits of Architecture electives. At least 3 credits must be in ARCH 54xx or 84xx.

Arch 5xxx  
or Arch 8xxx

**Joint- or Dual-degree Coursework:** M.Arch/M.S.-Architecture Student may take a total of 24 credits in common among the academic programs.





**Twin Cities Campus**  
**Architecture M.S.**  
*School of Architecture*  
**College of Design**

Link to a [list of faculty](#) for this program.

**Contact Information:**

School of Architecture, University of Minnesota, 145 Rapson Hall, 89 Church Street SE, Minneapolis, MN 55455 (612-624-7866; fax: 612-624-5743)

Email: [archinfo@umn.edu](mailto:archinfo@umn.edu)

Website: <http://arch.cdes.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 34
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The School of Architecture offers four distinct master of science in architecture degrees:

- 1) MS in architecture, sustainable design track (plan A or B);
- 2) MS in architecture, heritage conservation and preservation track (plan A or B);
- 3) MS in architecture, metropolitan design track (plan A, B, or C); and,
- 4) MS in architecture, research practices track (plan C only).

Each of the above has its own unique application requirements, prerequisites, and curriculum structure. Prospective applicants are encouraged to consult the degree programs section of the School of Architecture website for additional information: <http://arch.design.umn.edu>. Students who successfully complete the a master of science in architecture degree are eligible to receive 936 hours of IDP credit that is 17% of the 5,600 hours of mandatory internship for registration as an architect. To receive the IDP credit, the MS degree must be earned after receiving the M.Arch degree. The MS metropolitan design track requires summer semester coursework. The other three MS tracks do not require summer semester work.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

Other requirements to be completed before admission:

Each of the master of science in architecture programs has its own unique application requirements, prerequisites, and curriculum structure. Prospective applicants are encouraged to consult the degree programs section of the School of Architecture website for additional information: <http://arch.design.umn.edu>.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS
- MELAB

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 18 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 27 to 28 major credits and 6 credits outside the major. The final exam is oral.

**Plan C:** Plan C requires 24 to 30 major credits and 0 to 6 credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

**Joint- or Dual-degree Coursework:** M.Arch/MS-Architecture/MLA/MS-Architecture Student may take a total of 24 credits in common among the academic programs.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Sustainable Design

This sub-plan is limited to students completing the program under Plan A or Plan B.

The sustainable design track of the MS admits from diverse design and environmental backgrounds. Candidates for the program include, practicing design professionals, architecture graduate students, engineering and environmental science professionals, and related disciplines. Ideal applicants will have a clear sustainable design research agenda, experience in environmental design or design production, and a desire to develop new knowledge in the sustainable design field.

The sustainable design track's goals are to foster sustainable design education, research, and practice and to create a significant positive impact on sustainable design in the region and nation. It will achieve these goals by providing courses and research opportunities that:

Promote excellence and innovations in regional and global ecological design practice and research.

Contribute to the evolving and emerging sustainable design practice and research knowledge base, which includes ecological, environmental, social, and economic issues and impacts.

Provide architectural designers and researchers with qualitative and quantitative knowledge, methods, and tools to implement sustainable design in professional practice.

### Required Coursework

Take the following courses for a total of 12 credits:

- ARCH 8561 - Sustainable Design Theory and Practice (3.0 cr)
- ARCH 8567 - Site and Water Issues in Sustainable Design (3.0 cr)
- ARCH 8563 - Energy and Indoor Environmental Quality Issues in Sustainable Design (3.0 cr)
- ARCH 8565 - Materials Performance in Sustainable Building (3.0 cr)

### Architecture Electives

Take at least 6 ARCH elective credits, in consultation with the advisor or director of graduate studies.

#### Arch Electives

Take 6 - 7 credit(s) from the following:

- ARCH 5521 - Material Investigation: Concrete (4.0 cr)
- ARCH 5523 - Material Investigation: Steel and Glass (4.0 cr)
- ARCH 5527 - Material Investigations: Stone and Water (4.0 cr)
- ARCH 5541 - Material Strategies (3.0 cr)

#### Electives Outside Architecture

Take at least 6 credits outside the major, in consultation with the advisor or director of graduate studies.

Take 6 - 7 credit(s) from the following:

- SSM 5414 - Advanced Residential Building Science (4.0 cr)
- DES 5168 - Evidence-Based Design (3.0 cr)
- EEB 5053 - Ecology: Theory and Concepts (4.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- ESPM 5256 - Natural Resource Law and the Management of Public Lands and Waters (3.0 cr)
- ESPM 5261 - Economics and Natural Resources Management (4.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)



- [ESPM 5605](#) - Recycling: Extending Raw Materials Supplies (3.0 cr)
- [HSCI 5244](#) - Nature's History: Science, Humans, and the Environment (3.0 cr)
- [LA 5413](#) - Introduction to Landscape Architectural History (3.0 cr)
- [LA 5514](#) - Making the Mississippi (3.0 cr)
- [PA 5211](#) - Land Use Planning (3.0 cr)
- [PA 5253](#) - Designing Planning and Participation Processes (3.0 cr)
- [PA 5271](#) - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)
- [PA 5511](#) - Community Economic Development (3.0 cr)
- [PA 5721](#) - Energy Systems and Policy (3.0 cr)
- [PA 5722](#) - Economics of Natural Resource and Environmental Policy (3.0 cr)
- [PSY 5960](#) - Topics in Psychology (1.0 - 4.0 cr)

#### Plan A Requirements

Take 10 master's thesis credits.

[ARCH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

#### Plan B Requirements

Take at least 10 additional credits, in consultation with the advisor or director of graduate studies.

#### Additional credits

Take 10 - 11 credit(s) from the following:

- [ARCH 5521](#) - Material Investigation: Concrete (4.0 cr)  
or [ARCH 5523](#) - Material Investigation: Steel and Glass (4.0 cr)  
or [ARCH 5527](#) - Material Investigations: Stone and Water (4.0 cr)  
or [ARCH 5541](#) - Material Strategies (3.0 cr)  
or [SSM 5414](#) - Advanced Residential Building Science (4.0 cr)  
or [DES 5168](#) - Evidence-Based Design (3.0 cr)  
or [ESPM 5242](#) - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)  
or [ESPM 5245](#) - Sustainable Land Use Planning and Policy (3.0 cr)  
or [ESPM 5251](#) - Natural Resources in Sustainable International Development (3.0 cr)  
or [ESPM 5256](#) - Natural Resource Law and the Management of Public Lands and Waters (3.0 cr)  
or [ESPM 5261](#) - Economics and Natural Resources Management (4.0 cr)  
or [ESPM 5603](#) - Environmental Life Cycle Analysis (3.0 cr)  
or [ESPM 5605](#) - Recycling: Extending Raw Materials Supplies (3.0 cr)  
or [HSCI 5244](#) - Nature's History: Science, Humans, and the Environment (3.0 cr)  
or [LA 5413](#) - Introduction to Landscape Architectural History (3.0 cr)  
or [LA 5514](#) - Making the Mississippi (3.0 cr)  
or [PA 5211](#) - Land Use Planning (3.0 cr)  
or [PA 5253](#) - Designing Planning and Participation Processes (3.0 cr)  
or [PA 5271](#) - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)  
or [PA 5511](#) - Community Economic Development (3.0 cr)  
or [PA 5721](#) - Energy Systems and Policy (3.0 cr)  
or [PA 5722](#) - Economics of Natural Resource and Environmental Policy (3.0 cr)  
or [PSY 5960](#) - Topics in Psychology (1.0 - 4.0 cr)

#### Heritage Conservation & Preservation

This sub-plan is limited to students completing the program under Plan A or Plan B.

The heritage conservation and preservation track of the Architecture MS offers courses and research opportunities in the study of the preservation of historic buildings, districts, and landscapes, as well as the design and management of cultural heritage sites. The track explores heritage on several distinct but related levels. It examines the materiality of heritage resources through documentation, diagnosis, and the design of treatment interventions. It also encourages critical analysis and assessment of the cultural values that underlie and define preservation policies, laws, and professional norms. Through fieldwork, case studies, and courses that investigate regional, national, and global heritage, the track focuses on the philosophy, policy, technology, economics, and social implications of heritage preservation.

#### Required Coursework

Take the following courses for a total of 6 credits:

- [ARCH 5671](#) - Historic Preservation (3.0 cr)
- [ARCH 5673](#) - Historic Property Research and Documentation (3.0 cr)

#### Heritage Conservation and Preservation Electives

Take 2 courses from the following list for at least 6 credits:

- [ARCH 5410](#) - Topics in Architectural History (3.0 cr)
- [ARCH 5411](#) - Principles of Design Theory (3.0 cr)
- [ARCH 5412](#) - Architecture: A Global and Cultural History (3.0 cr)
- [ARCH 5670](#) - Topics in Historic Preservation (1.0 - 3.0 cr)



- [ARCH 5672](#) - Historic Building Conservation (3.0 cr)
- [ARCH 5674](#) - World Heritage Conservation (3.0 cr)
- [ARCH 5676](#) - Economics of Heritage Preservation (3.0 cr)
- [ARCH 5677](#) - Preservation of the Vernacular Built Environment and Cultural Landscape (3.0 cr)
- [ARCH 5678](#) - Preservation & Sustainability (3.0 cr)

#### Architecture Electives

Take at least 6 ARCH elective credits, in consultation with the advisor or director of graduate studies.

Take 6 - 7 credit(s) from the following:

- [ARCH 5441](#) - Minnesota: Architecture and Landscapes (3.0 cr)
- [ARCH 5711](#) - Theory and Principles of Urban Design (3.0 cr)
- [ARCH 4435](#) - History of American Architecture (3.0 cr)
- [ARCH 5609](#) - Development and Implementation of Research (3.0 cr)

#### Electives Outside Architecture

Take at least 6 credits outside the major, in consultation with the advisor or director of graduate studies.

Take 6 - 7 credit(s) from the following:

- [ESPM 5245](#) - Sustainable Land Use Planning and Policy (3.0 cr)
- [LA 5413](#) - Introduction to Landscape Architectural History (3.0 cr)
- [LA 5514](#) - Making the Mississippi (3.0 cr)
- [PA 5211](#) - Land Use Planning (3.0 cr)
- [PA 5253](#) - Designing Planning and Participation Processes (3.0 cr)
- [PA 5271](#) - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)
- [PA 5511](#) - Community Economic Development (3.0 cr)
- [PA 5221](#) - Private Sector Development (3.0 cr)
- [MST 5011](#) - Museum History and Philosophy (3.0 cr)
- [MST 5012](#) - Museum Practices (3.0 cr)

#### Plan A Requirements

Take 10 master's thesis credits.

[ARCH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

#### Plan B Requirements

Take an additional 9 to 10 credits, in consultation with the advisor or director of graduate studies.

Take 9 - 10 credit(s) from the following:

- [ARCH 5441](#) - Minnesota: Architecture and Landscapes (3.0 cr)
- [ARCH 5711](#) - Theory and Principles of Urban Design (3.0 cr)
- [ARCH 5435](#) - History of American Architecture (3.0 cr)
- [ESPM 5245](#) - Sustainable Land Use Planning and Policy (3.0 cr)
- [LA 5413](#) - Introduction to Landscape Architectural History (3.0 cr)
- [LA 5514](#) - Making the Mississippi (3.0 cr)
- [PA 5211](#) - Land Use Planning (3.0 cr)
- [PA 5253](#) - Designing Planning and Participation Processes (3.0 cr)
- [PA 5271](#) - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)
- [PA 5511](#) - Community Economic Development (3.0 cr)
- [PA 5221](#) - Private Sector Development (3.0 cr)
- [MST 5011](#) - Museum History and Philosophy (3.0 cr)
- [MST 5012](#) - Museum Practices (3.0 cr)

#### Metropolitan Design

This sub-plan is limited to students completing the program under Plan A, Plan B, or Plan C.

The metropolitan design track of the architecture MS is an advanced program intended for individuals who are keenly interested in the study of cities and their metropolitan regions. The track combines strong design instruction supported by applied research courses in urban design history and theory. The objective is to train students to work across a large range of urban scales and become familiar with the social, ecological, economic, and political interactions that eventually shape the quality of city living. It is open to professionals from the design disciplines and provides concurrent options for graduate students enrolled in the M.Arch and MLA professional programs. Concurrent students must graduate from the Architecture MS (metropolitan design track) after they have successfully completed their professional programs.

#### Required Coursework

Take the following courses for a total of 12 credits:

- [ARCH 5711](#) - Theory and Principles of Urban Design (3.0 cr)
- [ARCH 5721](#) - Case Studies in Urban Design (3.0 cr)
- [ARCH 8255](#) - Graduate Architectural Design V (6.0 cr)

#### Electives Outside Architecture

Take at least 6 credits outside the major, in consultation with the advisor or director of graduate studies.

Take 6 - 7 credit(s) from the following:



- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5511 - Community Economic Development (3.0 cr)
- HSG 5467 - Housing and the Social Environment (4.0 cr)
- HSG 5463 - Housing Policy (3.0 cr)
- LA 5405 - Interdisciplinary Studies in Landscape Architecture (1.0 - 6.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- PA 5721 - Energy Systems and Policy (3.0 cr)
- PA 5722 - Economics of Natural Resource and Environmental Policy (3.0 cr)
- PA 5723 - Water Policy (3.0 cr)
- PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)
- PA 5211 - Land Use Planning (3.0 cr)
- PA 5212 - Managing Urban Growth and Change (3.0 cr)
- PA 5231 - Transit Planning and Management (3.0 cr)
- PA 5261 - Housing Policy (3.0 cr)
- PA 5802 - Global Economic Policy (3.0 cr)

#### Remaining Electives

Take elective credits from the following list, in consultation with the advisor or director of graduate studies, to meet minimum major and total course credit requirements:

Take 6 - 7 credit(s) from the following:

- ARCH 5410 - Topics in Architectural History (3.0 cr)
- ARCH 5441 - Minnesota: Architecture and Landscapes (3.0 cr)
- ARCH 5731 - Territorial City (3.0 cr)
- ARCH 5671 - Historic Preservation (3.0 cr)
- ARCH 5361 - 3-D Computer Architectural Modeling and Design (3.0 cr)
- ARCH 5750 - Topics in Urban Design (1.0 - 4.0 cr)
- PA 5511 - Community Economic Development (3.0 cr)
- HSG 5467 - Housing and the Social Environment (4.0 cr)
- LA 5405 - Interdisciplinary Studies in Landscape Architecture (1.0 - 6.0 cr)
- ARCH 8561 - Sustainable Design Theory and Practice (3.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- PA 5721 - Energy Systems and Policy (3.0 cr)
- PA 5722 - Economics of Natural Resource and Environmental Policy (3.0 cr)
- PA 5723 - Water Policy (3.0 cr)
- PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)
- PA 5211 - Land Use Planning (3.0 cr)
- PA 5212 - Managing Urban Growth and Change (3.0 cr)
- PA 5231 - Transit Planning and Management (3.0 cr)
- PA 5261 - Housing Policy (3.0 cr)
- PA 5802 - Global Economic Policy (3.0 cr)

#### Plan A Requirements

Take 10 master's thesis credits.

[ARCH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

#### Research Practices

This sub-plan is limited to students completing the program under Plan C.

The Research Practices track addresses two goals: providing a structured path to licensure totaling seven years, and integrating research with practice.

MS-RP students are required to maximize their progress toward completing the Architectural Experience Program (AXP) during their MS program. This means work in a firm or other AXP setting is required while enrolled in the program, including each semester and summer between semesters. Exceptions will be made for extraordinary circumstances (such as grant-funded research or personal situation).

#### Required Coursework

Take the following courses for a total of 18 credits:

- [ARCH 5609](#) - Development and Implementation of Research (3.0 cr)
- [ARCH 5621](#) - Professional Practice in Architecture (3.0 cr)
- [ARCH 5651](#) - Building Stories (3.0 cr)
- [ARCH 5686](#) - Research Practices Final Project: Research into Practice (4.0 cr)
- [ARCH 5687](#) - Research Practices Final Project: Practice into Research (4.0 cr)
- [ARCH 5688](#) - Research Practices Final Project: Representation of Case Studies (1.0 cr)

#### Required Practicum

Take the following course twice:



[ARCH 5630](#) - Practicum: Advanced Issues in Practice (3.0 cr)

**Electives**

Take two 3-credit elective courses from architecture or non-architecture offerings, in consultation with the adviser or director of graduate studies.

ARCH 5xxx

ARCH 8xxx

xxxx 5xxx

xxxx 6xxx

xxxx 7xxx

xxxx 8xxx



### **Twin Cities Campus**

## **Design M.A.**

*Design, Housing & Apparel*

### **College of Design**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Design Graduate Program, 240 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108.

Email: [dhagrad@umn.edu](mailto:dhagrad@umn.edu)

Website: <http://dha.design.umn.edu/programs/grad>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 34
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The design graduate program focuses on the study of relationships between humans and their designed environments. This focus is based on the assumption that design and analysis of environments contributes to the improvement of the human condition. The program addresses theory, research, and application, using a shared disciplinary base from the arts and social and behavioral sciences. The goal of the program is for students to analyze, evaluate, and integrate theoretical frameworks related to humans and their designed environments.

Applications submitted to the design graduate program specify a track and degree objective.

Formal tracks are:

Apparel studies (including dress, history, and culture; product development; and retail and consumer studies)  
Graphic design  
Housing studies  
Interior design

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Eligibility requirements vary by track. Requirements by track are available on the track pages of the design graduate program website: <http://dha.design.umn.edu/programs/grad>

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5

The preferred English language test is Test of English as Foreign Language



Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 18 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 28 major credits and 6 credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Students may be required to complete additional credits upon recommendation of their committee.

### Design Program Core Requirements

[DES 8181](#) - Research Ethics (1.0 cr)

### Related Field Coursework

Students are required to take a minimum of 6 credits in a related field. Courses are selected with the approval of the advisor and committee.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Apparel Studies

The Apparel Studies track advances both theoretical knowledge and applications for textile and apparel products and their relationship to human behavior using a design lens. Students may focus on product development; dress, history, and culture; or retail and consumer studies. Within each of these areas of emphasis within the track, the student completes related coursework as well as research or creative production that culminates in a thesis. The MA degree is focused on the arts and humanities and is appropriate for the dress, history, and culture emphasis.

### Evaluation and Analysis Coursework

Students are required to take a minimum of 6 credits in evaluation and analysis.

Students may take other courses with the approval of the advisor and committee.

Take 6 or more credit(s) from the following:

- [DES 8102](#) - Quantitative Research Methods (3.0 cr)
- [DES 8103](#) - Qualitative and Mixed Methods Research (3.0 cr)

### Concentration

#### Dress, History, and Culture

##### Theory and Philosophy Coursework

Students take a minimum of 3 credits in this category.

[DES 8112](#) - Design Theory (3.0 cr)

or [DES 8164](#) - Innovation Theory and Analysis (3.0 cr)

##### Plan A Requirements

Take 8 or more credit(s) from the following:

- [APST 5193](#) - Directed Study in Apparel Studies (1.0 - 4.0 cr)
- [APST 5218](#) - Fashion, Design, and the Global Industry (3.0 cr)
- [APST 8192](#) - Readings in Apparel Studies (1.0 - 3.0 cr)
- [APST 8193](#) - Directed Study (1.0 - 3.0 cr)





- APST 8268 - Behavioral Aspects of Dress (3.0 cr)
- DES 5165 - Design and Globalization (3.0 cr)
- DES 8112 - Design Theory (3.0 cr)
- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- DES 8164 - Innovation Theory and Analysis (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)
- DES 8167 - Aesthetics of Design (3.0 cr)

•**Thesis credits**

Students take a minimum of 10 thesis credits.

- DES 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

or **Plan B Requirements**

All Plan B Master's students are required to register for DES 8222, Plan B Master's Project, the last semester of the program.

Take 15 or more credit(s) from the following:

- APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)
- APST 5218 - Fashion, Design, and the Global Industry (3.0 cr)
- APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)
- APST 8193 - Directed Study (1.0 - 3.0 cr)
- APST 8268 - Behavioral Aspects of Dress (3.0 cr)
- DES 5165 - Design and Globalization (3.0 cr)
- DES 8112 - Design Theory (3.0 cr)
- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- DES 8164 - Innovation Theory and Analysis (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)
- DES 8167 - Aesthetics of Design (3.0 cr)

•**Plan B Master's Project**

Students take a minimum of 3 credits in this category.

- APST 8222 - Plan B Master's Project (3.0 cr)

-OR-

**Product Development**

**Theory and Philosophy Coursework**

Students take a minimum of 3 credits in this category.

DES 8112 - Design Theory (3.0 cr)

or DES 8164 - Innovation Theory and Analysis (3.0 cr)

**Plan A Requirements**

Take 8 or more credit(s) from the following:

- APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)
- APST 5218 - Fashion, Design, and the Global Industry (3.0 cr)
- APST 5224 - Functional Clothing Design (4.0 cr)
- APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)
- APST 8193 - Directed Study (1.0 - 3.0 cr)
- DES 5185 - Human Factors in Design (3.0 cr)
- DES 5188 - Anthropometrics, Sizing & Fit (4.0 cr)
- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8114 - Design Studio (4.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- DES 8151 - Product Development: Theory and Practice (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)
- DES 8167 - Aesthetics of Design (3.0 cr)
- GDES 8361 - Color, Design, and Human Perception (3.0 cr)

•**Thesis Credits**

Students take a minimum of 10 thesis credits.

- DES 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

or **Plan B Requirements**

Plan B Master's students are required to take DES 8222, Master's Plan B Project, the final semester of the program.

Take 15 or more credit(s) from the following:

- APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)
- APST 5218 - Fashion, Design, and the Global Industry (3.0 cr)
- APST 5224 - Functional Clothing Design (4.0 cr)
- APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)
- APST 8193 - Directed Study (1.0 - 3.0 cr)
- DES 5185 - Human Factors in Design (3.0 cr)
- DES 5188 - Anthropometrics, Sizing & Fit (4.0 cr)



- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8114 - Design Studio (4.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- DES 8151 - Product Development: Theory and Practice (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)
- DES 8167 - Aesthetics of Design (3.0 cr)
- GDES 8361 - Color, Design, and Human Perception (3.0 cr)
- Plan B Master's Project  
Students take a minimum of 3 credits in this category.
- APST 8222 - Plan B Master's Project (3.0 cr)

-OR-

## Retail and Consumer Studies

### Theory and Philosophy Coursework

APST 8272 - Digital Consumers: Theories in Retail and Consumer Studies (3.0 cr)

#### Plan A Requirements

Take 8 or more credit(s) from the following:

- APST 5117 - Retail Environments and Human Behavior (3.0 cr)
- APST 5123 - Living in a Consumer Society (3.0 cr)
- APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)
- APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)
- APST 8193 - Directed Study (1.0 - 3.0 cr)
- APST 8268 - Behavioral Aspects of Dress (3.0 cr)
- APST 8271 - Retailing: Strategic Perspectives (3.0 cr)
- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- DES 8151 - Product Development: Theory and Practice (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)
- DES 8167 - Aesthetics of Design (3.0 cr)

#### Thesis Credits

Students take a minimum of 10 thesis credits.

- DES 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

#### or Plan B Requirements

Plan B Master's students are required to take APST 8222, Master's Plan B Project, the final semester of the program.

Take 15 or more credit(s) from the following:

- APST 5117 - Retail Environments and Human Behavior (3.0 cr)
- APST 5123 - Living in a Consumer Society (3.0 cr)
- APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)
- APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)
- APST 8193 - Directed Study (1.0 - 3.0 cr)
- APST 8268 - Behavioral Aspects of Dress (3.0 cr)
- APST 8271 - Retailing: Strategic Perspectives (3.0 cr)
- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- DES 8151 - Product Development: Theory and Practice (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)
- DES 8167 - Aesthetics of Design (3.0 cr)

#### Plan B Master's Project

Students take a minimum of 3 credits in this category.

- APST 8222 - Plan B Master's Project (3.0 cr)

## Graphic Design

The track in graphic design focuses on design theory, process, and methods related to design practice and research. Potential areas of study include graphic design history, theory, and critical narrative; design creativity; color and design; user-centered design; design authorship; data visualization; and interactive design.

## Theory and Philosophy Coursework

Students take a minimum of 3 credits in this category.

DES 8112 - Design Theory (3.0 cr)

or DES 8164 - Innovation Theory and Analysis (3.0 cr)

## Evaluation and Analysis Coursework

Students take a minimum of 6 credits in this category.

DES 8102 - Quantitative Research Methods (3.0 cr)

or DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)



or [GDES 5388](#) - Graphic Design Research (3.0 cr)

### Concentration

#### Plan A Requirements

Students are required to take DES 8114, and GDES 8361 or GDES 8362.

Take 8 or more credit(s) from the following:

- [DES 8113](#) - Teaching and Assessment (2.0 cr)
- [DES 8114](#) - Design Studio (4.0 cr)
- [DES 8115](#) - Grant Writing (2.0 cr)
- [GDES 4131W](#) - History of Graphic Design [WI] (4.0 cr)
- [GDES 4330](#) - Surface Fabric Design Workshop (4.0 cr)
- [GDES 4345](#) - Advanced Typography (4.0 cr)
- [GDES 5193](#) - Directed Study in Graphic Design (1.0 - 4.0 cr)
- [GDES 5311](#) - Illustration (3.0 cr)
- [GDES 5341](#) - Interaction Design (3.0 cr)
- [GDES 5342](#) - Advanced Web Design (3.0 cr)
- [GDES 5371](#) - Data Visualization Studio (3.0 cr)
- [GDES 5372](#) - Data Visualization for Interactive Platforms (3.0 cr)
- [GDES 5383](#) - Digital Illustration and Animation (3.0 cr)
- [GDES 5386](#) - Fundamentals of Game Design (3.0 cr)
- [GDES 8192](#) - Readings in Graphic Design (1.0 - 3.0 cr)
- [GDES 8193](#) - Directed Study (1.0 - 3.0 cr)
- [GDES 8361](#) - Color, Design, and Human Perception (3.0 cr)
- [GDES 8362](#) - The Nature of Representation in Visual Communication (3.0 cr)

#### •Thesis Credits

Students take a minimum of 10 thesis credits.

- [DES 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B Requirements

Students are required to take DES 8114, and GDES 8361 or GDES 8362. Plan B Master's students are required to take GDES 8222, Plan B Master's Project, the last semester of the program.

Take 15 or more credit(s) from the following:

- [DES 8113](#) - Teaching and Assessment (2.0 cr)
- [DES 8114](#) - Design Studio (4.0 cr)
- [DES 8115](#) - Grant Writing (2.0 cr)
- [GDES 4131W](#) - History of Graphic Design [WI] (4.0 cr)
- [GDES 4330](#) - Surface Fabric Design Workshop (4.0 cr)
- [GDES 4345](#) - Advanced Typography (4.0 cr)
- [GDES 5193](#) - Directed Study in Graphic Design (1.0 - 4.0 cr)
- [GDES 5311](#) - Illustration (3.0 cr)
- [GDES 5341](#) - Interaction Design (3.0 cr)
- [GDES 5342](#) - Advanced Web Design (3.0 cr)
- [GDES 5371](#) - Data Visualization Studio (3.0 cr)
- [GDES 5372](#) - Data Visualization for Interactive Platforms (3.0 cr)
- [GDES 5383](#) - Digital Illustration and Animation (3.0 cr)
- [GDES 5386](#) - Fundamentals of Game Design (3.0 cr)
- [GDES 8192](#) - Readings in Graphic Design (1.0 - 3.0 cr)
- [GDES 8193](#) - Directed Study (1.0 - 3.0 cr)
- [GDES 8361](#) - Color, Design, and Human Perception (3.0 cr)
- [GDES 8362](#) - The Nature of Representation in Visual Communication (3.0 cr)

#### •Plan B Master's Project

Students take a minimum of 3 credits in this category.

- [GDES 8222](#) - Plan B Master's Project (3.0 cr)

### Housing Studies

Applications for the Housing Studies Track graduate study and certificate are no longer being accepted.

The housing studies track advances both theoretical and applied knowledge in the housing field. Through research experiences, students are prepared to assist people and communities in addressing housing-related issues. Courses emphasize human needs and behavior, analysis of designed environments, policy and community development, and housing of specific subpopulations such as the elderly or low-income families with children.

### Theory and Philosophy: Required Course



[HSG 8467](#) - Theoretical Perspectives in Housing Studies (3.0 cr)

#### **Evaluation and Analysis Coursework**

Students take a minimum of 6 credits in this category.

Take 6 or more credit(s) from the following:

- [DES 8102](#) - Quantitative Research Methods (3.0 cr)
- [DES 8103](#) - Qualitative and Mixed Methods Research (3.0 cr)
- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)

#### **Concentration**

##### **Plan A Requirements**

8 credits are required. Students are required to take [HSG 5463](#) and [HSG 5467](#).

Take 8 or more credit(s) from the following:

- [DES 8113](#) - Teaching and Assessment (2.0 cr)
- [DES 8115](#) - Grant Writing (2.0 cr)
- [HSG 4461](#) - Housing Development and Management (4.0 cr)
- [HSG 4465](#) - Housing in a Global Perspective (3.0 cr)
- [HSG 5170](#) - Topics in Housing Studies (1.0 - 4.0 cr)
- [HSG 5193](#) - Directed Study in Housing Studies (1.0 - 4.0 cr)
- [HSG 5462](#) - Housing and Community Development (3.0 cr)
- [HSG 5463](#) - Housing Policy (3.0 cr)
- [HSG 5467](#) - Housing and the Social Environment (4.0 cr)
- [HSG 8170](#) - Topics in Housing Studies (1.0 - 3.0 cr)
- [HSG 8180](#) - Professional Seminar (1.0 - 2.0 cr)
- [HSG 8192](#) - Readings in Housing Studies (1.0 - 3.0 cr)
- [HSG 8193](#) - Directed Study (1.0 - 3.0 cr)

##### **Thesis Credits**

Students take a minimum of 10 credits in this category.

[DES 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### **Plan B Requirements**

15 credits are required. Students are required to take [HSG 5463](#) and [HSG 5467](#).

Take 15 or more credit(s) from the following:

- [DES 8113](#) - Teaching and Assessment (2.0 cr)
- [DES 8115](#) - Grant Writing (2.0 cr)
- [HSG 4461](#) - Housing Development and Management (4.0 cr)
- [HSG 4465](#) - Housing in a Global Perspective (3.0 cr)
- [HSG 5170](#) - Topics in Housing Studies (1.0 - 4.0 cr)
- [HSG 5193](#) - Directed Study in Housing Studies (1.0 - 4.0 cr)
- [HSG 5462](#) - Housing and Community Development (3.0 cr)
- [HSG 5463](#) - Housing Policy (3.0 cr)
- [HSG 5467](#) - Housing and the Social Environment (4.0 cr)
- [HSG 8170](#) - Topics in Housing Studies (1.0 - 3.0 cr)
- [HSG 8180](#) - Professional Seminar (1.0 - 2.0 cr)
- [HSG 8192](#) - Readings in Housing Studies (1.0 - 3.0 cr)
- [HSG 8193](#) - Directed Study (1.0 - 3.0 cr)

##### **Plan B Master's Project**

[HSG 8222](#) - Plan B Master's Project (3.0 cr)

#### **Interior Design**

Graduate study in the interior design track emphasizes the theory, research, and specialized practice components of design as applied to people's health, safety, and welfare in the interior environment, including culture, sustainability, and issues facing design education. Advances in theoretical knowledge and study of the interactions of humans in interior environments prepare students for teaching and research positions as well as specializations within the professions. A prior degree in interior design or architecture is required for admission to the study interior design at the graduate level.

#### **Theory and Philosophy Coursework**

[DES 8112](#) - Design Theory (3.0 cr)

or [DES 8164](#) - Innovation Theory and Analysis (3.0 cr)

or [DES 8166](#) - Material Culture and Design (3.0 cr)

#### **Evaluation and Analysis Coursework**

Students should take a minimum of six credits. Statistics course is required and either [DES 8102](#) or [DES 8103](#).

Take 6 or more credit(s) from the following:

- [DES 8102](#) - Quantitative Research Methods (3.0 cr)



- [DES 8103](#) - Qualitative and Mixed Methods Research (3.0 cr)
- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- [EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)
- [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)

**Concentration**

Take 8 or more credit(s) from the following:

- [DES 5165](#) - Design and Globalization (3.0 cr)
- [DES 5168](#) - Evidence-Based Design (3.0 cr)
- [DES 5185](#) - Human Factors in Design (3.0 cr)
- [DES 8113](#) - Teaching and Assessment (2.0 cr)
- [DES 8115](#) - Grant Writing (2.0 cr)
- [GDES 8361](#) - Color, Design, and Human Perception (3.0 cr)
- [IDES 8192](#) - Readings in Interior Design (1.0 - 3.0 cr)
- [IDES 8193](#) - Directed Study (1.0 - 3.0 cr)

**Thesis Credits**

Students take a minimum of 10 credits in this category.

- [DES 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Design M.F.A.**

*Design, Housing & Apparel*

### **College of Design**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies, Design Graduate Program, 240 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108.

Email: [dhagrad@umn.edu](mailto:dhagrad@umn.edu)

Website: <http://dha.design.umn.edu/programs/grad>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Master of Fine Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The design graduate program focuses on the study of relationships between humans and their designed environments. This focus is based on the assumption that design and analysis of environments contributes to the improvement of the human condition. The program addresses theory, research, and application, using a shared disciplinary base from the arts and social and behavioral sciences. The goal of the program is for students to analyze, evaluate, and integrate theoretical frameworks related to humans and their designed environments.

Applications submitted to the design graduate program specify the track and degree objective.

The MFA is available in the graphic design track only.

The track in graphic design focuses on design theory, process, and methods related to design practice and research. Potential areas of study include graphic design history, theory, and critical narrative; design creativity; color and design; user-centered design; design authorship; data visualization; and interactive design.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Eligibility requirements vary by track. Requirements by track are available on the track pages of the design graduate program website: <http://dha.design.umn.edu/programs/grad>

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6
  - Reading Score: 6.5
  - Writing Score: 6.5

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

**Plan C:** Plan C requires 52 major credits and 8 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** MFA coursework and research culminates in a creative thesis, which includes a paper and extensive creative project.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Students may be required to complete additional credits upon recommendation of their committee.

### Design Program Core Requirement

[DES 8181](#) - Research Ethics (1.0 cr)

### Related Field

Students are required to take a minimum of 8 credits in a related field. Courses are selected with the approval of the advisor and committee.

### Theory and Philosophy

Take 6 or more credit(s) from the following:

- [DES 8112](#) - Design Theory (3.0 cr)
- [DES 8164](#) - Innovation Theory and Analysis (3.0 cr)

### Evaluation and Analysis

Take 6 or more credit(s) from the following:

- [GDES 5388](#) - Graphic Design Research (3.0 cr)
- [DES 8102](#) - Quantitative Research Methods (3.0 cr)
- [DES 8103](#) - Qualitative and Mixed Methods Research (3.0 cr)

### Concentration

All students are required to take [DES 8114](#), [GDES 8361](#), and [GDES 8362](#).

Take 27 or more credit(s) from the following:

- [DES 8113](#) - Teaching and Assessment (2.0 cr)
- [DES 8114](#) - Design Studio (4.0 cr)
- [DES 8115](#) - Grant Writing (2.0 cr)
- [GDES 4131W](#) - History of Graphic Design [WI] (4.0 cr)
- [GDES 4330](#) - Surface Fabric Design Workshop (4.0 cr)
- [GDES 4345](#) - Advanced Typography (4.0 cr)
- [GDES 5193](#) - Directed Study in Graphic Design (1.0 - 4.0 cr)
- [GDES 5311](#) - Illustration (3.0 cr)
- [GDES 5341](#) - Interaction Design (3.0 cr)
- [GDES 5342](#) - Advanced Web Design (3.0 cr)
- [GDES 5371](#) - Data Visualization Studio (3.0 cr)
- [GDES 5372](#) - Data Visualization for Interactive Platforms (3.0 cr)
- [GDES 5383](#) - Digital Illustration and Animation (3.0 cr)
- [GDES 5386](#) - Fundamentals of Game Design (3.0 cr)
- [GDES 8192](#) - Readings in Graphic Design (1.0 - 3.0 cr)
- [GDES 8193](#) - Directed Study (1.0 - 3.0 cr)
- [GDES 8361](#) - Color, Design, and Human Perception (3.0 cr)
- [GDES 8362](#) - The Nature of Representation in Visual Communication (3.0 cr)

### MFA Creative Thesis Credits

Take 12 credits or more of the following:

[GDES 8990](#) - MFA Creative Thesis (6.0 cr)



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Graphic Design

All Design MMFA students must complete the graphic design track. See program requirements above.





### **Twin Cities Campus**

## **Design M.S.**

*Design, Housing & Apparel*

### **College of Design**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Design Graduate Program, 240 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108.

Email: [dhagrad@umn.edu](mailto:dhagrad@umn.edu)

Website: <http://dha.design.umn.edu/programs/grad>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 34 to 36
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The design graduate program focuses on the study of relationships between humans and their designed environments. This focus is based on the assumption that design and analysis of environments contributes to the improvement of the human condition. The program addresses theory, research, and application, using a shared disciplinary base from the arts and social and behavioral sciences. The goal of the program is for students to analyze, evaluate, and integrate theoretical frameworks related to humans and their designed environments.

Applications submitted to the design graduate program specify a track and degree objective.

Formal tracks are:

Apparel studies (including dress, history, and culture; product development; and retail and consumer studies)  
Graphic design  
Housing studies  
Interior design  
Product design

\*The Housing Studies Track graduate study is no longer accepting applications.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

For specific application requirements, including eligibility requirements for each track, see:  
<http://dha.design.umn.edu/programs/grad/admissions.html>.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS



- Total Score: 6.5
- Reading Score: 6.5
- Writing Score: 6.5

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 18 to 20 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 28 major credits and 6 credits outside the major. The final exam is oral.

**Plan C:** Plan C requires 28 major credits and 6 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Students may be required to complete additional credits upon recommendation of their committee.

### Design Program Core Requirement (1 credit)

Take the following course:

[DES 8181](#) - Research Ethics (1.0 cr)

### Related Field Coursework (6 credits)

Select at least 6 credits in a related field in consultation with the advisor and committee.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Apparel Studies

This sub-plan is limited to students completing the program under Plan A or Plan B.

### Evaluation and Analysis Coursework (6 credits)

Take the following courses, or other coursework with the approval of the advisor and committee, to meet the 6-credit requirement:

[DES 8102](#) - Quantitative Research Methods (3.0 cr)

[DES 8103](#) - Qualitative and Mixed Methods Research (3.0 cr)

### Concentration

#### Dress, History, and Culture

##### Theory and Philosophy Coursework (3 credits)

Select one of the following courses in consultation with the advisor and committee:

[DES 8112](#) - Design Theory (3.0 cr)

or [DES 8164](#) - Innovation Theory and Analysis (3.0 cr)

##### Plan A Electives (8 credits)

Take at least 8 credits from the following in consultation with the advisor and committee:

[APST 5193](#) - Directed Study in Apparel Studies (1.0 - 4.0 cr)

[APST 5218](#) - Fashion, Design, and the Global Industry (3.0 cr)



APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)  
APST 8193 - Directed Study (1.0 - 3.0 cr)  
APST 8268 - Behavioral Aspects of Dress (3.0 cr)  
DES 5165 - Design and Globalization (3.0 cr)  
DES 8112 - Design Theory (3.0 cr)  
DES 8113 - Teaching and Assessment (2.0 cr)  
DES 8115 - Grant Writing (2.0 cr)  
DES 8164 - Innovation Theory and Analysis (3.0 cr)  
DES 8166 - Material Culture and Design (3.0 cr)  
DES 8167 - Aesthetics of Design (3.0 cr)

**Thesis credits**

Plan A students take a minimum of 10 thesis credits.

DES 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

or **Plan B Electives (15 credits)**

Select 15 credits from the following in consultation with the advisor and committee:

APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)  
APST 5218 - Fashion, Design, and the Global Industry (3.0 cr)  
APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)  
APST 8193 - Directed Study (1.0 - 3.0 cr)  
APST 8268 - Behavioral Aspects of Dress (3.0 cr)  
DES 5165 - Design and Globalization (3.0 cr)  
DES 8112 - Design Theory (3.0 cr)  
DES 8113 - Teaching and Assessment (2.0 cr)  
DES 8115 - Grant Writing (2.0 cr)  
DES 8164 - Innovation Theory and Analysis (3.0 cr)  
DES 8166 - Material Culture and Design (3.0 cr)  
DES 8167 - Aesthetics of Design (3.0 cr)

**Plan B Master's Project (3 credits)**

Take at least 3 credits of the following in consultation with the advisor and committee the last semester of the MS program:

APST 8222 - Plan B Master's Project (3.0 cr)

-OR-

**Product Development**

**Theory and Philosophy Coursework (3 credits)**

Take one of the following courses in consultation with the advisor and committee:

DES 8112 - Design Theory (3.0 cr)  
or DES 8164 - Innovation Theory and Analysis (3.0 cr)

**Plan A Electives (8 credits)**

Take at least 8 credits from the following in consultation with the advisor and committee:

APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)  
APST 5218 - Fashion, Design, and the Global Industry (3.0 cr)  
APST 5224 - Functional Clothing Design (4.0 cr)  
APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)  
APST 8193 - Directed Study (1.0 - 3.0 cr)  
DES 5185 - Human Factors in Design (3.0 cr)  
DES 5188 - Anthropometrics, Sizing & Fit (4.0 cr)  
DES 8113 - Teaching and Assessment (2.0 cr)  
DES 8114 - Design Studio (4.0 cr)  
DES 8115 - Grant Writing (2.0 cr)  
DES 8151 - Product Development: Theory and Practice (3.0 cr)  
DES 8166 - Material Culture and Design (3.0 cr)  
DES 8167 - Aesthetics of Design (3.0 cr)  
GDES 8361 - Color, Design, and Human Perception (3.0 cr)

**Thesis Credits**

Plan A students take a minimum of 10 thesis credits.

DES 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

or **Plan B Electives (15 credits)**

Select 15 credits from the following in consultation with the advisor and committee:

APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)  
APST 5218 - Fashion, Design, and the Global Industry (3.0 cr)  
APST 5224 - Functional Clothing Design (4.0 cr)  
APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)  
APST 8193 - Directed Study (1.0 - 3.0 cr)  
DES 5185 - Human Factors in Design (3.0 cr)  
DES 5188 - Anthropometrics, Sizing & Fit (4.0 cr)



DES 8113 - Teaching and Assessment (2.0 cr)  
DES 8114 - Design Studio (4.0 cr)  
DES 8115 - Grant Writing (2.0 cr)  
DES 8151 - Product Development: Theory and Practice (3.0 cr)  
DES 8166 - Material Culture and Design (3.0 cr)  
DES 8167 - Aesthetics of Design (3.0 cr)  
GDES 8361 - Color, Design, and Human Perception (3.0 cr)

**Plan B Master's Project (3 credits)**

Take at least 3 credits of the following in consultation with the advisor and committee the last semester of the MS program:

APST 8222 - Plan B Master's Project (3.0 cr)

-OR-

**Retail and Consumer Studies**

**Theory and Philosophy Coursework (3 credits)**

Take the following course:

APST 8272 - Digital Consumers: Theories in Retail and Consumer Studies (3.0 cr)

**Plan A Electives (8 credits)**

Take at least 8 credits from the following in consultation with the advisor and committee:

APST 5117 - Retail Environments and Human Behavior (3.0 cr)  
APST 5123 - Living in a Consumer Society (3.0 cr)  
APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)  
APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)  
APST 8193 - Directed Study (1.0 - 3.0 cr)  
APST 8268 - Behavioral Aspects of Dress (3.0 cr)  
APST 8271 - Retailing: Strategic Perspectives (3.0 cr)  
DES 8113 - Teaching and Assessment (2.0 cr)  
DES 8115 - Grant Writing (2.0 cr)  
DES 8151 - Product Development: Theory and Practice (3.0 cr)  
DES 8166 - Material Culture and Design (3.0 cr)  
DES 8167 - Aesthetics of Design (3.0 cr)

**Thesis Credits**

Plan A students take a minimum of 10 thesis credits.

DES 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

**or Plan B Electives (15 credits)**

Select 15 credits from the following in consultation with the advisor and committee:

APST 5117 - Retail Environments and Human Behavior (3.0 cr)  
APST 5123 - Living in a Consumer Society (3.0 cr)  
APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)  
APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)  
APST 8193 - Directed Study (1.0 - 3.0 cr)  
APST 8268 - Behavioral Aspects of Dress (3.0 cr)  
APST 8271 - Retailing: Strategic Perspectives (3.0 cr)  
DES 8113 - Teaching and Assessment (2.0 cr)  
DES 8115 - Grant Writing (2.0 cr)  
DES 8151 - Product Development: Theory and Practice (3.0 cr)  
DES 8166 - Material Culture and Design (3.0 cr)  
DES 8167 - Aesthetics of Design (3.0 cr)

**Plan B Master's Project (3 credits)**

Take at least 3 credits of the following in consultation with the advisor and committee the last semester of the program:

APST 8222 - Plan B Master's Project (3.0 cr)

**Graphic Design**

This sub-plan is limited to students completing the program under Plan A or Plan B.

**Theory and Philosophy Coursework (3 credits)**

Take one of the following courses in consultation with the advisor and committee:

DES 8112 - Design Theory (3.0 cr)

or DES 8164 - Innovation Theory and Analysis (3.0 cr)

**Evaluation and Analysis Coursework (6 credits)**

Select two courses from the following in consultation with the advisor and committee:

DES 8102 - Quantitative Research Methods (3.0 cr)

DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)

GDES 5388 - Graphic Design Research (3.0 cr)

**Graphic Design Requirements (7 credits)**



Take DES 8114. Select GDES 8361 or GDES 8362 in consultation with the advisor and committee.

[DES 8114](#) - Design Studio (4.0 cr)

[GDES 8361](#) - Color, Design, and Human Perception (3.0 cr)

[GDES 8362](#) - The Nature of Representation in Visual Communication (3.0 cr)

### Concentration

#### Plan A Electives (1 credit)

Select a course from the following, in consultation with the advisor and committee, to complete the 1-credit requirement:

[DES 8113](#) - Teaching and Assessment (2.0 cr)

[DES 8115](#) - Grant Writing (2.0 cr)

[GDES 4131W](#) - History of Graphic Design [WI] (4.0 cr)

[GDES 4330](#) - Surface Fabric Design Workshop (4.0 cr)

[GDES 4345](#) - Advanced Typography (4.0 cr)

[GDES 5193](#) - Directed Study in Graphic Design (1.0 - 4.0 cr)

[GDES 5311](#) - Illustration (3.0 cr)

[GDES 5341](#) - Interaction Design (3.0 cr)

[GDES 5342](#) - Advanced Web Design (3.0 cr)

[GDES 5371](#) - Data Visualization Studio (3.0 cr)

[GDES 5372](#) - Data Visualization for Interactive Platforms (3.0 cr)

[GDES 5383](#) - Digital Illustration and Animation (3.0 cr)

[GDES 5386](#) - Fundamentals of Game Design (3.0 cr)

[GDES 8192](#) - Readings in Graphic Design (1.0 - 3.0 cr)

[GDES 8193](#) - Directed Study (1.0 - 3.0 cr)

#### Thesis Credits

Plan A students take a minimum of 10 thesis credits.

[DES 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B Electives (8 credits)

Select 8 credits from the following in consultation with the advisor and committee:

[DES 8113](#) - Teaching and Assessment (2.0 cr)

[DES 8115](#) - Grant Writing (2.0 cr)

[GDES 4131W](#) - History of Graphic Design [WI] (4.0 cr)

[GDES 4330](#) - Surface Fabric Design Workshop (4.0 cr)

[GDES 4345](#) - Advanced Typography (4.0 cr)

[GDES 5193](#) - Directed Study in Graphic Design (1.0 - 4.0 cr)

[GDES 5311](#) - Illustration (3.0 cr)

[GDES 5341](#) - Interaction Design (3.0 cr)

[GDES 5342](#) - Advanced Web Design (3.0 cr)

[GDES 5371](#) - Data Visualization Studio (3.0 cr)

[GDES 5372](#) - Data Visualization for Interactive Platforms (3.0 cr)

[GDES 5383](#) - Digital Illustration and Animation (3.0 cr)

[GDES 5386](#) - Fundamentals of Game Design (3.0 cr)

[GDES 8192](#) - Readings in Graphic Design (1.0 - 3.0 cr)

[GDES 8193](#) - Directed Study (1.0 - 3.0 cr)

#### Plan B Master's Project (3 credits)

Take at least 3 credits of the following in consultation with the advisor and committee the last semester of the MS program:

[GDES 8222](#) - Plan B Master's Project (3.0 cr)

### Housing Studies

This sub-plan is limited to students completing the program under Plan A or Plan B.

Applications for the housing studies track graduate study and certificate are no longer being accepted.

The housing studies track advances both theoretical and applied knowledge in the housing field. Through research experiences, students are prepared to assist people and communities in addressing housing-related issues. Courses emphasize human needs and behavior, analysis of designed environments, policy and community development, and housing of specific sub populations such as the elderly or low-income families with children.

#### Theory and Philosophy Coursework (3 credits)

Take the following course:

[HSG 8467](#) - Theoretical Perspectives in Housing Studies (3.0 cr)

#### Evaluation and Analysis Coursework (6 credits)



Select two courses from the following in consultation with the advisor and committee:

- DES 8102 - Quantitative Research Methods (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)

**Housing Studies Requirements (7 credits)**

Take the following courses:

- HSG 5463 - Housing Policy (3.0 cr)
- HSG 5467 - Housing and the Social Environment (4.0 cr)

**Concentration**

**Plan A Electives (1 credit)**

Select credits in consultation with the advisor and committee to meet the minimum number of course credits required:

- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- HSG 4461 - Housing Development and Management (4.0 cr)
- HSG 4465 - Housing in a Global Perspective (3.0 cr)
- HSG 5170 - Topics in Housing Studies (1.0 - 4.0 cr)
- HSG 5193 - Directed Study in Housing Studies (1.0 - 4.0 cr)
- HSG 5462 - Housing and Community Development (3.0 cr)
- HSG 8170 - Topics in Housing Studies (1.0 - 3.0 cr)
- HSG 8180 - Professional Seminar (1.0 - 2.0 cr)
- HSG 8192 - Readings in Housing Studies (1.0 - 3.0 cr)
- HSG 8193 - Directed Study (1.0 - 3.0 cr)

**Thesis Credits**

Plan A students take 10 thesis credits.

- DES 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan B Electives (8 credits)**

Select credits from the following, in consultation with the advisor and committee, to meet the minimum credit requirement:

- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- HSG 4461 - Housing Development and Management (4.0 cr)
- HSG 4465 - Housing in a Global Perspective (3.0 cr)
- HSG 5170 - Topics in Housing Studies (1.0 - 4.0 cr)
- HSG 5193 - Directed Study in Housing Studies (1.0 - 4.0 cr)
- HSG 5462 - Housing and Community Development (3.0 cr)
- HSG 8170 - Topics in Housing Studies (1.0 - 3.0 cr)
- HSG 8180 - Professional Seminar (1.0 - 2.0 cr)
- HSG 8192 - Readings in Housing Studies (1.0 - 3.0 cr)
- HSG 8193 - Directed Study (1.0 - 3.0 cr)

**Plan B Master's Project (3 credits)**

Take at least 3 credits of the following in consultation with the advisor and committee the last semester of the MS program:

- HSG 8222 - Plan B Master's Project (3.0 cr)

**Interior Design**

This sub-plan is limited to students completing the program under Plan A.

Graduate study in the interior design track emphasizes the theory, research, and specialized practice components of design as applied to people's health, safety, and welfare in the interior environment, including culture, sustainability, and issues facing design education. Advances in theoretical knowledge and study of the interactions of humans in interior environments prepare students for teaching and research positions as well as specializations within the professions. A prior degree in interior design or architecture is required for admission to the study interior design at the graduate level.

**Theory and Philosophy Coursework (3 credits)**

Select one of the following courses in consultation with the advisor and committee:

- DES 8112 - Design Theory (3.0 cr)
- DES 8164 - Innovation Theory and Analysis (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)

**Evaluation and Analysis Coursework (6 credits)**

Select at least one statistics course, and select either DES 8102 or 8103, in consultation with the advisor:

- DES 8102 - Quantitative Research Methods (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)



- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)

**Concentration (8 credits)**

Select at least 8 credits from the following in consultation with the advisor and committee:

- DES 5165 - Design and Globalization (3.0 cr)
- DES 5168 - Evidence-Based Design (3.0 cr)
- DES 5185 - Human Factors in Design (3.0 cr)
- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- GDES 8361 - Color, Design, and Human Perception (3.0 cr)
- IDES 8192 - Readings in Interior Design (1.0 - 3.0 cr)
- IDES 8193 - Directed Study (1.0 - 3.0 cr)

**Thesis Credits**

Take 10 thesis credits.

- DES 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

**Product Design**

This sub-plan is limited to students completing the program under Plan A or Plan C.

The product design track is creative and interdisciplinary, blending elements of industrial design, engineering, business, and humanities. Combining these disciplines gives you the tools and methods to design products and services (both physical and digital) that are functional, marketable, and human-centered. Our flexible programming gives you the option to deepen your theoretical and practical knowledge of product design and gain hands-on advanced product design experience to augment your background.

**Theory and Philosophy Coursework (3 credits)**

Select one of the following courses in consultation with the advisor and committee:

- DES 8112 - Design Theory (3.0 cr)
- DES 8164 - Innovation Theory and Analysis (3.0 cr)
- DES 8167 - Aesthetics of Design (3.0 cr)

**Concentration**

**Plan A**

**Evaluation and Analysis (3 credits)**

Select one of the following in consultation with the advisor and committee:

- DES 8102 - Quantitative Research Methods (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)

**Core Coursework (13 credits)**

Take the following courses:

- PDES 5701 - User-Centered Design Studio (3.0 cr)
- PDES 5702 - Visual Communication (3.0 cr)
- PDES 5703 - Prototyping Methods (4.0 cr)
- PDES 5704 - Computer-Aided Design Methods (3.0 cr)

**Thesis Credits**

Plan A students take 10 thesis credits.

- DES 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan C**

**Evaluation and Analysis (3 credits)**

Take the following course:

- PDES 5701 - User-Centered Design Studio (3.0 cr)

**Core Coursework (21 credits)**

Take the following courses:

- DES 5185 - Human Factors in Design (3.0 cr)
- PDES 5702 - Visual Communication (3.0 cr)
- PDES 5703 - Prototyping Methods (4.0 cr)



[PDES 5704](#) - Computer-Aided Design Methods (3.0 cr)

[PDES 8721](#) - New Product Design and Business Development I (4.0 cr)

[PDES 8722](#) - New Product Design and Business Development II (4.0 cr)





### **Twin Cities Campus**

## **Design Minor**

*Design, Housing & Apparel*

### **College of Design**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Design Graduate Program, 240 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108.

Email: [dhagrad@umn.edu](mailto:dhagrad@umn.edu)

Website: <http://dha.design.umn.edu/programs/grad>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The design graduate program focuses on the study of relationships between humans and their designed environments. This focus is based on the assumption that design and analysis of environments contributes to the improvement of the human condition. The program addresses theory, research, and application, using a shared disciplinary base from the arts and social and behavioral sciences. The goal of the program is for students to analyze, evaluate, and integrate theoretical frameworks related to humans and their designed environments.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Masters**

Students select a minimum of 9 credits in consultation with their advisor and the director of graduate studies for the design graduate program.

### **Doctoral**

Students select a minimum of 12 credits in consultation with their advisor and the director of graduate studies for the design graduate program.



**Twin Cities Campus**

**Design Ph.D.**

*Design, Housing & Apparel*

**College of Design**

Link to a [list of faculty](#) for this program.

**Contact Information:**

Design Graduate Program, 240 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108

Email: [dhagrad@umn.edu](mailto:dhagrad@umn.edu)

Website: <http://dha.design.umn.edu/programs/grad>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 64
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The design graduate program focuses on the study of relationships between humans and their designed environments. This focus is based on the assumption that design and analysis of environments contributes to the improvement of the human condition. The program addresses theory, research, and application, using a shared disciplinary base from the arts and social and behavioral sciences. The goal of the program is for students to analyze, evaluate, and integrate theoretical frameworks related to humans and their designed environments.

Applications submitted to the design graduate program specify a track and degree objective.

Formal tracks are:

- Apparel studies (including dress, history, and culture; product development; and retail and consumer studies
- Graphic design
- Housing studies
- Interior design

**Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Eligibility requirements vary by track. Requirements by track are available on the design graduate program website:

<http://dha.design.umn.edu/programs/grad>.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5

The preferred English language test is Test of English as Foreign Language



Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

28 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Students may be required to complete additional credits upon recommendation of their committee.

### Design Program Core Requirements

[DES 8181](#) - Research Ethics (1.0 cr)

### Related Field Coursework

Students are required to take a minimum of 12 credits in a related field. Courses are selected with the approval of the advisor and committee.

### Doctoral Dissertation Credits

Students take a minimum of 24 credits of DES 8888. With the permission of the advisor, up to 10 credits may be taken prior to passing the preliminary oral examination.

[DES 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Apparel Studies

The track in Apparel Studies advances both theoretical and practical knowledge of textile and apparel products related to human behavior. Here you will be provided with the opportunity to work with established scholars, participate in innovative research, and interact with a cohort of graduate students. As a graduate student in Apparel Studies, you can select from a wide range of supporting classes available from a multitude of programs at the University of Minnesota. You will also have access to social, cultural, and business resources abundant in the metropolitan setting of Minneapolis/St. Paul.

### Evaluation and Analysis Coursework

Students are required to take a minimum of 9 credits in evaluation and analysis, including 3 credits in statistics.

[DES 8102](#) - Quantitative Research Methods (3.0 cr)

[DES 8103](#) - Qualitative and Mixed Methods Research (3.0 cr)

#### Statistics

Take 3 or more credit(s) from the following:

- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- [EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)
- [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)

## CONCENTRATION

### Dress, History, and Culture



### Theory and Philosophy Coursework

Students take a minimum of 6 credits in this category.

DES 8112 - Design Theory (3.0 cr)

DES 8164 - Innovation Theory and Analysis (3.0 cr)

### Dress, History, and Culture Concentration Coursework

Take 12 or more credit(s) from the following:

- APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)
- APST 5218 - Fashion, Design, and the Global Industry (3.0 cr)
- APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)
- APST 8193 - Directed Study (1.0 - 3.0 cr)
- APST 8268 - Behavioral Aspects of Dress (3.0 cr)
- DES 5165 - Design and Globalization (3.0 cr)
- DES 8112 - Design Theory (3.0 cr)
- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- DES 8164 - Innovation Theory and Analysis (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)
- DES 8167 - Aesthetics of Design (3.0 cr)

-OR-

### Product Development

#### Theory and Philosophy Coursework

Students take a minimum of 6 credits in this category.

DES 8112 - Design Theory (3.0 cr)

DES 8164 - Innovation Theory and Analysis (3.0 cr)

#### Product Development Concentration Coursework

Take 12 or more credit(s) from the following:

- APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)
- APST 5218 - Fashion, Design, and the Global Industry (3.0 cr)
- APST 5224 - Functional Clothing Design (4.0 cr)
- APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)
- APST 8193 - Directed Study (1.0 - 3.0 cr)
- DES 5185 - Human Factors in Design (3.0 cr)
- DES 5188 - Anthropometrics, Sizing & Fit (4.0 cr)
- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8114 - Design Studio (4.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- DES 8151 - Product Development: Theory and Practice (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)
- DES 8167 - Aesthetics of Design (3.0 cr)
- GDES 8361 - Color, Design, and Human Perception (3.0 cr)

-OR-

### Retail and Consumer Studies

#### Theory and Philosophy Coursework

Students take a minimum of 6 credits in this category.

APST 8272 - Digital Consumers: Theories in Retail and Consumer Studies (3.0 cr)

Take 3 or more credit(s) from the following:

- APST 8268 - Behavioral Aspects of Dress (3.0 cr)
- DES 8112 - Design Theory (3.0 cr)
- DES 8164 - Innovation Theory and Analysis (3.0 cr)

#### Retail and Consumer Studies Concentration Coursework

Take 12 or more credit(s) from the following:

- APST 5117 - Retail Environments and Human Behavior (3.0 cr)
- APST 5123 - Living in a Consumer Society (3.0 cr)
- APST 5193 - Directed Study in Apparel Studies (1.0 - 4.0 cr)
- APST 8192 - Readings in Apparel Studies (1.0 - 3.0 cr)
- APST 8193 - Directed Study (1.0 - 3.0 cr)
- APST 8268 - Behavioral Aspects of Dress (3.0 cr)
- APST 8271 - Retailing: Strategic Perspectives (3.0 cr)
- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- DES 8151 - Product Development: Theory and Practice (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)
- DES 8167 - Aesthetics of Design (3.0 cr)



### Graphic Design

The Graphic Design Track focuses on design theory, process, and methods related to design practice and research. Potential areas of study include multicultural communication, visual representation of information, human interaction with designed objects, social and cultural implications of design, color systems and perception, design history, and design education. Students and faculty collaboratively develop designed objects and information resources that will enhance peoples lives. The program integrates theory with practice in the application of emergent and established technologies to digital design solutions.

#### Theory and Philosophy Coursework

Students take a minimum of 6 credits in this category.

[DES 8112](#) - Design Theory (3.0 cr)

or [DES 8164](#) - Innovation Theory and Analysis (3.0 cr)

#### Evaluation and Analysis Coursework

Students take a minimum of 9 credits in this category, including 3 credits in statistics.

Take 6 or more credit(s) from the following:

- [DES 8102](#) - Quantitative Research Methods (3.0 cr)
- [DES 8103](#) - Qualitative and Mixed Methods Research (3.0 cr)
- [GDES 5388](#) - Graphic Design Research (3.0 cr)

#### Statistics

Take 3 or more credit(s) from the following:

- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- [EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)
- [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)

#### Graphic Design Concentration Coursework

Students are required to take [GDES 8361](#) and [GDES 8362](#).

Take 12 or more credit(s) from the following:

- [DES 8113](#) - Teaching and Assessment (2.0 cr)
- [DES 8114](#) - Design Studio (4.0 cr)
- [DES 8115](#) - Grant Writing (2.0 cr)
- [GDES 4131W](#) - History of Graphic Design [WI] (4.0 cr)
- [GDES 4330](#) - Surface Fabric Design Workshop (4.0 cr)
- [GDES 4345](#) - Advanced Typography (4.0 cr)
- [GDES 5193](#) - Directed Study in Graphic Design (1.0 - 4.0 cr)
- [GDES 5311](#) - Illustration (3.0 cr)
- [GDES 5341](#) - Interaction Design (3.0 cr)
- [GDES 5342](#) - Advanced Web Design (3.0 cr)
- [GDES 5371](#) - Data Visualization Studio (3.0 cr)
- [GDES 5372](#) - Data Visualization for Interactive Platforms (3.0 cr)
- [GDES 5383](#) - Digital Illustration and Animation (3.0 cr)
- [GDES 5386](#) - Fundamentals of Game Design (3.0 cr)
- [GDES 8192](#) - Readings in Graphic Design (1.0 - 3.0 cr)
- [GDES 8193](#) - Directed Study (1.0 - 3.0 cr)
- [GDES 8361](#) - Color, Design, and Human Perception (3.0 cr)
- [GDES 8362](#) - The Nature of Representation in Visual Communication (3.0 cr)

### Housing Studies

Applications for the Housing Studies Track graduate study are no longer being accepted.

Housing studies is a multidisciplinary track that draws from a variety of theoretical perspectives. Students are trained in a variety of research methodologies. Coursework and research experiences combine to further understanding of the innovative approaches to the development of housing and related programs. With expertise in housing studies and research methods, graduates build careers in higher education, state and federal agencies, nonprofit community organizations, and government.

#### Theory and Philosophy Coursework

Students are required to take a total of 6 credits in this category, including [HSG 8467](#). Students select one additional course in theory and philosophy with the approval of the advisor and committee.

[HSG 8467](#) - Theoretical Perspectives in Housing Studies (3.0 cr)

#### Evaluation and Analysis Coursework

Students take a minimum of 9 credits in this category, including a minimum of 3 credits in statistics.

[DES 8102](#) - Quantitative Research Methods (3.0 cr)

[DES 8103](#) - Qualitative and Mixed Methods Research (3.0 cr)

#### Statistics

Take 3 or more credit(s) from the following:



- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)

#### **Housing Studies Concentration Coursework**

HSG 5463 and HSG 5467 are required.

Take 12 or more credit(s) from the following:

- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- HSG 4461 - Housing Development and Management (4.0 cr)
- HSG 4465 - Housing in a Global Perspective (3.0 cr)
- HSG 5170 - Topics in Housing Studies (1.0 - 4.0 cr)
- HSG 5193 - Directed Study in Housing Studies (1.0 - 4.0 cr)
- HSG 5462 - Housing and Community Development (3.0 cr)
- HSG 5463 - Housing Policy (3.0 cr)
- HSG 5467 - Housing and the Social Environment (4.0 cr)
- HSG 8170 - Topics in Housing Studies (1.0 - 3.0 cr)
- HSG 8180 - Professional Seminar (1.0 - 2.0 cr)
- HSG 8192 - Readings in Housing Studies (1.0 - 3.0 cr)
- HSG 8193 - Directed Study (1.0 - 3.0 cr)

#### **Interior Design**

Graduate study in the Interior Design Track emphasizes the theory, research, and specialized practice components of design as applied to peoples health, safety, and welfare in the interior environment, including culture, sustainability, and issues facing design education. Advances in theoretical knowledge and study of the interactions of humans in interior environments prepare students for teaching and research positions as well as design specializations within the profession. A prior degree in interior design or architecture is required for admission to study interior design at the graduate level.

#### **Theory and Philosophy Coursework**

Students take DES 8112 and choose either DES 8164 or DES 8166 for a total of 6 credits in this category.

DES 8112 - Design Theory (3.0 cr)

Take 3 or more credit(s) from the following:

- DES 8164 - Innovation Theory and Analysis (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)

#### **Evaluation and Analysis Coursework**

Students take a minimum of 9 credits in this category, including a minimum of 3 credits in statistics.

DES 8102 - Quantitative Research Methods (3.0 cr)

DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)

##### **Statistics**

Take 3 or more credit(s) from the following:

- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)

#### **Interior Design Concentration Coursework**

Take 12 or more credit(s) from the following:

- DES 5165 - Design and Globalization (3.0 cr)
- DES 5168 - Evidence-Based Design (3.0 cr)
- DES 5185 - Human Factors in Design (3.0 cr)
- DES 8113 - Teaching and Assessment (2.0 cr)
- DES 8115 - Grant Writing (2.0 cr)
- GDES 8361 - Color, Design, and Human Perception (3.0 cr)
- IDES 8192 - Readings in Interior Design (1.0 - 3.0 cr)
- IDES 8193 - Directed Study (1.0 - 3.0 cr)



### **Twin Cities Campus**

## **Ecological Restoration in Landscape Architecture Minor**

*Landscape Architecture*

### **College of Design**

Link to a [list of faculty](#) for this program.

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 10
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Restoration, conservation, and ecological design projects have become an increasingly important component of the practice of landscape architecture and natural resource management. It is critical for students interested in the design and management of natural lands, water management landscapes, landscape reclamation, and other restoration project types to gain exposure to the issues associated with ecological restoration projects. This minor focuses on the applied practice of restoration with an emphasis on restoration management and design and the skills needed to lead successful projects.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **Master's Minor Requirements**

- [ESPM 5071](#) - Ecological Restoration (4.0 cr)
- [LA 5204](#) - Metropolitan Landscape Ecology (3.0 cr)
- [LA 5576](#) - Ecological Restoration Project Planning and Management (3.0 cr)



### *Twin Cities Campus*

## Heritage Studies and Public History M.H.S.P.H.

School of Architecture

College of Design

Link to a [list of faculty](#) for this program.

### **Contact Information:**

School of Architecture  
College of Design  
Room 101 Rapson Hall  
89 Church St SE  
Minneapolis, MN 55455-0811

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 37
- This program does not require summer semesters for timely completion.
- Minnesota Historical Society History Center
- Degree: Master of Heritage Studies & Public History

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Heritage studies and public history (HSPH) are the publicly engaged and community-accountable practices of historical scholarship, whether it is based in archival research, archaeology, material culture studies, architecture, preservation, or landscape studies. Although such a commitment to public interpretation, education, and preservation is part of all these disciplines, it is of tremendous benefit to heritage professionals to understand the connections and common issues in all of these perspectives, because the heritage field is increasingly characterized by such interdisciplinary integration.

The goal of this graduate program is to provide heritage and public history professionals this broader view, increasing their resource base and network of expertise. The program takes advantage of the deep scholarly expertise in these fields at the University of Minnesota, as well as the Minnesota Historical Society's extensive resources and expertise, to offer unparalleled training in the theory and methods of heritage and public history studies at the graduate level. The program will combine rigorous scholarly training with hands-on professional development, preparing graduates for positions in major public history and heritage institutions in Minnesota and elsewhere. The program will also train future generations of scholars and practitioners in the field to develop new, innovative, and entrepreneurial forms of historical interpretation in service of the public good.

Students are expected to acquire both general and specialized sets of perspectives and skills. Some required courses are designed to instill breadth and cohort connections; others are designed to build expertise in specific arenas of the heritage field, represented by the program tracks. Students will engage in experiential learning through embedded (credited) internships, and the design and execution of a community-engaged project.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

### **Special Application Requirements:**

Prospective applicants are encouraged to consult the degree programs section of the School of Architecture website for additional information: <http://arch.design.umn.edu>.

International applicants must submit score(s) from one of the following tests:

- TOEFL

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the





catalog website.

## Program Requirements

**Plan B:** Plan B requires 31 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The Plan B option is available only to students pursuing the archaeological heritage track. The Plan B project is identified and planned in consultation with the adviser and the Archaeology Department at the Minnesota Historical Society.

**Plan C:** Plan C requires 31 major credits and 6 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** This course will operate as a workshop, drawing together a cohort of students, working individually or as part of a team, to craft independent heritage studies and public history research projects under the supervision of a faculty instructor. Projects may be based in archival research, public exhibitions, archaeology, material culture studies and preservation, architecture and preservation, or landscape studies. Consistent with the values of the program, projects shall have multidisciplinary perspectives, broadly consider aspects of diversity, and will be accountable to some stakeholder(s) identified by the students.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

### Core Coursework (13 credits)

All students must complete the following core courses. Take HSPH 8005 every fall and spring for 2 years for a total of 4 credits.

[HSPH 8001](#) - Who Owns the Past? Common Concerns and Big Questions in Heritage and Public History (3.0 cr)

[HSPH 8002](#) - Core Practices in Heritage Studies and Public History (3.0 cr)

[HSPH 8003](#) - Race and Indigeneity in Heritage Representation (3.0 cr)

[HSPH 8005](#) - Leadership and Future of Historical Organizations (1.0 cr)

### Outside Coursework (6 credits)

All students must complete at least 6 credits outside the major, chosen in consultation with the adviser or director of graduate studies.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Archaeological Heritage

This sub-plan is limited to students completing the program under Plan B or Plan C.

### Archaeological Heritage Track (18 credits)

The archaeological heritage track offers both the Plan B and Plan C options. Students are expected to identify their chosen option, in consultation with the advisor or director of graduate studies, by end of their second year in the program.

#### Required Archaeological Heritage Track Coursework (6 credits)

Take the following courses for a total of 6 credits:

[HSPH 8004](#) - Capstone in Heritage Studies and Public History (3.0 cr)

[ANTH 5448](#) - Applied Heritage Management (3.0 cr)

#### Electives (6 credits)

Students must complete at least 6 additional elective credits, selected in consultation with the advisor or director of graduate studies.

## Plan Options

### Plan B Requirements

Take 6 credits of HSPH 8101. At least 3 of the 6 credits must be applied to the Plan B project, with the remaining 3 assigned in consultation with the advisor or director of graduate studies.

[HSPH 8101](#) - Internship (3.0 cr)

-OR-

### Plan C Requirements

Take HSPH 8101 twice, to complete two separate internships, for a total of 6 credits.

[HSPH 8101](#) - Internship (3.0 cr)



### *Twin Cities Campus*

## Heritage Studies and Public History Minor

School of Architecture

College of Design

Link to a [list of faculty](#) for this program.

### **Contact Information:**

College of Design  
School of Architecture  
101 Rapson Hall  
89 Church Street SE  
Minneapolis, MN 55455-0811  
Email: [donofrio@umn.edu](mailto:donofrio@umn.edu)

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Heritage Studies and Public History (HSPH) are the publicly engaged and community-accountable practices of historical scholarship, whether based in archival research, archaeology, material culture studies, architecture, preservation, or landscape studies. Although such a commitment to public interpretation, education, and preservation is part of all these disciplines, it is of tremendous benefit to heritage professionals to understand the connections and common issues in all of these perspectives, because the heritage field is increasingly characterized by such interdisciplinary integration. The masters level minor is intended for students who are in programs preparing them for work in the heritage field, such as anthropology, art history, architecture/historic preservation, urban and regional planning, history, American studies, and other allied fields. The doctoral minor is intended for students who plan to work in heritage/public history positions outside of academia, or to be academic scholars whose work includes community-engaged research. The HSPH program and grad minor take advantage of the deep scholarly expertise in these fields at the University of Minnesota, as well as the Minnesota Historical Society's extensive resources and expertise, to offer unparalleled training in the theory and methods of heritage and public history studies at the graduate level.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the HSPH director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

#### **Core Coursework (6 credits)**

Take the following courses:

[HSPH 8001](#) - Who Owns the Past? Common Concerns and Big Questions in Heritage and Public History (3.0 cr)

[HSPH 8003](#) - Race and Indigeneity in Heritage Representation (3.0 cr)



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Masters

Select 3 additional HSPH-affiliated credits, in consultation with the HSPH director of graduate studies, to complete the 9-credit minimum. Coursework must be from a discipline other than the major field.

### Doctoral

Select 6 additional HSPH-affiliated credits, in consultation with the HSPH director of graduate studies, to complete the 12-credit minimum. Coursework must be from a discipline other than the major field.



### **Twin Cities Campus**

## **Housing Studies Postbaccalaureate Certificate**

*Design, Housing & Apparel*

### **College of Design**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Design Graduate Program, 240 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108

Email: [dhagrad@umn.edu](mailto:dhagrad@umn.edu)

Website: <http://dha.cdes.umn.edu/programs/grad/prospective/admissions/housingstudiescertificateprogram.htm>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 15
- This program does not require summer semesters for timely completion.
- Degree: Housing Studies PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The housing studies certificate is designed for individuals interested, or currently working, in housing related professions to expand their knowledge in areas including housing and community development, housing policy, and the residential environments.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Some elective courses require prerequisites that may be waived with instructor permission according to University policy.

#### **Required Course**

[HSG 5471](#) - Housing Studies Certificate Seminar (2.0 cr)

#### **Elective Courses**

Take 13 or more credit(s) from the following:

- [DES 8113](#) - Teaching and Assessment (2.0 cr)
- [DES 8115](#) - Grant Writing (2.0 cr)



- [HSG 4461](#) - Housing Development and Management (4.0 cr)
- [HSG 4465](#) - Housing in a Global Perspective (3.0 cr)
- [HSG 5170](#) - Topics in Housing Studies (1.0 - 4.0 cr)
- [HSG 5193](#) - Directed Study in Housing Studies (1.0 - 4.0 cr)
- [HSG 5462](#) - Housing and Community Development (3.0 cr)
- [HSG 5463](#) - Housing Policy (3.0 cr)
- [HSG 5467](#) - Housing and the Social Environment (4.0 cr)
- [HSG 8170](#) - Topics in Housing Studies (1.0 - 3.0 cr)
- [HSG 8180](#) - Professional Seminar (1.0 - 2.0 cr)
- [HSG 8192](#) - Readings in Housing Studies (1.0 - 3.0 cr)
- [HSG 8193](#) - Directed Study (1.0 - 3.0 cr)
- [HSG 8467](#) - Theoretical Perspectives in Housing Studies (3.0 cr)



### *Twin Cities Campus*

## Human Factors and Ergonomics M.S.

*DHA Human Factors and Ergonomics*

### College of Design

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Human Factors and Ergonomics Graduate Program, c/o DHA, 240 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108.

Email: [HFegrad@umn.edu](mailto:HFegrad@umn.edu)

Website: <http://humanfactors.design.umn.edu/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Human factors and ergonomics (HFE) is the study of how to make technological systems safe, effective, and easy and enjoyable to use. The graduate program offers interdisciplinary coursework that addresses human performance and how it can be enhanced through the design of tools, systems, working environments, processes, and organizations. HFE has applications ranging from clothing and living spaces to business processes, the design of health care processes and technology, computer interfaces, and aircraft cockpits.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 96
  - Internet Based - Listening Score: 24
  - Internet Based - Writing Score: 24
  - Internet Based - Reading Score: 24
  - Internet Based - Speaking Score: 24

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan C:** Plan C requires 30 major credits and 0 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.



A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

#### **Required Coursework (9 to 10 credits)**

##### **Required Seminar (1 credit)**

Take the following course:

[HUMF 8901](#) - Graduate Seminar in Human Factors and Ergonomics (1.0 cr)

##### **Research Methods Core (8 credits)**

Take the following courses:

[PSY 8814](#) - Analysis of Psychological Data (4.0 cr)

[PSY 8815](#) - Analysis of Psychological Data (4.0 cr)

##### **Research Ethics (0 to 1 credit)**

Take the course below, or select one of the online options identified at [http://humanfactors.design.umn.edu/research\\_ethics.html](http://humanfactors.design.umn.edu/research_ethics.html), in consultation with the advisor.

[DES 8181](#) - Research Ethics (1.0 cr)

#### **Plans**

##### **Plan A**

##### **Component Coursework (9 credits)**

Select a course from each of the following three components, in consultation with the advisor, for a total of 9 credits.

##### **Human Factors Fundamentals (3 credits)**

Select a course the following:

[DES 5185](#) - Human Factors in Design (3.0 cr)

[HUMF 5001](#) - Foundations of Human Factors/Ergonomics (3.0 cr)

[HUMF 5211](#) - Human Factors and Work Analysis (4.0 cr)

[HUMF 5874](#) - Service Design: Designing complex systems to improve service delivery (4.0 cr)

##### **Cognitive Human Factors (3 credits)**

Select a course the following:

[CGSC 8000](#) - Seminar: Philosophy of the Cognitive Sciences (3.0 cr)

[EPSY 8114](#) - Seminar: Cognition and Learning (3.0 cr)

[IDSC 8721](#) - Behavioral Decision Theory (3.0 cr)

[PSY 5014](#) - Psychology of Human Learning and Memory (3.0 cr)

[PSY 5015](#) - Cognition, Computation, and Brain (3.0 cr)

[PSY 5031W](#) - Perception [WI] (3.0 cr)

[PSY 5062](#) - Cognitive Neuropsychology (3.0 cr)

[PSY 5064](#) - Brain and Emotion (3.0 cr)

[PSY 8041](#) - Proseminar in Perception (3.0 cr)

[PSY 8042](#) - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

[PSY 8201](#) - Social Cognition (3.0 cr)

##### **Physical Human Factors (3 credits)**

Select a course the following:

[DES 5188](#) - Anthropometrics, Sizing & Fit (4.0 cr)

[KIN 4133](#) - Perceptual-Motor Control and Learning (3.0 cr)

[KIN 4136](#) - Embodied Cognition (3.0 cr)

[KIN 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)

[KIN 5505](#) - Human-Centered Design - Principles and Applications (3.0 cr)

[KIN 5643](#) - Applied Motion Capture and Movement Analysis Technology (3.0 cr)

[KIN 8211](#) - Seminar: Perception and Action (3.0 cr)

[RSC 5135](#) - Advanced Biomechanics I: Kinematics (3.0 cr)

[RSC 8135](#) - Human Kinematics (3.0 cr)

##### **Electives**

Select credits from the following, in consultation with the advisor, to complete the 20 course credits required.

##### **User Interface Design**

[CSCI 5115](#) - User Interface Design, Implementation and Evaluation (3.0 cr)

[CSCI 8115](#) - Human-Computer Interaction and User Interface Technology (3.0 cr)

[NURS 7118](#) - Human Factors and Human-Computer Interaction in Health Informatics (3.0 cr)

[WRIT 4501](#) - Usability and Human Factors in Technical Communication (3.0 cr)

[WRIT 8520](#) - Seminar in Scientific and Technical Communication (3.0 cr)

##### **Statistics**

If PSY 8960 is selected, take the Multivariate Statistics for Social Scientists section for 3 credits.

[PSY 8960](#) - Graduate Seminar in Psychology (1.0 - 4.0 cr)

[PUBH 7406](#) - Advanced Regression and Design (4.0 cr)



[STAT 5021](#) - Statistical Analysis (4.0 cr)

**Designing Experiments**

Take 0 or more credit(s) from the following:

•[STAT 5303](#) - Designing Experiments (4.0 cr)

**Research Methods**

Take 0 or more credit(s) from the following:

•[ANTH 4035](#) - Ethnographic Research Methods (3.0 cr)

•[KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)

•[PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

•[PUBH 6342](#) - Epidemiologic Methods II (3.0 cr)

•[PUBH 6343](#) - Epidemiologic Methods III (4.0 cr)

**Human Factors**

[CGSC 8410](#) - Perspectives in Learning, Perception, and Cognition (2.0 cr)

[CSCI 5125](#) - Collaborative and Social Computing (3.0 cr)

[CSCI 5609](#) - Visualization (3.0 cr)

[CSCI 5619](#) - Virtual Reality and 3D Interaction (3.0 cr)

[CSCI 8117](#) - Understanding the Social Web (3.0 cr)

[DES 5165](#) - Design and Globalization (3.0 cr)

[DES 8151](#) - Product Development: Theory and Practice (3.0 cr)

[GDES 8361](#) - Color, Design, and Human Perception (3.0 cr)

[IDSC 8722](#) - Heuristic Decision Making (2.0 cr)

[MKTG 8813](#) - Consumer Judgment and Decision Making I (2.0 cr)

[PSY 5501](#) - Vocational and Occupational Health Psychology (3.0 cr)

[PSY 5708](#) - Organizational Psychology (3.0 cr)

[PSY 5862](#) - Psychological Measurement: Theory and Methods (3.0 cr)

[PUBH 6120](#) - Injury Prevention in the Workplace, Community, and Home (2.0 cr)

[PUBH 6140](#) - Occupational and Environmental Epidemiology (2.0 cr)

[PUBH 6470](#) - SAS Procedures and Data Analysis (3.0 cr)

[PUBH 6806](#) - Principles of Public Health Research (2.0 cr)

[SOC 8412](#) - Social Network Analysis: Theory and Methods (3.0 cr)

**Thesis Credits**

Take at least 10 master's thesis credits.

[HUMF 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan C**

**Component Coursework (9 credits)**

Select a course from each of the following three components, in consultation with the advisor, for a total of 9 credits.

**Human Factors Fundamentals (3 credits)**

Select a course from the following:

[DES 5185](#) - Human Factors in Design (3.0 cr)

[HUMF 5001](#) - Foundations of Human Factors/Ergonomics (3.0 cr)

[HUMF 5211](#) - Human Factors and Work Analysis (4.0 cr)

[HUMF 5874](#) - Service Design: Designing complex systems to improve service delivery (4.0 cr)

**Cognitive Human Factors (3 credits)**

Select a course from the following:

[CGSC 8000](#) - Seminar: Philosophy of the Cognitive Sciences (3.0 cr)

[EPSY 8114](#) - Seminar: Cognition and Learning (3.0 cr)

[IDSC 8721](#) - Behavioral Decision Theory (3.0 cr)

[PSY 5014](#) - Psychology of Human Learning and Memory (3.0 cr)

[PSY 5015](#) - Cognition, Computation, and Brain (3.0 cr)

[PSY 5031W](#) - Perception [WI] (3.0 cr)

[PSY 5062](#) - Cognitive Neuropsychology (3.0 cr)

[PSY 5064](#) - Brain and Emotion (3.0 cr)

[PSY 8041](#) - Proseminar in Perception (3.0 cr)

[PSY 8042](#) - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

[PSY 8201](#) - Social Cognition (3.0 cr)

**Physical Human Factors (3 credits)**

Select a course from the following:

[DES 5188](#) - Anthropometrics, Sizing & Fit (4.0 cr)

[KIN 4133](#) - Perceptual-Motor Control and Learning (3.0 cr)

[KIN 4136](#) - Embodied Cognition (3.0 cr)

[KIN 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)

[KIN 5505](#) - Human-Centered Design - Principles and Applications (3.0 cr)

[KIN 5643](#) - Applied Motion Capture and Movement Analysis Technology (3.0 cr)





- KIN 8211 - Seminar: Perception and Action (3.0 cr)  
RSC 5135 - Advanced Biomechanics I: Kinematics (3.0 cr)  
RSC 8135 - Human Kinematics (3.0 cr)

**Electives**

Select from the following, in consultation with the advisor, to complete the 30-credit minimum:

**User Interface Design**

- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)  
CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)  
NURS 7118 - Human Factors and Human-Computer Interaction in Health Informatics (3.0 cr)  
WRIT 4501 - Usability and Human Factors in Technical Communication (3.0 cr)  
WRIT 8520 - Seminar in Scientific and Technical Communication (3.0 cr)

**Statistics**

If PSY 8960 is selected, take the Multivariate Statistics for Social Scientists section for 3 credits.

- PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)  
PUBH 7406 - Advanced Regression and Design (4.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)

**Designing Experiments**

- STAT 5303 - Designing Experiments (4.0 cr)

**Research Methods**

- ANTH 4035 - Ethnographic Research Methods (3.0 cr)  
KIN 5981 - Research Methodology in Kinesiology and Sport Management (3.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6343 - Epidemiologic Methods III (4.0 cr)

**Human Factors**

- CGSC 8410 - Perspectives in Learning, Perception, and Cognition (2.0 cr)  
CSCI 5125 - Collaborative and Social Computing (3.0 cr)  
CSCI 5609 - Visualization (3.0 cr)  
CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)  
CSCI 8117 - Understanding the Social Web (3.0 cr)  
DES 5165 - Design and Globalization (3.0 cr)  
DES 8151 - Product Development: Theory and Practice (3.0 cr)  
GDES 8361 - Color, Design, and Human Perception (3.0 cr)  
IDSC 8722 - Heuristic Decision Making (2.0 cr)  
MKTG 8813 - Consumer Judgment and Decision Making I (2.0 cr)  
PSY 5501 - Vocational and Occupational Health Psychology (3.0 cr)  
PSY 5708 - Organizational Psychology (3.0 cr)  
PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)  
PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)  
PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)  
PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)  
PUBH 6806 - Principles of Public Health Research (2.0 cr)  
SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)

**50% Project-Based Coursework (6 credits)**

At least 6 credits of Plan C coursework must also satisfy the 50% Project-Based Coursework requirement. Select from the following in consultation with the advisor:

Take 6 or more credit(s) from the following:

- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
- CSCI 5609 - Visualization (3.0 cr)
- CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)
- DES 5185 - Human Factors in Design (3.0 cr)
- DES 8151 - Product Development: Theory and Practice (3.0 cr)
- HUMF 5874 - Service Design: Designing complex systems to improve service delivery (4.0 cr)
- WRIT 4501 - Usability and Human Factors in Technical Communication (3.0 cr)



### *Twin Cities Campus*

## Human Factors and Ergonomics Minor

*DHA Human Factors and Ergonomics*

### College of Design

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Human Factors and Ergonomics Graduate Program, c/o DHA, 240 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108.

Email: [HFEgrad@umn.edu](mailto:HFEgrad@umn.edu)

Website: <http://humanfactors.design.umn.edu/>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Human factors and ergonomics (HFE) is the study of how to make technological systems safe, effective, and easy and enjoyable to use. The graduate program offers interdisciplinary coursework that addresses human performance and how it can be enhanced through design of tools, systems, working environments, processes, and organizations. HFE has applications ranging from clothing and living spaces to business processes, the design of health care processes and technology, computer interfaces, and aircraft cockpits. The minor is available to master's and doctoral students.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Any University of Minnesota graduate student in good standing is eligible to apply. Students discuss appropriate coursework with their advisers and the Director of Graduate Studies for Human Factors and Ergonomics. A GPA of 3.0 is required for good standing in the minor.

Master's students are required to take 9 credits to fulfill the minor.  
Doctoral students are required to take 12 credits to fulfill the minor.

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

#### **Masters**

Students select a minimum of 9 credits in consultation with their advisor and the director of graduate studies for the human factors and ergonomics graduate program.



**Doctoral**

Students select a minimum of 12 credits in consultation with their advisor and the director of graduate studies for the human factors and ergonomics graduate program.



### **Twin Cities Campus**

## **Human Factors and Ergonomics Ph.D.**

*DHA Human Factors and Ergonomics*

### **College of Design**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Human Factors and Ergonomics Graduate Program, c/o DHA, 240 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108.

Email: [HFEgrad@umn.edu](mailto:HFEgrad@umn.edu)

Website: <https://humanfactors.design.umn.edu/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Human factors and ergonomics (HFE) is the study of how to make technological systems safe, effective, and easy and enjoyable to use. The graduate program offers interdisciplinary coursework that addresses human performance and how it can be enhanced through design of tools, systems, working environments, processes, and organizations. HFE has applications ranging from clothing and living spaces to business processes, the design of healthcare processes and technology, computer interfaces, and aircraft cockpits.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 96
  - Internet Based - Listening Score: 24
  - Internet Based - Writing Score: 24
  - Internet Based - Reading Score: 24
  - Internet Based - Speaking Score: 24

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

36 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.



A minimum GPA of 3.0 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

### Required Coursework

#### Required Seminar (1 credit)

Take the following course:

[HUMF 8901](#) - Graduate Seminar in Human Factors and Ergonomics (1.0 cr)

#### Research Methods Core (8 credits)

Take the following courses:

[PSY 8814](#) - Analysis of Psychological Data (4.0 cr)

[PSY 8815](#) - Analysis of Psychological Data (4.0 cr)

#### Research Ethics (0-1 credits)

Take the course below, or select one of the online options identified at [http://humanfactors.design.umn.edu/research\\_ethics.html](http://humanfactors.design.umn.edu/research_ethics.html), in consultation with the advisor.

[DES 8181](#) - Research Ethics (1.0 cr)

#### Additional Research Methods Course (3-4 credits)

Select a research methods course from the following in consultation with the advisor:

##### Statistics

If PSY 8960 is selected, take the Multivariate Statistics for Social Scientists section for 3 credits.

[PSY 8960](#) - Graduate Seminar in Psychology (1.0 - 4.0 cr)

[PUBH 7406](#) - Advanced Regression and Design (4.0 cr)

[STAT 5021](#) - Statistical Analysis (4.0 cr)

##### or Designing Experiments

[STAT 5303](#) - Designing Experiments (4.0 cr)

##### or Research Methods

[ANTH 4035](#) - Ethnographic Research Methods (3.0 cr)

[KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)

[PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

[PUBH 6342](#) - Epidemiologic Methods II (3.0 cr)

[PUBH 6343](#) - Epidemiologic Methods III (4.0 cr)

#### Component Courses (9 Credits)

Select a course from each of the following three components, in consultation with the advisor, for a total of 9 credits.

##### Human Factors Fundamentals

Take at least 3 credits from the following:

[DES 5185](#) - Human Factors in Design (3.0 cr)

[HUMF 5001](#) - Foundations of Human Factors/Ergonomics (3.0 cr)

[HUMF 5211](#) - Human Factors and Work Analysis (4.0 cr)

[HUMF 5874](#) - Service Design: Designing complex systems to improve service delivery (4.0 cr)

##### Cognitive Human Factors

Take at least 3 credits from the following:

[CGSC 8000](#) - Seminar: Philosophy of the Cognitive Sciences (3.0 cr)

[EPSY 8114](#) - Seminar: Cognition and Learning (3.0 cr)

[IDSC 8721](#) - Behavioral Decision Theory (3.0 cr)

[PSY 5014](#) - Psychology of Human Learning and Memory (3.0 cr)

[PSY 5015](#) - Cognition, Computation, and Brain (3.0 cr)

[PSY 5031W](#) - Perception [WI] (3.0 cr)

[PSY 5037](#) - Psychology of Hearing (3.0 cr)

[PSY 5062](#) - Cognitive Neuropsychology (3.0 cr)

[PSY 5064](#) - Brain and Emotion (3.0 cr)

[PSY 8041](#) - Proseminar in Perception (3.0 cr)

[PSY 8042](#) - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

[PSY 8201](#) - Social Cognition (3.0 cr)

##### Physical Human Factors

Take at least 3 credits from the following:

[DES 5188](#) - Anthropometrics, Sizing & Fit (4.0 cr)

[KIN 4133](#) - Perceptual-Motor Control and Learning (3.0 cr)

[KIN 4136](#) - Embodied Cognition (3.0 cr)

[KIN 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)

[KIN 5505](#) - Human-Centered Design - Principles and Applications (3.0 cr)

[KIN 5643](#) - Applied Motion Capture and Movement Analysis Technology (3.0 cr)

[KIN 8211](#) - Seminar: Perception and Action (3.0 cr)

[RSC 5135](#) - Advanced Biomechanics I: Kinematics (3.0 cr)

[RSC 8135](#) - Human Kinematics (3.0 cr)

#### Electives



Select from the following, in consultation with the advisor, to complete the 36 course credits required:

**User Interface Design**

- [CSCI 5115](#) - User Interface Design, Implementation and Evaluation (3.0 cr)
- [CSCI 8115](#) - Human-Computer Interaction and User Interface Technology (3.0 cr)
- [NURS 7118](#) - Human Factors and Human-Computer Interaction in Health Informatics (3.0 cr)
- [WRIT 4501](#) - Usability and Human Factors in Technical Communication (3.0 cr)
- [WRIT 8520](#) - Seminar in Scientific and Technical Communication (3.0 cr)

**Human Factors**

- [CGSC 8410](#) - Perspectives in Learning, Perception, and Cognition (2.0 cr)
- [CSCI 5125](#) - Collaborative and Social Computing (3.0 cr)
- [CSCI 5609](#) - Visualization (3.0 cr)
- [CSCI 5619](#) - Virtual Reality and 3D Interaction (3.0 cr)
- [CSCI 8117](#) - Understanding the Social Web (3.0 cr)
- [DES 5165](#) - Design and Globalization (3.0 cr)
- [DES 8151](#) - Product Development: Theory and Practice (3.0 cr)
- [GDES 8361](#) - Color, Design, and Human Perception (3.0 cr)
- [IDSC 8722](#) - Heuristic Decision Making (2.0 cr)
- [MKTG 8813](#) - Consumer Judgment and Decision Making I (2.0 cr)
- [PSY 5501](#) - Vocational and Occupational Health Psychology (3.0 cr)
- [PSY 5708](#) - Organizational Psychology (3.0 cr)
- [PSY 5862](#) - Psychological Measurement: Theory and Methods (3.0 cr)
- [PUBH 6120](#) - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- [PUBH 6140](#) - Occupational and Environmental Epidemiology (2.0 cr)
- [PUBH 6470](#) - SAS Procedures and Data Analysis (3.0 cr)
- [PUBH 6806](#) - Principles of Public Health Research (2.0 cr)
- [SOC 8412](#) - Social Network Analysis: Theory and Methods (3.0 cr)

**Thesis Credits**

Take at least 24 doctoral thesis credits.

- [HUMF 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### *Twin Cities Campus*

## Landscape Architecture M.L.A.

*Landscape Architecture*

### College of Design

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Landscape Architecture, 144 Rapson Hall, 89 Church Street SE, Minneapolis, MN 55455 (612-625-6860)

Email: [ladesk@umn.edu](mailto:ladesk@umn.edu)

Website: <http://landarch.design.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 57 to 89
- This program does not require summer semesters for timely completion.
- N/A
- Degree: Master of Landscape Architecture

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of landscape architecture (MLA) is a first-professional degree required for students who wish to become licensed professional landscape architects. The program is accredited by the national Landscape Architecture Accreditation Board (LAAB). The curriculum introduces students to the practice and discipline of landscape architecture, providing them with the artistic, technical, cognitive, and communication skills, in addition to the scientific and aesthetic knowledge, necessary to practice in the profession and in related environmental fields. Students are encouraged to select from electives offered to develop a special focus or to explore more areas in depth.

The MLA program (MLA I) is a three-year, 89-credit degree. Coursework exposes students to the broad field of landscape architecture as both a discipline and a profession. Classes are collaborative in nature and challenge students to delve into landscape issues that cut across multiple systems and scales. Because the core of the curriculum is six design studios, organized in a sequential framework, a commitment to three successive years in the program is essential.

Applicants with accredited professional baccalaureate degrees in landscape architecture or architecture may be considered for the advanced-standing MLA degree (MLA II). The MLA II requires at least 58 credits of design studio, research methods, and elective courses.

### Accreditation

This program is accredited by Landscape Architectural Accreditation Board (LAAB)

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

MLA program applicants must have completed a baccalaureate degree.

#### **Special Application Requirements:**

Students are admitted for fall semester only. MLA program applicants must apply by January 15, for entry the following fall, to receive first consideration for admission, fellowships, and assistantships. In addition to the University's admission requirements, applicants must submit an electronic portfolio in 8.5 x 11 PDF format. GRE scores are not required; however, they can be helpful to applicants seeking national fellowships such as the Fulbright Scholarship. Please refer to the MLA website for detailed information regarding department specific application requirements and procedures, including a downloadable checklist, at <http://landarch.design.umn.edu/prog/index.html>.

International applicants must submit score(s) from one of the following tests:



- TOEFL
  - Internet Based - Total Score: 86
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 51 to 83 major credits and 6 credits outside the major. There is no final exam. A capstone project is required.  
**Capstone Project:** See department for more details.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

### Core Coursework

All MLA I and MLA II students must take the following courses for a total of 36 credits. LA 8206 must be taken twice.

- [LA 5131](#) - Geospatial Data Analysis and Design (3.0 cr)
- [LA 5202](#) - Landscape Analysis Workshop (1.0 cr)
- [LA 8206](#) - Making Urban Landscape Space (6.0 cr)
- [LA 8301](#) - Landscape Architecture: Research Issues and Methods (3.0 cr)
- [LA 8302](#) - Professional Practice (3.0 cr)
- [LA 8554](#) - Project Programming (2.0 cr)
- [LA 8555](#) - Advanced Landscape Planning and Design (6.0 cr)
- [LA 8773](#) - Landscape Infrastructure and Systems III (3.0 cr)
- [LA 8774](#) - Landscape Infrastructure and Systems IV (3.0 cr)

### Outside Electives

All MLA I and MLA II students must take at least 6 of their elective credits outside of landscape architecture. Students may choose any 5000-level or above course. Preferred electives include ARCH 5711, ARCH 5721, ARCH 5756, DES 5165, ESPM 5071, PA 5004, PA 5013, PA 5211, PA 5231.

### MLA I and MLA II Program Options

The MLA I is a 3-year program. The MLA II is a 2-year program for students with an accredited undergraduate degree or who receive advanced standing.

### MLA I Requirements

#### Additional Course Requirements

MLA I students must take the following courses for 32 credits:

- [LA 5201](#) - Making Landscape Spaces and Types (6.0 cr)
- [LA 5203](#) - Ecological Dimensions of Space Making (6.0 cr)
- [LA 5204](#) - Metropolitan Landscape Ecology (3.0 cr)
- [LA 5376](#) - Representation I (4.0 cr)
- [LA 5377](#) - Representation II (4.0 cr)
- [LA 5413](#) - Introduction to Landscape Architectural History (3.0 cr)
- [LA 5771](#) - Landscape Infrastructure and Systems I (3.0 cr)
- [LA 5772](#) - Landscape Infrastructure Systems II (3.0 cr)

#### Additional Required Coursework

MLA I students may participate in the Cities on the Water study abroad option, with the approval of their advisor and the director of graduate studies. Students choosing the study abroad option take 6 credits of LA 8207, 3 credits of LA 5381, 3 credits of LA 5414, and 3 credits of LA 5761 for a total of 15 credits. Students who do not choose the study abroad option take LA 8205 for 6 credits plus 9 credits of electives for a total of 15 credits.

#### Cities on Water--Study Abroad Option

MLA I students may participate in the Cities on the Water study abroad option, with the approval of their advisor and the director of graduate studies. Students choosing the study abroad option take 6 credits of LA 8207, 3 credits of LA 5381, 3 credits of LA 5414, and 3 credits of LA 5761 for a total of 15 credits.





- LA 5381 - The City in Visual Culture (3.0 cr)
- LA 5414 - Study Abroad: History and Culture (0.0 - 3.0 cr)
- LA 5761 - Infrastructure + Culture (3.0 cr)
- LA 8207 - Cities on Water International Workshop (6.0 cr)

**or Students Not Studying Abroad**

Students who do not choose the study abroad option take LA 8205 for 6 credits plus 9 credits of electives for a total of 15 credits.

- LA 8205 - Urban Form Options: Landscape Architecture Studio (6.0 cr)

**Electives for Students Not Studying Abroad**

MLA I students not choosing to study abroad take at least 9 elective credits that term along with 6 credits of LA 8205. Students may choose any 5000-level or above course. Preferred electives include ARCH 5711, ARCH 5721, ARCH 5756, DES 5165, ESPM 5071, PA 5004, PA 5013, PA 5211, PA 5231

-OR-

**MLA II Requirements**

**Cities on Water--Study Abroad Option**

MLA II students may participate in the Cities on the Water study abroad option, with adviser and director of graduate studies approval. Students choosing the study abroad option take 6 credits of LA 8207, 3 credits of LA 5381, 3 credits of LA 5414, and 3 credits of LA 5761 for a total of 15 credits.

- LA 8207 - Cities on Water International Workshop (6.0 cr)
- LA 5381 - The City in Visual Culture (3.0 cr)
- LA 5414 - Study Abroad: History and Culture (0.0 - 3.0 cr)
- LA 5761 - Infrastructure + Culture (3.0 cr)

**or Students Not Studying Abroad**

Those not choosing to study abroad take 6 credits of LA 8205, 4 credits of LA 5377, and 6 credits of electives for a total of 16 credits.

- LA 8205 - Urban Form Options: Landscape Architecture Studio (6.0 cr)
- LA 5377 - Representation II (4.0 cr)

**Electives for Students Not Studying Abroad**

MLA II students not choosing to study abroad take 6 credits of electives. Students may choose any 5000-level or above course.

Preferred electives include ARCH 5711, ARCH 5721, ARCH 5756, DES 5165, ESPM 5071, PA 5004, PA 5013, PA 5211, PA 5231.

**Joint- or Dual-degree Coursework:** MLA/MS-Architecture Student may take a total of 24 credits in common among the academic programs.



### *Twin Cities Campus*

## Landscape Architecture M.S.

*Landscape Architecture*

### College of Design

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Landscape Architecture, 144 Rapson Hall, 89 Church Street SE, Minneapolis, MN 55455 (612-625-6860; fax: 612-625-0710)

Website: <http://landarch.design.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MS is for students with a clear focus in research related to landscape architecture. MS students build expertise related to the practice of landscape architecture as they learn how to conduct research. Students specialize within areas of faculty expertise, which may include art and landscape architecture, landscape ecology, landscape architectural history and theory, park and recreation design, rural and suburban landscape planning, transportation, planning of world heritage sites, and urban design.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.8
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan A:** Plan A requires 6 major credits, 14 credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.



### Coursework Requirements

#### Landscape Architecture Electives

Take 6 or more credit(s) from the following:

- LA 5xxx
- LA 8xxx

#### Interest Area Electives

Choose elective credits, in consultation with the advisor, from coursework outside landscape architecture.

Take 6 or more credit(s) from the following:

- xxxx 5xxx
- xxxx 6xxx
- xxxx 7xxx
- xxxx 8xxx

#### Remaining Electives

Choose remaining credits in consultation with the advisor.

Take 8 or more credit(s) from the following:

- xxxx 5xxx
- xxxx 6xxx
- xxxx 7xxx
- xxxx 8xxx

#### Thesis credits

Take 10 master's thesis credits.

[LA 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### *Twin Cities Campus*

## Landscape Architecture Minor

*Landscape Architecture*

**College of Design**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Landscape Architecture, University of Minnesota, 144 Rapson Hall, 89 Church Street SE, Minneapolis, MN 55455 (612-625-6860; fax: 612-625-0710)

Email: [gsland@umn.edu](mailto:gsland@umn.edu)

Website: <http://landarch.design.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students in landscape architecture develop professional design skills through courses that address the increasingly complex relationships between art, ecology, and community that influence and inform design on the land. Courses emphasize three principal areas of study: 1) landscape architecture as a means to add to the aesthetic richness of our culture and environment--helping us to better understand ourselves and our place in the world; 2) integration of biological, geophysical, and ecological processes into lasting, meaningful, and systemically rigorous landscape architecture that sustains and protects the health of people and the ecosystems on which they depend; and 3) design for urban and suburban places and people, with emphasis on gaining knowledge and experience through direct engagement with clients and the public in order to address the problems and opportunities of the metropolitan core of cities.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Minor requirements are determined in consultation with the Landscape Architecture director of graduate studies.

### **Required Course**

Take the following required course for 3 credits:

[LA 5413](#) - Introduction to Landscape Architectural History (3.0 cr)

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Masters**

#### **Electives**

Take at least 6 credits from the following:

[LA 5003](#) - Climate Change Adaptation (3.0 cr)

[LA 5204](#) - Metropolitan Landscape Ecology (3.0 cr)



[LA 5514](#) - Making the Mississippi (3.0 cr)

[LA 5755](#) - Infrastructure, Natural Systems and the Space of Inhabited Landscapes (3.0 cr)

[LA 5771](#) - Landscape Infrastructure and Systems I (3.0 cr)

[LA 8301](#) - Landscape Architecture: Research Issues and Methods (3.0 cr)

#### Doctoral

##### Electives

Take at least 9 credits from the following:

[LA 5003](#) - Climate Change Adaptation (3.0 cr)

[LA 5204](#) - Metropolitan Landscape Ecology (3.0 cr)

[LA 5514](#) - Making the Mississippi (3.0 cr)

[LA 5755](#) - Infrastructure, Natural Systems and the Space of Inhabited Landscapes (3.0 cr)

[LA 5771](#) - Landscape Infrastructure and Systems I (3.0 cr)

[LA 8301](#) - Landscape Architecture: Research Issues and Methods (3.0 cr)



### **Twin Cities Campus**

## **Lighting Design Minor**

*DHA Interior Design*

### **College of Design**

Link to a [list of faculty](#) for this program.

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The lighting design minor provides an educational forum for students to engage regional lighting professionals, design practitioners, and industry representatives to study the evolving role of lighting design and technologies in professional practice. The coordination of lighting courses from interior design and architecture provides an integrated approach to electric lighting, interior design, and daylighting. The minor enables students to gain insight into the relationship between interior and architectural design strategies.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **Required**

Master's students take these three courses:

- [ARCH 5539](#) - Daylighting and Architecture Design (3.0 cr)
- [IDES 5612](#) - Lighting Design (3.0 cr)
- [IDES 5617](#) - Lighting Design Innovations and Technological Advances (3.0 cr)

#### **Doctoral**

##### **Required Courses**

Doctoral students take these three courses:

- [ARCH 5539](#) - Daylighting and Architecture Design (3.0 cr)
- [IDES 5612](#) - Lighting Design (3.0 cr)
- [IDES 5617](#) - Lighting Design Innovations and Technological Advances (3.0 cr)

##### **Electives**

Take one course from the list below for 3 credits.

- [TH 5540](#) - Lighting Design for the Theatre (3.0 cr)
- or [TH 5545](#) - Stage Lighting Technology (3.0 cr)
- or [IDES 5193](#) - Directed Study in Interior Design (1.0 - 4.0 cr)
- or [IDES 5196](#) - Work experience (lighting internship) (3.0 cr)



### *Twin Cities Campus*

## Metropolitan Design Postbaccalaureate Certificate

*Design, Housing & Apparel*

### College of Design

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Design, Metropolitan Design Program, 1 Rapson Hall, 89 Church Street SE, Minneapolis, MN 55455 (625-9000; fax: 626-0600)

Email: [mdc@umn.edu](mailto:mdc@umn.edu)

Website: <http://www.designcenter.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 21
- This program does not require summer semesters for timely completion.
- Degree: Metropolitan Design PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The metropolitan design certificate at the College of Design prepares students with the essential knowledge and understanding of the city within the complexities of the 21st-century metropolis. As suburban development is losing some of its past seductions, traditional cities are being transformed to accommodate the return to city living, an American counter-trend that requires the integrative approach of many fields of knowledge.

The certificate is open to graduate students in the College of Design and graduate students from other colleges with related urban planning programs are welcome to apply. The certificate is a two-semester, 21-credit course sequence within existing master's degrees at the College of Design. It is strongly recommended that the required urban design courses should be taken in sequence.

Interested students should enroll during the second semester (spring) of graduate studies. It is recommended that students make a decision to enroll in the certificate early so that the completion of courses can be made within the time required for completion of the professional degree.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

Other requirements to be completed before admission:

An application is required including a 2-page statement of interest in the program, university transcripts, and a portfolio of design work (no more 10 pages). Other students not from the College of Design should submit comparable graphic examples and two written papers.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

### Coursework

#### Required Courses (12 credits)

Take the following courses:

[ARCH 5711](#) - Theory and Principles of Urban Design (3.0 cr)

[ARCH 5721](#) - Case Studies in Urban Design (3.0 cr)

[ARCH 8255](#) - Graduate Architectural Design V (6.0 cr)

#### Electives (9 credits)

Select 9 credits from the following in consultation with the advisor:

[ARCH 5361](#) - 3-D Computer Architectural Modeling and Design (3.0 cr)

[ARCH 5441](#) - Minnesota: Architecture and Landscapes (3.0 cr)

[ARCH 5671](#) - Historic Preservation (3.0 cr)

[ARCH 5731](#) - Territorial City (3.0 cr)

[ARCH 8561](#) - Sustainable Design Theory and Practice (3.0 cr)

[HSG 5463](#) - Housing Policy (3.0 cr)

[HSG 5467](#) - Housing and the Social Environment (4.0 cr)

[LA 5204](#) - Metropolitan Landscape Ecology (3.0 cr)

[LA 5405](#) - Interdisciplinary Studies in Landscape Architecture (1.0 - 6.0 cr)

[PA 5204](#) - Urban Spatial and Social Dynamics (3.0 cr)

[PA 5211](#) - Land Use Planning (3.0 cr)

[PA 5212](#) - Managing Urban Growth and Change (3.0 cr)

[PA 5231](#) - Transit Planning and Management (3.0 cr)

[PA 5261](#) - Housing Policy (3.0 cr)

[PA 5501](#) - Theories and Policies of Development (3.0 cr)

[PA 5511](#) - Community Economic Development (3.0 cr)

[PA 5721](#) - Energy Systems and Policy (3.0 cr)

[PA 5722](#) - Economics of Natural Resource and Environmental Policy (3.0 cr)

[PA 5723](#) - Water Policy (3.0 cr)

[PA 5802](#) - Global Economic Policy (3.0 cr)





### **Twin Cities Campus**

## **Museum Studies Minor**

*Design, Housing & Apparel*

### **College of Design**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Museum Studies Graduate Minor, College of Design, 240 McNeal Hall, 1985 Buford Avenue, 612-626-1219

Email: [nelsonm@umn.edu](mailto:nelsonm@umn.edu)

Website: [http://www.design.umn.edu/prospective\\_students/programs/museumstudies.html](http://www.design.umn.edu/prospective_students/programs/museumstudies.html)

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 7
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The museum studies minor offers a structured graduate curriculum for master's and doctoral students interested in museums. It provides students from a variety of disciplines with an introduction to the issues involved in museum practices (e.g., educational, curatorial, administrative, and conservation). The curriculum includes seminars and internships.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

### **Special Application Requirements:**

As a minor-only program, all graduate students who have already been accepted into a University of Minnesota Graduate program are eligible for acceptance into the program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Core Course Requirements**

All students pursuing the museum studies minor must take the following core coursework, including 1 internship credit (MST 5020).

Internships must be approved by the museum studies director of graduate studies.

[MST 5011](#) - Museum History and Philosophy (3.0 cr)

[MST 5012](#) - Museum Practices (3.0 cr)

[MST 5020](#) - Internship (1.0 - 6.0 cr)

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Master's**

Complete the 7-credit core curriculum described above.

### **Doctoral**

#### **Doctoral Electives**



In addition to the core curriculum, take at least 5 credits from the following courses:

**Communication**

Take 0 or more credit(s) from the following:

- [JOUR 5251](#) - Strategic Communication Theory (3.0 cr)

or **Leadership**

Take 0 or more credit(s) from the following:

- [ACL 5221](#) - Creative Entrepreneurship and Resource Development (3.0 cr)
- [OLPD 5048](#) - Cross-Cultural Perspectives on Leadership (3.0 cr)
- [OLPD 8021](#) - Leadership: From Theory to Reflective Practice (3.0 cr)
- [PA 5101](#) - Management and Governance of Nonprofit Organizations (3.0 cr)
- [PA 5104](#) - Strategic Human Resource Management (3.0 cr)
- [PA 5123](#) - Philanthropy in America: History, Practice, and Trends (1.5 - 3.0 cr)
- [PA 5253](#) - Designing Planning and Participation Processes (3.0 cr)
- [PA 5251](#) - Strategic Planning and Management (3.0 cr)

or **Education**

Take 0 or more credit(s) from the following:

- [PSY 5014](#) - Psychology of Human Learning and Memory (3.0 cr)

or **Evaluation**

Take 0 or more credit(s) from the following:

- [OLPD 5501](#) - Principles and Methods of Evaluation (3.0 cr)
- [PA 5311](#) - Program Evaluation (3.0 cr)

or **Exhibition Design**

Take 0 or more credit(s) from the following:

- [DES 5185](#) - Human Factors in Design (3.0 cr)
- [DES 8164](#) - Innovation Theory and Analysis (3.0 cr)
- [GDES 8361](#) - Color, Design, and Human Perception (3.0 cr)
- [KIN 5505](#) - Human-Centered Design - Principles and Applications (3.0 cr)

or **Other Museum Studies Electives**

Internships (MST 5020) must be approved by the museum studies director of graduate studies. Directed study (MST 8993) must be guided by a member of the museum studies graduate faculty.

Take 0 or more credit(s) from the following:

- [MST 5020](#) - Internship (1.0 - 6.0 cr)
- [MST 8993](#) - Directed Study in Museum Studies (1.0 - 4.0 cr)



### **Twin Cities Campus**

## **Product Design Minor**

*Design, Housing & Apparel*

### **College of Design**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies, Product Design Graduate Minor, 240 McNeal Hall, 1985 Buford Avenue, St. Paul, MN 55108

Email: [dhagrad@umn.edu](mailto:dhagrad@umn.edu)

Website: <http://product.design.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 11
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Product design is the planning of an item intended to be manufactured and sold. These items exist both as discrete artifacts and as actors in larger social systems, such as branded environments, services, experiences, and social interactions. A graduate minor may be earned in product design when it logically relates to the graduate major field. The minor program is designed to suit the particular needs and interests of the student. The course of study is determined in consultation with the student's major advisor and the director of graduate studies for the minor.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A graduate minor may be earned in product design when it logically relates to the graduate major field.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum of two courses with the PDES designator must be taken to fulfill the minor requirements.

The course of study must be approved by the product design director of graduate studies.

#### **Product Design Core Courses**

##### **Required Course (3 Credits)**

[PDES 5701](#) - User-Centered Design Studio (3.0 cr)

##### **Product Design Process (3 to 8 Credits)**

###### **Option 1**

[PDES 5711](#) - Product Innovation Lab (4.0 cr)

###### **or Option 2**

[DES 8151](#) - Product Development: Theory and Practice (3.0 cr)

###### **or Option 3**

[ME 8221](#) - New Product Design and Business Development I (4.0 cr)

[ME 8222](#) - New Product Design and Business Development II (4.0 cr)

###### **or Option 4**

[BMEN 8401](#) - New Product Design and Business Development (4.0 cr)

[BMEN 8402](#) - New Product Design and Business Development (4.0 cr)

###### **or Option 5**



Take ENTR 6041 for 2 to 4 credits, in consultation with the Product Design director of graduate studies.

[ENTR 6041](#) - Initiating New Product Design and Business Development (2.0 - 4.0 cr)

[ENTR 6042](#) - Implementing New Product Design and Business Development (4.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Masters

#### Electives (0 to 4 Credits)

Select remaining coursework, in consultation with the product design director of graduate studies, to meet the 11-credit minimum and the requirement for 2 PDES courses. Product design core courses not applied to the core requirement may be used as electives.

##### Design Process

[PDES 5711](#) - Product Innovation Lab (4.0 cr)

or [DES 8151](#) - Product Development: Theory and Practice (3.0 cr)

or [BMEN 8401](#) - New Product Design and Business Development (4.0 cr)

[BMEN 8402](#) - New Product Design and Business Development (4.0 cr)

or [ME 8221](#) - New Product Design and Business Development I (4.0 cr)

[ME 8222](#) - New Product Design and Business Development II (4.0 cr)

or [DES 8164](#) - Innovation Theory and Analysis (3.0 cr)

##### or Drawing and Visualization

[PDES 5702](#) - Visual Communication (3.0 cr)

or [PDES 5704](#) - Computer-Aided Design Methods (3.0 cr)

or [GDES 8362](#) - The Nature of Representation in Visual Communication (3.0 cr)

##### or Prototyping, Manufacturing, and the Environment

[PDES 5703](#) - Prototyping Methods (4.0 cr)

or [ME 5221](#) - Computer-Assisted Product Realization (4.0 cr)

or [ME 5223](#) - Materials in Design (4.0 cr)

or [ME 5241](#) - Computer-Aided Engineering (4.0 cr)

or [ME 8243](#) - Topics in Design (4.0 cr)

or [ESPM 5603](#) - Environmental Life Cycle Analysis (3.0 cr)

or [ESPM 5605](#) - Recycling: Extending Raw Materials Supplies (3.0 cr)

##### or Human Factors

[DES 5185](#) - Human Factors in Design (3.0 cr)

or [CSCI 5115](#) - User Interface Design, Implementation and Evaluation (3.0 cr)

or [GDES 5341](#) - Interaction Design (3.0 cr)

or [GDES 5386](#) - Fundamentals of Game Design (3.0 cr)

or [KIN 5505](#) - Human-Centered Design - Principles and Applications (3.0 cr)

or [HUMF 5001](#) - Foundations of Human Factors/Ergonomics (3.0 cr)

##### or Understanding the Consumer and the Market

[PDES 5705](#) - History and Future of Product Design (3.0 cr)

or [ANTH 5121](#) - Business Anthropology (2.0 cr)

or [DES 8164](#) - Innovation Theory and Analysis (3.0 cr)

or [MKTG 6055](#) - Buyer Behavior (2.0 cr)

or [MKTG 6050](#) - Marketing Analytics: Managerial Decisions (2.0 cr)

### Doctoral

#### Electives (1 to 4 Credits)

Select remaining coursework, in consultation with the product design director of graduate studies, to meet the 12-credit minimum and the requirement for 2 PDES courses. Product design core courses not applied to the core requirement may be used as electives.

##### Design Process

[PDES 5711](#) - Product Innovation Lab (4.0 cr)

or [DES 8151](#) - Product Development: Theory and Practice (3.0 cr)

or [BMEN 8401](#) - New Product Design and Business Development (4.0 cr)

[BMEN 8402](#) - New Product Design and Business Development (4.0 cr)

or [ME 8221](#) - New Product Design and Business Development I (4.0 cr)

[ME 8222](#) - New Product Design and Business Development II (4.0 cr)

or [DES 8164](#) - Innovation Theory and Analysis (3.0 cr)

##### or Drawing and Visualization

[PDES 5702](#) - Visual Communication (3.0 cr)

or [PDES 5704](#) - Computer-Aided Design Methods (3.0 cr)

or [GDES 8362](#) - The Nature of Representation in Visual Communication (3.0 cr)

##### or Prototyping, Manufacturing, and the Environment



[PDES 5703](#) - Prototyping Methods (4.0 cr)  
or [ME 5221](#) - Computer-Assisted Product Realization (4.0 cr)  
or [ME 5223](#) - Materials in Design (4.0 cr)  
or [ME 5241](#) - Computer-Aided Engineering (4.0 cr)  
or [ME 8243](#) - Topics in Design (4.0 cr)  
or [ESPM 5603](#) - Environmental Life Cycle Analysis (3.0 cr)  
or [ESPM 5605](#) - Recycling: Extending Raw Materials Supplies (3.0 cr)  
or **Human Factors**  
[DES 5185](#) - Human Factors in Design (3.0 cr)  
or [CSCI 5115](#) - User Interface Design, Implementation and Evaluation (3.0 cr)  
or [GDES 5341](#) - Interaction Design (3.0 cr)  
or [GDES 5386](#) - Fundamentals of Game Design (3.0 cr)  
or [KIN 5505](#) - Human-Centered Design - Principles and Applications (3.0 cr)  
or [HUMF 5001](#) - Foundations of Human Factors/Ergonomics (3.0 cr)  
or **Understanding the Consumer and the Market**  
[PDES 5705](#) - History and Future of Product Design (3.0 cr)  
or [ANTH 5121](#) - Business Anthropology (2.0 cr)  
or [DES 8164](#) - Innovation Theory and Analysis (3.0 cr)  
or [MKTG 6055](#) - Buyer Behavior (2.0 cr)  
or [MKTG 6050](#) - Marketing Analytics: Managerial Decisions (2.0 cr)



### **Twin Cities Campus**

## **Additional Licensure Other**

*Curriculum & Instruction, Educational Psychology, Family Social Science, Kinesiology, School of, Organizational Leadership, Policy and Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

CEHD Office of Teacher Education

275 Peik Hall

159 Pillsbury Dr SE

Minneapolis, MN 55455

612-625-5060

Email: [ote@umn.edu](mailto:ote@umn.edu)

Website: <http://www.cehd.umn.edu/future/graduate/teach/additional/default.html>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 19 to 24
- This program requires summer semesters for timely completion.
- Degree: College of Education Additional Licensure

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The additional licensure program offers a variety of courses specifically designed to address the competencies required by the state for various teaching and administrative licenses. Additional licenses are added to a current five-year, full-time professional Minnesota teaching license. Courses are offered throughout the year with evening courses offered during fall, spring, and summer semesters, and day courses offered during the summer semester. Students who enroll in the program are generally practicing teachers. They complete the program in an average of one to two years.

### **Accreditation**

This program is accredited by NCATE/BOT, Council of Exceptional Children (CEC) and Council on Education of the Deaf (CED).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

This program is not offered full-time and therefore is not intended for international students needing a visa to study in the United states.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Students must complete all coursework with a grade of S or C or better.

#### **Required courses**

Required courses are specific to the individual Additional Licensure sub-plan programs listed.

### **Program Sub-plans**



Students are required to complete one of the following sub-plans.  
Students may complete the program with more than one sub-plan.

Director of Community Education

Director of Special Education

Early Childhood Special Education

Parent and Family Education

Principal K-12

Superintendent K- 12



### **Twin Cities Campus**

## **Additional Licensure Teaching**

*Curriculum & Instruction, Educational Psychology, Family Social Science, Kinesiology, School of, Organizational Leadership, Policy and Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

CEHD Office of Teacher Education, 110 Wulling Hall, 86 Pillsbury Dr SE, Minneapolis, MN 55455 612-625-5060.

Email: [ote@umn.edu](mailto:ote@umn.edu)

Website: <http://www.cehd.umn.edu/graduate/additional-license.html>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 19 to 24
- This program requires summer semesters for timely completion.
- Degree: College of Education Additional Licensure

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The additional licensure program offers a variety of courses specifically designed to address the competencies required by the state for various teaching and administrative licenses. Additional licenses are added to a current five-year, full-time professional Minnesota teaching license. Courses are offered throughout the year with evening courses offered during fall, spring, and summer semesters, and day courses offered during summer semester. Students who enroll in the program are generally practicing teachers. They complete the program in an average of one to two years.

## **Accreditation**

This program is accredited by NCATE/BOT, Council of Exceptional Children (CEC) and Council on Education of the Deaf (CED).

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

Other requirements to be completed before admission:

This program is not offered full-time and therefore is not intended for international students needing a visa to study in the United States.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Students must complete all coursework with a grade of S or C or better.

#### **Required courses**

Required courses are specific to the individual Additional Licensure sub-plan programs listed.

## **Program Sub-plans**





Students are required to complete one of the following sub-plans.  
Students may complete the program with more than one sub-plan.

#### Academic and Behavioral Strategist

The professional development program in special education offers a program of study that leads to K-12 licensure as an Academic Behavioral Strategist (ABS) and an MEd degree. This degree is designed to prepare teachers to work in a variety of educational settings with students who have mild to moderate disabilities. Graduates of the program are student-centered, collaborative professionals who implement evidence-based instructional interventions with fidelity to improve learner outcomes. The program incorporates maximizing learner expectations and learning opportunities including cultural and social diversity. Graduates are prepared to assess, analyze, and problem solve the challenges of learning for students with developmental disabilities and their families, focusing on the objective of providing effective teaching practices and instructional strategies.

#### Agricultural Education 5-12

#### Autism Spectrum Disorders licensure

New student applications to Autism Spectrum Disorders are not being accepted.

#### Chemistry Education 9-12

#### Comm Arts/Lit Educ 5-8/9-12

#### Comm Arts/Lit Education 5-8

#### Deaf and Hard of Hearing

The deaf education program within special education leads to an M.Ed. degree with potential for MN Licensure with additional coursework. It is designed to prepare reflective educators to work with students (and their families) with diverse linguistic and cultural backgrounds. Our program philosophy focuses on providing students with an in-depth understanding of advocacy, identity development, language and literacy development, and how to facilitate and assess development across ages and curricular areas giving equal value to ASL and English. The program will prepare graduates to have bilingual and bicultural competence along with the ability to demonstrate best practices and effective instructional strategies to meet the needs of individual learners; in addition, to engage in and value partnerships with deaf adults, parents, community and professional organizations.

#### Developmental Disabilities

New student applications to Developmental Disabilities are not being accepted.

#### Early Childhood Educ Birth-Gr3

#### Earth & Space Science Ed 9-12

#### Emotional and Behavioral Disorders

New student applications to Emotional and Behavioral Disorders are not being accepted.

#### English as a Second Lang K-12

#### Learning Disabilities K-12

New student applications to Developmental Disabilities are not being accepted.

#### Life Science Education 9-12

#### Mathematics Education 5-8

#### Mathematics Education 5-8/9-12

#### Oral/Aural

See Deaf and Hard of Hearing.



Physics Education 9-12

Reading

Visual Arts Education K-12

WorldLang/Cultures: Japanese K-12

WorldLang/Cultures: Arabic K-12

WorldLang/Cultures: Chinese K-12

WorldLang/Cultures: French K-12

WorldLang/Cultures: German K-12

WorldLang/Cultures: Hebrew K-12

WorldLang/Cultures: Italian K-12

WorldLang/Cultures: Latin K-12

WorldLang/Cultures: Norweg K-12

WorldLang/Cultures: Ojibwe K-12

WorldLang/Cultures: Polish K-12

WorldLang/Cultures: Russian K-12

WorldLang/Cultures: Spanish K-12

WorldLang/Cultures: Swedish K-12

Dance

Theatre



### **Twin Cities Campus**

## **Adult Education M.Ed.**

*Organizational Leadership, Policy and Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455 (612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 34
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in adult education (AdEd), is a specialized academic area of the Human Resource Development program in the Department of Organizational Leadership, Policy, and Development. AdEd graduate programs prepare individuals to work with adults in a variety of roles, such as program developers, teachers, advisers, administrators, and managers in a variety of formal and informal settings, such as educational institutions, business and industry, community agencies, healthcare organizations, continuing and professional education, and adult basic education.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

#### **Special Application Requirements:**

When applying online, applicants should complete Statements #1 & 2 (Statement #1 should indicate if student is in a special cohort). Filling out statement #3 optional. Applicants must also submit a résumé and personal statement (limit two pages) describing career goals and rationale for interest in the M.Ed. program. Two letters of recommendation from individuals who can attest to the applicant's potential are also required. Admissions are done on a rolling basis with the following deadlines: March 1 (Summer), July 1 (Fall), November 1 (Spring).

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan C:** Plan C requires 24 major credits and 10 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Required Courses

Students must complete at least 34 credits, including the following courses:

- OLPD 5296: Field Experience in Adult Education  
(3 credits are required and no more than 6 credits may be applied toward the program)
- [OLPD 5201](#) - Strategies for Teaching Adults (3.0 cr)
- [OLPD 5202](#) - Perspectives of Adult Learning and Development (3.0 cr)
- [OLPD 5204](#) - Designing the Adult Education Program (3.0 cr)
- [OLPD 5296](#) - Field Experience in Adult Education (1.0 - 6.0 cr)
- [OLPD 5607](#) - Organization Development (3.0 cr)
- [OLPD 5801](#) - Survey: Human Resource Development and Adult Education (3.0 cr)
- [OLPD 5819](#) - Evaluating and Using Research in Organizations and Education (3.0 cr)

One additional 3 credit Adult Education course with adviser approval

Up to 10 credits of elective courses with adviser approval to equal the 34 credits needed for this program. The appropriate elective courses may vary.

Note on OLPD 5296 Field Experience in Adult Education: 3 credits are required and no more than 6 credits may be applied toward the program.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Rochester

All sub-plans have the same curriculum requirements. New students are not being admitted to this sub-plan. Courses may be taken on the Twin Cities campus.



### **Twin Cities Campus**

## **Adult Education Postbaccalaureate Certificate**

*Organizational Leadership, Policy and Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Organization Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455 (612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 14
- This program does not require summer semesters for timely completion.
- Degree: Adult Education PBacc Certificate Grad

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in adult education (AdEd), is a specialized academic area of the Human Resource Development program track in the Department of Organizational Leadership, Policy, and Development. AdEd graduate programs prepare individuals to work with adults in a variety of roles, such as program developers, teachers, advisors, administrators, and managers in a variety of formal and informal settings, such as educational institutions, business and industry, community agencies, healthcare organizations, continuing and professional education, and adult basic education.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Admission is open to degree-seeking or non-degree seeking students who possess a U.S. bachelor's degree (or international equivalent). Applications are reviewed on an ongoing basis and may be submitted at any time.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.



Certificate coursework completed with undergraduate student status cannot be applied to graduate-level degree programs.

**Required Coursework**

[OLPD 5801](#) - Survey: Human Resource Development and Adult Education (3.0 cr)

[OLPD 5201](#) - Strategies for Teaching Adults (3.0 cr)

[OLPD 5202](#) - Perspectives of Adult Learning and Development (3.0 cr)

Students should enroll for a minimum of 4 credits of OLPD 5296 or OLPD 5696

[OLPD 5296](#) - Field Experience in Adult Education (1.0 - 6.0 cr)

or [OLPD 5696](#) - Internship: Human Resource Development (1.0 - 10.0 cr)

**Electives**

Only if needed to meet 14 credit minimum

[OLPD 5607](#) - Organization Development (3.0 cr)

or Additional OLPD courses with adviser approval to make total credits earned equal at least 14 credits.



### **Twin Cities Campus**

## **Adult Literacy Postbaccalaureate Certificate**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

The Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455 (612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 14
- This program does not require summer semesters for timely completion.
- Degree: Adult Literacy PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The adult literacy certificate is designed to prepare teachers, administrators, trainers, and counselors in the broad political, social, economic, and theoretical aspects of adult literacy in a global environment.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

US bachelor's degree or international equivalent.

### **Special Application Requirements:**

Admission is open to degree-seeking or non-degree seeking students. Students may pursue the certificate alone or concurrently with a UM master's or doctoral degree program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Certificate coursework completed with undergraduate student status cannot be applied to graduate-level degree programs.

#### **Adult Literacy**

Select courses from the following three modules for a total of at least 6 credits.

##### **Module 1**

[OLPD 5211](#) - Introduction to the Undereducated Adult (1.0 cr)

[OLPD 5212](#) - Introduction to Adult Literacy in the Workplace (1.0 cr)

[OLPD 5213](#) - Introduction to Adult Literacy in the Community (1.0 cr)

##### or **Module 2**

[OLPD 5224](#) - Formal Assessment of Adult Literacy (1.0 cr)

[OLPD 5225](#) - Informal Assessment of Adult Literacy (1.0 cr)

[OLPD 5226](#) - Advanced Assessment of Adult Literacy (1.0 cr)

##### or **Module 3**

[OLPD 5233](#) - Methods of Teaching Beginning Adult Literacy (1.0 cr)



[OLPD 5234](#) - Methods of Teaching Intermediate Adult Literacy (1.0 cr)

[OLPD 5235](#) - Methods of Teaching Advanced Adult Literacy (1.0 cr)

or **Subgroup 3**

#### **Adult Education**

Take one of the following courses for 3 credits.

[OLPD 5201](#) - Strategies for Teaching Adults (3.0 cr)

or [OLPD 5202](#) - Perspectives of Adult Learning and Development (3.0 cr)

#### **Field Experience**

Take the following course for 3 credits.

[OLPD 5296](#) - Field Experience in Adult Education (1.0 - 6.0 cr)

#### **Electives**

Take at least 2 credits of electives. Courses other than the following may be substituted with program advisor approval.

[CI 5651](#) - Foundations of Second Languages and Cultures Education (3.0 cr)

or [CI 5656](#) - Teaching Literacy in Second Language Classrooms (3.0 cr)

or [CI 5657](#) - Teaching Speaking and Listening in Second Language Classrooms (3.0 cr)

or [CI 5662](#) - Second Language Curriculum Design (3.0 cr)





### **Twin Cities Campus**

## **Advanced Practices in Second Language Teaching Postbaccalaureate Certificate**

Curriculum & Instruction

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, 125 Peik Hall, 159 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-625-4006; fax: 612-624-8277)

Email: [Clinfo@umn.edu](mailto:Clinfo@umn.edu)

Website: <http://cehd.umn.edu/ci>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program requires summer semesters for timely completion.
- Degree: Adv Prac in Second Lang Teaching PBac Cert.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The University of Minnesota's Advanced Practices in Second Language Teaching Certificate program is designed for teachers of foreign languages and English as a second/foreign language and is offered by the Department of Curriculum and Instruction in partnership with the Center for Advanced Research on Language Acquisition (CARLA) Summer Institute Program.

Courses are offered on the Twin Cities campus, typically during the last three weeks in July. The certificate may be completed independently or in conjunction with a master of education (M.Ed) degree in second languages and cultures education at the University of Minnesota.

Although the University certificate does not lead to teaching licensure or state certification, it adds value to a pre-service or in-service teacher's academic program and professional life. Completion of the advanced practices in second language teaching certificate indicates successful participation in a set of internationally recognized, high-quality summer institutes for language teaching and provides a vehicle for teachers to receive tangible recognition of preparation in advanced language teaching practices and methodologies.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

A completed bachelor's degree is required for admission.

#### **Special Application Requirements:**

Applicants must submit transcripts from every college attended (even those where a degree wasn't earned), scores from the TOEFL/IELTS/MELAB (if applicable), a resume, and a one page personal statement discussing your experience teaching languages and the ways this certificate program will contribute to your professional development. Certificate applications are reviewed by the department three times per academic year: Fall, Spring and Summer.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80



The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Core Courses (6 credits)

[CI 5621](#) - Culture as the Core in the Second Language Classroom (2.0 cr)

[CI 5622](#) - Exploring Learner Language: Puzzles and Tools for the Classroom (2.0 cr)

If [CI 5608](#): CARLA Summer Institute Seminar is selected, student must take "Teaching Language Online" topic section.

[LGTT 5110](#) - Technology in the Second Language Classroom (2.0 cr)

or [CI 5608](#) - CARLA Summer Institute Seminar (1.0 - 4.0 cr)

### Elective Courses (6 credits)

Take 3 or more course(s) totaling 6 or more credit(s) from the following:

•[CI 5608](#) - CARLA Summer Institute Seminar (1.0 - 4.0 cr)

•[CI 5623](#) - Improving Language Learning: A Practical Course in Styles- and Strategies-based Instruction (2.0 cr)

•[CI 5624](#) - Content-based Language Instruction and Curriculum Development (2.0 cr)

•[CI 5625](#) - Assessing Language Learners' Communication Skills via Authentic Communicative Performance Tasks (2.0 cr)

•[CI 5626](#) - Developing Learners' Sociocultural Competence (2.0 cr)



### ***Twin Cities Campus***

## **Applied Child and Adolescent Development M.A.**

*Institute of Child Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Institute of Child Development

51 East River Parkway

Minneapolis, MN 55455

612-625-9778

Email: [icdapply@umn.edu](mailto:icdapply@umn.edu)

Website: <http://icd.umn.edu/academics/applied-child-and-adolescent-development/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 32 to 35
- This program requires summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students will gain knowledge of developmental processes and competence in the application of theory and research to practice and policy/research. Specialization happens via formal tracks in infant and early childhood mental health, child life, or individualized studies.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants identify their selected track at the time of application.

Applicants must have completed at least one general psychology, human development, or social science course with a grade of B or higher. Applicants must submit, via the online application system, a departmental application to a specific track, TOEFL scores if applicable, three letters of recommendation from persons familiar with their potential for graduate study, unofficial transcripts, a statement of career interests, goals, and objectives, and a statement of diversity.

#### **Special Application Requirements:**

Child Life track applicants (required):

\*Completed, or have in progress, a child life introductory course

\*Have completed at least 100 hours of paid or volunteer work in a pediatric health care setting, preferably under the supervision of a certified child specialist

\*Meet the Child Life Councils minimum technical standards for clinical-setting internships

Child Life track applicants (recommended):

\*Completed course in human anatomy or medical terminology

\*Completed, or have in progress, a child life practicum experience

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19



The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 32 to 35 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Field Experience credits: The field experience, taken at the end of a student's course of study, integrates the foundational knowledge gained via coursework with an applied field experience/internship.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

### Core Courses (14 Credits)

Take the following courses:

[CPSY 5301](#) - Advanced Developmental Psychology (3.0 cr)

[CPSY 5302](#) - Cognitive and Biological Development (3.0 cr)

[CPSY 5303](#) - Social and Emotional Development (3.0 cr)

[CPSY 5304](#) - Research Methods in Applied Child and Adolescent Development (3.0 cr)

[CPSY 5306](#) - Ethics and Professionalism in Applied Child and Adolescent Development (2.0 cr)

### Field Experience Credits (3 to 6 credits)

Students pursuing the Individualized Studies track or the Infant and Early Childhood Mental Health Track take 3 credits. Students pursuing the Child Life track take 6 credits. Credits are completed in consultation with the advisor.

[CPSY 5996](#) - Field Experience in Applied Child and Adolescent Development (1.0 - 12.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Child Life

The child life track is committed to preparing child life specialists with a strong educational foundation in developmental science coupled with a thorough theoretical education in topics central to the child life profession, such as illness and injury, therapeutic play and relationships, and childhood death and bereavement. Students will develop the skills necessary to promote family-centered care and work with children and their families who are living with chronic and acute healthcare challenges.

### Required Courses (15 credits)

Take the following courses:

[CPSY 5601](#) - Child Life Theory, Practice and Program Development (3.0 cr)

[CPSY 5602](#) - Developmental Perspectives on Illness and Injury in Healthcare (3.0 cr)

[CPSY 5603](#) - Therapeutic Play for Child Life Practice (3.0 cr)

[CPSY 5604](#) - Therapeutic Relationships: Supporting Children in Healthcare (3.0 cr)

[CPSY 5605](#) - Childhood Death and Bereavement (3.0 cr)

### Individualized Studies

The individualized studies track prepares students whose work intersects with children and families with a strong academic foundation in developmental science and the opportunity to choose electives that best meet a student's individual career goals. This track recognizes the wide-ranging professions that benefit from integration with developmental science, such as policy development, evaluation studies, prevention science, parent education, among many other domains currently addressed via existing coursework at the University.

### Required Courses (3 credits)

Take the following course:

[EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)



### Electives (12 credits)

Select at least 12 elective credits in consultation with the track advisor.

### Infant and Early Childhood Mental Health

The Infant and Early Childhood Mental Health track is committed to the development of culturally competent, trauma-informed practitioners and policy makers through inter-disciplinary studies and supervised professional practice. The track's philosophy is shaped by an ecological, multigenerational, relational model of development and intervention, attending to the ways biology, environment (i.e., family, culture, socioeconomic context), and individual history transact to promote health and pathology. The track consists of coursework and training in the application of developmental science to early childhood evidence-based practice and policy development. The training prepares practitioners to conceptualize case work with young children (0-5) and their caregivers, and prepares individuals to formulate and advocate research-based policy and practice in the area of children's mental health.

### LPCC Licensure

The University does not award licensure; however, IECMH-track students who can attend on-campus classes have the opportunity to take 28 additional credits concurrently with their MA to complete LPCC licensure application requirements for the state of Minnesota. Most of the required coursework is offered through the University's Integrated Behavioral Health Program at the College of Continuing and Professional Studies.

Licensure requirements are subject to change. Please visit <https://mn.gov/boards/behavioral-health/> for current requirements.

### Required Courses (15 credits)

Take the following courses:

- CPSY 5503 - Development and Psychopathology in Early Childhood (3.0 cr)
- CPSY 5506 - Infant Observation Seminar I (1.0 cr)
- CPSY 5508 - Infant Observation Seminar II (1.0 cr)
- CPSY 5511 - Infant Observation Seminar III (1.0 cr)
- CPSY 5513 - Early Childhood Assessment (3.0 cr)
- CPSY 5518 - Prevention and Intervention in Early Childhood: Principles (3.0 cr)
- CPSY 5521 - Prevention and Intervention in Early Childhood: Practice (3.0 cr)



### **Twin Cities Campus**

## **Autism Spectrum Disorder Postbaccalaureate Certificate**

*Educational Psychology*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Educational Psychology, 250 Educational Science Building, 56 East River Road, Minneapolis, MN 55455; 612-624-6083

Email: [sped-adm@umn.edu](mailto:sped-adm@umn.edu)

Website: <http://www.cehd.umn.edu/edpsych/Programs/SpecialEd/certificate/Autism.html>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Autism Spectrum Disorder Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The certificate program in autism spectrum disorder (ASD) is designed to prepare teachers and related service personnel to design and deliver services to children and youth with ASD and their families. This 12-credit program provides a broad overview of major issues in ASD and specialized training in methods of assessment, intervention, and treatment evaluation. This program offers professional development opportunities for autism resource specialists, public and private social service agency staff, personnel at public and private schools, treatment facility personnel, and other human service professionals.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

Other requirements to be completed before admission:

International students wishing to complete the certificate must be admitted to a degree program at the University of Minnesota, Twin Cities. Graduate applicants must have a minimum 2.80 GPA in an undergraduate degree and 3.00 in graduate coursework from accredited institutions.

### **Special Application Requirements:**

All applicants must submit the following materials: - Two letters of recommendation on letterhead stationery from individuals who can address the applicant's abilities to work in a professional context with this population - Typed goal statement - Completed online application - Transcripts from all postsecondary institutions attended or currently attending, except the University of Minnesota. For students not currently in a University of Minnesota program, transcripts must be received from the issuing school in a sealed and stamped envelope.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

All coursework must be completed for the certificate. Students will have a maximum of four years to do so from the time of admission. Students must maintain a minimum 3.00 GPA in certificate coursework to remain in the program.

### Required Coursework (12 credits)

Students must complete the following coursework.

[EPSY 5616W](#) - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)

[EPSY 5631](#) - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)

[EPSY 5632](#) - Module 2: Evidence-based Methods for AAC Assessment and Intervention (2.0 cr)

[EPSY 5661](#) - Introduction to Autism Spectrum Disorder (3.0 cr)

[EPSY 5663](#) - Assessment and Intervention for Individuals with Autism Spectrum Disorder (3.0 cr)



### **Twin Cities Campus**

## **Clinical Physiology and Movement Science Minor**

*Kinesiology, School of*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

400 Cooke Hall, 1900 University Avenue S.E., Minneapolis, MN 55455 (612-624-4370; fax: 612-624-1314)

Email: [jkonczak@umn.edu](mailto:jkonczak@umn.edu)

Website: <http://ccms.umn.edu/academic-programs/program-description>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master's or doctoral minor in clinical physiology and movement science is an innovative free-standing graduate minor that is available to University of Minnesota graduate students. Offering a uniquely interdisciplinary program in a new, emerging field of study, the minor is designed for graduate students in clinical, engineering, nursing, public health, and medical fields who are interested in the clinical aspects of physiology and movement science. The interdisciplinary coursework combines physiology and movement science with clinical skills for research and the diagnosis and assessment of disease conditions. Developed by faculty with rich collective expertise from across the University, the minor offers students a choice of two tracks: clinical physiology or clinical movement science.

The minor is attractive to graduate students seeking a PhD or master's degree in kinesiology, rehabilitation sciences, and the speech and hearing sciences; in biomedical or mechanical engineering; in the School of Nursing; in the School of Public Health; or seeking a combined MD/PhD who have an interest in a variety of medical fields such as neurology, neurosurgery, otolaryngology, orthopedics, and pediatrics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students wishing to pursue this graduate minor must be currently enrolled in a graduate degree program at the University of Minnesota.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

CPMS 5101 Introduction to Clinical Physiology and Movement Science is a required core course for all students seeking the minor. KIN 5987 Professional Skills and Grant Writing for Health Sciences, 2 credits, is also required for a PhD minor, unless an equivalent course has been taken or the student can document previous grant writing experience.

Additional elective courses are selected in consultation with the faculty advisor and approved by the director of graduate studies (DGS), in order to satisfy the requirements for the minor. Courses chosen will depend on the background and goals of the student. Students can select one of two tracks: clinical physiology or clinical movement science.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.





Students may not complete the program with more than one sub-plan.

### Clinical Movement Science (Master's)

#### Required Courses

[CPMS 5101](#) - Introduction to Clinical Physiology and Movement Science (3.0 cr)

[KIN 5987](#) - Professional Skills and Grant Writing for Health Sciences (2.0 cr)

#### Electives

Electives are chosen in consultation with the advisor. NURS 8173 and SAPH 8173 are cross-listed.

Take 4 or more credit(s) from the following:

- [BMEN 5201](#) - Advanced Biomechanics (3.0 cr)
- [CPMS 5201](#) - Colloquium in Clinical Physiology and Movement Science (1.0 cr)
- [CPMS 8201](#) - Seminar in Clinical Physiology and Movement Science (1.0 cr)
- [KIN 5122](#) - Applied Exercise Physiology (3.0 cr)
- [KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)
- [KIN 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)
- [KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)
- [KIN 5485](#) - Exercise Testing and Prescription (3.0 cr)
- [KIN 5585](#) - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)
- [KIN 5941](#) - Clinical Movement Neuroscience (3.0 cr)
- [KIN 8122](#) - Seminar: Exercise Physiology (2.0 cr)
- [KIN 8132](#) - Seminar: Motor Development (3.0 cr)
- [KIN 8135](#) - Seminar: Motor Control and Learning (3.0 cr)
- [KIN 8211](#) - Seminar: Perception and Action (3.0 cr)
- [NURS 5222](#) - Advanced Human Physiology (2.0 cr)
- [NURS 8171](#) - Qualitative Research Design and Methods (3.0 - 4.0 cr)
- [NURS 8173](#) - Principles and Methods of Implementing Research (3.0 cr)
- [SAPH 8173](#) - Principles and Methods of Implementing Research (3.0 cr)
- [NURS 8175](#) - Quantitative Research Design and Methods (3.0 cr)
- [OT 5393](#) - Functional Anatomy and Kinesiology (4.0 cr)
- [OTOL 5993](#) - Directed Studies (1.0 - 12.0 cr)
- [OTOL 8239](#) - Otoneurology (1.0 - 2.0 cr)
- [OTOL 8244](#) - Seminar: Current Literature (1.0 cr)
- [PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)
- [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)
- [PUBH 6342](#) - Epidemiologic Methods II (3.0 cr)
- [PUBH 7415](#) - Introduction to Clinical Trials (3.0 cr)
- [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- [RSC 5135](#) - Advanced Biomechanics I: Kinematics (3.0 cr)
- [RSC 5814](#) - Age, Exercise, and Rehabilitation (2.0 cr)
- [RSC 5841](#) - Applied Data Acquisition and Processing (3.0 cr)
- [RSC 8130](#) - Current Literature Seminar (1.0 - 3.0 cr)
- [RSC 8135](#) - Human Kinematics (3.0 cr)
- [RSC 8170](#) - Special Topics in Rehabilitation Science (1.0 - 3.0 cr)
- [RSC 8282](#) - Problems in Human Movement (4.0 cr)

### Clinical Movement Science (Doctoral)

#### Required Courses

[CPMS 5101](#) - Introduction to Clinical Physiology and Movement Science (3.0 cr)

[KIN 5987](#) - Professional Skills and Grant Writing for Health Sciences (2.0 cr)

#### Electives

Electives are chosen in consultation with the advisor. NURS 8173 and SAPH 8173 are cross-listed.

Take 7 or more credit(s) from the following:

- [BMEN 5201](#) - Advanced Biomechanics (3.0 cr)
- [CPMS 5201](#) - Colloquium in Clinical Physiology and Movement Science (1.0 cr)
- [CPMS 8201](#) - Seminar in Clinical Physiology and Movement Science (1.0 cr)
- [KIN 5122](#) - Applied Exercise Physiology (3.0 cr)
- [KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)
- [KIN 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)
- [KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)
- [KIN 5485](#) - Exercise Testing and Prescription (3.0 cr)
- [KIN 5585](#) - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)
- [KIN 5941](#) - Clinical Movement Neuroscience (3.0 cr)
- [KIN 8122](#) - Seminar: Exercise Physiology (2.0 cr)
- [KIN 8132](#) - Seminar: Motor Development (3.0 cr)
- [KIN 8135](#) - Seminar: Motor Control and Learning (3.0 cr)



- KIN 8211 - Seminar: Perception and Action (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 8171 - Qualitative Research Design and Methods (3.0 - 4.0 cr)
- NURS 8173 - Principles and Methods of Implementing Research (3.0 cr)
- SAPH 8173 - Principles and Methods of Implementing Research (3.0 cr)
- NURS 8175 - Quantitative Research Design and Methods (3.0 cr)
- OT 5393 - Functional Anatomy and Kinesiology (4.0 cr)
- OTOL 5993 - Directed Studies (1.0 - 12.0 cr)
- OTOL 8239 - Otoneurology (1.0 - 2.0 cr)
- OTOL 8244 - Seminar: Current Literature (1.0 cr)
- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
- PUBH 6341 - Epidemiologic Methods I (3.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 7415 - Introduction to Clinical Trials (3.0 cr)
- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- RSC 5135 - Advanced Biomechanics I: Kinematics (3.0 cr)
- RSC 5814 - Age, Exercise, and Rehabilitation (2.0 cr)
- RSC 5841 - Applied Data Acquisition and Processing (3.0 cr)
- RSC 8130 - Current Literature Seminar (1.0 - 3.0 cr)
- RSC 8135 - Human Kinematics (3.0 cr)
- RSC 8170 - Special Topics in Rehabilitation Science (1.0 - 3.0 cr)
- RSC 8282 - Problems in Human Movement (4.0 cr)

### Clinical Physiology (Master's)

#### Required Courses

- CPMS 5101 - Introduction to Clinical Physiology and Movement Science (3.0 cr)

#### Electives

Electives are chosen in consultation with the advisor. NURS 8173 and SAPH 8173 are cross-listed.

Take 6 or more credit(s) from the following:

- BMEN 5201 - Advanced Biomechanics (3.0 cr)
- CPMS 5201 - Colloquium in Clinical Physiology and Movement Science (1.0 cr)
- CPMS 8201 - Seminar in Clinical Physiology and Movement Science (1.0 cr)
- KIN 5122 - Applied Exercise Physiology (3.0 cr)
- KIN 5141 - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)
- KIN 5235 - Advanced Biomechanics II: Kinetics (3.0 cr)
- KIN 5385 - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)
- KIN 5485 - Exercise Testing and Prescription (3.0 cr)
- KIN 5585 - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)
- KIN 5941 - Clinical Movement Neuroscience (3.0 cr)
- KIN 8122 - Seminar: Exercise Physiology (2.0 cr)
- KIN 8132 - Seminar: Motor Development (3.0 cr)
- KIN 8135 - Seminar: Motor Control and Learning (3.0 cr)
- KIN 8211 - Seminar: Perception and Action (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 8171 - Qualitative Research Design and Methods (3.0 - 4.0 cr)
- NURS 8173 - Principles and Methods of Implementing Research (3.0 cr)
- SAPH 8173 - Principles and Methods of Implementing Research (3.0 cr)
- NURS 8175 - Quantitative Research Design and Methods (3.0 cr)
- OT 5393 - Functional Anatomy and Kinesiology (4.0 cr)
- OTOL 5993 - Directed Studies (1.0 - 12.0 cr)
- OTOL 8239 - Otoneurology (1.0 - 2.0 cr)
- OTOL 8244 - Seminar: Current Literature (1.0 cr)
- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
- PUBH 6341 - Epidemiologic Methods I (3.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 7415 - Introduction to Clinical Trials (3.0 cr)
- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- RSC 5135 - Advanced Biomechanics I: Kinematics (3.0 cr)
- RSC 5814 - Age, Exercise, and Rehabilitation (2.0 cr)
- RSC 5841 - Applied Data Acquisition and Processing (3.0 cr)
- RSC 8130 - Current Literature Seminar (1.0 - 3.0 cr)
- RSC 8135 - Human Kinematics (3.0 cr)
- RSC 8170 - Special Topics in Rehabilitation Science (1.0 - 3.0 cr)
- RSC 8282 - Problems in Human Movement (4.0 cr)



### Clinical Physiology (Doctoral)

#### Required Courses

**CPMS 5101** - Introduction to Clinical Physiology and Movement Science (3.0 cr)

#### Electives

Electives are chosen in consultation with the advisor. NURS 8173 and SAPH 8173 are cross-listed.

Take 9 or more credit(s) from the following:

- BMEN 5201** - Advanced Biomechanics (3.0 cr)
- CPMS 5201** - Colloquium in Clinical Physiology and Movement Science (1.0 cr)
- CPMS 8201** - Seminar in Clinical Physiology and Movement Science (1.0 cr)
- KIN 5122** - Applied Exercise Physiology (3.0 cr)
- KIN 5141** - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)
- KIN 5235** - Advanced Biomechanics II: Kinetics (3.0 cr)
- KIN 5385** - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)
- KIN 5485** - Exercise Testing and Prescription (3.0 cr)
- KIN 5585** - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)
- KIN 5941** - Clinical Movement Neuroscience (3.0 cr)
- KIN 8122** - Seminar: Exercise Physiology (2.0 cr)
- KIN 8132** - Seminar: Motor Development (3.0 cr)
- KIN 8135** - Seminar: Motor Control and Learning (3.0 cr)
- KIN 8211** - Seminar: Perception and Action (3.0 cr)
- NURS 5222** - Advanced Human Physiology (2.0 cr)
- NURS 8171** - Qualitative Research Design and Methods (3.0 - 4.0 cr)
- NURS 8173** - Principles and Methods of Implementing Research (3.0 cr)
- SAPH 8173** - Principles and Methods of Implementing Research (3.0 cr)
- NURS 8175** - Quantitative Research Design and Methods (3.0 cr)
- OT 5393** - Functional Anatomy and Kinesiology (4.0 cr)
- OTOL 5993** - Directed Studies (1.0 - 12.0 cr)
- OTOL 8239** - Otoneurology (1.0 - 2.0 cr)
- OTOL 8244** - Seminar: Current Literature (1.0 cr)
- PUBH 6320** - Fundamentals of Epidemiology (3.0 cr)
- PUBH 6341** - Epidemiologic Methods I (3.0 cr)
- PUBH 6342** - Epidemiologic Methods II (3.0 cr)
- PUBH 7415** - Introduction to Clinical Trials (3.0 cr)
- PUBH 7420** - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- RSC 5135** - Advanced Biomechanics I: Kinematics (3.0 cr)
- RSC 5814** - Age, Exercise, and Rehabilitation (2.0 cr)
- RSC 5841** - Applied Data Acquisition and Processing (3.0 cr)
- RSC 8130** - Current Literature Seminar (1.0 - 3.0 cr)
- RSC 8135** - Human Kinematics (3.0 cr)
- RSC 8170** - Special Topics in Rehabilitation Science (1.0 - 3.0 cr)
- RSC 8282** - Problems in Human Movement (4.0 cr)



### **Twin Cities Campus**

## **Clinical Physiology and Movement Science Postbaccalaureate Certificate**

*Kinesiology, School of*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

400 Cooke Hall, 1900 University Avenue S.E., Minneapolis, MN 55455 (612-624-4370; fax: 612-624-1314).

Email: [jkonczak@umn.edu](mailto:jkonczak@umn.edu)

Website: <http://ccms.umn.edu/academic-programs/program-description>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Clinical Physiology & Movement Science PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The clinical physiology and movement science postbaccalaureate certificate program is aimed at D.N.P. and M.D. fellows in nursing and medicine, as well as professionals in clinical fields, such as physical, occupational, and speech therapy. In addition, engineers working in the area of medical technology or medical device development are potential candidates. The interdisciplinary coursework combines physiology and movement science with clinical skills for research and the diagnosis and assessment of disease conditions. Students have the option to tailor the program to their individual needs and interest. They may select from a list of more than 30 courses. Developed by faculty with a rich collective expertise from across the University, the programs offer students a choice of two tracks: clinical physiology and clinical movement science.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Students wishing to pursue the certificate program must have completed a bachelor's degree, preferably in an allied health sciences or natural science field.

### **Special Application Requirements:**

If the individual is applying for a certificate and is not currently enrolled in a graduate program at the University of Minnesota, two letters of support will be requested and a GPA of 3.0 or greater (or equivalent if there were a different student evaluation system) from a previous graduate program will be required. Submission package includes: clinical physiology and movement science application form, resume or curriculum vitae, transcripts, two letters of support, and documented language proficiency. Deadline for Fall semester admission is July 15; deadline for Spring semester admission is November 15.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Paper Based - Total Score: 550

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**



Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Required Course

This course is required for both the Clinical Movement Science track and the Clinical Physiology track:

[CPMS 5101](#) - Introduction to Clinical Physiology and Movement Science (3.0 cr)

### Elective Courses

The following courses are offered by a number of graduate programs and can be used as course electives for the certificate program in consultation with the adviser. NURS 8173 and SAPH 8173 are cross-listed.

[BMEN 5201](#) - Advanced Biomechanics (3.0 cr)  
or [CPMS 5201](#) - Colloquium in Clinical Physiology and Movement Science (1.0 cr)  
or [CPMS 8201](#) - Seminar in Clinical Physiology and Movement Science (1.0 cr)  
or [KIN 5122](#) - Applied Exercise Physiology (3.0 cr)  
or [KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)  
or [KIN 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)  
or [KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)  
or [KIN 5485](#) - Exercise Testing and Prescription (3.0 cr)  
or [KIN 5585](#) - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)  
or [KIN 5941](#) - Clinical Movement Neuroscience (3.0 cr)  
or [KIN 8122](#) - Seminar: Exercise Physiology (2.0 cr)  
or [KIN 8132](#) - Seminar: Motor Development (3.0 cr)  
or [KIN 8135](#) - Seminar: Motor Control and Learning (3.0 cr)  
or [NURS 5222](#) - Advanced Human Physiology (2.0 cr)  
or [NURS 8171](#) - Qualitative Research Design and Methods (3.0 - 4.0 cr)  
or [NURS 8173](#) - Principles and Methods of Implementing Research (3.0 cr)  
or [SAPH 8173](#) - Principles and Methods of Implementing Research (3.0 cr)  
or [NURS 8175](#) - Quantitative Research Design and Methods (3.0 cr)  
or [OT 5393](#) - Functional Anatomy and Kinesiology (4.0 cr)  
or [OTOL 5993](#) - Directed Studies (1.0 - 12.0 cr)  
or [OTOL 8239](#) - Otoneurology (1.0 - 2.0 cr)  
or [OTOL 8244](#) - Seminar: Current Literature (1.0 cr)  
or [PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)  
or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)  
or [PUBH 6342](#) - Epidemiologic Methods II (3.0 cr)  
or [PUBH 7415](#) - Introduction to Clinical Trials (3.0 cr)  
or [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)  
or [RSC 5135](#) - Advanced Biomechanics I: Kinematics (3.0 cr)  
or [RSC 5814](#) - Age, Exercise, and Rehabilitation (2.0 cr)  
or [RSC 5841](#) - Applied Data Acquisition and Processing (3.0 cr)  
or [RSC 8130](#) - Current Literature Seminar (1.0 - 3.0 cr)  
or [RSC 8135](#) - Human Kinematics (3.0 cr)  
or [RSC 8170](#) - Special Topics in Rehabilitation Science (1.0 - 3.0 cr)  
or [RSC 8282](#) - Problems in Human Movement (4.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### Clinical Movement Science

Clinical movement science is a new, interdisciplinary field of study focusing on human movement dysfunctions due to neurological or orthopedic diseases or diminished physical activity. This new field bridges the gap between basic and clinical sciences by crossing the boundaries of traditional disciplines of neurology, neurophysiology, kinesiology, and physical and occupational therapy. The curriculum includes a required core course that covers the theory and application of clinical physiology and movement science. Elective courses are chosen from a broad list of offerings in departments such as kinesiology, public health, rehabilitation science, and otolaryngology.

The postbaccalaureate certificate requires a minimum of 12 semester credits. CPMS 5101 serves as a required core course for all students seeking a certificate. Electives are selected in consultation with the faculty adviser and approved by the director of graduate studies (DGS), in order to satisfy the requirements for the certificate. The specific courses chosen will depend on the background and goals of the individual student.



### Sample Program for Clinical Movement Science Track

#### Required

[CPMS 5101](#) - Introduction to Clinical Physiology and Movement Science (3.0 cr)

#### Electives

Students should register for 2 credits of OTOL 8239.

[RSC 5841](#) - Applied Data Acquisition and Processing (3.0 cr)

[OTOL 8239](#) - Otoneurology (1.0 - 2.0 cr)

[KIN 5941](#) - Clinical Movement Neuroscience (3.0 cr)

### Clinical Physiology

This sub-plan is optional and does not fulfill the sub-plan requirement for this program.

Clinical physiology is a branch of physiology that bridges basic physiology and clinical medicine. It joins the gap between basic and clinical sciences by crossing the boundaries of traditional disciplines of neurology, neurophysiology, kinesiology, and physical and occupational therapy. The curriculum includes a required core course that covers the theory and application of clinical physiology and movement science. Elective courses are chosen from a broad list of offerings in departments such as kinesiology, public health, rehabilitation science, and otolaryngology.

The postbaccalaureate certificate requires a minimum of 12 semester credits. CPMS 5101 is required for all students seeking a certificate. Electives are selected in consultation with the faculty adviser and approved by the director of graduate studies (DGS) in order to satisfy the requirements for the certificate. The specific courses chosen will depend on the background and goals of the individual student.

### Sample Program for Clinical Physiology Track

#### Required

[CPMS 5101](#) - Introduction to Clinical Physiology and Movement Science (3.0 cr)

#### Electives

[KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)

[PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

[RSC 8130](#) - Current Literature Seminar (1.0 - 3.0 cr)

[KIN 8122](#) - Seminar: Exercise Physiology (2.0 cr)



### **Twin Cities Campus**

## **Curriculum and Instruction M.Ed.**

*Curriculum & Instruction*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-4006; fax: 612-624-8277)

Email: [Cinfo@umn.edu](mailto:Cinfo@umn.edu)

Website: <http://cehd.umn.edu/ci>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of education (MEd)/professional studies degree programs are designed to meet the needs of practicing professionals in education and human development fields. Students admitted typically have interests in improving their current professional practice and applying their education to their present work responsibilities.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

A bachelor's degree from an accredited college or university.

#### **Special Application Requirements:**

Applicants must submit transcripts from every college attended (even those where a degree wasn't earned), scores from the TOEFL/IELTS/MELAB (if applicable), a resume, and a clearly written statement of career interests, goals, and objectives. Master's applications are reviewed by department faculty three times per academic year: Fall, Spring and Summer.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may complete the program with more than one sub-plan.

### Arts in Education

This sub-plan is limited to students completing the program under Plan C.

The MEd/professional studies program in arts in education is designed for experienced art, theater, and dance teachers, and others who want to acquire advanced knowledge and leadership skills in the arts field. The program is flexible and can be tailored to accommodate individual needs. Final project requirements include a school-based project examining a problem, issue, or topic identified by the student.

The MEd/professional studies arts in education sub-plan requires a minimum of 10 credits of core coursework, 14 credits of arts in education coursework, and 6 credits of electives for a total of 30 credits.

#### Core Coursework (10 credits)

CI 5186 should be taken for 1 credit.

CI 5049 - Digital Media & Technology Integration: Arts Education Theory & Practice (3.0 cr)

CI 5116 - Action Research in Educational Settings (3.0 cr)

CI 5155 - Contemporary Approaches to Curriculum: Instruction and Assessment (3.0 cr)

CI 5186 - School-Related Projects (1.0 - 4.0 cr)

#### Arts in Education Requirements (14 credits)

CI 5050 should be taken for 3 credits.

CI 5050 - Issues in Art Education (1.0 - 4.0 cr)

CI 5069 - Curriculum Innovations in Arts Education (3.0 cr)

CI 5075 - The Social, Historical and Cultural Foundations of Arts Education (3.0 cr)

CI 5078 - Application of Aesthetic Theory in Education (2.0 cr)

CI 8079 - Arts Based Research in Education (3.0 cr)

#### Electives (6 credits)

Courses will be selected in consultation with faculty advisor.

### Elementary Education

This sub-plan is limited to students completing the program under Plan C.

ALERT: the MEd/professional studies degree program in elementary education is currently suspended. We are not accepting applications at this time.

The MEd/professional studies program in elementary education is designed for elementary teachers who want to improve their instructional, decision-making, evaluation, and leadership skills. The program is flexible and can be tailored to accommodate individual needs.

The MEd/professional studies elementary education sub-plan requires 3 credits of core coursework, 15 credits of elementary education coursework, and 12 credits of electives for a total of 30 credits.

#### Core Coursework (3 credits)

CI 5111 - Introduction to Elementary School Teaching (3.0 cr)

#### Elementary Education Requirements (15 credits)

Courses will be selected in consultation with faculty advisor.

#### Electives (12 credits)

Courses will be selected in consultation with faculty advisor.





### English Education

This sub-plan is limited to students completing the program under Plan C.

The MEd/professional studies program in English education addresses the needs and interests of middle school, high school, and community-college English teachers. The English education program provides instruction on current developments in English/language arts curriculum theory and research, as well as methods for teaching literature, reading, composition, media, drama, and journalism. The program is flexible and can be tailored to accommodate individual needs.

The MEd/professional studies English education sub-plan requires 6 credits of core coursework, 18 credits of English education coursework, and 6 credits of electives for a total of 30 credits.

#### Core Coursework (6 credits)

CI 5155 - Contemporary Approaches to Curriculum: Instruction and Assessment (3.0 cr)

CI 5351 - Technology Tools for Educators (3.0 cr)

#### English Education Requirements (18 credits)

Take 18 or more credit(s) from the following:

•CI 5404 - Multicultural Literature for Children and Adolescents (3.0 cr)

•CI 5410 - Special Topics in the Teaching of Literacy (1.0 - 3.0 cr)

•CI 5417 - Elementary literacy Instruction for ESL Students (3.0 cr)

•CI 5422 - Teaching Writing in Schools (3.0 cr)

•CI 5442 - Literature for Adolescents (3.0 cr)

•CI 5451 - Teaching Reading in Middle and Secondary Grades (3.0 cr)

•CI 5472 - Teaching Critical Media Analysis in Schools (3.0 cr)

•CI 5475 - Teaching Digital Writing (3.0 cr)

•CI 5641 - Language, Culture, and Education (3.0 cr)

#### Electives (6 credits)

Courses will be selected in consultation with faculty advisor.

### Environmental Education

This sub-plan is limited to students completing the program under Plan C.

ALERT: the MEd/professional studies degree program in environmental education is currently suspended. We are not accepting applications at this time.

The MEd/professional studies degree program in environmental education is designed to develop leaders in environmental education through integrated research, outreach, and teaching. This program of at least 30 semester credits offers an interdisciplinary, integrated approach to environmental learning and leadership for school teachers, extension service educators, and environmental educators in formal and informal settings. Learning experiences allow students to integrate their work experience and academic study. Field work, evaluation methods, internships, and other practical applications of theory and method are integral parts of the program.

The MEd/professional studies environmental education sub-plan requires 13 credits of core coursework, 3 credits of coursework related to research methods/evaluation/statistics, and 14 credits of electives for a total of 30 credits.

#### Core Coursework (13 credits)

CI 5186 and CI 5190 must each be taken for a minimum of 2 credits.

ESPM 5202 - Environmental Conflict Management, Leadership, and Planning (3.0 cr)

CI 5186 - School-Related Projects (1.0 - 4.0 cr)

CI 5190 - Directed Individual Study in Curriculum and Instruction (1.0 - 6.0 cr)

CI 5537 - Principles of Environmental Education (3.0 cr)

CI 5747 - Global and Environmental Education: Content and Practice (3.0 cr)

#### Research Methods, Evaluation, or Statistics (3 credits)

A minimum of 3 credits, chosen in consultation with the faculty advisor, intended to provide skills or knowledge essential to the required research project.

#### Electives (14 credits)

A minimum of 14 credits of graduate-level coursework (5xxx and above) selected in consultation with faculty advisor from the following fields: natural sciences, social sciences, humanities, education, natural resources, or agriculture.

### Interdisciplinary Studies

This sub-plan is limited to students completing the program under Plan C.



The MEd/professional studies program in interdisciplinary studies is a graduate-level, practitioner-based, coursework-only program designed for cohorts of experienced K-12 teachers of different subjects. This program is for cohorts of students and is not offered to individuals.

It integrates coursework representing a number of academic disciplines as defined in K-12 contexts with coursework emphasizing particular areas of interest. Practicing teachers complete 30 semester credits of work in two areas: a core academic program with courses representing a range of K-12 disciplines, and elective courses related to a specific focus area. The program may be combined with a certificate program offered in the Department of Curriculum and Instruction. Depending upon the cohort for which the program is designed, the program may be completed entirely online, entirely face-to-face (F2F), or as a hybrid, with a combination of F2F and online coursework.

The MEd/professional studies interdisciplinary studies sub-plan requires a minimum of 15 credits of interdisciplinary studies coursework, and 15 credits of electives for a total of 30 credits.

## **MEd - Interdisciplinary Studies**

### **Interdisciplinary Studies**

Total: 30 credits

#### **Interdisciplinary Requirements (15 credits)**

Students will take CI 5150 twice: once under the "Educational Inequities: Race, Class & Gender" topic, and the second under the "Teaching for Civic Engagement" topic. Each course should be taken for 3 credits.

Take 5 or more course(s) totaling 15 or more credit(s) from the following:

- **CI 5361** - Teaching and Learning with the Internet (2.0 - 3.0 cr)
- **CI 5540** - Special Topics: Science Education (1.0 - 4.0 cr)
- **CI 5150** - Curriculum Topics (1.0 - 4.0 cr)
- **CI 5474** - New Literacies Frameworks and Instruction: Digital Texts and Digital Reading (3.0 cr)

#### **Electives (15 credits)**

Elective credits around a specific focus area will be identified for specific cohorts based on their expressed interests. Elective credits may be comprised of courses leading to a particular certificate.

-OR-

### **Interdisciplinary Studies - Dual Language & Immersion Education Cohort**

Total: 30 credits

#### **Interdisciplinary Requirements (15 credits)**

Students will take CI 5150 twice: once under the "Educational Inequities: Race, Class & Gender" topic, and the second under the "Teaching for Civic Engagement" topic.

Take 5 or more course(s) totaling 15 or more credit(s) from the following:

- **CI 5361** - Teaching and Learning with the Internet (2.0 - 3.0 cr)
- **CI 5540** - Special Topics: Science Education (1.0 - 4.0 cr)
- **CI 5150** - Curriculum Topics (1.0 - 4.0 cr)
- **CI 5474** - New Literacies Frameworks and Instruction: Digital Texts and Digital Reading (3.0 cr)

#### **Cohort Requirements (15 credits)**

Students will take the topic "Biliteracy Development in Dual Language and Immersion Classrooms" for the CI 5660 requirement. CI 5660 is taken for 3 credits.

- CI 5648** - Advanced Practices in Teaching Academic Language (3.0 cr)
- CI 5660** - Special Topics in the Teaching of Second Languages and Cultures (1.0 - 4.0 cr)
- CI 5670** - Foundations of Dual Language and Immersion Education (3.0 cr)
- CI 5671** - Curriculum Development and Assessment in Dual Language/Immersion Classrooms (3.0 cr)
- CI 5672** - Language-Focused Instructional Practices and Strategies for Dual Language/Immersion Classrooms (3.0 cr)

### **Language Immersion Education**

This sub-plan is limited to students completing the program under Plan C.

The MEd/professional studies program in language immersion education is designed for practicing language immersion, dual language, or bilingual educators, or individuals with an interest in language immersion and dual language education. Program participants have the option to add a 15-credit certificate in dual language and immersion education, which requires a separate application. Offered partially online, the program provides educators with the specific knowledge base and pedagogical skill set needed for the dual language and immersion (DLI) education setting and emphasizes practical application of concepts. Key topics include: second language acquisition; research foundations of DLI education; curriculum planning and assessment development that integrates subject-matter content, language, literacy and culture; biliteracy development; language-focused instructional practices and strategies to bring a language focus to content-based instruction; academic language development; issues related to language status; culturally relevant pedagogy; and tools for assessing language proficiency development.



The MEd/professional studies language immersion education sub-plan requires 17-18 credits of language immersion education coursework, and 12-13 credits of electives for a total of 30 credits.

**Language Immersion Requirements (17-18 credits)**

- CI 5648 - Advanced Practices in Teaching Academic Language (3.0 cr)
- CI 5670 - Foundations of Dual Language and Immersion Education (3.0 cr)
- CI 5671 - Curriculum Development and Assessment in Dual Language/Immersion Classrooms (3.0 cr)
- CI 5672 - Language-Focused Instructional Practices and Strategies for Dual Language/Immersion Classrooms (3.0 cr)
- CI 5676 - Biliteracy Development in Dual Language/Immersion Classrooms (3.0 cr)

Students will take one of the following technology courses, or an alternate 3-credit substitute approved by the advisor.

- CI 5351 - Technology Tools for Educators (3.0 cr)
- or LGTT 5110 - Technology in the Second Language Classroom (2.0 cr)

**Electives (12-13 credits)**

Electives will be selected in consultation with faculty advisor, but may include the following options:

Take 12 - 13 credit(s) from the following:

- CI 5116 - Action Research in Educational Settings (3.0 cr)
- CI 5186 - School-Related Projects (1.0 - 4.0 cr)
- CI 5628 - Analyzing Learner Language in Second Language Acquisition (3.0 cr)
- CI 5641 - Language, Culture, and Education (3.0 cr)
- CI 5646 - English Grammar for ESL Teachers (3.0 cr)

**Learning Technologies**

This sub-plan is limited to students completing the program under Plan C.

The MEd/professional studies program in learning technologies is designed for professionals interested in using technology in their organizations (especially K-12 and college educators, new media designers, and corporate trainers). This program also serves students interested in using technology to develop instructional materials for a wide range of settings. Because TEL certificate requirements are incorporated into the MEd program, students may earn a certificate while earning the MEd degree.

The MEd/professional studies learning technologies sub-plan requires 9 credits of core coursework, 12 credits of learning technologies coursework, and 9 credits of electives for a total of 30 credits.

**Core Coursework (9 credits)**

- CI 5331 - Introduction to Learning Technologies (3.0 cr)
- CI 5116 - Action Research in Educational Settings (3.0 cr)
- CI 5392 - Learning Technologies M.Ed. Capstone Project (3.0 cr)

**Learning Technologies Requirements (12 credits)**

Courses will be selected in consultation with faculty advisor.

**Electives (9 credits)**

Courses will be selected in consultation with faculty advisor.

**Mathematics Education**

This sub-plan is limited to students completing the program under Plan C.

The MEd/professional studies program in mathematics education is designed for experienced mathematics teachers who want to acquire advanced knowledge and leadership skills in the field of mathematics education. The program is flexible and can be tailored to accommodate individual needs. Final project requirements include a school-based project examining a problem, issue, or topic identified by the student.

The MEd/professional studies mathematics education sub-plan requires 6 credits of core coursework, 14 credits of mathematics education coursework, and 10 credits of electives for a total of 30 credits.

**Core Coursework (6 credits)**

- CI 5155 - Contemporary Approaches to Curriculum: Instruction and Assessment (3.0 cr)
- CI 5116 - Action Research in Educational Settings (3.0 cr)

**Mathematics Education Requirements (14 credits)**

- MTHE 5314 - Teaching and Learning Mathematics (3.0 cr)
- MTHE 5366 - Technology-Assisted Mathematics Instruction (3.0 cr)
- MTHE 5993 - Directed Studies in Mathematics Education (2.0 cr)

**Mathematics Education Electives**

Take 2 or more course(s) totaling 6 or more credit(s) from the following:



- [MTHE 5155](#) - Rational Number Concepts and Proportionality (3.0 cr)
- [MTHE 5171](#) - Teaching Problem Solving (3.0 cr)
- [MTHE 5172](#) - Teaching Probability and Statistics (3.0 cr)

**Electives (10 credits)**

Courses will be selected in consultation with faculty advisor. Students choose electives from MATH-designated courses (minimum 7 credits); one MTHE-designated course may be included (maximum 3 credits).

**Science Education**

This sub-plan is limited to students completing the program under Plan C.

ALERT: the MEd/professional studies degree program in science education is currently suspended. We are not accepting applications at this time.

The MEd/professional studies program in science education is designed for experienced science teachers who want to acquire advanced knowledge and leadership skills in the field of science education. The program is flexible and can be tailored to accommodate individual needs. Final project requirements include a school-based project examining a problem, issue, or topic identified by the student.

The MEd/professional studies science education sub-plan requires 9 credits of core coursework, 12 credits of science education coursework, and 9 credits of electives for a total of 30 credits.

**Core Coursework (9 credits)**

CI 5186 should be taken for 3 credits.

[CI 5155](#) - Contemporary Approaches to Curriculum: Instruction and Assessment (3.0 cr)

[CI 5351](#) - Technology Tools for Educators (3.0 cr)

[CI 5186](#) - School-Related Projects (1.0 - 4.0 cr)

**Science Education Requirements (12 credits)**

[CI 5533](#) - Current Developments in Science Teaching (3.0 cr)

[CI 5534](#) - Studies in Science Education (3.0 cr)

[CI 5535](#) - Foundations of Science Education (3.0 cr)

[CI 5536](#) - Equity, Policy, and Assessment in Science Education (3.0 cr)

**Electives (9 credits)**

Courses will be selected in consultation with faculty advisor.

**Social Studies**

This sub-plan is limited to students completing the program under Plan C.

ALERT: the MEd/professional studies degree program in social studies education is currently suspended. We are not accepting applications at this time.

The MEd/professional studies program in social studies education is designed for experienced social studies teachers who want to acquire advanced knowledge and leadership skills in the field of social studies education. This program is flexible and can be tailored to accommodate individual needs.

The MEd/professional studies social studies education sub-plan requires 3 credits of core coursework, 15 credits of social studies education coursework, and 12 credits of electives for a total of 30 credits.

**Core Coursework (3 credits)**

[CI 5741](#) - Introduction to Social Studies Education (3.0 cr)

**Social Studies Requirements (15 credits)**

Courses will be selected in consultation with faculty advisor.

**Electives (12 credits)**

Courses will be selected in consultation with faculty advisor.

**Second Language Education**

This sub-plan is limited to students completing the program under Plan C.

The MEd/professional studies program in second language education (SLE) is designed for second language teachers who want to acquire advanced knowledge of research, best practices, and effective policies in the field of language education. The program addresses the needs and interests of second language educators in a variety of teaching contexts, including world, heritage, and indigenous languages as well as English as a second/foreign language (ESL/EFL). While the program emphasizes instructional issues related to K-12 education, it is also relevant to teachers working with university-level or adult learners. The program is flexible and can



be tailored to accommodate individual needs.

The MEd/professional studies second language education sub-plan requires 17-18 credits of coursework in the Second Language Education Program and technology, and 12-13 credits of electives for a total of 30 credits.

#### **SLE Requirements (17-18 credits)**

- CI 5651 - Foundations of Second Languages and Cultures Education (3.0 cr)
- CI 5656 - Teaching Literacy in Second Language Classrooms (3.0 cr)
- CI 5657 - Teaching Speaking and Listening in Second Language Classrooms (3.0 cr)
- CI 5662 - Second Language Curriculum Design (3.0 cr)
- CI 5642 - Assessing English Learners (3.0 cr)

or CI 5658 - Foreign Language Testing and Assessment (3.0 cr)

Students will take one of the following technology courses, or an alternate 3-credit substitute approved by the advisor.

- CI 5351 - Technology Tools for Educators (3.0 cr)
- or LGTT 5110 - Technology in the Second Language Classroom (2.0 cr)

#### **Electives (12-13 credits)**

Electives will be selected in consultation with faculty advisor, but may include the following options:

Take 12 - 13 credit(s) from the following:

- CI 5116 - Action Research in Educational Settings (3.0 cr)
- CI 5186 - School-Related Projects (1.0 - 4.0 cr)
- CI 5628 - Analyzing Learner Language in Second Language Acquisition (3.0 cr)
- CI 5641 - Language, Culture, and Education (3.0 cr)
- CI 5646 - English Grammar for ESL Teachers (3.0 cr)
- CI 5648 - Advanced Practices in Teaching Academic Language (3.0 cr)
- CI 5653 - Methods in Teaching English as a Second Language (ESL) in Higher Education (3.0 cr)

#### **Second Language Pedagogy**

This sub-plan is limited to students completing the program under Plan C.

The MEd/professional studies program in second language pedagogy is designed for practicing K-16 world language or English as a second language (ESL) teachers with an interest in enhancing their pedagogical knowledge and skills. Program participants have the option to add a 12 credit certificate in advanced practices in second language teaching, which requires a separate application. This coursework-only program is offered in conjunction with the summer institute program offered through the University's Center for Advanced Research on Language Acquisition (CARLA).

Key topics include second language acquisition; the foundations of second language pedagogy and education; using technology to enhance language instruction; content-based curriculum development; performance assessment and issues in language testing; strategies to enhance second language literacy development and the teaching of speaking and listening skills; and integrating culture in language teaching.

The MEd/professional studies second language pedagogy sub-plan requires 21 credits of second language pedagogy coursework, and 9 credits of electives for a total of 30 credits.

#### **Second Language Pedagogy Requirements (21 credits)**

- LGTT 5110 - Technology in the Second Language Classroom (2.0 cr)
- CI 5621 - Culture as the Core in the Second Language Classroom (2.0 cr)
- CI 5622 - Exploring Learner Language: Puzzles and Tools for the Classroom (2.0 cr)
- CI 5651 - Foundations of Second Languages and Cultures Education (3.0 cr)
- CI 5656 - Teaching Literacy in Second Language Classrooms (3.0 cr)
- CI 5657 - Teaching Speaking and Listening in Second Language Classrooms (3.0 cr)
- CI 5662 - Second Language Curriculum Design (3.0 cr)
- CI 5642 - Assessing English Learners (3.0 cr)
- or CI 5658 - Foreign Language Testing and Assessment (3.0 cr)

#### **Electives (9 credits)**

Take 9 or more credit(s) from the following:

- CI 5608 - CARLA Summer Institute Seminar (1.0 - 4.0 cr)
- CI 5623 - Improving Language Learning: A Practical Course in Styles- and Strategies-based Instruction (2.0 cr)
- CI 5624 - Content-based Language Instruction and Curriculum Development (2.0 cr)
- CI 5625 - Assessing Language Learners' Communication Skills via Authentic Communicative Performance Tasks (2.0 cr)
- CI 5626 - Developing Learners' Sociocultural Competence (2.0 cr)
- CI 5641 - Language, Culture, and Education (3.0 cr)



### *Twin Cities Campus*

## Developmental Psychology MA

*Institute of Child Development*

### College of Education and Human Development

Link to a [list of faculty](#) for this program.

#### Contact Information:

Email: [ljendras@umn.edu](mailto:ljendras@umn.edu)

Website: <https://icd.umn.edu/academics/child-psychology-graduate/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Institute of Child Development does not offer admission for this master's degree. Only current developmental psychology PhD students may choose to complete this master's degree (Plan B) during their progress toward the PhD.

Students seeking an applied master's in developmental psychology should consider the Institute of Child Development's applied MA in child and adolescent development.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

Note: The Institute of Child Development does not offer admission for this master's degree. Students may choose to complete this master's degree (Plan B) during their progress toward the Ph.D.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan B:** Plan B requires 22 major credits and 0 credits outside the major. The final exam is written. A capstone project is required.

**Capstone Project:** The Plan B project is written and corresponds with the student's first year research project requirement.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

#### Major Courses

[CPSY 8301](#) - Developmental Psychology: Cognitive Processes (4.0 cr)

[CPSY 8302](#) - Developmental Psychology: Social and Emotional Processes (4.0 cr)

[CPSY 8304](#) - Developmental Research Methods (3.0 cr)

[CPSY 8307](#) - Prelim Seminar (1.0 cr)

#### Statistics Sequence

[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

[EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)

#### Special Topics and Advanced Seminars

Take 2 or more course(s) totaling 4 or more credit(s) from the following:

- [CPSY 8360](#) - Special Topics in Developmental Psychology (1.0 - 3.0 cr)



- CPSY 8606 - Advanced Developmental Psychopathology (3.0 cr)
- CPSY 8607 - Developmental Neurobiology of Stress and Emotion (3.0 cr)
- CPSY 8608 - Clinical Intervention with Children (3.0 cr)



### **Twin Cities Campus**

## **Developmental Psychology Minor**

*Institute of Child Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Website: <https://icd.umn.edu/academics/child-psychology-graduate/doctoral-minor/>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Graduate students pursuing a doctoral degree in other fields may complete a doctoral minor in developmental psychology. Contact the Institute of Child Development for more information.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Please contact the associate director of Curriculum and Student Services at the Institute of Child Development before declaring the developmental psychology minor.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

#### **Developmental Psychology Core**

[CPSY 8301](#) - Developmental Psychology: Cognitive Processes (4.0 cr)

[CPSY 8302](#) - Developmental Psychology: Social and Emotional Processes (4.0 cr)

#### **Remaining electives**

Select additional credits in consultation with the developmental psychology director of graduate studies.

Take 1 - 2 course(s) totaling 4 or more credit(s) from the following:

- CPSY 8xxx

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **DOCTORAL**





### **Twin Cities Campus**

## **Developmental Psychology PhD**

*Institute of Child Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Website: <https://icd.umn.edu/academics/developmental-psychology-graduate/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 68 to 97
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The PhD in developmental psychology focuses primarily on training for research in normal human development. The goal of the program is to train all students for careers in research and college teaching in developmental psychology, and to prepare students in the developmental psychopathology and clinical science program options for careers in applied areas of child psychology as well.

Students are admitted to either the developmental science track or the developmental psychopathology and clinical science track. Developmental science track students may choose to specialize in an area such as cognitive neuroscience, language, learning, personality, memory, perception, psychobiology, or social development.

Students interested in clinical research may specialize in developmental psychopathology and clinical science through participation in the developmental psychopathology and clinical science (DPCS) training program. DPCS training is a cooperative effort between the Institute of Child Development and the Department of Psychology to instruct leaders in research and teaching. DPCS training draws on the unique strengths of each program. Students in this track complete a required clinical internship, which adds an additional year to program completion.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Most students admitted have a substantial academic background in psychology and undergraduate research experience.

Graduate education is not a pre-requisite for admission to the PhD program. Many students apply after earning their bachelor's degree, provided they have sufficient research experience.

### **Special Application Requirements:**

For full application instructions, please see: <http://icd.umn.edu/academics/child-psychology-graduate/apply/> Applications are accepted for fall semester entry only and due by December 1 of the previous year. Late applications are not accepted.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Internet Based - Speaking Score: 27

The preferred English language test is Test of English as Foreign Language



Key to [test abbreviations](#)(GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

44 to 48 credits are required in the major.  
0 to 25 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

### Core Courses

- [CPSY 8301](#) - Developmental Psychology: Cognitive Processes (4.0 cr)
- [CPSY 8302](#) - Developmental Psychology: Social and Emotional Processes (4.0 cr)
- [CPSY 8304](#) - Developmental Research Methods (3.0 cr)
- [CPSY 8307](#) - Prelim Seminar (1.0 cr)
- [CPSY 8321](#) - Seminar in Teaching Developmental Psychology (1.0 cr)
- [CPSY 8322](#) - Apprenticeship in Teaching Developmental Psychology (1.0 - 3.0 cr)

### Statistical Analysis Sequence

- [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)

### Research Credits

Take 14 or more credit(s) from the following:

- [CPSY 8994](#) - Research Problems in Child Psychology (1.0 - 6.0 cr)

### Thesis Credits

Students are eligible to take research credits once they have successfully defended their dissertation prospectus.

Take exactly 24 credit(s) from the following:

- [CPSY 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Developmental Science Track

Our program is designed to prepare tomorrow's leaders in the field of developmental science. Study human development across the lifespan and prepare for a career in academics or research.

Choose to conduct research in areas including cognitive development, language, learning, executive function, social development, or developmental psychobiology and neuroscience. You also can choose to combine your interests and work alongside multiple ICD faculty members to define a research area that's unique to you.

Students will take an additional five credit hours of child psychology special topics and advanced seminar courses, along with an additional five credit hours of child psychology or outside elective courses, to fulfill degree requirements.

### Special Topics and Advanced Seminars

5 credits of CPSY 8360/CPSY 86xx, of which one course must be at least 3 credits.

Take 2 or more course(s) totaling 5 or more credit(s) from the following:

- [CPSY 8360](#) - Special Topics in Developmental Psychology (1.0 - 3.0 cr)
- [CPSY 8606](#) - Advanced Developmental Psychopathology (3.0 cr)
- [CPSY 8607](#) - Developmental Neurobiology of Stress and Emotion (3.0 cr)



- CPSY 8608 - Clinical Intervention with Children (3.0 cr)

#### **Elective Credits**

5 credits of CPSY or outside elective coursework, planned in consultation with adviser.

CPSY 8xxx

or Graduate-level courses (5000-8000 level) to be chosen in consultation with your faculty advisor.

#### **Developmental Psychopathology and Clinical Science**

We offer a joint track in collaboration with the Department of Psychology focused on the study of psychopathology in the context of development. To prepare you to become a leader in the science and profession of clinical child psychology, you'll take developmental psychology courses with your cohort at the Institute of Child Development, as well as clinical-based courses in the Department of Psychology.

As a student in the clinical science track, you'll complete coursework in clinical psychology, practicums, and a year-long internship. You'll also receive APA-accredited clinical training through the psychology doctoral program.

The joint track takes six years to complete, including the internship.

DPCS students must take an additional 31 course credits, in addition to successfully completing an internship, to graduate.

#### **DPCS Courses**

PSY 8960 should be taken once for one credit. PSY 8620 must be taken 4 times with a minimum of 4 credits, it is recommended that it be taken for four semesters, one credit each semester.

CPSY 8606 - Advanced Developmental Psychopathology (3.0 cr)

CPSY 8608 - Clinical Intervention with Children (3.0 cr)

PSY 8111 - Biological, Cognitive, Affective, Social, Developmental and Historical Aspects of Psychopathology (4.0 cr)

PSY 8542 - Professional Standards and Ethics in Clinical Psychology (3.0 cr)

PSY 8611 - Intellectual and Neuropsychological Assessment: Measurement, Methodology, and Development (5.0 cr)

PSY 8612 - Assessment of Personality and Psychopathology: Interviewing, Diagnosis, and Cultural Diversity (5.0 cr)

PSY 8620 - Clinical Practicum: Consultation, Supervision, Professional Standards, and Lifelong Learning (1.0 - 6.0 cr)

PSY 8621 - Foundations in Therapeutic Intervention Applying Theory to Clinical Practice (3.0 cr)

PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)



### **Twin Cities Campus**

## **Disability Policy and Services Postbaccalaureate Certificate**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455  
(612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Disability Policy and Services PBacc Cert Grad

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The certificate in disability policy and services is designed to allow graduate as well as community professionals, to study policies and services that affect the lives of children, youth, and adults with disabilities. The 12-credit program surveys the spectrum of education, health, and social services available to individuals with disabilities and their families, and examines the public and private networks of disability services from an interdisciplinary perspective. While the program addresses the needs of people with all types of disabilities, it emphasizes developmental disabilities across the lifespan. The program's individualized learning experience (ILE) requires students to integrate theory with practice by completing a disability-related research project or working directly with people with disabilities in settings such as schools, recreation centers, or human-service agencies.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.50.

Other requirements to be completed before admission:

Applicants must have completed an undergraduate degree by the time they start the program. Students must have completed a four-year college degree or equivalent coursework. Applications are reviewed on a rolling basis and may be submitted at any time.

### **Special Application Requirements:**

Please address the following five questions below. Please answer each question listed and limit your response to 2 typed or word-processed pages, size-12 font. Upload your responses to the ApplyYourself online application in the "Program Specific Questions" upload area.

- What are your major areas of interest in the field of disability services or related to individuals with disabilities?
- What have been your past experiences in the area of disability services or related to individuals with disabilities?
- What is your current involvement in the field of disability services or related to individuals with disabilities?
- What is your anticipated or desired career interest?
- Why are you interested in the Disability Policy and Services Certificate Program?

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.



A minimum GPA of 2.80 is required for students to remain in good standing.

In addition to coursework, students must participate in at least six, one-hour interdisciplinary reflection groups to discuss relevant topics and ways to integrate field experiences with coursework. Reflection groups are offered throughout the year, including the summer session.

**Required Course**

[OLPD 5356](#) - Disability Policy and Services (3.0 cr)

**Specialized Coursework**

This component broadens the student's level of knowledge in disability policies and services. Students must choose from courses offered across the University focusing on disability policy, disability services, and/or interdisciplinary teaming, such as communication disorders, family social science, kinesiology, nursing, public affairs, or social work. The ICI Certificate Coordinator can provide students with a list of acceptable courses meeting this requirement.

6 cr to be taken with approval from the ICI Certificate Coordinator

**Individualized learning experience & Interdisciplinary reflection groups**

This component allows students to integrate and apply the information they have learned in coursework. Students work with the ICI Certf Coord to design an individualized learning experience (ILE) in which they work with persons who have disabilities in settings like schools, recreation centers, health clinics, or human-service agencies. The ILE can be completed in one or two semesters, but must total at least 3 cr and at least 200 hours. The 3 cr to be taken with approval from the ICI Certf Coord



### **Twin Cities Campus**

## **Dual Language and Immersion Education Postbaccalaureate Certificate**

Curriculum & Instruction

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-4006; fax: 612-624-8277)

Email: [Clinfo@umn.edu](mailto:Clinfo@umn.edu)

Website: <http://cehd.umn.edu/ci>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 15
- This program does not require summer semesters for timely completion.
- Degree: Dual Language Immersion Education PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This graduate-level certificate program gives students an opportunity to complete a coordinated series of courses in the area of dual language and immersion education. The program does not lead to a state teaching certificate or licensure (note that a university certificate program or certificate is distinct from a state certificate or certification).

In Minnesota and other states in the US, dual language/immersion teachers at the elementary level are required to hold a teaching license in elementary education, and at the secondary level a license in the subject matter they teach (e.g., science, social studies, math). The University of Minnesota offers an initial teacher licensure program in elementary education with a focus on dual language and immersion education.

The dual language and immersion education certificate program is designed for preK-12 teachers and other professionals to be able to work effectively in the following school-based program models:

- "One-way" foreign language immersion programs designed for native English-speaking students
- "Two-way" bilingual immersion programs designed for native English-speaking students and native speakers of the program's partner language, such as Spanish
- Developmental bilingual programs designed for minority language learners, such as native Spanish speakers
- Indigenous language immersion programs designed for Native American children in indigenous communities with the goal of revitalizing an endangered language and culture

In dual language and immersion programs, the second/foreign/minority language that students are acquiring is a vehicle to teach school subjects. In order to be considered a dual language or immersion program, the immersion language must be used for at least 50 percent of subject-matter instruction during the elementary school years. In a middle/secondary continuation program, at least two, year-long content courses must be taught in the immersion language.

These programs aim for "additive bilingualism and biliteracy," or the acquisition of another language at no expense to the first, native language.

This unique University certificate program incorporates a coherent set of courses designed specifically for dual language and immersion teachers, and other professionals. Offered by the college's Department of Curriculum and Instruction (C&I), the program was designed jointly by the college's Second Language Education faculty, and representatives of dual language and immersion programs in the Twin Cities metropolitan area.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

A completed bachelor's degree is required for admission.



Students currently enrolled in a University of Minnesota graduate-level degree program may also apply.

Other requirements to be completed before admission:

Applicants should either be currently practicing as dual language or immersion educators, or provide evidence of the necessary background and interest (based on a goal statement).

This certificate program is available to graduate-level students only. Coursework taken before completion of the bachelor's degree cannot be applied to the certificate program.

**Special Application Requirements:**

Applicants must submit transcripts from every college attended (even those where a degree wasn't earned), scores from the TOEFL/IELTS/MELAB (if applicable), a resume, and a goal statement (only if applicant is not a practicing dual language or immersion educator). Certificate applications are reviewed by the department three times per academic year: Fall, Spring and Summer.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

**Core Courses (12 credits)**

- CI 5670 - Foundations of Dual Language and Immersion Education (3.0 cr)
- CI 5671 - Curriculum Development and Assessment in Dual Language/Immersion Classrooms (3.0 cr)
- CI 5672 - Language-Focused Instructional Practices and Strategies for Dual Language/Immersion Classrooms (3.0 cr)
- CI 5676 - Biliteracy Development in Dual Language/Immersion Classrooms (3.0 cr)

**Elective Courses (3 credits)**

Electives will be selected in consultation with faculty advisor, but may include the following:

- CI 5648 - Advanced Practices in Teaching Academic Language (3.0 cr)



### **Twin Cities Campus**

## **Early Childhood Education M.Ed.**

*Institute of Child Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Institute of Child Development, 51 East River Road, Minneapolis, MN 55455 (612-625-9778; fax: 612-624-6373)

Email: [alle0335@umn.edu](mailto:alle0335@umn.edu)

Website: <http://icd.umn.edu/academics/early-childhood-education-master-of-education/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 32 to 40
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Early Childhood Education MEd prepares outstanding teachers of young children with a strong foundation in child development theory and research and developmentally appropriate methodology for educating the different ages within the early childhood years (birth to age 8). Clinical experiences in the Shirley G. Moore Laboratory School and in local urban/suburban public schools create a strong experiential base in which to apply the principles and methods learned in University courses. Emphasis is placed on understanding individual learners, working with diverse learners, using a variety of instructional strategies, providing inclusive programming for children with and without special needs, working closely with families, and creating positive classroom communities. The program includes preparation in developing and implementing professional writing and curriculum planning, authentic assessment, documentation of student learning, reflective practice, professional development, and ethics.

This MEd includes coursework that also satisfies initial licensure requirements. Upon completion of all requirements, students are eligible for recommendation for teacher licensure in early childhood education (birth to third grade), which is awarded through the Minnesota Department of Education.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

A bachelor's degree must be completed at the time of matriculation.

#### **Required prerequisites**

##### **Prerequisite Coursework**

Students without an Early Childhood Education: Foundations BS from the University, and who wish to pursue Minnesota state licensure, must complete the following prerequisite coursework adopted by PELSB (Professional Educator Licensing and Standards Board). Prerequisites may be completed after admission, but cannot be applied to MEd credit requirements.

##### **Developmental Psychology Courses**

[CPSY 2301](#) - Introduction to Child Psychology [SOCS] (4.0 cr)

[CPSY 4331](#) - Social and Personality Development (3.0 cr)

[CPSY 4343](#) - Cognitive Development (3.0 cr)

##### **Early Childhood Courses**

[CPSY 5241](#) - Practicum in Early Childhood Education (3.0 cr)

[CPSY 5251W](#) - Social and Philosophical Foundations of Early Childhood Education [WI] (3.0 cr)

[CPSY 5252](#) - Facilitating Social and Emotional Learning in Early Childhood Education (3.0 cr)

[CPSY 5253](#) - Facilitating Cognitive and Language Learning in Early Childhood Education (3.0 cr)

[CPSY 5254](#) - Facilitating Creative and Motor Learning in Early Childhood Education (2.0 cr)

[EPSY 5625](#) - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)

##### **Foundation Courses**

[CI 5307](#) - Technology for Teaching and Learning (1.5 cr)





[OLPD 5009](#) - Human Relations: Applied Skills for School and Society (1.0 cr)

**Elementary Education Foundations**

[CI 3211](#) - Introduction to Elementary Teaching (3.0 cr)

[CI 3212](#) - Practicum: Elementary Teaching (2.0 cr)

**Language and Literacy**

**Linguistics**

[CI 3610](#) - Linguistics for Teachers [SOCS] (3.0 cr)

or [LING 3001](#) - Introduction to Linguistics [SOCS] (4.0 cr)

or [ENGL 3601](#) - Analysis of the English Language (4.0 cr)

or [CPSY 4345](#) - Language Development and Communication (3.0 cr)

**Literacy**

[CI 3401W](#) - Diversity in Children's Literature [WI] (3.0 cr)

[CI 5413](#) - Foundations of Reading (3.0 cr)

[CI 5414](#) - Practicum: Working With Developing Readers (2.0 cr)

**Cognition**

[EPSY 5001](#) - Learning, Cognition, and Assessment (3.0 cr)

Other requirements to be completed before admission:

Applicants are strongly encouraged to obtain paid or unpaid classroom experience with young children, ages birth to third grade, with multicultural and diverse populations. Students with an undergraduate degree other than the University of Minnesota Twin Cities BS in Early Childhood Education: Foundations, and who wish to pursue Minnesota state licensure, must complete prerequisite coursework to meet state licensure standards.

**Special Application Requirements:**

Applicants who have completed the Early Childhood: Foundations BS degree through the University of Minnesota apply for fall admission.

Applicants who have not completed a bachelor's degree at the University of Minnesota can apply for spring, summer, or fall admission.

All applicants must submit the following five required application materials through the online application system:

1. Transcripts - Unofficial transcripts or academic records should be uploaded directly to the online application. International students should also upload an English translation if the transcript is not in English. Please do not mail in paper copies of your transcripts. There is no need for official transcripts or academic records for initial review. If you are admitted, the University will then request official copies of this material.
2. Resume
3. Essay
4. Two Letters of Recommendation - These letters should be written by someone who is knowledgeable about your education-related experiences, work with young children, work style, and personal attributes.
5. Application fee - This fee is charged when you submit your application and is required for each application you submit. Fees must be paid online with a credit card.

Nonnative English speakers and/or international students should also submit an official score report from the Test of English as a Foreign Language (TOEFL).

See full application instructions and deadlines at: <https://icd.umn.edu/academics/early-childhood-education-master-of-education/apply/>

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan C:** Plan C requires 32 to 40 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Additional requirements and credits may be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services.

### Early Childhood Education

MEd required coursework

#### Undergraduate Pathway (32 credits)

Students who transition into the MEd degree from the University's Early Childhood Education: Foundations track take the courses below to earn their MEd. Take 2 credits of CPSY 5187.

CI 5425 - Reading Instruction in the Elementary Grades (3.0 cr)

CI 5426 - Language Arts Instruction in the Elementary Grades (3.0 cr)

CI 5502 - Science Instruction in the Elementary Grades (3.0 cr)

CI 5645 - Methods for Teaching English Learners (3.0 cr)

CI 5702 - Social Studies Instruction in the Elementary Grades (3.0 cr)

CI 5822 - Mathematics Instruction in the Elementary Grades (3.0 cr)

CPSY 5171 - Practicum: Applying Instructional Methods in the Elementary School (2.0 cr)

CPSY 5181 - Clinical Experience in Elementary School Teaching (10.0 cr)

CPSY 5187 - Capstone Project: Improvement of Teaching in Early Childhood Education (2.0 cr)

#### or Graduate Pathway (38 to 40 credits)

These courses are required for all students who have not earned their undergraduate degree from the University's Early Childhood Education: Foundations track. Students complete the courses below in addition to the required pre-requisites, which may be taken after admittance into the MEd program. Take 2 credits of CPSY 5187. The number of CPSY 5281 credits required is dependent upon teaching placement.

CPSY 5281 - Student Teaching in Early Childhood Education (6.0 - 8.0 cr)

CI 5425 - Reading Instruction in the Elementary Grades (3.0 cr)

CI 5426 - Language Arts Instruction in the Elementary Grades (3.0 cr)

CI 5502 - Science Instruction in the Elementary Grades (3.0 cr)

CI 5645 - Methods for Teaching English Learners (3.0 cr)

CI 5702 - Social Studies Instruction in the Elementary Grades (3.0 cr)

CI 5822 - Mathematics Instruction in the Elementary Grades (3.0 cr)

CPSY 5171 - Practicum: Applying Instructional Methods in the Elementary School (2.0 cr)

CPSY 5181 - Clinical Experience in Elementary School Teaching (10.0 cr)

CPSY 5187 - Capstone Project: Improvement of Teaching in Early Childhood Education (2.0 cr)



### ***Twin Cities Campus***

## **Education, Curriculum, and Instruction M.A.**

*Curriculum & Instruction*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-2545; fax: 612-624-8277).

Email: [cigs@umn.edu](mailto:cigs@umn.edu)

Website: <http://cehd.umn.edu/ci>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 41
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

By focusing on the curricular and instructional processes central to all educational endeavors, graduate programs within the Department of Curriculum and Instruction prepare students for professional roles in K-12 education, postsecondary and research settings, educational service agencies, and business and industry.

The MA degree includes formal tracks in arts in education; elementary education; learning technologies; literacy education; mathematics education; science education; second language education; social studies education; and teaching English to speakers of other languages.

Students must have an interest in research in education or a related field; students plan a program of coursework that prepares them to conduct scholarly research in an area of expertise related to a track or tracks listed above.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Generally a bachelor's degree with licensure and/or teaching experience fulfills the requirement. For some areas, however, there is no equivalent undergraduate program. In that case, 15 to 20 credits of undergraduate coursework determined acceptable by advisors and the director of graduate studies is adequate.

#### **Special Application Requirements:**

Applicants must submit transcripts from every college attended (even those where a degree wasn't earned), scores from the GRE, scores from the TOEFL/IELTS/MELAB (if applicable), three letters of recommendation from individuals familiar with their scholarship and research potential, a resume, a clearly written statement of career interests, goals, and objectives, and a diversity statement. Some program tracks require an example of academic writing. Master's applications are reviewed by department faculty once per academic year, with December 1 as the deadline.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19



- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 15 to 25 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 to 25 major credits and 6 to 9 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** All MA students must demonstrate familiarity with the tools of research or scholarship in their major track, the ability to work independently, and the ability to present their work effectively.

Plan B paper(s) are less formal than the Plan A thesis and may build more directly from coursework; papers should involve deep engagement of the research literature. A paper done for a course may serve as one of the Plan B papers, with the understanding that it would be extended and revised under the advisor's supervision.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

Language Requirement: For TESOL track only

A minimum GPA of 3.00 is required for students to remain in good standing.

In education, curriculum & instruction, students may pursue Plan A (with thesis) or Plan B (with one or two papers). Core and research course requirements are specified for Plan A and Plan B in accord with each track and are chosen in consultation with the advisor.

Plan A requires 15-26 credits in the major, depending upon the formal track chosen, and a minimum of 6 credits in one or more related fields outside the major. Plan A also requires 10 thesis credits.

Plan B requires 24-26 credits in the major and 6-9 credits in one or more related fields outside the major, depending upon formal track chosen.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may complete the program with more than one sub-plan.

### Arts in Education

The MA program's arts in education track presents opportunities for students with experience in schools or other educational settings to develop their ability to work at the intersection of theory and practice. Gaining the knowledge and skills necessary to be reflective and well-informed art educators, graduates become educational leaders in many contexts--school districts, museums, community arts organizations, government agencies--or often pursue further graduate study. Students are encouraged to take courses both across the College of Education and Human Development and the University at large and typically fulfill program requirements by exploring issues of teaching, learning, curriculum, teacher education, and school reform in urban and suburban schools, several renowned art museums in the greater Minneapolis area, and within the initial teacher licensure program at the University. The course of study is planned in consultation with the adviser to meet the academic interests and background of the students; those needs are balanced with the expected foundations in research and scholarship. Independent scholarship is encouraged and typically comes in the form of a final project (Plan B) or a more formal thesis (Plan A).

Program faculty exhibit a strong commitment to curriculum innovation, issues of social justice and diversity, and life-long aesthetic and



artistic development.

The arts in education track (Plan A) requires 13 credits of required major coursework plus an additional 2 credits of coursework to be selected in consultation with faculty advisor, 6 credits in a minor/related field, and 10 masters thesis credits for a total of 31 credits.

The arts in education track (Plan B) requires 7 credits of required major coursework plus an additional 11 credits of coursework selected in consultation with faculty advisor, 6 credits of research coursework which includes 3 credits for the Plan B paper, and 6 credits in a minor/related field for a total of 30 credits.

#### Plan A or Plan B

##### Arts in Ed - Plan A

Total: 31 credits

##### Major Coursework

Required courses are listed; others selected in consultation with faculty advisor for a total of 15 credits

CI 5078 - Application of Aesthetic Theory in Education (2.0 cr)

CI 8075 - Seminar: Art Education (2.0 cr)

CI 8079 - Arts Based Research in Education (3.0 cr)

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

##### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

##### Thesis Credits

A minimum of 10 credits are required

CI 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### Arts in Ed - Plan B

Total: 30 credits

##### Major Coursework

Required courses are listed; others selected in consultation with faculty advisor for a total of 18 credits

CI 5078 - Application of Aesthetic Theory in Education (2.0 cr)

CI 8075 - Seminar: Art Education (2.0 cr)

CI 8079 - Arts Based Research in Education (3.0 cr)

##### Research Coursework

CI 8095 is required and should be taken for 3 credits; other courses selected in consultation with faculty advisor for a total of 6 credits

CI 8095 - Problems: Art Education (1.0 - 12.0 cr)

##### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

#### Elementary Education

The MA program's elementary education track is designed to help professionals acquire and contribute to the advancement of knowledge and leadership so necessary to address the dynamic challenges of contemporary education at the elementary level. Emphasized within the track are, for example, the following: a focus on interdisciplinary approaches to curriculum development, the use of inquiry as a key pedagogical approach, the importance of a strong understanding of diversity and its social and educational implications, and child development and learning theories as the foundation for research and teaching elementary settings.

The elementary education track (Plan A) requires 6 credits of required major coursework plus an additional 9 credits of coursework to be selected in consultation with faculty advisor, 6 credits in a minor/related field, and 10 masters thesis credits for a total of 31 credits.

The elementary education track (Plan B) requires 18 credits of coursework selected in consultation with faculty advisor, 6 credits of research coursework which includes 3 credits for the Plan B paper, and 6 credits in a minor/related field for a total of 30 credits.

#### Plan A or Plan B

##### Elem Ed - Plan A

Total: 31 credits

##### Major Coursework

Required courses are listed; others selected in consultation with faculty advisor for a total of 15 credits

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

##### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits



### Thesis Credits

A minimum of 10 credits are required

[CI 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

### Elem Ed - Plan B

Total: 30 credits

#### Major Coursework

Courses will be selected in consultation with faculty advisor for a total of 18 credits

#### Research Coursework

CI 8195 (Plan B paper) should be taken for 3 credits; other courses selected in consultation with faculty advisor for a total of 6 credits

[CI 8195](#) - Problems: Improvement of Instruction (1.0 - 6.0 cr)

#### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

### Learning Technologies

The learning technologies (LT) MA track prepares people for research and practice related to multimedia, design, K-12 technology integration, and online distance learning. MA graduates often conduct research and engage in LT-related practice in K-12, higher education, or business or industry, such as software companies. LT coursework includes hands-on learning and use of current technologies, development of technological solutions, consideration of theory and research, and conducting educational research.

The MA's LT track is targeted at students interested in a stronger research orientation than those who pursue the master of education degree. MA students, who often continue to a PhD program, are required to take courses in research methodology and to write a Plan A thesis or Plan B paper to complete their degree. Master's degrees extend the content in the certificate programs and include various courses taken from inside and outside the program. Students may engage in advanced media and software design and development or develop plans for technology integration for diverse educational settings.

The learning technologies track (Plan A) requires 9 credits of required major coursework plus an additional 9 credits of coursework to be selected in consultation with faculty advisor, 6 credits in a minor/related field, and 10 masters thesis credits for a total of 34 credits.

The learning technologies track (Plan B) requires 6 credits of required major coursework plus an additional 12 credits of coursework to be selected in consultation with faculty advisor, 6 credits of research coursework which includes 3 credits for the Plan B paper, and 6 credits in a minor/related field for a total of 30 credits.

### Plan A or Plan B

#### LT - Plan A

Total: 34 credits

#### Major Coursework

Required courses are listed; others selected in consultation with faculty advisor for a total of 18 credits

[CI 5331](#) - Introduction to Learning Technologies (3.0 cr)

[CI 8134](#) - Foundations of Research in Curriculum and Instruction I (3.0 cr)

[CI 8135](#) - Foundations of Research in Curriculum and Instruction II (3.0 cr)

#### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

#### Thesis Credits

A minimum of 10 credits are required

[CI 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### LT - Plan B

Total: 30 credits

#### Major Coursework

18 credits are required; 6 credits of required courses are listed. Recommend 12 remaining credits be taken in a technology certificate area.

[CI 5331](#) - Introduction to Learning Technologies (3.0 cr)

[CI 5155](#) - Contemporary Approaches to Curriculum: Instruction and Assessment (3.0 cr)

#### Research Coursework

CI 8395 is required and should be taken for 3 credits; other courses selected in consultation with faculty advisor for a total of 6 credits

[CI 8395](#) - Directed Study: Learning Technologies (1.0 - 6.0 cr)

#### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits



### Literacy Education

The MA program's literacy track is thoughtfully designed to balance theory with practical application in a variety of educational settings. There is a deep foundation in evaluating current research and students are encouraged to contribute meaningfully to research in the field of literacy. Faculty members and students work together to study at the intersection of the strands of literacy: children's and adolescent literature, critical literacies, English education, language arts, and reading. Literacy research related to diverse learners in urban, multilingual settings is a central focus of the program. The course of study is planned in consultation with the adviser to meet the academic interests and background of the students; those needs are balanced with the expected foundations in research and scholarship. Independent scholarship is encouraged and typically comes in the form of a final project (Plan B) or a more formal thesis (Plan A).

The literacy education track (Plan A) requires 6 credits of required major coursework plus an additional 9 credits of coursework to be selected in consultation with faculty advisor, 6 credits in a minor/related field, and 10 masters thesis credits for a total of 31 credits.

The literacy education track (Plan B) requires 18 credits of coursework selected in consultation with faculty advisor, 6 credits of research coursework which includes 3 credits for the Plan B paper, and 6 credits in a minor/related field for a total of 30 credits.

#### Plan A or Plan B

##### Lit Ed - Plan A

Total: 31 credits

##### Major Coursework

Required courses are listed; others selected in consultation with faculty advisor for a total of 15 credits. At least one course must be a Literacy Education seminar.

[CI 8134](#) - Foundations of Research in Curriculum and Instruction I (3.0 cr)

[CI 8135](#) - Foundations of Research in Curriculum and Instruction II (3.0 cr)

##### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

##### Thesis Credits

A minimum of 10 credits are required

[CI 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### Lit Ed - Plan B

Total: 30 credits

##### Major Coursework

Courses will be selected in consultation with faculty advisor for a total of 18 credits. At least one course must be a Literacy Education seminar.

##### Research Coursework

[CI 8495](#) is required and should be taken for 3 credits; other courses selected in consultation with faculty advisor for a total of 6 credits

[CI 8495](#) - Problems: Teaching English and Reading (1.0 - 6.0 cr)

##### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

### Mathematics Education

The MA program's mathematics education track prepares students for research and practice related to K-12 mathematics and engineering education. The MA is targeted at students interested in a stronger research orientation than those who pursue the master of education (MEd) degree. MA students, who often continue on to a PhD program, are required to take courses in research methodology and to write a Plan A or Plan B paper to complete their degree. Graduate students participate in this work as teaching assistants, research assistants in externally funded projects, and as instructors.

The mathematics education track (Plan A) requires 15 credits of required major coursework, 6 credits in a minor/related field, and 10 masters thesis credits for a total of 31 credits.

The mathematics education track (Plan B) requires 15 credits of coursework selected in consultation with faculty advisor, 6 credits of required research coursework plus an additional 3 credits of research coursework selected in consultation with faculty advisor, and 6 credits in a minor/related field for a total of 30 credits.

#### Plan A or Plan B

##### Math Ed - Plan A

Total: 31 credits



### Major Coursework

Required courses are listed

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

CI 8572 - Learning Theory and Classical Research in STEM Education (3.0 cr)

MTHE 8571 - Research in Mathematics Education (3.0 cr)

### Major Coursework - Additional Choice

Choose any one of the following for a total of 3 credits. Any variable credit course should be taken for 3 credits.

MTHE 5155 - Rational Number Concepts and Proportionality (3.0 cr)

or MTHE 5171 - Teaching Problem Solving (3.0 cr)

or MTHE 5172 - Teaching Probability and Statistics (3.0 cr)

or MTHE 5366 - Technology-Assisted Mathematics Instruction (3.0 cr)

or MTHE 8591 - Seminar: Mathematics Education (1.0 - 3.0 cr)

### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

### Thesis Credits

A minimum of 10 credits are required

CI 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

### Math Ed - Plan B

Total: 30 credits

#### Major Coursework

Selected in consultation with faculty advisor for a total of 15 credits

#### Research Coursework

Required courses are listed and MTHE 8995 should be taken for 3 credits; other courses selected in consultation with faculty advisor for a total of 9 credits

MTHE 8571 - Research in Mathematics Education (3.0 cr)

MTHE 8995 - Problems: Mathematics Education (1.0 - 6.0 cr)

#### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

### Science Education

The MA program's science education track is designed to prepare scholars to conduct thoughtful research in order to assume roles as university faculty members, educational leaders, policy makers, and researchers and to contribute meaningfully to the field. The field of science education is a broad one and includes science and environmental education at the K-12 levels, the college level, in informal and adult settings, and in early childhood. Focus areas of research within the science education area are the preparation of pre-service science teachers (K-12), induction and mentoring of beginning science teachers, design and implementation of curricula across the K-college spectrum, environmental education, cooperative learning, and social justice.

The science education track (Plan A) requires 15 credits of required major coursework, 6 credits in a minor/related field, and 10 masters thesis credits for a total of 31 credits.

The science education track (Plan B) requires 15 credits of required major coursework plus an additional 3 credits of coursework to be selected in consultation with faculty advisor, 6 credits of research coursework which includes 3 credits for the Plan B paper, and 6 credits in a minor/related field for a total of 30 credits.

### Plan A or Plan B

#### Sci Ed - Plan A

Total: 31 credits

#### Major Coursework

Required courses are listed; CI 8570 should be taken for 3 credits.

CI 5535 - Foundations of Science Education (3.0 cr)

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

CI 8570 - Advanced Topics in Science Education (1.0 - 4.0 cr)

CI 8571 - Equity, Policy, and Social Justice in Science Education (3.0 cr)

#### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

#### Thesis Credits

A minimum of 10 credits are required

CI 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)





-OR-

### Sci Ed - Plan B

Total: 30 credits

#### Major Coursework

Required courses are listed; others selected in consultation with faculty advisor for a total of 18 credits. CI 8570 should be taken twice for a total of 6 credits.

CI 5534 - Studies in Science Education (3.0 cr)

CI 5535 - Foundations of Science Education (3.0 cr)

CI 8570 - Advanced Topics in Science Education (1.0 - 4.0 cr)

CI 8571 - Equity, Policy, and Social Justice in Science Education (3.0 cr)

#### Research Coursework

CI 8595 is required and should be taken for 3 credits; other courses selected in consultation with faculty advisor for a total of 6 credits

CI 8595 - Problems: Science Education (1.0 - 6.0 cr)

#### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

### Second Language Education

The second language education (SLE) track is nationally and internationally known for its programs, which focus on English as a second language (ESL) for K-12, postsecondary, and adult classrooms; bilingual and immersion education; and traditional foreign language education in both K-12 and postsecondary settings. The program's perspective on language learning and teaching is markedly pedagogical and informed by an awareness of the role social context plays in the process of language learning and teaching. Master's students in the SLE track engage in coursework and projects that balance theory and research with practical application. Students pursue a course of study that is designed in collaboration with the faculty advisor to correspond to the interests and background of each student and to provide a solid understanding of research and best practice in the field. Independent scholarship is encouraged and typically comes in the form of a final project (Plan B) or a more formal thesis (Plan A).

The second language education track (Plan A) requires 18 credits of required major coursework, 6 credits in a minor/related field, and 10 masters thesis credits for a total of 34 credits.

The second language education track (Plan B) requires 15 credits of major coursework, 9 credits of foundational and research coursework which includes 3 credits for the Plan B paper, and 6 credits in a minor/related field for a total of 30 credits.

### Plan A or Plan B

#### SLE - Plan A

Total: 34 credits

#### Major Coursework

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

CI 5651 - Foundations of Second Languages and Cultures Education (3.0 cr)

or CI 5670 - Foundations of Dual Language and Immersion Education (3.0 cr)

If taking CI 8650, student should register for 3 credits

CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)

or CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)

or CI 8689 - Language and Education Policy (3.0 cr)

or CI 8650 - Seminar: Special Topics in Second Languages and Cultures Research (1.0 - 3.0 cr)

Take exactly 2 course(s) totaling exactly 6 credit(s) from the following:

• CI 5628 - Analyzing Learner Language in Second Language Acquisition (3.0 cr)

• CI 5662 - Second Language Curriculum Design (3.0 cr)

or CI 5671 - Curriculum Development and Assessment in Dual Language/Immersion Classrooms (3.0 cr)

• CI 5658 - Foreign Language Testing and Assessment (3.0 cr)

or CI 5642 - Assessing English Learners (3.0 cr)

• CI 5656 - Teaching Literacy in Second Language Classrooms (3.0 cr)

or CI 5676 - Biliteracy Development in Dual Language/Immersion Classrooms (3.0 cr)

• CI 5657 - Teaching Speaking and Listening in Second Language Classrooms (3.0 cr)

or CI 5672 - Language-Focused Instructional Practices and Strategies for Dual Language/Immersion Classrooms (3.0 cr)

#### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

#### Thesis Credits

A minimum of 10 credits are required

CI 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-



## SLE - Plan B

Total: 30 credits

### Major Coursework

Take exactly 15 credit(s) from the following:

- [CI 5628](#) - Analyzing Learner Language in Second Language Acquisition (3.0 cr)
- [CI 5648](#) - Advanced Practices in Teaching Academic Language (3.0 cr)
- [CI 5619](#) - Teaching World Languages and Cultures in Elementary Settings (2.0 cr)
- [CI 5641](#) - Language, Culture, and Education (3.0 cr)
- [CI 5656](#) - Teaching Literacy in Second Language Classrooms (3.0 cr)  
or [CI 5676](#) - Biliteracy Development in Dual Language/Immersion Classrooms (3.0 cr)
- [CI 5657](#) - Teaching Speaking and Listening in Second Language Classrooms (3.0 cr)  
or [CI 5672](#) - Language-Focused Instructional Practices and Strategies for Dual Language/Immersion Classrooms (3.0 cr)
- [CI 5662](#) - Second Language Curriculum Design (3.0 cr)  
or [CI 5671](#) - Curriculum Development and Assessment in Dual Language/Immersion Classrooms (3.0 cr)
- [CI 5658](#) - Foreign Language Testing and Assessment (3.0 cr)  
or [CI 5642](#) - Assessing English Learners (3.0 cr)

### Foundational & Research Coursework

Student should take the Plan B paper course - [CI 8695](#) - for 3 credits

[CI 8695](#) - Problems: Second Languages and Cultures Education (1.0 - 6.0 cr)

[CI 5651](#) - Foundations of Second Languages and Cultures Education (3.0 cr)

or [CI 5670](#) - Foundations of Dual Language and Immersion Education (3.0 cr)

If student takes [CI 5177](#), it should be taken for 3 credits

[CI 5177](#) - Practical Research (1.0 - 3.0 cr)

or [CI 5628](#) - Analyzing Learner Language in Second Language Acquisition (3.0 cr)

or [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)

### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

## Social Studies Education

The MA's social studies education track focuses on issues related to curriculum, instruction and assessment in K-12 social studies. Graduate students are strongly encouraged to present research papers at professional conferences, specifically the National Council for the Social Studies and the American Educational Research Association.

Faculty maintain active research agendas with several research centers at the University including the Center for Applied Research and Educational Improvement, housed within the College of Education and Human Development, and two research centers housed outside the College: the Center for Environmental Learning and Leadership and the Center for the Study of Political Psychology. Social studies faculty research interests include the areas of political socialization, political tolerance, authentic assessment, citizenship and civics education, and democratic thought. In addition, faculty members engage in research centered on the history of curricula, multicultural and gender studies, and social justice.

The social studies education track (Plan A) requires 10 credits of required major coursework plus an additional 6 credits of coursework to be selected in consultation with faculty advisor, 6 credits in a minor/related field, and 10 masters thesis credits for a total of 32 credits.

The social studies education track (Plan B) requires 18 credits of coursework to be selected in consultation with faculty advisor, 6 credits of research coursework which includes 3 credits for the Plan B paper, and 6 credits in a minor/related field for a total of 30 credits.

## Plan A or Plan B

### Soc Stud Ed - Plan A

Total: 32 credits

#### Major Coursework

Required courses are listed; others selected in consultation with faculty advisor for a total of 16 credits. [CI 8796](#) has to be taken for a minimum of 1 credit.

[CI 5762](#) - Developing Civic Discourse in the Social Studies (3.0 cr)

[CI 8134](#) - Foundations of Research in Curriculum and Instruction I (3.0 cr)

[CI 8135](#) - Foundations of Research in Curriculum and Instruction II (3.0 cr)

[CI 8796](#) - Research Internship in Social Studies Education (1.0 - 6.0 cr)

#### Minor or Related Field

Selected in consultation with faculty advisor for a total of 6 credits

#### Thesis Credits



A minimum of 10 credits are required  
[CI 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### **Soc Stud Ed - Plan B**

Total: 30 credits

##### **Major Coursework**

Courses are selected in consultation with faculty advisor for a total of 18 credits

##### **Research Coursework**

CI 8795 is required and should be taken for 3 credits; other courses selected in consultation with faculty advisor for a total of 6 credits

[CI 8795](#) - Problems: Social Studies Education (1.0 - 6.0 cr)

##### **Minor or Related Field**

Selected in consultation with faculty advisor for a total of 6 credits

#### **Teaching English to Speakers of Other Languages**

The teaching English to speakers of other languages (TESOL) track focuses on the broad field of applied linguistics uniting research, teaching and service in addressing the second language learning needs of adult learners in the university and the wider community, both in the US and abroad. Independent scholarship is encouraged and typically comes in the form of a final project (Plan B) or a more formal thesis (Plan A).

The teaching English to speakers of other languages (TESOL) track (Plan A) requires 25 credits of required major coursework, 6 credits in a minor/related field, and 10 masters thesis credits for a total of 41 credits.

The teaching English to speakers of other languages (TESOL) track (Plan B) requires 25 credits of required major coursework, and 9 credits in a minor/related field for a total of 34 credits.

#### **Plan A or Plan B**

##### **TESOL - Plan A**

Total: 41 credits

##### **Major Coursework**

CI 5654 must be taken for 6 credits.

[CI 5651](#) - Foundations of Second Languages and Cultures Education (3.0 cr)

[CI 5653](#) - Methods in Teaching English as a Second Language (ESL) in Higher Education (3.0 cr)

[CI 5646](#) - English Grammar for ESL Teachers (3.0 cr)

[CI 5649](#) - Language Analysis for ESL Teaching in Higher Ed (4.0 cr)

[CI 5654](#) - Practicum in Language Teaching: ESL and World Languages (1.0 - 6.0 cr)

[CI 5628](#) - Analyzing Learner Language in Second Language Acquisition (3.0 cr)

[CI 5658](#) - Foreign Language Testing and Assessment (3.0 cr)

or [CI 5642](#) - Assessing English Learners (3.0 cr)

##### **Minor or Related Field**

Selected in consultation with faculty advisor for a total of 6 credits

##### **Thesis**

A minimum of 10 credits are required

[CI 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### **TESOL - Plan B**

Total: 34 credits

##### **Major Coursework**

CI 5654 must be taken for 6 credits.

[CI 5651](#) - Foundations of Second Languages and Cultures Education (3.0 cr)

[CI 5653](#) - Methods in Teaching English as a Second Language (ESL) in Higher Education (3.0 cr)

[CI 5646](#) - English Grammar for ESL Teachers (3.0 cr)

[CI 5649](#) - Language Analysis for ESL Teaching in Higher Ed (4.0 cr)

[CI 5654](#) - Practicum in Language Teaching: ESL and World Languages (1.0 - 6.0 cr)

[CI 5628](#) - Analyzing Learner Language in Second Language Acquisition (3.0 cr)

[CI 5658](#) - Foreign Language Testing and Assessment (3.0 cr)

or [CI 5642](#) - Assessing English Learners (3.0 cr)

##### **Minor or Related Field**

Selected in consultation with faculty advisor for a total of 9 credits



### **Twin Cities Campus**

## **Education, Curriculum, and Instruction Minor**

*Curriculum & Instruction*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-2545; fax: 612-624-8277)

Email: [cigs@umn.edu](mailto:cigs@umn.edu)

Website: <http://cehd.umn.edu/ci>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

By focusing on the curricular and instructional processes central to all educational endeavors, graduate programs within the Department of Curriculum and Instruction prepare students for professional roles in preK-12 education, postsecondary and research settings, educational service agencies, and business and industry.

The minor in education, curriculum and instruction may include a focus in any one of the available tracks: art education; culture and teaching (at the doctoral level); elementary education; learning technologies; literacy education; mathematics education; science education; second language education; and social studies education.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students must consult with the Director of Graduate Studies in the Department of Curriculum & Instruction regarding specific coursework and committee involvement for the minor. The Director of Graduate Studies gives final approval for the minor coursework submitted on the Graduate Degree Plan or Graduate Planning & Audit System (GPAS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Master's**

A minor at the master's level requires a minimum of 6 credits of CI-designated coursework selected in consultation with the director of graduate studies.

#### **Doctoral**

#### **Doctoral (12 Credits)**



CI 8131 - Curriculum and Instruction Core: Critical Examination of Curriculum in Context (3.0 cr)

CI 8132 - Curriculum and Instruction Core: Teaching Theory and Research (3.0 cr)

**Electives (6 Credits)**

Courses will be selected in consultation with the director of graduate studies.



### *Twin Cities Campus*

## Education, Curriculum, and Instruction Ph.D.

*Curriculum & Instruction*

### College of Education and Human Development

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-2545; fax: 612-624-8277).

Email: [cigs@umn.edu](mailto:cigs@umn.edu)

Website: <http://cehd.umn.edu/ci>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 75
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

By focusing on the curricular and instructional processes central to all educational endeavors, graduate programs within the Department of Curriculum and Instruction prepare students for academic and professional roles in K-12 education, post-secondary education, research settings, educational service agencies, and business and industry.

The PhD degree includes formal tracks in the following: arts in education; culture and teaching; elementary education; learning technologies; literacy education; science, technology, engineering and mathematics (stem) education; second language education; and social studies education.

Students must have an interest in research in education or a related field; students plan a program of coursework that prepares them to conduct scholarly research in an area of expertise related to a track listed above.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A master's degree is preferred for admission to some of the tracks within the PhD program, but it is not always required.

Other requirements to be completed before admission:

Generally a bachelor's degree with licensure and/or teaching experience fulfills the requirement. For some areas, however, there is no equivalent undergraduate program. In that case, 15 to 20 credits of undergraduate coursework determined acceptable by faculty is adequate.

#### **Special Application Requirements:**

Applicants must submit transcripts from every college attended (even those where a degree wasn't earned), scores from the GRE, scores from the TOEFL/IELTS/MELAB (if applicable), three letters of recommendation from individuals familiar with their scholarship and research potential, a clearly written statement of career interests, goals, and objectives, a diversity statement, and a resume. Some program tracks require an example of academic writing. Doctoral applications are reviewed by department faculty once per academic year.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21



- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

39 credits are required in the major.  
12 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

A total of 75 credits is required for the education, curriculum and instruction PhD program. Requirements include core coursework required by all students, major coursework in the student's selected track, research methodology coursework, and a minimum of 12 credits in a minor or supporting program. All PhD students must also complete 24 doctoral thesis credits. Specific courses and additional work vary depending upon the track and are planned in consultation with the faculty advisor.

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may complete the program with more than one sub-plan.

### Arts in Education

The PhD program's arts in education track presents opportunities for students with experience in schools or other informal educational settings to develop necessary philosophical, theoretical, and methodological competence to make scholarly contributions to the field. Working as researchers, scholars, policy makers, and practitioners, graduates become educational leaders in universities, colleges, K-12 school districts, museums, community arts organizations, and government agencies.

Students typically carry out dissertation inquiry in local urban and suburban schools, several renowned art museums in the Minneapolis-St. Paul area, and within the initial teacher licensure program at the University. Both qualitative and quantitative research methods have guided PhD candidates' inquiry on the following: rightness of aesthetic-based problem solving, design thinking, and media arts theory and practice in arts classrooms; teaching critical literacy in and through the arts; innovation in culture-based arts education; and other knowledge building questions specific to art teacher development and retention.

Faculty and students are committed to understanding equity and social justice in both research and teaching. Graduate students often work closely with faculty in the development, implementation, and evaluation of national, state, and local arts education initiatives.

Arts in education students must take 6 credits of core coursework, 15 credits of major coursework, 15 credits of research coursework, 3 credits of electives, and 12 credits outside the track. Unless otherwise noted, credits need to be selected in consultation with the student's faculty advisor. 24 doctoral thesis credits are also required.

### Core Coursework

- CI 8131 - Curriculum and Instruction Core: Critical Examination of Curriculum in Context (3.0 cr)
- CI 8132 - Curriculum and Instruction Core: Teaching Theory and Research (3.0 cr)

### Major Coursework

Required courses are listed; others selected in consultation with faculty advisor for a total of 15 credits. CI 8085 is a required course as well, though it may be taken as either a major requirement course or as a research elective course.

- CI 5075 - The Social, Historical and Cultural Foundations of Arts Education (3.0 cr)
- CI 5078 - Application of Aesthetic Theory in Education (2.0 cr)
- CI 8075 - Seminar: Art Education (2.0 cr)



CI 8079 - Arts Based Research in Education (3.0 cr)

#### Research Coursework

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

#### Research Electives

9 additional credits to be selected based upon student's research methodology. If student wishes to take a course not selected below, they should first consult with their faculty advisor to make sure it will count as a research elective.

Take 9 or more credit(s) from the following:

- CI 8079 - Arts Based Research in Education (3.0 cr)
- CI 8085 - Narrative Inquiry in Education (3.0 cr)
- CI 8145 - Using Mixed Methods in Educational Research (3.0 cr)
- CI 8146 - Critical Ethnography in Education (3.0 cr)
- CI 8147 - Critical Discourse Analysis in Educational Research (3.0 cr)
- CI 8148 - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- CI 8153 - Research Approaches to Classroom Discourse (3.0 cr)
- CI 8155 - Immigrant Families and U.S. Schools (3.0 cr)
- CI 8165 - Queer and Feminist Theories: Collective Memory Research Methods (3.0 cr)
- CI 8371 - Applied Social Network Analysis in Education (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)
- CI 8689 - Language and Education Policy (3.0 cr)
- CI 8913 - Interpretive Research (3.0 cr)
- OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- AMST 8289 - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- LING 5462 - Field Research in Spoken Language (3.0 cr)

#### Minor or Supporting Program

12 credits outside the track, selected in consultation with faculty advisor

#### Elective

3 credits selected in consultation with faculty advisor

#### Culture and Teaching

The culture and teaching (CaT) track engages the study of education as a cultural phenomenon. Students in CaT study a range of educational processes that take place both in and beyond the borders of schools, and explore alternative epistemologies and pedagogies. Faculty and students are dedicated to seeking better understandings of issues pertaining to equity and social justice in both research and teaching. The track is interdisciplinary and collaborative, so students' work will encompass many different approaches, methods, and perspectives.

Some of CaT's courses focus on the ways in which teachers are prepared to teach; engage in ongoing professional development; and develop their own personal and professional identities within collegial communities. Other courses examine the salience of understanding white racial identity for pedagogy and social change; as well as the implications of globalization and immigration for teaching, learning, and curriculum. Still other courses explore popular culture and media in relation to contemporary critical theory and teaching practices. "Culture" in CaT includes thinking about "high" and "popular" cultures, the cultures of teaching and the cultures of





learning, and how our responses to all influence and are influenced by everyday meanings and practices.

CaT students must take 6 credits of core coursework, 15 credits of major coursework, 15 credits of research coursework, 3 credits of electives, and 12 credits outside the track. Unless otherwise noted, credits need to be selected in consultation with the student's faculty advisor. 24 doctoral thesis credits are also required.

#### Core Coursework

CI 8131 - Curriculum and Instruction Core: Critical Examination of Curriculum in Context (3.0 cr)

CI 8132 - Curriculum and Instruction Core: Teaching Theory and Research (3.0 cr)

#### Major Coursework

15 credits total, with 9 credits selected in consultation with faculty advisor. CI 8159 will be taken twice for a total of 6 credits.

CI 8159 - Culture and Teaching Colloquium (3.0 cr)

#### Research Coursework

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

#### Research Electives

9 additional credits to be selected based upon student's research methodology. If student wishes to take a course not selected below, they should first consult with their faculty advisor to make sure it will count as a research elective.

Take 9 or more credit(s) from the following:

- CI 8079 - Arts Based Research in Education (3.0 cr)
- CI 8085 - Narrative Inquiry in Education (3.0 cr)
- CI 8145 - Using Mixed Methods in Educational Research (3.0 cr)
- CI 8146 - Critical Ethnography in Education (3.0 cr)
- CI 8147 - Critical Discourse Analysis in Educational Research (3.0 cr)
- CI 8148 - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- CI 8153 - Research Approaches to Classroom Discourse (3.0 cr)
- CI 8155 - Immigrant Families and U.S. Schools (3.0 cr)
- CI 8165 - Queer and Feminist Theories: Collective Memory Research Methods (3.0 cr)
- CI 8371 - Applied Social Network Analysis in Education (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)
- CI 8689 - Language and Education Policy (3.0 cr)
- CI 8913 - Interpretive Research (3.0 cr)
- OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- AMST 8289 - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- LING 5462 - Field Research in Spoken Language (3.0 cr)

#### Minor or Supporting Program

12 credits outside the track, selected in consultation with faculty advisor

#### Elective

3 credits selected in consultation with faculty advisor

#### Elementary Education



This sub-plan is optional and does not fulfill the sub-plan requirement for this program.

The PhD program's elementary education track is designed to help professionals acquire and contribute to the advancement of knowledge and leadership necessary to address the dynamic challenges of contemporary education at the elementary level. Emphasized within the track are, for example, the following: a focus on interdisciplinary approaches to curriculum development, the use of inquiry as a key pedagogical approach, the importance of a strong understanding of diversity and its social and educational implications, and child development and learning theories as the foundation for research and teaching in elementary settings.

Elementary students must take 6 credits of core coursework, 15 credits of major coursework, 15 credits of research coursework, 3 credits of electives, and 12 credits outside the track. Unless otherwise noted, credits need to be selected in consultation with the student's faculty advisor. 24 doctoral thesis credits are also required.

#### **Core Coursework**

CI 8131 - Curriculum and Instruction Core: Critical Examination of Curriculum in Context (3.0 cr)

CI 8132 - Curriculum and Instruction Core: Teaching Theory and Research (3.0 cr)

#### **Major Coursework**

15 credits selected in consultation with faculty advisor

#### **Research Coursework**

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

#### **Research Electives**

9 additional credits to be selected based upon student's research methodology. If student wishes to take a course not selected below, they should first consult with their faculty advisor to make sure it will count as a research elective.

Take 9 or more credit(s) from the following:

- CI 8079 - Arts Based Research in Education (3.0 cr)
- CI 8085 - Narrative Inquiry in Education (3.0 cr)
- CI 8145 - Using Mixed Methods in Educational Research (3.0 cr)
- CI 8146 - Critical Ethnography in Education (3.0 cr)
- CI 8147 - Critical Discourse Analysis in Educational Research (3.0 cr)
- CI 8148 - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- CI 8153 - Research Approaches to Classroom Discourse (3.0 cr)
- CI 8155 - Immigrant Families and U.S. Schools (3.0 cr)
- CI 8165 - Queer and Feminist Theories: Collective Memory Research Methods (3.0 cr)
- CI 8371 - Applied Social Network Analysis in Education (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)
- CI 8689 - Language and Education Policy (3.0 cr)
- CI 8913 - Interpretive Research (3.0 cr)
- OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- AMST 8289 - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- LING 5462 - Field Research in Spoken Language (3.0 cr)

#### **Minor or Supporting Program**



12 credits outside the track, selected in consultation with faculty advisor

**Elective**

3 credits selected in consultation with faculty advisor

**Learning Technologies**

The PhD's learning technologies (LT) track prepares students for research and practice related to multimedia, design, K-12 technology integration, and online distance learning. PhD graduates often earn academic positions in higher education or become directors and leaders of development or research within business and industry. Coursework in LT includes hands-on learning and use of current technologies, development of technological solutions, research methods, and theory of curriculum, instruction, and learning.

The PhD degree is targeted primarily at students interested in pursuing research careers. Student research, culminating in a dissertation, typically evaluates various learning technologies issues and interventions. Common areas of study include conditions affecting educational technology use in schools, higher education, and business settings, and tend to focus on psychological, sociological, and philosophical factors. For example, recent graduates have studied the impact of technology on learning and cognition, variables that mediate effective technology use in education, and issues related to ethical technology use.

LT students must take 6 credits of core coursework, 15 credits of major coursework, 15 credits of research coursework, 3 credits of electives, and 12 credits outside the track. Unless otherwise noted, credits need to be selected in consultation with the student's faculty advisor. 24 doctoral thesis credits are also required.

**Core Coursework**

CI 8131 - Curriculum and Instruction Core: Critical Examination of Curriculum in Context (3.0 cr)

CI 8132 - Curriculum and Instruction Core: Teaching Theory and Research (3.0 cr)

**Major Coursework**

15 credits selected in consultation with faculty advisor

**Research Coursework**

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

**Research Electives**

9 additional credits to be selected based upon student's research methodology. If student wishes to take a course not selected below, they should first consult with their faculty advisor to make sure it will count as a research elective.

Take 9 or more credit(s) from the following:

- CI 8079 - Arts Based Research in Education (3.0 cr)
- CI 8085 - Narrative Inquiry in Education (3.0 cr)
- CI 8145 - Using Mixed Methods in Educational Research (3.0 cr)
- CI 8146 - Critical Ethnography in Education (3.0 cr)
- CI 8147 - Critical Discourse Analysis in Educational Research (3.0 cr)
- CI 8148 - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- CI 8153 - Research Approaches to Classroom Discourse (3.0 cr)
- CI 8155 - Immigrant Families and U.S. Schools (3.0 cr)
- CI 8165 - Queer and Feminist Theories: Collective Memory Research Methods (3.0 cr)
- CI 8371 - Applied Social Network Analysis in Education (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)
- CI 8689 - Language and Education Policy (3.0 cr)
- CI 8913 - Interpretive Research (3.0 cr)
- OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)



- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- AMST 8289 - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- LING 5462 - Field Research in Spoken Language (3.0 cr)

#### Minor or Supporting Program

12 credits outside the track, selected in consultation with faculty advisor

#### Elective

3 credits selected in consultation with faculty advisor

#### Literacy Education

The Literacy Education track helps students become literacy leaders. Working in schools and other educational settings, students develop an understanding of literacy as a set of socially and culturally situated practices. We take literacy to be plural and intersectional, defined by a range of skills that enable us to navigate multiple disciplines and thrive as lifelong learners. Faculty and students cooperate on projects that advance theory, research, and practice in the (overlapping) core areas of reading education, childrens and adolescent literature, critical literacy, English education, translanguaging literacy, as well as multimodal, digital and culturally-relevant literacies.

We are committed to equity and a vision of an inclusive future. To advance these goals,

- we engage in research, teaching, and outreach that supports culturally and linguistically diverse learners,
- we advance understanding of childrens literature as a force for social transformation,
- we develop literacy teachers and leaders for diverse schools,
- we apply multiple theoretical and research perspectives to problems and questions central to the field of literacy,
- we advocate for justice literacy, race literacy, eco-literacy, digital literacy, and other new literacies as tools that empower us to face global challenges,
- we strive to influence literacy policies to address inequities and benefit all learners.

Literacy students must take 6 credits of core coursework, 15 credits of major coursework, 15 credits of research coursework, 3 credits of electives, and 12 credits outside the track. Unless otherwise noted, credits need to be selected in consultation with the student's faculty advisor. 24 doctoral thesis credits are also required.

#### Core Coursework

- CI 8131 - Curriculum and Instruction Core: Critical Examination of Curriculum in Context (3.0 cr)
- CI 8132 - Curriculum and Instruction Core: Teaching Theory and Research (3.0 cr)

#### Major Coursework

Required course is listed; others selected in consultation with faculty advisor for a total of 15 credits.

- CI 8431 - Literacy Seminar: Literacy in a Post-Truth Era (3.0 cr)

#### Research Coursework

- CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)
- CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

#### Research Electives

9 additional credits to be selected based upon student's research methodology. If student wishes to take a course not selected below, they should first consult with their faculty advisor to make sure it will count as a research elective.

Take 9 or more credit(s) from the following:

- CI 8079 - Arts Based Research in Education (3.0 cr)
- CI 8085 - Narrative Inquiry in Education (3.0 cr)
- CI 8145 - Using Mixed Methods in Educational Research (3.0 cr)
- CI 8146 - Critical Ethnography in Education (3.0 cr)
- CI 8147 - Critical Discourse Analysis in Educational Research (3.0 cr)
- CI 8148 - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- CI 8153 - Research Approaches to Classroom Discourse (3.0 cr)
- CI 8155 - Immigrant Families and U.S. Schools (3.0 cr)
- CI 8165 - Queer and Feminist Theories: Collective Memory Research Methods (3.0 cr)
- CI 8371 - Applied Social Network Analysis in Education (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)
- CI 8689 - Language and Education Policy (3.0 cr)
- CI 8913 - Interpretive Research (3.0 cr)
- OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)



- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- AMST 8289 - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- LING 5462 - Field Research in Spoken Language (3.0 cr)

#### Minor or Supporting Program

Minor or Supporting Program

#### Elective

3 credits selected in consultation with faculty advisor

#### Science, Technology, Engineering, and Mathematics Education

The doctoral program's STEM education track at the University of Minnesota is interdisciplinary, focusing on science education, mathematics education, engineering education or agricultural education. Students pursuing this track will choose an area of emphasis in one of the four specializations, while simultaneously participating in scholarly work that spans all areas of STEM education. This integrated-style is one of the first in the nation, and is designed to prepare scholars to conduct thoughtful disciplinary and interdisciplinary research in STEM education in order to assume roles as university faculty members, educational leaders, policy makers, and researchers.

STEM students must take 6 credits of core coursework, 9 credits of STEM core coursework, 9 credits of focus area specific (science or mathematics or engineering or agriculture) coursework, 15 credits of research coursework, and 12 credits outside the track. Unless otherwise noted, credits need to be selected in consultation with the student's faculty advisor. 24 doctoral thesis credits are also required.

#### Core Coursework

CI 8131 - Curriculum and Instruction Core: Critical Examination of Curriculum in Context (3.0 cr)

CI 8132 - Curriculum and Instruction Core: Teaching Theory and Research (3.0 cr)

#### STEM Core Coursework

CI 8571 - Equity, Policy, and Social Justice in Science Education (3.0 cr)

CI 8572 - Learning Theory and Classical Research in STEM Education (3.0 cr)

CI 8573 - Nature of Inquiry in STEM Education (3.0 cr)

#### STEM Focus Area Coursework

Students take 9 credits, with faculty advisor approval, in their focus area: science education or mathematics education or engineering education or agricultural education.

#### Science Education

3 required credits are listed; 6 additional credits must be taken in consultation with faculty advisor.

CI 8574 - History and Philosophy of Science in Education (3.0 cr)

#### or Mathematics Education

9 credits required in consultation with faculty advisor

#### or Engineering Education

9 credits required in consultation with faculty advisor

#### or Agricultural Education

6 required credits are listed; one additional "AFEE" 3 credit course must be taken in consultation with faculty advisor.

AECM 8090 - Seminar: Agricultural Education and Extension (1.0 - 3.0 cr)

AECM 8094 - Research in Agricultural Education and Extension (1.0 - 6.0 cr)

#### Research Coursework

Students must take CI 8134 and CI 8135, as well as a minimum of 6 credits of statistics and one research elective course, for a total of 15 credits.

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)



### Statistics Requirement

Students must take a minimum of 6 credits of graduate-level Statistics in consultation with their advisor

### Research Electives

3 additional credits to be selected based upon student's research methodology. If student wishes to take a course not selected below, they should first consult with their faculty advisor to make sure it will count as a research elective.

Take 3 or more credit(s) from the following:

- CI 8079 - Arts Based Research in Education (3.0 cr)
- CI 8085 - Narrative Inquiry in Education (3.0 cr)
- CI 8145 - Using Mixed Methods in Educational Research (3.0 cr)
- CI 8146 - Critical Ethnography in Education (3.0 cr)
- CI 8147 - Critical Discourse Analysis in Educational Research (3.0 cr)
- CI 8148 - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- CI 8153 - Research Approaches to Classroom Discourse (3.0 cr)
- CI 8155 - Immigrant Families and U.S. Schools (3.0 cr)
- CI 8165 - Queer and Feminist Theories: Collective Memory Research Methods (3.0 cr)
- CI 8371 - Applied Social Network Analysis in Education (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)
- CI 8689 - Language and Education Policy (3.0 cr)
- CI 8913 - Interpretive Research (3.0 cr)
- OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- AMST 8289 - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- LING 5462 - Field Research in Spoken Language (3.0 cr)

### Minor or Supporting Program

12 credits outside the track, selected in consultation with faculty advisor.

### Second Language Education

The PhD track in second language education (SLE) focuses on the study of language use, teaching, learning, and policy across a range of educational and community settings, including programs that serve language minority and language majority learners: ESL/EFL, foreign language education, and bilingual and immersion education. The PhD track is designed to assume roles as university faculty members, researchers, policy makers, and educational leaders. Independent scholarship is the cornerstone of the PhD.

The SLE PhD track has four specializations that correspond to the program's primary focus areas and faculty expertise:

- 1) Second language acquisition and classroom discourse research examines language learning processes and the way language is used by learners and their interlocutors in or out of school.
- 2) Second language pedagogy and teacher development research examines teachers' classroom practices and strategies as well as professional identities, experiences and attitudes.
- 3) Language policy research involves analysis of the formation, implementation, and negotiation of language policy in national, school, community, and private spheres.
- 4) Languages and cultures across schools and communities research examines connections across homes, schools, and communities with an emphasis on the experience.

SLE students must take 6 credits of core coursework, 15 credits of major coursework, 15 credits of research coursework, 3 credits of electives, and 12 credits outside the track. Unless otherwise noted, credits need to be selected in consultation with the student's faculty



advisor. 24 doctoral thesis credits are also required.

#### Core Coursework

- CI 8131 - Curriculum and Instruction Core: Critical Examination of Curriculum in Context (3.0 cr)
- CI 8132 - Curriculum and Instruction Core: Teaching Theory and Research (3.0 cr)

#### Major Coursework

Required courses are listed; others selected in consultation with faculty advisor for a total of 15 credits.

- CI 8161 - Research Experience I: Study Design and Planning (3.0 cr)
- CI 8162 - Research Experience II: Data Analysis and Manuscript Preparation (3.0 cr)

#### Research Coursework

- CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)
- CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

#### Research Electives

9 additional credits to be selected based upon student's research methodology. If student wishes to take a course not selected below, they should first consult with their faculty advisor to make sure it will count as a research elective.

Take 9 or more credit(s) from the following:

- CI 8079 - Arts Based Research in Education (3.0 cr)
- CI 8085 - Narrative Inquiry in Education (3.0 cr)
- CI 8145 - Using Mixed Methods in Educational Research (3.0 cr)
- CI 8146 - Critical Ethnography in Education (3.0 cr)
- CI 8147 - Critical Discourse Analysis in Educational Research (3.0 cr)
- CI 8148 - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- CI 8153 - Research Approaches to Classroom Discourse (3.0 cr)
- CI 8155 - Immigrant Families and U.S. Schools (3.0 cr)
- CI 8165 - Queer and Feminist Theories: Collective Memory Research Methods (3.0 cr)
- CI 8371 - Applied Social Network Analysis in Education (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)
- CI 8689 - Language and Education Policy (3.0 cr)
- CI 8913 - Interpretive Research (3.0 cr)
- OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- AMST 8289 - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- LING 5462 - Field Research in Spoken Language (3.0 cr)

#### Minor or Supporting Program

12 credits outside the track, selected in consultation with faculty advisor.

#### Elective

3 credits selected in consultation with faculty advisor.

#### Social Studies Education

The PhD program's social studies education track focuses on issues related to curriculum, instruction, and assessment in K-12 social studies. Full-time graduate students generally have opportunities to supervise student teachers, teach introductory social studies classes, and conduct and publish research with one or more faculty members. Doctoral students are required to complete a research



internship with one or more of the faculty as part of their study for the degree. Graduate students are strongly encouraged to present research papers at professional conferences, specifically the National Council for the Social Studies and the American Educational Research Association. Recent PhD graduates have conducted research in the areas of intercultural relations, moral development, multicultural gender-fair curriculum, social studies instructional issues, and the standards movement as it relates to social studies education. Graduates have assumed positions as instructional leaders in the public schools, curriculum development specialists, social studies assessment specialists, and college/university faculty.

Social Studies students must take 6 credits of core coursework, 15 credits of major coursework, 15 credits of research coursework, 3 credits of electives, and 12 credits outside the track. Unless otherwise noted, credits need to be selected in consultation with the student's faculty advisor. 24 doctoral thesis credits are also required.

#### Core Coursework

CI 8131 - Curriculum and Instruction Core: Critical Examination of Curriculum in Context (3.0 cr)

CI 8132 - Curriculum and Instruction Core: Teaching Theory and Research (3.0 cr)

#### Major Coursework

15 credits selected in consultation with faculty advisor.

#### Research Coursework

CI 8134 - Foundations of Research in Curriculum and Instruction I (3.0 cr)

CI 8135 - Foundations of Research in Curriculum and Instruction II (3.0 cr)

#### Research Electives

9 additional credits to be selected based upon student's research methodology. If student wishes to take a course not selected below, they should first consult with their faculty advisor to make sure it will count as a research elective.

Take 9 or more credit(s) from the following:

- CI 8079 - Arts Based Research in Education (3.0 cr)
- CI 8085 - Narrative Inquiry in Education (3.0 cr)
- CI 8145 - Using Mixed Methods in Educational Research (3.0 cr)
- CI 8146 - Critical Ethnography in Education (3.0 cr)
- CI 8147 - Critical Discourse Analysis in Educational Research (3.0 cr)
- CI 8148 - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- CI 8153 - Research Approaches to Classroom Discourse (3.0 cr)
- CI 8155 - Immigrant Families and U.S. Schools (3.0 cr)
- CI 8165 - Queer and Feminist Theories: Collective Memory Research Methods (3.0 cr)
- CI 8371 - Applied Social Network Analysis in Education (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)
- CI 8689 - Language and Education Policy (3.0 cr)
- CI 8913 - Interpretive Research (3.0 cr)
- OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- AMST 8289 - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- LING 5462 - Field Research in Spoken Language (3.0 cr)

#### Minor or Supporting Program

12 credits outside the track, selected in consultation with faculty advisor.





**Elective**

3 credits selected in consultation with faculty advisor.



### ***Twin Cities Campus***

## **Educational Psychology M.A.**

*Educational Psychology*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Educational Psychology, 250 Educational Science Building, 56 East River Road, Minneapolis, MN 55455; 612-624-6083

Email: [epsy-adm@umn.edu](mailto:epsy-adm@umn.edu)

Website: <http://www.cehd.umn.edu/edpsych>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 60
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Educational Psychology MA program has five tracks: counselor education (CE); school psychology; special education (including applied behavior analysis); psychological foundations of education (with emphases in learning and cognition/educational technology, social psychological and social developmental processes in educational psychology, including human relations); and quantitative methods in education (with emphases in measurement/evaluation and statistics/statistics education).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Applicants apply online by submitting a department application, three letters of recommendation, and a statement of goals and interests. Applications should be accompanied by official transcripts from all colleges and universities attended.

School Psychology: Applicants to the school psychology track must also submit a one-page critical issue essay, answering the following questions: What is the role of a school psychologist? What are the most critical educational issues school psychologists can help address? How would you like to contribute to addressing these issues in your future career? An interview is required for those who make the initial cut in school psychology. Applications are accepted for fall term only.

Application deadlines are November 15 for the school psychology track; December 1 for the quantitative methods and special education tracks; January 6 for the counselor education track; March 1 for the psychological foundations track, and as a second deadline for the quantitative methods track.

To be considered for fellowship nominations, applications must be submitted by the November 15 (school psychology) or December 1 deadlines.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19



- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 to 24 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 to 60 major credits and 0 credits outside the major. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

All courses must be taken A-F unless only offered S-N.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Counselor Education

This sub-plan is limited to students completing the program under Plan B.

The Counselor Education (CE) track subscribes to the scientist/practitioner model, which assumes that scholarly inquiry and counseling practice are interdependent and complementary. The track's primary mission is to prepare counselors to bring a well-trained professional's attitude and interest to bear on the application of counseling and educational knowledge. In addition to becoming skilled clinicians, students learn to be critical consumers and producers of both quantitative and qualitative research. Emphasis areas: clinical mental health, higher education, and school counseling.

The CE track requires 60 credits, a portfolio, and written final examination.

All coursework must be taken on the A/F grading basis with a minimum cumulative GPA of 3.0; no more than 2 courses graded below B-; and no more than 6 credits of incomplete grades.

### Ed Psych Core Courses (12 credits)

Take the following courses:

- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- [EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)
- [EPSY 5157](#) - Social & Developmental Psychology of Education (3.0 cr)
- [EPSY 5114](#) - Psychology of Student Learning (3.0 cr)

### Counseling Theory & Practice Courses (30 credits)

Take the following courses:

- [EPSY 5402](#) - Counseling History and Theories (3.0 cr)
- [EPSY 5403](#) - Counseling Diverse Populations (3.0 cr)
- [EPSY 5404](#) - Group Counseling (3.0 cr)
- [EPSY 5405](#) - Career Counseling (3.0 cr)
- [EPSY 5406](#) - Ethics in Counseling (3.0 cr)



EPSY 5407 - Diagnosis and Treatment in Counseling (3.0 cr)  
EPSY 5408 - Evidence-Based Counseling Relationships (3.0 cr)  
EPSY 5409 - Trauma and Crisis Counseling (3.0 cr)  
EPSY 5437 - Evidence-Based Practices in Counseling (3.0 cr)  
FSOS 5111 - Introduction to Family Therapy (3.0 cr)

## Emphases

### Clinical Mental Health Emphasis (18 credits)

Students pursuing the Clinical Mental Health emphasis take the following 18 credits:

EPSY 5416 - Introduction to Clinical Mental Health Counseling (3.0 cr)  
EPSY 5429 - Advanced Concepts in Community Counseling (3.0 cr)  
EPSY 5439 - Case Conceptualization and Treatment Planning (3.0 cr)  
EPSY 5482 - Practicum in Community and Higher Education Counseling (3.0 cr)  
EPSY 5483 - Internship I (3.0 cr)  
EPSY 5484 - Internship II (3.0 cr)

-OR-

### Higher Ed Emphasis (18 credits)

Students pursuing the Higher Ed emphasis take the following 18 credits.

OLPD 5712 - Multicultural Theories of College Student Development Applied to Teaching and Learning (3.0 cr)  
EPSY 5429 - Advanced Concepts in Community Counseling (3.0 cr)  
EPSY 5439 - Case Conceptualization and Treatment Planning (3.0 cr)  
EPSY 5482 - Practicum in Community and Higher Education Counseling (3.0 cr)  
EPSY 5483 - Internship I (3.0 cr)  
EPSY 5484 - Internship II (3.0 cr)

-OR-

### School Counseling Emphasis (18 credits)

Students pursuing the School Counseling emphasis take the following 18 credits. Take 3 credits of EPSY 5435.

EPSY 5414 - School Counselor Accountability, Advocacy, and Leadership (3.0 cr)  
EPSY 5415 - Counseling Children and Adolescents (3.0 cr)  
EPSY 5435 - Introduction to School Counseling (3.0 - 6.0 cr)  
EPSY 5481 - Practicum in School Counseling (3.0 cr)  
EPSY 5483 - Internship I (3.0 cr)  
EPSY 5484 - Internship II (3.0 cr)

### Psychological Foundations of Education

Graduate study in psychological foundations of education prepares students for research and teaching positions in colleges and universities. Students have also gone on to positions in professional settings such as schools, private industry, human service organizations, health science units, and government agencies.

The goal of the track is to apply and generate knowledge of psychological processes and methodological procedures involved in learning and teaching.

The psychological foundations track offers emphases in learning and cognition/educational technology or social psychological and social developmental (including human relations) processes in educational psychology.

The Plan A requires 24 course credits; 10 thesis credits; a thesis; and a final oral examination.

The Plan B option requires 33 course credits; a Plan B paper; and a final written examination.

EPSY courses in the area of emphasis will satisfy Ed Psych core requirement for 3 credits of learning/cognition or social/personality.

### Ed Psych Core Courses (12 credits)

#### Learning/Cognition Course (3 credits)

Students pursuing the Learning and Cognition/Educational Technology emphasis must select 1 of the following courses. Students pursuing the Social Psychological/Social Developmental Process emphasis must select 1 of the 5-level courses from the list.

EPSY 5101 - Intelligence and Creativity (3.0 cr)  
EPSY 5114 - Psychology of Student Learning (3.0 cr)  
EPSY 5116 - Education of the Gifted and Talented (3.0 cr)  
EPSY 5119 - Mind, Brain, and Education (3.0 cr)  
EPSY 8112 - Mathematical Cognition (3.0 cr)  
EPSY 8116 - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)



[EPSY 8118](#) - Advanced Cognitive Psychology (3.0 cr)

**Social/Personality Course (3 credits)**

Students pursuing the Social Psychological/Social Developmental Process emphasis must select 1 of the following courses. Students pursuing the Learning/Cognition emphasis must select 1 of the EPSY courses listed.

[EPSY 5151](#) - Cooperative Learning (3.0 cr)

[EPSY 5157](#) - Social & Developmental Psychology of Education (3.0 cr)

[EPSY 8157](#) - Key Topics and Issues in Applying Social Psychology to Education (3.0 cr)

[PSY 5202](#) - Attitudes and Social Behavior (3.0 cr)

[PSY 5204](#) - Psychology of Interpersonal Relationships (3.0 cr)

[PSY 5205](#) - Applied Social Psychology (3.0 cr)

[PSY 5207](#) - Personality and Social Behavior (3.0 cr)

[PSY 8201](#) - Social Cognition (3.0 cr)

[PSY 8202](#) - Close Relationships (3.0 cr)

[PSY 8208](#) - Social Psychology: The Self (3.0 cr)

[CPSY 8302](#) - Developmental Psychology: Social and Emotional Processes (4.0 cr)

**Statistics Course (3 credits)**

Select 3 credits from the following:

[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

[EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)

**Measurement/Evaluation Course (3 credits)**

Select 3 credits from the following:

[EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)

[EPSY 5243](#) - Principles and Methods of Evaluation (3.0 cr)

[PSY 5862](#) - Psychological Measurement: Theory and Methods (3.0 cr)

**Research Methodology Course (3 credits)**

Take the following course:

[EPSY 5216](#) - Introduction to Research in Educational Psychology and Human Development (3.0 cr)

**Plan B Requirements (9 credits)**

**Plan B Paper (6 credits)**

Students must take 6 credits of [EPSY 5991](#) or [EPSY 8994](#).

[EPSY 5991](#) - Independent Study in Educational Psychology (1.0 - 8.0 cr)

[EPSY 8994](#) - Research Problems: Educational Psychology (1.0 - 6.0 cr)

**Additional Coursework (3 credits)**

Plan B students select 3 credits, preferably in either learning/cognition or social psychology/social development, in consultation with the advisor.

**Plan A Requirement**

**Thesis Credits**

Plan A students take 10 master's thesis credits.

[EPSY 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

**Emphases**

**Learning & Cognition/Educational Technology Emphasis (12 credits)**

**Required Courses (6 credits)**

Select 6 credits from the following:

[EPSY 5101](#) - Intelligence and Creativity (3.0 cr)

[EPSY 5114](#) - Psychology of Student Learning (3.0 cr)

[EPSY 5116](#) - Education of the Gifted and Talented (3.0 cr)

[EPSY 5119](#) - Mind, Brain, and Education (3.0 cr)

**Specialization Courses (6 credits)**

Select 6 credits from the following:

[EPSY 8112](#) - Mathematical Cognition (3.0 cr)

[EPSY 8113](#) - The Psychology of Scientific Reasoning (3.0 cr)

[EPSY 8114](#) - Seminar: Cognition and Learning (3.0 cr)

[EPSY 8116](#) - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)

[EPSY 8118](#) - Advanced Cognitive Psychology (3.0 cr)

[EPSY 8290](#) - Special Topics: Seminar in Psychological Foundations (1.0 - 6.0 cr)

[CPSY 8301](#) - Developmental Psychology: Cognitive Processes (4.0 cr)

-OR-

**Social Psychological/Social Developmental Processes Emphasis**

**Required Course (3 credits)**

Take the following course:

[EPSY 5157](#) - Social & Developmental Psychology of Education (3.0 cr)



### Specialization Coursework (6 credits)

Select 6 credits from the following:

- EPSY 5151 - Cooperative Learning (3.0 cr)
- EPSY 8157 - Key Topics and Issues in Applying Social Psychology to Education (3.0 cr)
- EPSY 8290 - Special Topics: Seminar in Psychological Foundations (1.0 - 6.0 cr)
- PSY 5135 - Psychology of Individual Differences (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8202 - Close Relationships (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)

### Additional Course (3 credits)

Select 3 credits, preferably in either Learning and Cognition/Educational Technology or Social Psychological/Social Developmental Processes, in consultation with the advisor.

### Quantitative Methods in Education

This sub-plan is limited to students completing the program under Plan B.

In QME students explore methodologies of measurement/evaluation, and statistics/statistics education to improve our understanding and use of these methods as well as explore new approaches to address educational phenomena. Students specializing in measurement study psychometric theories and methods of developing, selecting, and using measures of knowledge, skills, abilities, and non-cognitive variables. This includes item writing, test design, equating, scaling, and standard setting, techniques supporting decision making and accountability. Students specializing in evaluation study theories and models of evaluation that include quantitative and qualitative techniques for evaluating the effectiveness of educational and human services programs. Students specializing in statistics study a wide range of statistical methods, as well as their underlying statistical theories, and develop an understanding of the relationship between research design and statistical analysis, acquiring skills in using a variety of statistical techniques appropriate for specific problems in education. Students specializing in statistics education investigate issues related to teaching and learning statistics and gain experience in statistics instruction. QME students develop knowledge and skills that prepare them for a variety of positions, including test companies, colleges and universities, research and evaluation centers, public school systems, government agencies, and industry.

The QME track requires 33 credits; a Plan B paper; and a final oral examination.

Courses in the QME core course requirements will satisfy Ed Psych core course requirement for 3 credits of statistics and 3 credits of measurement/evaluation.

### Ed Psych Core Course Requirements (12 credits)

#### Statistics Course (3 credits)

Select 3 credits from the following:

- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)

#### Measurement/Evaluation Course (3 credits)

Select 3 credits from the following:

- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)

#### Learning/Cognition Course (3 credits)

Select 3 credits from the following:

- EPSY 5101 - Intelligence and Creativity (3.0 cr)
- EPSY 5114 - Psychology of Student Learning (3.0 cr)
- EPSY 5119 - Mind, Brain, and Education (3.0 cr)
- EPSY 5116 - Education of the Gifted and Talented (3.0 cr)
- EPSY 8112 - Mathematical Cognition (3.0 cr)
- EPSY 8116 - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)
- EPSY 8118 - Advanced Cognitive Psychology (3.0 cr)
- EPSY 8707 - Principles of Behavior Analysis and Learning (3.0 cr)
- CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)
- PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)
- PSY 5015 - Cognition, Computation, and Brain (3.0 cr)



PSY 5054 - Psychology of Language (3.0 cr)  
PSY 8042 - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

**Social/Personality Course (3 credits)**

Select 3 credits from the following:

EPSY 5151 - Cooperative Learning (3.0 cr)  
EPSY 5135 - Human Relations Workshop (4.0 cr)  
EPSY 5157 - Social & Developmental Psychology of Education (3.0 cr)  
EPSY 8132 - Personality Development and Socialization (3.0 cr)  
EPSY 8157 - Key Topics and Issues in Applying Social Psychology to Education (3.0 cr)  
EPSY 8819 - Emotion & Childhood Psychopathology (3.0 cr)  
PSY 5101 - Personality: Current Theory and Research (3.0 cr)  
PSY 5135 - Psychology of Individual Differences (3.0 cr)  
PSY 5202 - Attitudes and Social Behavior (3.0 cr)  
PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)  
PSY 5205 - Applied Social Psychology (3.0 cr)  
PSY 5207 - Personality and Social Behavior (3.0 cr)  
PSY 8201 - Social Cognition (3.0 cr)  
PSY 8202 - Close Relationships (3.0 cr)  
PSY 8208 - Social Psychology: The Self (3.0 cr)  
CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)  
CPSY 8606 - Advanced Developmental Psychopathology (3.0 cr)  
SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)

**Plan B Paper (3 credits)**

Take 3 credits of the following:

EPSY 5991 - Independent Study in Educational Psychology (1.0 - 8.0 cr)

**QME Core Coursework (18 credits)**

Take the following courses. All courses must be taken A/F.

EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)  
EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)  
EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)  
EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
EPSY 8252 - Statistical Methods in Education II (3.0 cr)

**Emphases**

**Measurement & Evaluation Emphasis (6 credits)**

Select 6 credits from the following. Other courses can be applied to this requirement with advisor approval.

EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)  
EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)  
EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)  
EPSY 8265 - Factor Analysis (3.0 cr)  
EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)  
EPSY 8267 - Applied Multivariate Analysis (3.0 cr)  
EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)  
EPSY 8283 - Research Synthesis and Meta-Analysis (3.0 cr)  
OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)

-OR-

**Statistics & Statistics Education Emphasis (6 credits)**

Select 6 credits from the following. Other courses can be applied to this requirement with advisor approval.

EPSY 5271 - Becoming a Teacher of Statistics (3.0 cr)  
EPSY 5272 - Statistics Teaching Internship (1.0 - 3.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
EPSY 8265 - Factor Analysis (3.0 cr)  
EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)  
EPSY 8267 - Applied Multivariate Analysis (3.0 cr)  
EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)  
EPSY 8283 - Research Synthesis and Meta-Analysis (3.0 cr)

**School Psychology**

This sub-plan is limited to students completing the program under Plan B.



School psychology does not offer the MA as a terminal degree; rather, the MA is required to pursue the specialist certificate or PhD in educational psychology.

The final examination may be oral, written, or both.

### **EPSY Core Course Requirements (12 credits)**

#### **Statistics Course (3 credits)**

Select 3 credits from the following:

[EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)

[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

#### **Measurement/Evaluation Course (3 credits)**

Take the following course:

[EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)

#### **Learning/Cognition Course (3 credits)**

Select 3 credits from the following:

[EPSY 5101](#) - Intelligence and Creativity (3.0 cr)

[EPSY 5114](#) - Psychology of Student Learning (3.0 cr)

[EPSY 5119](#) - Mind, Brain, and Education (3.0 cr)

[EPSY 5116](#) - Education of the Gifted and Talented (3.0 cr)

[EPSY 8112](#) - Mathematical Cognition (3.0 cr)

[EPSY 8116](#) - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)

[EPSY 8118](#) - Advanced Cognitive Psychology (3.0 cr)

[EPSY 8707](#) - Principles of Behavior Analysis and Learning (3.0 cr)

[CPSY 8301](#) - Developmental Psychology: Cognitive Processes (4.0 cr)

[PSY 5014](#) - Psychology of Human Learning and Memory (3.0 cr)

[PSY 5015](#) - Cognition, Computation, and Brain (3.0 cr)

[PSY 5054](#) - Psychology of Language (3.0 cr)

[PSY 8042](#) - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

#### **Social/Personality Course (3 credits)**

Take the following course:

[EPSY 8819](#) - Emotion & Childhood Psychopathology (3.0 cr)

#### **Plan B Paper (3 credits)**

Take the following course:

[EPSY 8822](#) - Research in School Psychology (3.0 cr)

#### **School Psychology Coursework (15 credits)**

Select 15 credits from the following:

[EPSY 5216](#) - Introduction to Research in Educational Psychology and Human Development (3.0 cr)

[EPSY 5802](#) - History & Scientific Bases of Psychology (3.0 cr)

[EPSY 5851](#) - Engaging Diverse Students and Families (3.0 cr)

[EPSY 8811](#) - Assessment in School Psychology I: Foundations of Academic Assessment (3.0 cr)

[EPSY 8812](#) - Assessment in School Psychology II: Intellectual and Social-Emotional Domains (3.0 cr)

[EPSY 8813](#) - Introductory Practicum in School Psychology (2.0 cr)

[EPSY 8815](#) - Behavioral and Social Emotional Prevention and Intervention (3.0 cr)

[EPSY 8816](#) - Academic Prevention and Intervention (3.0 cr)

[EPSY 8817](#) - Problem Analysis and Consultation in School Psychology (3.0 cr)

[EPSY 8818](#) - Intermediate Practicum in School Psychology (2.0 cr)

[EPSY 8821](#) - Issues in School Psychology (3.0 cr)

[EPSY 8823](#) - Ethics and Professional Standards in School Psychology (3.0 cr)

[EPSY 8849](#) - Assessment in Early Childhood (3.0 cr)

### **Special Education**

The special education track aims to improve outcomes for individuals who require specialized support to experience success across the lifespan. We are committed to engaging in meaningful research and to bridging research and practice to improve the lives of children and families in diverse contexts, and to have a lasting impact on teacher education, leadership, and policy. Early involvement in research projects and the development of original research addressing the needs of individuals requiring specialized support is encouraged and may include focused attention to intervention science, implementation science, social and cognitive development, behavioral and psychological management, language and communication skills, and/or the design and use of technology to promote impact.

The special education track focuses on the attainment of core competencies required for special education professionals as well as interdisciplinary skills and goals needed to address diverse challenges in diverse contexts. A complementary emphasis is placed on systematic understanding and problem solving in relation to social and cultural perceptions, care, education, intervention, and support of persons with disabilities.





Students may emphasize consulting, college teaching, or research in one or more of the specialized plans below.

The Plan A requires a final oral examination. The Plan B option final examination may be oral, written, or both.

### EPSY Core Course Requirements (12 credits)

#### Statistics Course (3 credits)

Take 3 credits from the following:

- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)

#### Measurement/Evaluation (3 credits)

Select 3 credits from the Measurement list or from the Evaluation list:

##### Measurement

- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5614W - Assessment and Due Process in Special Education [WI] (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)
- PSY 5865 - Advanced Psychological and Educational Measurement (4.0 cr)

##### or Evaluation

- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)

#### Learning/Cognition Course (3 credits)

Students pursuing the Applied Behavior Analysis emphasis must take EPSY 5659 (petition required). All other students select 3 credits from the following:

- EPSY 5101 - Intelligence and Creativity (3.0 cr)
- EPSY 5114 - Psychology of Student Learning (3.0 cr)
- EPSY 5119 - Mind, Brain, and Education (3.0 cr)
- EPSY 5116 - Education of the Gifted and Talented (3.0 cr)
- EPSY 8112 - Mathematical Cognition (3.0 cr)
- EPSY 8116 - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)
- EPSY 8118 - Advanced Cognitive Psychology (3.0 cr)
- EPSY 8707 - Principles of Behavior Analysis and Learning (3.0 cr)
- CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)
- PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)
- PSY 5015 - Cognition, Computation, and Brain (3.0 cr)
- PSY 5054 - Psychology of Language (3.0 cr)
- PSY 8042 - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

#### Social/Personality Course (3 credits)

Select 3 credits from the following:

- EPSY 5135 - Human Relations Workshop (4.0 cr)
- EPSY 5151 - Cooperative Learning (3.0 cr)
- EPSY 5157 - Social & Developmental Psychology of Education (3.0 cr)
- EPSY 8132 - Personality Development and Socialization (3.0 cr)
- EPSY 8157 - Key Topics and Issues in Applying Social Psychology to Education (3.0 cr)
- EPSY 8819 - Emotion & Childhood Psychopathology (3.0 cr)
- PSY 5101 - Personality: Current Theory and Research (3.0 cr)
- PSY 5135 - Psychology of Individual Differences (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8202 - Close Relationships (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)



- CPSY 8606 - Advanced Developmental Psychopathology (3.0 cr)
- SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)

#### Plan A Requirements

##### Electives (9 credits)

Select 9 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

- EPSY 5604 - Transition From School to Work and Community Living for Persons With Special Needs (3.0 cr)
- EPSY 5605W - Collaborative Practices for the Special Educator [WI] (3.0 cr)
- EPSY 5614W - Assessment and Due Process in Special Education [WI] (3.0 cr)
- EPSY 5616W - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)
- EPSY 5617 - Academic and Social Interventions for Students with Mild to Moderate Disabilities (3.0 cr)
- EPSY 5618 - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)
- EPSY 5625 - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)
- EPSY 5631 - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)
- EPSY 5632 - Module 2: Evidence-based Methods for AAC Assessment and Intervention (2.0 cr)
- EPSY 5641 - Foundations of Deaf Education (3.0 cr)
- EPSY 5642 - Early Intervention for Infants, Toddlers and Families: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5643 - Seminar: Identity, Culture and Diversity in Deaf Education (2.0 cr)
- EPSY 5644 - Early Childhood Language and Literacy Development and Best Practices: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5645 - Deaf Plus: Educating and Understanding Deaf Students with Disabilities (1.0 cr)
- EPSY 5646 - Best Practices Teaching Reading and Writing for School Age: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5647 - Spoken Language Practices and Assistive Technology: Deaf and Hard of Hearing (2.0 cr)
- EPSY 5651 - Best Practices Teaching Content Areas: Deaf Education (3.0 cr)
- EPSY 5652 - Incorporating Academic ASL in the Classroom: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5657 - Interventions for Behavioral Problems in School Settings (3.0 cr)
- EPSY 5661 - Introduction to Autism Spectrum Disorder (3.0 cr)
- EPSY 5663 - Assessment and Intervention for Individuals with Autism Spectrum Disorder (3.0 cr)
- EPSY 5681 - Educating Preschoolers with Disabilities: Specialized Approaches and Interventions (3.0 cr)
- EPSY 5720 - Special Topics: Special Education (1.0 - 4.0 cr)
- CI 5645 - Methods for Teaching English Learners (3.0 cr)
- MTHE 5355 - Mathematics for Diverse Learners (3.0 cr)

##### Thesis Credits (10 credits)

Take 10 master's thesis credits.

- EPSY 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

#### Plan B Requirements

##### Electives (12 credits)

Plan B students not pursuing the Applied Behavior Analysis Emphasis select 12 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with advisor approval.

- EPSY 5604 - Transition From School to Work and Community Living for Persons With Special Needs (3.0 cr)
- EPSY 5605W - Collaborative Practices for the Special Educator [WI] (3.0 cr)
- EPSY 5614W - Assessment and Due Process in Special Education [WI] (3.0 cr)
- EPSY 5616W - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)
- EPSY 5617 - Academic and Social Interventions for Students with Mild to Moderate Disabilities (3.0 cr)
- EPSY 5618 - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)
- EPSY 5625 - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)
- EPSY 5631 - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)
- EPSY 5632 - Module 2: Evidence-based Methods for AAC Assessment and Intervention (2.0 cr)
- EPSY 5641 - Foundations of Deaf Education (3.0 cr)
- EPSY 5642 - Early Intervention for Infants, Toddlers and Families: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5643 - Seminar: Identity, Culture and Diversity in Deaf Education (2.0 cr)
- EPSY 5644 - Early Childhood Language and Literacy Development and Best Practices: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5645 - Deaf Plus: Educating and Understanding Deaf Students with Disabilities (1.0 cr)
- EPSY 5646 - Best Practices Teaching Reading and Writing for School Age: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5647 - Spoken Language Practices and Assistive Technology: Deaf and Hard of Hearing (2.0 cr)
- EPSY 5651 - Best Practices Teaching Content Areas: Deaf Education (3.0 cr)
- EPSY 5652 - Incorporating Academic ASL in the Classroom: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5657 - Interventions for Behavioral Problems in School Settings (3.0 cr)
- EPSY 5661 - Introduction to Autism Spectrum Disorder (3.0 cr)
- EPSY 5663 - Assessment and Intervention for Individuals with Autism Spectrum Disorder (3.0 cr)
- EPSY 5681 - Educating Preschoolers with Disabilities: Specialized Approaches and Interventions (3.0 cr)
- EPSY 5720 - Special Topics: Special Education (1.0 - 4.0 cr)
- CI 5645 - Methods for Teaching English Learners (3.0 cr)
- MTHE 5355 - Mathematics for Diverse Learners (3.0 cr)

##### Research Problems (6 credits)

Take 6 credits of the following:



[EPSY 8994](#) - Research Problems: Educational Psychology (1.0 - 6.0 cr)

**Applied Behavior Analysis Emphasis**

The Applied Behavior Analysis emphasis is for Plan B students only.

**Required Courses (15 credits)**

Take 15 credits from the following:

[EPSY 5623](#) - Ethics in Applied Behavior Analysis (3.0 cr)

[EPSY 5657](#) - Interventions for Behavioral Problems in School Settings (3.0 cr)

[EPSY 5663](#) - Assessment and Intervention for Individuals with Autism Spectrum Disorder (3.0 cr)

[EPSY 8706](#) - Single Case Designs in Intervention Research (3.0 cr)

[EPSY 8708](#) - Functional Behavior Assessment (3.0 cr)

or [EPSY 5661](#) - Introduction to Autism Spectrum Disorder (3.0 cr)

**Research Problems (9 credits)**

Take 9 credits of the following:

[EPSY 8994](#) - Research Problems: Educational Psychology (1.0 - 6.0 cr)



### ***Twin Cities Campus***

## **Educational Psychology Minor**

*Educational Psychology*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Educational Psychology, 250 Educational Science Building, 56 East River Road, Minneapolis, MN 55455; 612-624-6083

Email: [epsy-adm@umn.edu](mailto:epsy-adm@umn.edu)

Website: <http://www.cehd.umn.edu/edpsych>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The educational psychology program has five tracks: 1) counseling and student personnel psychology (CSPP); 2) school psychology; 3) special education; 4) psychological foundations of education (learning and cognition/educational technology, social psychological and social developmental processes in educational psychology including human relations); and 5) quantitative methods in education (including measurement, evaluation, statistics, and statistics education).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A master's minor requires at least 6 credits of graduate-level EPSY courses. A doctoral minor requires at least 12 credits of graduate-level EPSY courses, of which at least 9 credits must be in 8xxx courses. Course selection is determined in consultation with the educational psychology committee member. Courses must be taken on an A-F grade basis with a minimum grade of B in all coursework for the minor. Students will not be able to substitute courses taken outside of Educational Psychology (EPSY).

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Master's**

A master's minor requires at least 6 credits of graduate-level EPSY courses. Course selection is determined in consultation with the educational psychology committee member. Courses must be taken on an A-F grade basis with a minimum grade of B in all coursework for the minor.

#### **Doctoral**

A doctoral minor requires at least 12 credits of graduate-level EPSY courses, of which at least 9 credits must be in 8xxx courses. Course selection is determined in consultation with the educational psychology committee member. Courses must be taken on an A-F



grade basis with a minimum grade of B in all coursework for the minor.



### **Twin Cities Campus**

## **Educational Psychology Ph.D.**

*Educational Psychology*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Educational Psychology, 250 Educational Science Building, 56 East River Road, Minneapolis, MN 55455; 612-624-6083

Email: [epsy-adm@umn.edu](mailto:epsy-adm@umn.edu)

Website: <http://www.cehd.umn.edu/edpsych>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 66 to 97
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The educational psychology program has four tracks: school psychology; special education; psychological foundations of education (with emphases in learning and cognition/educational technology, social psychological and social developmental processes in educational psychology including human relations); and quantitative methods in education (with emphases in measurement/evaluation and statistics/statistics education).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Applicants must apply online submitting a department application, three letters of recommendation, and a statement of goals and interests. Applications should be accompanied by official transcripts from all colleges and universities attended. In addition, school psychology applicants must also submit a one-page critical issue essay, answering the following questions: What is the role of a school psychologist? What are the most critical educational issues school psychologists can help address? How would you like to contribute to addressing these issues in your future career? An interview is required for those who make the initial cut in school psychology.

Applications are accepted for fall admission only. Application deadlines are November 15 for the school psychology track; December 1 for the psychological foundations, quantitative methods and special education tracks; March 1 as a second deadline for quantitative methods. To be considered for fellowship nominations, applications must be submitted by the November 15 (school psychology) or December 1 deadlines.

Applicants must submit the following test score(s):

GRE General Test (no subject tests are required)

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

42 to 73 credits are required in the major.  
0 to 9 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Students must complete credits in EPSY core courses (6 credits in statistics, 3 credits in measurement/evaluation, 6 credits in research methods, 9 credits from at least two areas: learning/cognition, social/personality, history/systems), 9 credits EPSY electives and 24 thesis credits. Further required credits are detailed within subplan requirements.

Courses must be taken A-F unless only offered S-N.

### Thesis Credits

Take at least 24 doctoral thesis credits.  
[EPSY 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Psychological Foundations of Education

Graduate study in psychological foundations of education prepares students for research and teaching positions in colleges and universities. Students have also gone on to positions in professional settings such as schools, private industry, human service organizations, health science units, and government agencies. The goal of the track is to apply and generate knowledge of psychological processes and methodological procedures involved in learning and teaching.

The psychological foundations track offers emphases in learning and cognition/educational technology or social psychological and social developmental (including human relations) processes in educational psychology. Students typically choose one of these areas in addition to achieving broad competence in all aspects of the curriculum.

Students take 72 credits distributed as follows: 24 credits EPSY core requirements, 9 credits EPSY electives, 18 credits in the area of emphasis in PsyF (12 PSYF credits can be used to satisfy EPSY core and elective requirements), 9 credits of coursework outside of ed psych, and 24 thesis credits.

### Ed Psych Core Course Requirements

Psychological foundations students must take 3 credits in history/systems, 3 credits in learning/cognition, 3 credits in social/personality, 6 credits in research methods, 6 credits in statistics, 3 credits in measurement/evaluation, and 9 credits EPSY electives. Courses taken to satisfy EPSY core requirements must be taken on an A-F grade basis.

#### History/Systems (3 credits)

PsyF students must take [EPSY 8905](#).

[EPSY 8905](#) - History and Systems of Psychology: Landmark Issues in Educational Psychology (3.0 cr)

#### Learning/Cognition (3 credits)

Students in the learning area of PsyF can satisfy this requirement with required learning emphasis courses from the list below.

Students in the social area of PsyF must take one of the following courses: [EPSY 5101](#), [5113](#), [5114](#), [5116](#), or [5119](#).

[EPSY 5101](#) - Intelligence and Creativity (3.0 cr)

[EPSY 5114](#) - Psychology of Student Learning (3.0 cr)

[EPSY 5116](#) - Education of the Gifted and Talented (3.0 cr)

[EPSY 5119](#) - Mind, Brain, and Education (3.0 cr)

[EPSY 8112](#) - Mathematical Cognition (3.0 cr)

[EPSY 8116](#) - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)

[EPSY 8118](#) - Advanced Cognitive Psychology (3.0 cr)

#### Social/Personality (3 credits)

Students in the social area of PsyF can satisfy this requirement with required social emphasis courses from the list below. Students



in the learning area of PsyF must take one of the following courses: EPSY 5151, 5157, or 8157.

- EPSY 5151 - Cooperative Learning (3.0 cr)
- EPSY 5157 - Social & Developmental Psychology of Education (3.0 cr)
- EPSY 8157 - Key Topics and Issues in Applying Social Psychology to Education (3.0 cr)
- PSY 5135 - Psychology of Individual Differences (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8202 - Close Relationships (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)

**Research Methods (6 credits)**

- EPSY 5216 - Introduction to Research in Educational Psychology and Human Development (3.0 cr)
- EPSY 8216 - Seminar: Research Processes in Psychological Foundations of Education (3.0 cr)

**Statistics (6 credits)**

- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)

**Measurement/Evaluation (3 credits)**

Take 3 credits from the following list:

- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)

**EPSY Electives**

9 credits of EPSY electives can be satisfied by additional courses in the area of emphasis.

**External Courses (9 credits)**

Psych foundations students must take a minimum of 9 credits of coursework outside of educational psychology in consultation with advisor.

**Psychological Foundations Emphases**

Students must take additional courses in their area of emphasis in consultation with advisor. EPSY courses will satisfy 3 credits ed psych learning or social core requirement and 9 credits EPSY electives.

**Learning/Cognition Emphasis**

**Required Learning and Cognition Courses (6 credits)**

Take 6 credits from the following list:

- EPSY 5101 - Intelligence and Creativity (3.0 cr)
- EPSY 5114 - Psychology of Student Learning (3.0 cr)
- EPSY 5116 - Education of the Gifted and Talented (3.0 cr)
- EPSY 5119 - Mind, Brain, and Education (3.0 cr)

**Specialization Courses in Learning and Cognition (12 credits)**

Select at least 12 credits from the following in consultation with advisor. Substitute courses can be applied to this requirement with advisor approval.

- EPSY 8112 - Mathematical Cognition (3.0 cr)
- EPSY 8113 - The Psychology of Scientific Reasoning (3.0 cr)
- EPSY 8114 - Seminar: Cognition and Learning (3.0 cr)
- EPSY 8116 - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)
- EPSY 8117 - Writing Empirical Paper and Research/Grant Proposals in Education and Psychology (3.0 cr)
- EPSY 8118 - Advanced Cognitive Psychology (3.0 cr)
- EPSY 8290 - Special Topics: Seminar in Psychological Foundations (1.0 - 6.0 cr)
- CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)

-OR-

**Social Emphasis**

**Required Social Psychology or Social Development Courses (6 credits)**

Take 6 credits from the following list:

- EPSY 5151 - Cooperative Learning (3.0 cr)
- EPSY 5157 - Social & Developmental Psychology of Education (3.0 cr)
- PSY 5135 - Psychology of Individual Differences (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)

**Specialization Courses in Social Psychology or Social Development (12 credits)**





Select at least 12 credits from the following in consultation with advisor. Substitute courses can be applied to this requirement with advisor approval.

[EPSY 8117](#) - Writing Empirical Paper and Research/Grant Proposals in Education and Psychology (3.0 cr)

[EPSY 8157](#) - Key Topics and Issues in Applying Social Psychology to Education (3.0 cr)

[EPSY 8290](#) - Special Topics: Seminar in Psychological Foundations (1.0 - 6.0 cr)

[PSY 8201](#) - Social Cognition (3.0 cr)

[PSY 8202](#) - Close Relationships (3.0 cr)

[PSY 8208](#) - Social Psychology: The Self (3.0 cr)

[CPSY 8302](#) - Developmental Psychology: Social and Emotional Processes (4.0 cr)

### Quantitative Methods in Education

In QME students explore methodologies of measurement/evaluation, and statistics/statistics education to improve our understanding and use of these methods as well as explore new approaches to address educational phenomena. Students specializing in measurement study psychometric theories and methods of developing, selecting, and using measures of knowledge, skills, abilities, and non-cognitive variables. This includes item writing, test design, equating, scaling, and standard setting, techniques supporting decision making and accountability. Students specializing in evaluation study theories and models of evaluation that include quantitative and qualitative techniques for evaluating the effectiveness of educational and human services programs. Students specializing in statistics study a wide range of statistical methods, as well as their underlying statistical theories, and develop an understanding of the relationship between research design and statistical analysis, acquiring skills in using a variety of statistical techniques appropriate for specific problems in education. Students specializing in statistics education investigate issues related to teaching and learning statistics and gain experience in statistics instruction. QME students develop knowledge and skills that prepare them for a variety of positions, including test companies, colleges and universities, research and evaluation centers, public school systems, government agencies, and industry.

Students take 72 credits distributed as follows: 27 credits EPSY core requirements, 9 credits EPSY electives, 18 credits QME core requirements, 12 additional credits in the area of emphasis in QME (18 QME credits can be used to satisfy EPSY core and elective requirements), and 24 thesis credits.

### Ed Psych Core Course Requirements

Students must take 9 credits in at least two of these areas: learning/cognition, social/personality or history/systems; and 9 credits in research methods. (QME core courses will satisfy EPSY core requirements for 6 credits in statistics and 3 credits in measurement/evaluation; 9 credits in EPSY electives can be satisfied by additional courses in the area of emphasis.) Courses taken to satisfy EPSY core requirements must be taken on an A-F grade basis.

#### Learning/Cognition, Social/Personality, History/Systems (9 credits)

Take 9 or more credit(s) including 2 or more sub-requirements(s) from the following:

##### learning/cognition

Take 0 or more course(s) from the following:

- [EPSY 5101](#) - Intelligence and Creativity (3.0 cr)
- [EPSY 5114](#) - Psychology of Student Learning (3.0 cr)
- [EPSY 5119](#) - Mind, Brain, and Education (3.0 cr)
- [EPSY 5116](#) - Education of the Gifted and Talented (3.0 cr)
- [EPSY 8112](#) - Mathematical Cognition (3.0 cr)
- [EPSY 8116](#) - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)
- [EPSY 8118](#) - Advanced Cognitive Psychology (3.0 cr)
- [EPSY 8707](#) - Principles of Behavior Analysis and Learning (3.0 cr)
- [CPSY 8301](#) - Developmental Psychology: Cognitive Processes (4.0 cr)
- [PSY 5014](#) - Psychology of Human Learning and Memory (3.0 cr)
- [PSY 5015](#) - Cognition, Computation, and Brain (3.0 cr)
- [PSY 5054](#) - Psychology of Language (3.0 cr)
- [PSY 8042](#) - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

##### social/personality

Take 0 or more course(s) from the following:

- [EPSY 5135](#) - Human Relations Workshop (4.0 cr)
- [EPSY 5151](#) - Cooperative Learning (3.0 cr)
- [EPSY 5157](#) - Social & Developmental Psychology of Education (3.0 cr)
- [EPSY 8132](#) - Personality Development and Socialization (3.0 cr)
- [EPSY 8157](#) - Key Topics and Issues in Applying Social Psychology to Education (3.0 cr)
- [EPSY 8819](#) - Emotion & Childhood Psychopathology (3.0 cr)
- [CPSY 8302](#) - Developmental Psychology: Social and Emotional Processes (4.0 cr)
- [CPSY 8606](#) - Advanced Developmental Psychopathology (3.0 cr)
- [PSY 5101](#) - Personality: Current Theory and Research (3.0 cr)
- [PSY 5135](#) - Psychology of Individual Differences (3.0 cr)
- [PSY 5202](#) - Attitudes and Social Behavior (3.0 cr)



- PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8202 - Close Relationships (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)
- history/systems**  
Take 0 or more course(s) from the following:
  - EPSY 8905 - History and Systems of Psychology: Landmark Issues in Educational Psychology (3.0 cr)

#### **Research Methods (9 credits)**

QME students must take these 3 research methods courses.

- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)

#### **Statistics**

6 credits of statistics will be satisfied by QME core course requirements.

- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)

#### **Measurement/Evaluation**

3 credits of measurement or evaluation will be satisfied by QME core course requirements.

- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- or EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)

#### **EPSY Electives**

9 credits of EPSY electives can be satisfied by additional QME core courses and courses in the area of emphasis.

#### **QME Core Course Requirements (18 credits)**

Students must take these courses, including an 8xxx level measurement course selected in consultation with advisor (minimum 18 credits total). Courses taken to satisfy QME core requirements must be taken on an A-F grade basis.

- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8xxx measurement course (minimum 3 credits)

#### **QME Emphases**

Students must take a minimum of 12 credits in their area of emphasis in consultation with advisor. EPSY courses will satisfy 9 credits ed psych elective core requirement.

#### **Measurement & Evaluation Emphasis (12 credits)**

Courses can be from the following list or selected in consultation with the advisor.

- EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- EPSY 8283 - Research Synthesis and Meta-Analysis (3.0 cr)
- OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5521 - Cost and Economic Analysis in Educational Evaluation (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)

-OR-

#### **Statistics & Statistics Education Emphasis (12 credits)**

Courses can be from the following list or selected in consultation with the advisor.

- EPSY 5271 - Becoming a Teacher of Statistics (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)



- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8271 - Statistics Education Research Seminar: Studies on Teaching and Learning Statistics (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- EPSY 8283 - Research Synthesis and Meta-Analysis (3.0 cr)

### School Psychology

The school psychology PhD program is fully accredited by the American Psychological Association, and the Minnesota Board of Teaching, and approved by the National Association of School Psychologists. Through coursework and practica/internships, students develop competencies in research, assessment, consultation, prevention and intervention, supervision, and higher education instruction. Graduates are employed as faculty and researchers in universities, and as psychologists in K12 schools, clinics, hospitals, community mental health centers. Graduates are eligible for the state school psychologist credential, national certification in school psychology, and most states license to practice professional psychology. Students graduate preparation focuses on the knowledge and skills necessary to develop, implement, and disseminate high quality research and to engage in provision of research-based school psychological practices within multi-tier systems of support to improve academic, social, behavioral, and emotional competence of children and youth. Students develop specific competencies through a broad range of didactic courses, research activities, teaching and supervisory experience, and field placements, including practica and a full-year internship.

Students take 97 credits distributed as follows: 24 credits EPSY core requirements, 9 credits EPSY electives, 49 credits School Psychology required courses (9 credits can be used to satisfy EPSY elective requirement), and 24 thesis credits.

### Ed Psych Core Course Requirements

Students must take 9 credits in at least two of these areas: learning/cognition, social/personality or history/systems; 6 credits in research methods; 6 credits in statistics; 3 credits in measurement/evaluation and 9 credits EPSY electives. Courses taken to satisfy EPSY core requirements must be taken on an A-F grade basis.

#### Learning/Cognition, Social/Personality, History/Systems (9 credits)

Take 9 or more credit(s) including 2 or more sub-requirements(s) from the following:

##### learning/cognition

Take 0 or more course(s) from the following:

- EPSY 5101 - Intelligence and Creativity (3.0 cr)
- EPSY 5114 - Psychology of Student Learning (3.0 cr)
- EPSY 5116 - Education of the Gifted and Talented (3.0 cr)
- EPSY 5119 - Mind, Brain, and Education (3.0 cr)
- EPSY 8112 - Mathematical Cognition (3.0 cr)
- EPSY 8116 - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)
- EPSY 8118 - Advanced Cognitive Psychology (3.0 cr)
- EPSY 8707 - Principles of Behavior Analysis and Learning (3.0 cr)
- CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)
- PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)
- PSY 5015 - Cognition, Computation, and Brain (3.0 cr)
- PSY 5054 - Psychology of Language (3.0 cr)
- PSY 8042 - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

##### social/personality

School Psychology students must take EPSY 8819

Take 1 or more course(s) from the following:

- EPSY 5135 - Human Relations Workshop (4.0 cr)
- EPSY 5151 - Cooperative Learning (3.0 cr)
- EPSY 5157 - Social & Developmental Psychology of Education (3.0 cr)
- EPSY 8132 - Personality Development and Socialization (3.0 cr)
- EPSY 8157 - Key Topics and Issues in Applying Social Psychology to Education (3.0 cr)
- EPSY 8819 - Emotion & Childhood Psychopathology (3.0 cr)
- CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)
- CPSY 8606 - Advanced Developmental Psychopathology (3.0 cr)
- PSY 5101 - Personality: Current Theory and Research (3.0 cr)
- PSY 5135 - Psychology of Individual Differences (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8202 - Close Relationships (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)

##### history/systems

Take 0 or more course(s) from the following:

- EPSY 8905 - History and Systems of Psychology: Landmark Issues in Educational Psychology (3.0 cr)



### Statistics (6 credits)

- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)

### Measurement/Evaluation (3 credits)

- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)

### Research Methods (6 credits)

6 credits required

- EPSY 8822 - Research in School Psychology (3.0 cr)

Take 3 or more credit(s) from the following:

- EPSY 5216 - Introduction to Research in Educational Psychology and Human Development (3.0 cr)
- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)

### EPSY Electives

9 credits of EPSY electives can be satisfied by school psychology course requirements.

### School Psychology Course Requirements (27 credits)

Take the following courses. EPSY courses will satisfy 9 credits ed psych elective core requirement.

- EPSY 5802 - History & Scientific Bases of Psychology (3.0 cr)
- EPSY 5851 - Engaging Diverse Students and Families (3.0 cr)
- EPSY 8811 - Assessment in School Psychology I: Foundations of Academic Assessment (3.0 cr)
- EPSY 8812 - Assessment in School Psychology II: Intellectual and Social-Emotional Domains (3.0 cr)
- EPSY 8815 - Behavioral and Social Emotional Prevention and Intervention (3.0 cr)
- EPSY 8816 - Academic Prevention and Intervention (3.0 cr)
- EPSY 8817 - Problem Analysis and Consultation in School Psychology (3.0 cr)
- EPSY 8821 - Issues in School Psychology (3.0 cr)
- EPSY 8823 - Ethics and Professional Standards in School Psychology (3.0 cr)

### Introductory Practicum (4 credits)

Students must take EPSY 8813 twice.

- EPSY 8813 - Introductory Practicum in School Psychology (2.0 cr)

### Intermediate Practicum (4 credits)

Students must take EPSY 8818 twice.

- EPSY 8818 - Intermediate Practicum in School Psychology (2.0 cr)

### Comprehensive/Advanced Practica (6 credits)

- EPSY 8831 - Comprehensive School Practicum in School Psychology (3.0 cr)
- EPSY 8832 - Advanced Practicum in School Psychology (3.0 cr)

### Practicum: Instruction and Supervision in School Psychology (6 credits)

Students must take EPSY 8841 twice.

- EPSY 8841 - Practicum: Instruction and Supervision in School Psychology (3.0 cr)

### Internship (2 credits)

There are two options for internship registration:

\* Students completing an internship after defending their dissertation must register for EPSY 8843 both fall & spring semesters of the internship year (2 credits total).

\* Students completing an internship before dissertation defense must register for EPSY 8842 both fall & spring semesters of the internship year (1 credit each term).

- EPSY 8843 - Internship - School Psychology (1.0 cr)

or EPSY 8842 - Internship: School Psychological Services (1.0 - 10.0 cr)

### Special Education

The special education program aims to improve outcomes for individuals who require specialized support to experience success across the lifespan. We are committed to engaging in meaningful research and to bridging research and practice to improve the lives of children and families in diverse contexts, and to have a lasting impact on teacher education, leadership, and policy. Early involvement in research projects and the development of original research addressing the needs of individuals requiring specialized support is encouraged and may include focused attention to intervention science, implementation science, social and cognitive development, behavioral and psychological management, language and communication skills, and/or the design and use of technology to promote impact. A complementary emphasis is placed on problems unique to or extremely influential in the field, including social and cultural perceptions about disabilities as well as federal, state, and local legislation regarding prevention, care and education of persons with disabilities. Special projects and training programs supplement academic studies.

The special education track focuses on the attainment of core competencies and related skills, such as systematic problem solving, empirical design, data analytics, and measurement.

Students take 66 credits distributed as follows: 24 credits EPSY core requirements, 9 credits EPSY electives, 18 credits special ed course requirements (9 credits can be used to satisfy EPSY elective requirement), and 24 thesis credits.

### Ed Psych Core Course Requirements

Students must take 9 credits in at least two of these areas: learning/cognition, social/personality or history/systems; 6 credits in research methods; 6 credits in statistics; 3 credits in measurement/evaluation and 9 credits EPSY electives. Courses taken to satisfy



EPSY core requirements must be taken on an A-F grade basis.

**Learning/Cognition, Social/Personality, History/Systems (9 credits)**

Take 9 or more credit(s) including 2 or more sub-requirements(s) from the following:

**learning/cognition**

Take 0 or more course(s) from the following:

- EPSY 5101 - Intelligence and Creativity (3.0 cr)
- EPSY 5114 - Psychology of Student Learning (3.0 cr)
- EPSY 5116 - Education of the Gifted and Talented (3.0 cr)
- EPSY 5119 - Mind, Brain, and Education (3.0 cr)
- EPSY 8112 - Mathematical Cognition (3.0 cr)
- EPSY 8116 - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)
- EPSY 8118 - Advanced Cognitive Psychology (3.0 cr)
- EPSY 8707 - Principles of Behavior Analysis and Learning (3.0 cr)
- CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)
- PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)
- PSY 5015 - Cognition, Computation, and Brain (3.0 cr)
- PSY 5054 - Psychology of Language (3.0 cr)
- PSY 8042 - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

**social/personality**

Take 0 or more course(s) from the following:

- EPSY 5135 - Human Relations Workshop (4.0 cr)
- EPSY 5151 - Cooperative Learning (3.0 cr)
- EPSY 5157 - Social & Developmental Psychology of Education (3.0 cr)
- EPSY 8132 - Personality Development and Socialization (3.0 cr)
- EPSY 8157 - Key Topics and Issues in Applying Social Psychology to Education (3.0 cr)
- EPSY 8819 - Emotion & Childhood Psychopathology (3.0 cr)
- CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)
- CPSY 8606 - Advanced Developmental Psychopathology (3.0 cr)
- PSY 5101 - Personality: Current Theory and Research (3.0 cr)
- PSY 5135 - Psychology of Individual Differences (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8202 - Close Relationships (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)

**history/systems**

Take 0 or more course(s) from the following:

- EPSY 8905 - History and Systems of Psychology: Landmark Issues in Educational Psychology (3.0 cr)

**Research Methods (6 credits)**

EPSY 8694 - Research in Special Education (3.0 cr)

EPSY 8706 - Single Case Designs in Intervention Research (3.0 cr)

**Statistics (6 credits)**

EPSY 8251 - Statistical Methods in Education I (3.0 cr)

EPSY 8252 - Statistical Methods in Education II (3.0 cr)

**Measurement/Evaluation (3 credits)**

Take 3 credits from the following.

EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)

EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)

EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)

EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)

EPSY 5614W - Assessment and Due Process in Special Education [WI] (3.0 cr)

EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)

EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)

EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)

EPSY 8265 - Factor Analysis (3.0 cr)

PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)

PSY 5865 - Advanced Psychological and Educational Measurement (4.0 cr)

**EPSY Electives**

9 credits of EPSY electives can be satisfied by special ed course requirements.

**Special Ed Course Requirements**

Students take 9 required special education credits and 9 elective credits in consultation with the advisor. EPSY courses will satisfy 9 credits ed psych elective core requirement.



**Doctoral Core Seminars (6 credits)**

- EPSY 8701 - Doctoral Core Seminar: Special Education I (3.0 cr)
- EPSY 8702 - Doctoral Core Seminar: Special Education II (3.0 cr)

**Grant Writing Course (3 credits)**

- EDHD 8300 - Special Topics in Education and Human Development: Grant Writing - Behav, Social, and Educ Sciences (3 cr.)

**Electives (9 credits)**

In consultation with their advisor, students take 9 credits of electives to develop focused expertise. Possible courses include, but are in no way limited to the following. Courses taken to satisfy Ed Psych Core Course Requirements cannot be used to satisfy special ed elective requirement credits.

**Recommended Special Topics/Advanced Issues**

- EPSY 8602 - Advanced Topics in Special Education Research (3.0 cr)
- EPSY 8612 - Seminar: Students with Academic Difficulties (3.0 cr)
- EPSY 8994 - Research Problems: Educational Psychology (1.0 - 6.0 cr)
- EPSY 8707 - Principles of Behavior Analysis and Learning (3.0 cr)
- EPSY 8708 - Functional Behavior Assessment (3.0 cr)

**Learning/Cognition**

- EPSY 8112 - Mathematical Cognition (3.0 cr)
- EPSY 8116 - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)
- EPSY 8118 - Advanced Cognitive Psychology (3.0 cr)
- CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)

**Measurement/Statistics/Evaluation**

- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- EPSY 8283 - Research Synthesis and Meta-Analysis (3.0 cr)



### **Twin Cities Campus**

## **Educational Psychology Specialist Certificate in Education and School Psychological Services**

*Educational Psychology*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Educational Psychology, University of Minnesota, 250 Educational Science Building, 56 East River Road, Minneapolis, MN 55455; 612-624-6083

Email: [spcy-adm@umn.edu](mailto:spcy-adm@umn.edu)

Website: <http://www.cehd.umn.edu/edpsych/Programs/SchoolPsych/default.html>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Certificate of Specialist in Educ/Sch Psych Svc

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students graduate preparation focuses on the knowledge and skills necessary to engage in provision of research-based school psychological practices within multi-tier systems of support to improve academic, social, behavioral, and emotional competence of children and youth, as well as to develop, implement, and use applied research in school settings. Students develop specific competencies through a broad range of didactic courses, research activities, and field placements, including practica and a full-year internship. The specialist certificate is designed for students who want to become practitioners. The school psychology specialist certificate is approved by the Minnesota Board of Teaching and the National Association of School Psychologists. Graduates are eligible for the Minnesota school psychologist credential, and the national certification in school psychology, as well as the school psychology credential in most states.

### **Accreditation**

This program is accredited by National Association of School Psychologists (NASP).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

### **Special Application Requirements:**

Applicants must apply online submitting a department application, three letters of recommendation, and a statement of goals and interests. Applicants must also submit a one page critical issue essay, answering the following questions: What is the role of a school psychologist? What are the most critical educational issues school psychologists can help address? How would you like to contribute to addressing these issues in your future career?

Applications should be accompanied by official transcripts from all colleges and universities attended. The GRE General Test is required (no subject tests are required); an interview is also required for those who make the initial cut.

Applications are accepted for fall admission only (deadline November 15).

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL  
- Internet Based - Total Score: 79



- Internet Based - Writing Score: 21
- Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

Students take 60 credits distributed as follows: 15 credits EPSY core courses, 6 credits EPSY electives, and 45 credits school psychology course requirements (6 credits can satisfy EPSY elective requirement). There is a written final exam.

### Ed Psych Core Course Requirements

Students must take 3 credits in statistics, 3 credits in measurement/evaluation, 3 credits learning/cognition, 3 credits social/personality, 3 credits in research methods and 6 credits EPSY electives. Courses taken to satisfy EPSY core requirements must be taken on an A-F grade basis.

#### Statistics (3 credits)

Select one of the following courses.

[EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)

[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

#### Measurement/Evaluation (3 credits)

[EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)

#### Learning/Cognition (3 credits)

Select one of the following courses. School Psychology students in the Specialist Certificate program may submit a petition for EPSY 5659.

[EPSY 5101](#) - Intelligence and Creativity (3.0 cr)

[EPSY 5114](#) - Psychology of Student Learning (3.0 cr)

[EPSY 5119](#) - Mind, Brain, and Education (3.0 cr)

[EPSY 5116](#) - Education of the Gifted and Talented (3.0 cr)

[EPSY 8112](#) - Mathematical Cognition (3.0 cr)

[EPSY 8116](#) - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)

[EPSY 8118](#) - Advanced Cognitive Psychology (3.0 cr)

[EPSY 8707](#) - Principles of Behavior Analysis and Learning (3.0 cr)

[CPSY 8301](#) - Developmental Psychology: Cognitive Processes (4.0 cr)

[PSY 5014](#) - Psychology of Human Learning and Memory (3.0 cr)

[PSY 5015](#) - Cognition, Computation, and Brain (3.0 cr)

[PSY 5054](#) - Psychology of Language (3.0 cr)

[PSY 8042](#) - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

#### Social/Personality (3 credits)

[EPSY 8819](#) - Emotion & Childhood Psychopathology (3.0 cr)

#### Research Methods (3 credits)

Select one of the following courses.

[EPSY 5216](#) - Introduction to Research in Educational Psychology and Human Development (3.0 cr)

[EPSY 8215](#) - Advanced Research Methodologies in Education (3.0 cr)

#### EPSY Electives

6 credits of EPSY electives can be satisfied by school psychology course requirements.

### School Psychology Course Requirements

Students must take 36 credits required courses, 3 credits research problems and 6 credits electives.

#### Introductory Practicum (4 credits)

Students must take EPSY 8813 twice.

[EPSY 8813](#) - Introductory Practicum in School Psychology (2.0 cr)

#### Intermediate Practicum (4 credits)

Students must take EPSY 8818 twice.

[EPSY 8818](#) - Intermediate Practicum in School Psychology (2.0 cr)





**Internship (4 credits)**

Students must take EPSY 8842 twice for 4 credits total. Note: if additional electives are taken students may enroll in one credit per semester of internship, as long as the total number of credits accrued while in the program is at least 60.

[EPSY 8842](#) - Internship: School Psychological Services (1.0 - 10.0 cr)

**Additional Required Courses (24 credits)**

EPSY courses will satisfy 6 credits educational psychology elective core requirement.

[EPSY 5851](#) - Engaging Diverse Students and Families (3.0 cr)

[EPSY 8811](#) - Assessment in School Psychology I: Foundations of Academic Assessment (3.0 cr)

[EPSY 8812](#) - Assessment in School Psychology II: Intellectual and Social-Emotional Domains (3.0 cr)

[EPSY 8815](#) - Behavioral and Social Emotional Prevention and Intervention (3.0 cr)

[EPSY 8816](#) - Academic Prevention and Intervention (3.0 cr)

[EPSY 8817](#) - Problem Analysis and Consultation in School Psychology (3.0 cr)

[EPSY 8821](#) - Issues in School Psychology (3.0 cr)

[EPSY 8823](#) - Ethics and Professional Standards in School Psychology (3.0 cr)

**Research Problems (3 credits)**

[EPSY 8822](#) - Research in School Psychology (3.0 cr)

**Electives (6 credits)**

Students must take at least 6 credits electives selected in consultation with advisor.



### **Twin Cities Campus**

## **Educational Psychology Specialist Certificate in Education and Special Education**

*Educational Psychology*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Educational Psychology, University of Minnesota, 250 Educational Science Building, 56 East River Road, Minneapolis, MN 55455 (612-624-6083; fax 612-624-8241).

Email: [epsy-adm@umn.edu](mailto:epsy-adm@umn.edu)

Website: <http://www.cehd.umn.edu/edpsych>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Certificate of Specialist in Educ/Spec Educ

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The special education track aims to improve outcomes for individuals who require specialized support to experience success across the lifespan. We are committed to engaging in meaningful research and to bridging research and practice to improve the lives of children and families in diverse contexts, and to have a lasting impact on teacher education, leadership, and policy. Early involvement in research projects and the development of original research addressing the needs of individuals requiring specialized support is encouraged and may include focused attention to intervention science, implementation science, social and cognitive development, behavioral and psychological management, language and communication skills, and/or the design and use of technology to promote impact.

The special education track focuses on the attainment of core competencies required for special education professionals as well as interdisciplinary skills and goals needed to address diverse challenges in diverse contexts. A complementary emphasis is placed on systematic understanding and problem solving in relation to social and cultural perceptions, care, education, intervention, and support of persons with disabilities.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

### **Special Application Requirements:**

Applicants must apply online submitting a department application, three letters of recommendation, and a statement of goals and interests. Applications are accepted for fall admission only (deadline December 1).

Applications should be accompanied by official transcripts from all colleges and universities attended. The GRE General Test is required (no subject tests are required).

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80



Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

Students take 60 credits distributed as follows: 15 credits EPSY core courses, 6 credits EPSY electives and 45 credits of coursework in special education (6 credits can satisfy EPSY elective requirement).

### Ed Psych Core Course Requirements

Students must take 3 credits in statistics, 3 credits in measurement/evaluation, 3 credits learning/cognition, 3 credits social/personality, 3 credits in research methods and 6 credits EPSY electives. Courses taken to satisfy EPSY core requirements must be taken on an A-F grade basis.

#### Statistics (3 credits)

[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

#### Measurement/Evaluation (3 credits)

Select one of the following courses from measurement or evaluation.

##### measurement

[EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)

[EPSY 5614W](#) - Assessment and Due Process in Special Education [WI] (3.0 cr)

[EPSY 8222](#) - Advanced Measurement: Theory and Application (4.0 cr)

[EPSY 8225](#) - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)

[EPSY 8226](#) - Item Response Models: Theory and Applications (3.0 cr)

[EPSY 8265](#) - Factor Analysis (3.0 cr)

[PSY 5862](#) - Psychological Measurement: Theory and Methods (3.0 cr)

[PSY 5865](#) - Advanced Psychological and Educational Measurement (4.0 cr)

##### or evaluation

[EPSY 5243](#) - Principles and Methods of Evaluation (3.0 cr)

[EPSY 5244](#) - Survey Design, Sampling, and Implementation (3.0 cr)

[EPSY 5247](#) - Qualitative Methods in Educational Psychology (3.0 cr)

[OLPD 5501](#) - Principles and Methods of Evaluation (3.0 cr)

#### Learning/Cognition (3 credits)

Select one of the following courses.

[CPSY 8301](#) - Developmental Psychology: Cognitive Processes (4.0 cr)

[EPSY 5101](#) - Intelligence and Creativity (3.0 cr)

[EPSY 5114](#) - Psychology of Student Learning (3.0 cr)

[EPSY 5116](#) - Education of the Gifted and Talented (3.0 cr)

[EPSY 5119](#) - Mind, Brain, and Education (3.0 cr)

[EPSY 8112](#) - Mathematical Cognition (3.0 cr)

[EPSY 8116](#) - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)

[EPSY 8118](#) - Advanced Cognitive Psychology (3.0 cr)

[EPSY 8707](#) - Principles of Behavior Analysis and Learning (3.0 cr)

[PSY 5014](#) - Psychology of Human Learning and Memory (3.0 cr)

[PSY 5015](#) - Cognition, Computation, and Brain (3.0 cr)

[PSY 5054](#) - Psychology of Language (3.0 cr)

[PSY 8042](#) - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

#### Social/Personality (3 credits)

Select one of the following courses.

[CPSY 8302](#) - Developmental Psychology: Social and Emotional Processes (4.0 cr)

[CPSY 8606](#) - Advanced Developmental Psychopathology (3.0 cr)

[EPSY 5135](#) - Human Relations Workshop (4.0 cr)

[EPSY 5151](#) - Cooperative Learning (3.0 cr)

[EPSY 5157](#) - Social & Developmental Psychology of Education (3.0 cr)

[EPSY 8132](#) - Personality Development and Socialization (3.0 cr)

[EPSY 8819](#) - Emotion & Childhood Psychopathology (3.0 cr)

[PSY 5101](#) - Personality: Current Theory and Research (3.0 cr)

[PSY 5135](#) - Psychology of Individual Differences (3.0 cr)

[PSY 5202](#) - Attitudes and Social Behavior (3.0 cr)

[PSY 5204](#) - Psychology of Interpersonal Relationships (3.0 cr)



- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8202 - Close Relationships (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)

**Research Methods (3 credits)**

- EPSY 8215 - Advanced Research Methodologies in Education (3.0 cr)

**EPSY Electives**

6 credits of EPSY electives can be satisfied by special education course requirements.

**Special Education Course Requirements**

EPSY courses will satisfy 6 credits Ed Psych elective core requirement.

**Special Topic/Issues Courses (9 credits)**

- EDHD 8300 - Special Topics in Education and Human Development: Grant Writing - Behav, Social, and Educ Sciences (3 cr.)
- EPSY 8600 Special Topic course or other EPSY 8xxx level course chosen in consultation with advisor (3 cr.)
- EPSY 8600 Special Topic course or other EPSY 8xxx level course chosen in consultation with advisor (3 cr.)

**Doctoral Core Seminars (6 credits)**

- EPSY 8701 - Doctoral Core Seminar: Special Education I (3.0 cr)
- EPSY 8702 - Doctoral Core Seminar: Special Education II (3.0 cr)

**Special Ed Research Related Courses (6 credits)**

- EPSY 8694 - Research in Special Education (3.0 cr)
- EPSY 8706 - Single Case Designs in Intervention Research (3.0 cr)

**Specialist Project (9 credits)**

Select at least 9 credits from the following in consultation with advisor.

- EPSY 8993 - Directed Study: Educational Psychology (1.0 - 10.0 cr)
- EPSY 8994 - Research Problems: Educational Psychology (1.0 - 6.0 cr)

**Electives (15 credits)**

In consultation with their advisor, students take 15 credits of electives to develop focused expertise. Possible courses include, but are in no way limited to the following. Courses taken to satisfy Ed Psych Core Course Requirements cannot be used to satisfy special ed elective requirement credits.

**Recommended Advanced Issues Courses**

- EPSY 8602 - Advanced Topics in Special Education Research (3.0 cr)
- EPSY 8707 - Principles of Behavior Analysis and Learning (3.0 cr)
- EPSY 8708 - Functional Behavior Assessment (3.0 cr)

**Learning/Cognition**

- CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)
- EPSY 8112 - Mathematical Cognition (3.0 cr)
- EPSY 8116 - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)
- EPSY 8118 - Advanced Cognitive Psychology (3.0 cr)

**Social/Personality**

- CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)
- CPSY 8606 - Advanced Developmental Psychopathology (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8202 - Close Relationships (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)

**Measurement/Evaluation/Statistics**

- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- EPSY 8283 - Research Synthesis and Meta-Analysis (3.0 cr)

**Other**

- EPSY 5851 - Engaging Diverse Students and Families (3.0 cr)
- OLPD 5344 - School Law (3.0 cr)



**Twin Cities Campus**

## Family Education M.Ed.

Family Social Science

### College of Education and Human Development

Link to a [list of faculty](#) for this program.

**Contact Information:**

Department of Family Social Science, 290 McNeal Hall, 1985 Buford Ave, St. Paul, MN 55108 (612-625-2705; fax: 612-625-4227)

Email: [famed@umn.edu](mailto:famed@umn.edu)

Website: <http://www.cehd.umn.edu/fsos/programs/index.html>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Family Education MEd develops and strengthens professionals' competencies to work with individuals and families to enhance family life. This practitioner-based program, offered by the Department of Family Social Science (FSoS), prepares licensed teachers to further develop their knowledge and skills in the family education field, or non-licensed professionals to work with adults, youth, or children in a variety of settings. Students are prepared to be parent educators for positions in an early childhood family education (ECFE) program in Minnesota, as well as for family education positions in a variety of settings including health care, social service agencies, and religious settings in Minnesota and in other states and countries. Diversity and cultural responsiveness are integrated throughout coursework, student teaching, and observation experiences.

## Program Delivery

This program is available:

- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

## Prerequisites for Admission

A bachelor's degree from an accredited institution in family studies, child psychology, early childhood education, nutrition, or related fields. A 2.80 overall GPA in undergraduate work.

**Special Application Requirements:**

Application deadlines are March 1 and October 1. Apply Online at <https://choose.umn.edu/apply/>

For program specific application details see <http://www.cehd.umn.edu/fsos/programs/masters/family-ed/how-to-apply.html>

International Students: Please note, this program is not offered full-time and therefore is not intended for international students needing a visa to study in the US.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Required Coursework (15 credits)

Take the following courses:

[FSOS 5937](#) - Parent-Child Interaction (3.0 cr)

[FSOS 5942](#) - Diverse Family Experiences (3.0 cr)

[FSOS 5944](#) - Curricular Design in Parent Education (3.0 cr)

[FSOS 5945](#) - Teaching and Learning in Parent Education (3.0 cr)

[FSOS 5946](#) - Assessment and Evaluation in Parent Education (3.0 cr)

### Supporting Focus (15 credits)

Fifteen credits selected from existing UMN courses in consultation with students academic adviser to create a supporting focus which will support development of career goals. Examples may include courses in family social science, child development, education, public health, addiction studies, policy development, program evaluation, prevention science, etc.

#### Classroom Experience

Professionals seeking additional classroom experience are recommended to take the following course:

[FSOS 5949](#) - Student Teaching in Parent Education (3.0 cr)

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Parent Education Teaching License

Additional requirements and credits may be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services.



### ***Twin Cities Campus***

## **Family Social Science M.A.**

*Family Social Science*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Family Social Science, 290 McNeal Hall, 1985 Buford Avenue, Saint Paul, MN 55108 (612-625-3116; fax: 612-625-4227)

Email: [fsosgrad@umn.edu](mailto:fsosgrad@umn.edu)

Website: <http://www.cehd.umn.edu/fsos/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 32
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Family Social Science offers a unique program of study using the insights and methods of the social sciences to examine how families work within various contexts and cultures.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Three overall criteria guide admissions decisions: 1) evidence of strong academic preparation and the ability and desire to perform graduate level scholarship, including research; 2) fit of the applicant's professional goals with family social science (FSoS) faculty scholarship and with the overall FSoS mission, that is, enhancing the well-being of diverse families in a changing world; and 3) unique contributions applicant would make to FSoS values, including social relevance, collaboration, inclusiveness, excellence, innovation, and diversity. The Prevention Science sub-plan is not accepting applications at this time.

#### **Special Application Requirements:**

For more information about application requirements and procedures, consult the Family Social Science web page at <http://www.cehd.umn.edu/fsos/>.

The Prevention Science sub-plan is not accepting applications at this time.

Applicants for the master's program are reviewed only once per year. The application deadline is March 1 for admission for the following fall semester.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 to 19 major credits, 3 to 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 19 to 23 major credits and 3 to 7 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** Students must demonstrate familiarity with the tools of research or scholarship in the field of family social science or prevention science, the ability to work independently, and the ability to present the results of their investigation effectively, by completing at least one Plan B project.

The project should involve a combined total of approximately 120 hours (the equivalent of three full-time weeks) of work. The graduate faculty specifies both the nature and extent of the options available to satisfy this requirement, and whether the requirement is to be satisfied in conjunction with, or independent of, the courses in the student's program.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.50 is required for students to remain in good standing.

The MA program is offered under Plan A and Plan B. The Plan A master's is recommended for students who intend to pursue a PhD degree. The Plan B master's is for students who wish to further their education so that they may hold positions of responsibility serving families. Although the instruction is based on research, the Plan B degree is not intended to provide intensive research training. The Plan B program is understood to be a terminal degree and is not recommended for students who intend to pursue the PhD degree. Consult the department for the most current information.

### Plan A

Plan A requires at least 30 credits, including at least 20 course credits, of which 6 credits are outside the department in a related field, and 10 thesis credits.

[FSOS 5014](#) - Quantitative Family Research Methods I (3.0 cr)

[FSOS 5015](#) - Family Research Laboratory (1.0 cr)

[FSOS 8001](#) - Conceptual Frameworks in the Family (3.0 cr)

[FSOS 8013](#) - Qualitative Family Research Methods (3.0 cr)

[FSOS 8200](#) - Orientation for Family Social Science (1.0 cr)

#### FSOS Elective

One FSOS course (3.0 cr)

or One PREV course (3.0 cr)

#### Statistical Methods

[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

[EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)

#### Thesis Credits

Take 10 or more credit(s) from the following:

• [FSOS 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

### Plan B

Plan B requires at least 30 credits, including at least 26 course credits, of which 3 credits are outside the department in a related field, and at least 4 credits for a Plan B project.

[FSOS 8001](#) - Conceptual Frameworks in the Family (3.0 cr)

[FSOS 8200](#) - Orientation for Family Social Science (1.0 cr)

One of the following research methods course(s).

[FSOS 5014](#) - Quantitative Family Research Methods I (3.0 cr)

[FSOS 5015](#) - Family Research Laboratory (1.0 cr)

or [FSOS 8013](#) - Qualitative Family Research Methods (3.0 cr)

or Evaluation research methods course (3.0 cr)

#### Electives

FSOS/PREV courses (12-13 cr)

FSOS Elective

or PREV Elective

#### Statistical Methods





EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
EPSY 8252 - Statistical Methods in Education II (3.0 cr)  
or EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)  
or One course outside FSOS (3.0 cr)

#### Family Science Plan B Project

Take exactly 1 course(s) totaling exactly 4 credit(s) from the following:

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Prevention Science

This sub-plan is limited to students completing the program under Plan A or Plan B.

Understanding & Using What Works:

How can communities support families that have experienced trauma? What are the root causes of addictive behavior? And what strategies work best to promote the wellbeing of children and families?

Prevention Science equips students, scholars, and professionals across a range of fields to answer these questions and confront many of the daunting challenges facing today's families and communities. The Master's in Prevention Science is grounded in the belief that our greatest hope for improving the lives of children and families is comprehensive, multi-disciplinary training and education that bridges research and practice.

The Prevention Science Plan A requires at least 32 credits, including at least 22 course credits of which 3 credits are outside the department in a related field, and 10 thesis credits.

The Prevention Science sub-plan is not accepting applications at this time.

#### Plan A

FSOS 5014 - Quantitative Family Research Methods I (3.0 cr)  
FSOS 5015 - Family Research Laboratory (1.0 cr)  
FSOS 8001 - Conceptual Frameworks in the Family (3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
FSOS 5701 - Prevention Science: Principles and Practices (3.0 cr)  
or PREV 8001 - Prevention Science: Principles and Practices (3.0 cr)  
FSOS 5702 - Prevention Science Research Methodology (3.0 cr)  
or PREV 8002 - Prevention Science Research Methodology (3.0 cr)  
FSOS 5703 - New Topics in Prevention: Implementation and Dissemination (3.0 cr)  
or PREV 8003 - New Topics in Prevention: Implementation and Dissemination (3.0 cr)  
Take 1 or more course(s) totaling exactly 3 credit(s) from the following:  
•FSOS 8193 - Directed Study in Family Social Science (1.0 - 6.0 cr)

#### Thesis Credits

Take 1 or more course(s) totaling exactly 10 credit(s) from the following:  
•FSOS 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

#### Plan B

FSOS 5014 - Quantitative Family Research Methods I (3.0 cr)  
FSOS 5015 - Family Research Laboratory (1.0 cr)  
FSOS 8001 - Conceptual Frameworks in the Family (3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
FSOS 5701 - Prevention Science: Principles and Practices (3.0 cr)  
or PREV 8001 - Prevention Science: Principles and Practices (3.0 cr)  
FSOS 5702 - Prevention Science Research Methodology (3.0 cr)  
or PREV 8002 - Prevention Science Research Methodology (3.0 cr)  
FSOS 5703 - New Topics in Prevention: Implementation and Dissemination (3.0 cr)  
or PREV 8003 - New Topics in Prevention: Implementation and Dissemination (3.0 cr)

#### Independent Study in Prevention Science

Take 1 or more course(s) totaling exactly 3 credit(s) from the following:  
•FSOS 8193 - Directed Study in Family Social Science (1.0 - 6.0 cr)

#### Electives

Four additional credits of elective courses from student's area of concentration.

#### Plan B Project



Take 1 or more course(s) totaling exactly 4 credit(s) from the following:

- [FSOS 8755](#) - Master's Paper: Plan B Project (1.0 - 6.0 cr)



### **Twin Cities Campus**

## **Family Social Science Minor**

*Family Social Science*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Family Social Science, 290 McNeal Hall, 1985 Buford Avenue, Saint Paul, MN 55108 (612-625-3116; fax: 612-625-4227).

Email: [fsosgrad@umn.edu](mailto:fsosgrad@umn.edu)

Website: <https://www.cehd.umn.edu/fsos/programs/grad-minor.html>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The program of study for the family social science graduate minor uses methods of social science to examine family systems and their interactions with various environments. The curriculum supports study in core family social science coursework including family theories, family research methods, and core family content.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Master's students must complete at least 6 credits of 5xxx or 8xxx coursework in family social science.

Doctoral students must complete at least 12 credits of 5xxx or 8xxx coursework in family social science.

All courses for the minor must be taken A-F and completed with a GPA of at least 3.00.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Doctoral**

##### **Required**

Take 12 or more credit(s) from the following:

##### **Required**

- **FSOS 8001** - Conceptual Frameworks in the Family (3.0 cr)
- FSOS 8101** - Family Stress, Coping, and Adaptation (3.0 cr)
- FSOS 8xxx**
- FSOS 5014** - Quantitative Family Research Methods I (3.0 cr)
- FSOS 5015** - Family Research Laboratory (1.0 cr)
- or **FSOS 8013** - Qualitative Family Research Methods (3.0 cr)



or [FSOS 8014](#) - Quantitative Family Research Methods II (3.0 cr)

**Masters**

**Required**

Take 6 or more credit(s) from the following:

- [FSOS 8001](#) - Conceptual Frameworks in the Family (3.0 cr)

**FSOS Electives**

[FSOS 8101](#) - Family Stress, Coping, and Adaptation (3.0 cr)

or [FSOS 5014](#) - Quantitative Family Research Methods I (3.0 cr)

[FSOS 5015](#) - Family Research Laboratory (1.0 cr)

or [FSOS 8013](#) - Qualitative Family Research Methods (3.0 cr)

or [FSOS 8014](#) - Quantitative Family Research Methods II (3.0 cr)



### **Twin Cities Campus**

## **Family Social Science Ph.D.**

*Family Social Science*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Family Social Science, 290 McNeal Hall, 1985 Buford Avenue, Saint Paul, MN 55108 (612-625-3116; fax: 612-625-4227)

Email: [fsosgrad@umn.edu](mailto:fsosgrad@umn.edu)

Website: <http://www.cehd.umn.edu/fsos/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 72 to 75
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Family social science (FSoS) offers a unique program of study using insights and methods of the social sciences to examine how families work within various contexts and cultures. A doctoral degree in family social science provides a broad foundation of expertise in theory, research, and practice.

Your program of study will include research and coursework across the breadth of family social science, including child adjustment in family context; families and culture; families and financial decisions; family formation and intergenerational studies; families, loss, and trauma; and intimate family relationships. Coursework and research engagement, along with intensive mentoring from faculty, prepares students to contribute to the broader field of family science.

### **Accreditation**

This program is accredited by Commission on Accreditation for Marriage and Family Therapy Education.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Three overall criteria guide admissions decisions: 1) evidence of strong academic preparation and the ability and desire to perform graduate level scholarship, including research; 2) fit of the applicant's professional goals with family social science (FSoS) faculty scholarship and with the overall FSoS mission, that is, enhancing the well-being of diverse families in a changing world; and 3) unique contributions the applicant would make to FSoS values, including social relevance, collaboration, inclusiveness, excellence, innovation, and diversity.

#### **Special Application Requirements:**

Family Science Specialization:

Students may apply for admission to the Family Science Ph.D. specialization after completing either a Bachelor's degree or a Master's degree. If you do not already hold a Master's degree, you may apply for the combined Master's/Ph.D. Program.

Couple & Family Therapy Specialization:

The Couple & Family Therapy Ph.D. specialization features rigorous training in couple and family therapy research informed by diverse disciplines and perspectives.

This specialization is accredited by the Commission on Accreditation for Marriage and Family Therapy Education. Admission to the Couple & Family Therapy specialization is available to applicants who have already obtained a clinical Master's degree, or have achieved equivalent clinical experience as determined by the CFT Faculty.



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

48 to 51 credits are required in the major.  
0 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.5 is required for students to remain in good standing.

Courses in the PhD degree program must contribute to an organized program of study and research. The program requires at least 72 credits, including a minimum of 48 course credits and 24 dissertation credits. Coursework includes at least 23 credits in core family theory and research methods, 9 credits in statistics, and 7 credits of directed research. Students are admitted to one of two designated specializations: family science (9 additional credits) or couple and family therapy (12 additional credits).

Students are also required to publish in peer-reviewed journals, present at disciplinary conferences, and demonstrate teaching ability, the ability to translate research into practice, and professional service and leadership. Additionally, all students are required to write research, teaching, outreach and engagement, and leadership and professional service statements. Students in the clinical track are also required to write two Theories of Change papers.

### Core Requirements

Take the following courses for a total of 23 credits:

- [FSOS 8200](#) - Orientation for Family Social Science (1.0 cr)
- [FSOS 8001](#) - Conceptual Frameworks in the Family (3.0 cr)
- [FSOS 8002](#) - Advanced Family Conceptual Frameworks (3.0 cr)
- [FSOS 8013](#) - Qualitative Family Research Methods (3.0 cr)
- [FSOS 8015](#) - Advanced Qualitative Family Research Methods (3.0 cr)
- [FSOS 5014](#) - Quantitative Family Research Methods I (3.0 cr)
- [FSOS 5015](#) - Family Research Laboratory (1.0 cr)
- [FSOS 8014](#) - Quantitative Family Research Methods II (3.0 cr)
- [FSOS 8101](#) - Family Stress, Coping, and Adaptation (3.0 cr)

### Directed Research

Take FSOS 8794 during the first three years of the program for a total of 7 credits.

Take 7 or more credit(s) from the following:

- [FSOS 8794](#) - Directed Research in Family Social Science (1.0 - 6.0 cr)

### Statistics or Methods

Take one of the following statistics/methods sequences for a total of 9 credits:

#### Family Science

- [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- Advanced Statistics or Methods (3.0 cr)
  - or [EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)



- or [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- or [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)
- or [EPSY 8268](#) - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- or [EPSY 8282](#) - Statistical Analysis of Longitudinal Data (3.0 cr)
- or [NURS 8185](#) - Qualitative Data Analysis for Health Care Research (3.0 - 4.0 cr)
- or [NURS 8195](#) - Mixed Methods in the Social, Behavioral, and Applied Health Sciences (3.0 cr)

or **Couple & Family Therapy**

- [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- [FSOS 8036](#) - Couple/Marriage and Family Therapy Research (3.0 cr)

### Specialization Requirements

#### Family Science Specialization

##### Family Science Electives

Take at least 6 credits in consultation with advisor.

FSOS Elective

- or [PREV 8001](#) - Prevention Science: Principles and Practices (3.0 cr)

##### Community/Engagement/Internship Experience

Take 3 credits of coursework to fulfill the specialization's community, engagement, or internship experience requirement, chosen in consultation with advisor.

- [FSOS 8193](#) - Directed Study in Family Social Science (1.0 - 6.0 cr)
- or Elective (3.0 cr)

-OR-

#### Couple & Family Therapy Specialization Requirements

##### Family Therapy Supervision

Take 3 or more credit(s) from the following:

- [FSOS 8034](#) - Marriage and Family Therapy Supervision (3.0 cr)

##### Family Therapy Practicum

Take FSOS 8295 twice for a total of 6 credits.

Take 6 or more credit(s) from the following:

- [FSOS 8196](#) - Couple/Marriage Family Therapy Practicum (1.0 - 6.0 cr)

##### Family Therapy Internship

Take 3 or more credit(s) from the following:

- [FSOS 8296](#) - Couple/ Marriage Family Therapy Internship (1.0 - 12.0 cr)



### **Twin Cities Campus**

## **Human Resource Development M.Ed.**

*Organizational Leadership, Policy and Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455  
(612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 34
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of education (MEd)/professional studies program in human resource development (HRD) focuses on training of human resources and organizational change issues. This graduate-level, practitioner-based program can be tailored to meet the needs of individual students. The HRD program is offered by the Department of Organizational Leadership, Policy, and Development (OLPD) in the College of Education and Human Development (CEHD). Courses at the University of Minnesota campus are offered at a variety of times, including late afternoons and evenings. Students may also enroll in courses offered during the summer and at off-campus sites.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

#### **Special Application Requirements:**

In addition to Statements #1 & 2, applicants must upload or submit a résumé and personal statement describing their career goals and rationale for interest in the M.Ed. program (limit two pages) along with the application. Two letters of recommendation must also be submitted. Applications are accepted on a rolling basis with semester deadlines of March 1 (Summer), July 1 (Fall) and November 1 (Spring).

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

**Plan C:** Plan C requires 22 major credits and 12 credits outside the major. There is no final exam.





This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Core Course Requirements

Students not holding an undergraduate degree in HRD must complete at least 34 credits, including the following courses listed below.

Note: For OLPD 5696 at least 4 credits are required and no more than 6 credits will count toward the program.

[OLPD 5201](#) - Strategies for Teaching Adults (3.0 cr)

[OLPD 5605](#) - Strategic Planning through Human Resources (3.0 cr)

[OLPD 5607](#) - Organization Development (3.0 cr)

[OLPD 5615](#) - Training and Development of Human Resources (3.0 cr)

[OLPD 5696](#) - Internship: Human Resource Development (1.0 - 10.0 cr)

[OLPD 5801](#) - Survey: Human Resource Development and Adult Education (3.0 cr)

[OLPD 5819](#) - Evaluating and Using Research in Organizations and Education (3.0 cr)

Twelve (12) elective credits approved by a faculty adviser.

### U of M HRD UG Degree Continuing Students

Students holding an undergraduate HRD degree from the University of Minnesota will not be required to retake courses completed during the undergraduate program. Students must still take a total of 34 credits of graduate coursework in the program. Of this, students must complete at least 16 credits in HRD-designated courses as described below. Note: For OLPD 5696 at least 4 credits are required and no more than 6 credits will count toward the program.

#### Required Courses (16 cr)

[OLPD 5605](#) - Strategic Planning through Human Resources (3.0 cr)

[OLPD 5696](#) - Internship: Human Resource Development (1.0 - 10.0 cr)

[OLPD 5819](#) - Evaluating and Using Research in Organizations and Education (3.0 cr)

#### Option 1 (6 cr)

Organization Development Specialization

[OLPD 5607](#) - Organization Development (3.0 cr)

[OLPD 8602](#) - Advanced Organization Development (3.0 cr)

#### Option 2 (6 cr)

Training and Development Specialization

[OLPD 5615](#) - Training and Development of Human Resources (3.0 cr)

[OLPD 8601](#) - Advanced Training and Development of Human Resources (3.0 cr)

#### Additional HRD Courses (6 cr)

6 additional HRD credits approved by faculty adviser

#### Electives (12 cr)

12 elective credits approved by faculty adviser

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Rochester

Requirements for the Rochester sub-plan are the same as those listed in general description. Students may take courses on Twin Cities or Rochester campuses.



### **Twin Cities Campus**

## **Human Resource Development Postbaccalaureate Certificate**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455  
(612-624-1006, fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 14
- This program does not require summer semesters for timely completion.
- Degree: Human Resource Development PBacc Cert Grad

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The certificate program in human resource development (HRD) focuses on training of human resources and organizational change issues. The HRD program is offered by the Organizational Leadership, Policy, and Development (OLPD) in the College of Education and Human Development (CEHD). Courses at the University of Minnesota campus are offered at a variety of times, including late afternoons and evenings.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Admission is open to degree-seeking or non-degree seeking students who possess a U.S. bachelor's degree (or international equivalent). Applications are reviewed on an ongoing basis and may be submitted at any time.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Certificate coursework completed with undergraduate student status cannot be applied to graduate-level degree programs.

#### **Required Courses**

[OLPD 5801](#) - Survey: Human Resource Development and Adult Education (3.0 cr)

[OLPD 5615](#) - Training and Development of Human Resources (3.0 cr)

[OLPD 5607](#) - Organization Development (3.0 cr)

#### **Internship or Field Experience**

4 credits is recommended for either option below:

Take exactly 1 course(s) totaling 3 - 6 credit(s) from the following:

- [OLPD 5696](#) - Internship: Human Resource Development (1.0 - 10.0 cr)
- [OLPD 5296](#) - Field Experience in Adult Education (1.0 - 6.0 cr)

#### **Electives**

The remaining credits can be selected from the following:

[OLPD 5201](#) - Strategies for Teaching Adults (3.0 cr)



or Additional OLPD courses with adviser approval to make total credits earned equal at least 14 credits.



### **Twin Cities Campus**

## **Infant and Early Childhood Mental Health Graduate Minor**

*Institute of Child Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Email: [icdapply@umn.edu](mailto:icdapply@umn.edu)

Website: <https://icd.umn.edu/academics/infant-and-early-childhood-mental-health/graduate-minor/>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9 to 12
- Length of program in credits (Doctorate): 12 to 15
- This program requires summer semesters for timely completion.
- Students will have the option to complete a field study at a location of their choosing. This will not be a requirement of the minor, however.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This program will provide students across diverse disciplines and training programs with access to foundational learning from the field of Infant and Early Childhood Mental Health (IECMH). Students will gain knowledge of developmental processes related to competence, psychopathology, and resilience in the application of theory and research to early childhood and multi-generational practice and policy.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Students must be actively pursuing a masters or doctoral degree at the University of Minnesota.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

#### **Required Courses**

Three foundational courses, for a total of 9 credits, are required for both the masters and doctoral minor.

[CPSY 5518](#) - Prevention and Intervention in Early Childhood: Principles (3.0 cr)

[CPSY 5503](#) - Development and Psychopathology in Early Childhood (3.0 cr)

[CPSY 5513](#) - Early Childhood Assessment (3.0 cr)

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **Optional Field Experience**

Students pursuing the IECMH masters-level minor may take up to 3 credits of CPSY 5996 in addition to the 9 required course credits. CPSY 5996 is an optional opportunity that not required for the minor.

[CPSY 5996](#) - Field Experience in Applied Child and Adolescent Development (1.0 - 12.0 cr)



### Doctoral

#### Required Observation Courses

Take exactly 3 course(s) totaling exactly 3 credit(s) from the following:

- CPSY 5506 - Infant Observation Seminar I (1.0 cr)
- CPSY 5508 - Infant Observation Seminar II (1.0 cr)
- CPSY 5511 - Infant Observation Seminar III (1.0 cr)

#### Optional Field Experience

Students pursuing the IECMH doctoral-level minor may take 3 credits of CPSY 5996 in addition to the 12 required course credits. CPSY 5996 is an optional opportunity that not required for the minor.

Take exactly 3 credit(s) from the following:

- CPSY 5996 - Field Experience in Applied Child and Adolescent Development (1.0 - 12.0 cr)



### **Twin Cities Campus**

## **Infant and Early Childhood Mental Health Postbaccalaureate Certificate**

*Institute of Child Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Institute of Child Development, 51 East River Road, Minneapolis, MN 55455 (612-625-2252; fax: 612-624-6373).

Email: [icdapply@umn.edu](mailto:icdapply@umn.edu)

Website: <https://icd.umn.edu/academics/infant-and-early-childhood-mental-health/>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 20
- This program requires summer semesters for timely completion.
- Online.
- Degree: Infant & Early Childhood Mental Health PBac Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The University of Minnesota online Infant and Early Childhood Mental Health (IECMH) Certificate Program is an intensive, interdisciplinary postbaccalaureate training program for students and professionals in domains of mental health, health and early care, and education.

The program serves to deepen the knowledge and skills of individuals working in birth-to-five prevention, intervention, program administration, and policy development, and to prepare individuals to provide leadership in expanding the breadth and depth of relationship-based services and policies.

The IECMH certificate program is founded on a core set of principles of infant and early childhood mental health practice, asserting that services to families should be relationship-based, culturally sensitive, grounded in an understanding of developmental theory and research with special attention to the effects of trauma, and supported by reflective practice.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants must hold at least a baccalaureate degree from an accredited college or university in a related area (e.g., child development, social work, child psychology) or document at least two years of work experience in a related field.

The admissions model is cohort-based, with new cohorts usually admitted every other year. Admission to this program is currently suspended, but may be opened for fall 2015 at a future time. Please see our website for more details:

<http://www.cehd.umn.edu/CEED/certificateprograms/iecmh/admissionprocess.html>

### **Special Application Requirements:**

Applicants should have at least two years of documented experience in early childhood research or practice.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Internet Based - Speaking Score: 27
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5



The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Coursework (20 credits)

Take the following courses. CPSY 5996 must be taken for 2 credits

[CPSY 5501](#) - Foundations in Infant and Early Childhood Mental Health I (3.0 cr)

[CPSY 5503](#) - Development and Psychopathology in Early Childhood (3.0 cr)

[CPSY 5506](#) - Infant Observation Seminar I (1.0 cr)

[CPSY 5508](#) - Infant Observation Seminar II (1.0 cr)

[CPSY 5511](#) - Infant Observation Seminar III (1.0 cr)

[CPSY 5513](#) - Early Childhood Assessment (3.0 cr)

[CPSY 5518](#) - Prevention and Intervention in Early Childhood: Principles (3.0 cr)

[CPSY 5521](#) - Prevention and Intervention in Early Childhood: Practice (3.0 cr)

[CPSY 5996](#) - Field Experience in Applied Child and Adolescent Development (1.0 - 12.0 cr)



### **Twin Cities Campus**

## **Integrative Leadership Minor**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. S.E., Minneapolis, MN 55455 (612-624-1006)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd/grad-programs/ILM/default.html>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate-level academic minor in integrative leadership (ILM) will enhance the preparation of graduate students to lead and foster collective actions across boundaries of individuals, groups, organizations, sectors, and nations to solve some of the world's most pressing and complex problems.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

Prior admission into an established master's, doctoral, or graduate professional degree program is required. Students interested in admission to the minor should contact the ILM director of graduate studies. Admission requires the addition of the required minor coursework to the student's graduate degree program form and the ILM director of graduate studies's signature on the form. Students must demonstrate relevant academic background and experience.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Any student in any University of Minnesota graduate or professional program, regardless of college or enrollment, is encouraged to apply for this minor. Students must already be admitted to a master's, doctoral, or professional degree program at the University of Minnesota.

Doctoral students will need to take an additional course from either the Overview of Leadership Theory or Leading Engagement Processes subgroups to total the 12 credits required of the doctoral minor.

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Doctoral**

#### **Overview of Leadership Theory**

Take 3 - 6 credit(s) from the following:

- **OLPD 5048** - Cross-Cultural Perspectives on Leadership (3.0 cr)





- OLPD 8021 - Leadership: From Theory to Reflective Practice (3.0 cr)
- PA 5011 - Management of Organizations (3.0 cr)
- PUBH 6780 - Topics: Public Health Administration and Policy (1.0 - 3.0 cr)
- Courses on overview of leadership theory and development from other colleges may be substituted for this core course subject to approval by the Director of Graduate Studies for the Integrative Leadership Minor.

**Leading Engagement Processes**

If student is taking PA 5990 to fulfill this requirement it should be for section called "Neighborhood Collaborative Engagement (CHANCE)."

MGMT 6035 is cross listed with LAW 6626.

Take 3 - 6 credit(s) from the following:

- MGMT 6035 - Complex and Cross-Cultural Negotiations (2.0 cr)
- MGMT 6410 - Corporate Responsibility (2.0 cr)
- OLPD 5736 - Public Engagement and Higher Education (3.0 cr)
- OLPD 6490 - Managing Civic Engagement (3.0 cr)
- PA 5145 - Civic Participation in Public Affairs (3.0 cr)
- PA 5253 - Designing Planning and Participation Processes (3.0 cr)
- PA 5990 - Topics: Public Affairs - General Topics (0.0 - 3.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- Courses on overview of leadership theory and development from other colleges may be substituted for this core course subject to approval by the Director of Graduate Studies for the Integrative Leadership Minor.

**Required Final Course**

All students must take one of the following:

- LAW 6623 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- or MGMT 6402 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- or OLPD 6402 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- or PA 5105 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- or PUBH 6702 - Integrative Leadership Seminar (3.0 cr)

**Additional Coursework**

A minimum of 3 additional credits must be selected from the list of electives below. With permission from the ILM director of graduate studies, students with sufficient background and previous course experience equivalent to one or more courses within the curriculum may apply for waiver of appropriate requirements and replace waived courses with additional electives. PA 5190 is a topics course and topic must be approved by ILM director of graduate studies prior to registering for course.

- MGMT 6004 - Negotiation Strategies (2.0 cr)
- or MGMT 6032 - Strategic Alliances (2.0 cr)
- or MGMT 6034 - Strategic Leadership (2.0 cr)
- or MGMT 6035 - Complex and Cross-Cultural Negotiations (2.0 cr)
- or MGMT 6040 - Competing Globally (2.0 cr)
- or NURS 7610 - System Leadership and Innovation (3.0 cr)
- or OLPD 5323 - Women in Leadership (3.0 cr)
- or OLPD 5332 - Personal Leadership and the Private College (3.0 cr)
- or OLPD 8702 - Administration and Leadership in Higher Education (3.0 cr)
- or PA 5103 - Leadership and Change (1.5 - 3.0 cr)
- or PA 5190 - Topics in Public and Nonprofit Leadership and Management (1.0 - 3.0 cr)
- or PA 5251 - Strategic Planning and Management (3.0 cr)
- or PA 5405 - Public Policy Implementation (3.0 cr)
- or PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- or PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)

**Masters****Overview of Leadership Theory**

Take 3 or more credit(s) from the following:

- OLPD 5048 - Cross-Cultural Perspectives on Leadership (3.0 cr)
- OLPD 8021 - Leadership: From Theory to Reflective Practice (3.0 cr)
- PA 5011 - Management of Organizations (3.0 cr)
- PUBH 6780 - Topics: Public Health Administration and Policy (1.0 - 3.0 cr)
- Other

Courses on overview of leadership theory and development from other colleges may be substituted for this core course subject to approval by the director of graduate studies for the integrative leadership minor.

**Leading Engagement Processes**

If student is taking PA 5990 to fulfill this requirement it should be for section called "Neighborhood Collaborative Engagement (CHANCE)."

MGMT 6035 is cross listed with LAW 6626.

Take 3 or more credit(s) from the following:



- [MGMT 6035](#) - Complex and Cross-Cultural Negotiations (2.0 cr)
- [MGMT 6410](#) - Corporate Responsibility (2.0 cr)
- [OLPD 5736](#) - Public Engagement and Higher Education (3.0 cr)
- [OLPD 6490](#) - Managing Civic Engagement (3.0 cr)
- [PA 5145](#) - Civic Participation in Public Affairs (3.0 cr)
- [PA 5253](#) - Designing Planning and Participation Processes (3.0 cr)
- [PA 5990](#) - Topics: Public Affairs - General Topics (0.0 - 3.0 cr)
- [PUBH 6066](#) - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)

• **Other**

Courses on overview of leadership theory and development from other colleges may be substituted for this core course subject to approval by the director of graduate studies for the integrative leadership minor.

**Required Final Course**

All students must take one course from the following:

- [LAW 6623](#) - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- or [MGMT 6402](#) - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- or [OLPD 6402](#) - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- or [PA 5105](#) - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- or [PUBH 6702](#) - Integrative Leadership Seminar (3.0 cr)



### **Twin Cities Campus**

## **International Education Minor**

*Organizational Leadership, Policy and Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 178 Pillsbury Dr S E Minneapolis, MN 5545-0226 (612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The interdisciplinary minor in international education is for students enrolled in any masters or doctoral program who wish to enter careers in research, consulting, administration, and teaching in an international context. The minor offers a coordinated set of courses from the Departments of Curriculum and Instruction; Educational Psychology; Organizational Leadership, Policy, and Development; the School of Kinesiology; and the Institute of Child Development.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

#### **Special Application Requirements:**

Admission is contingent upon being admitted to a master's or a doctoral degree-granting program at the University of Minnesota. For an application form visit the international education minor website (<http://www.cehd.umn.edu/olpd/grad-programs/CIDE/gradminor.html>) or consult with the director of graduate studies for more information.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Each program is developed in consultation with the student, the student's advisor, major director of graduate studies, and director of graduate studies for international education. Requirements include courses listed below. Electives from the University may be added with the advisor's consent and director of graduate studies approval.

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Masters**

#### **Core Courses**

Take 1 or more course(s) from the following:

- **OLPD 5103** - Comparative Education (3.0 cr)
- **OLPD 5104** - Strategies for International Development of Education Systems (3.0 cr)
- **OLPD 5121** - Educational Reform in International Context (3.0 cr)



- OLPD 5124 - Critical Issues in International Education and Educational Exchange (3.0 cr)
- OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)
- OLPD 8101 - International Education and Development (3.0 cr)
- OLPD 8103 - Comparative Education (3.0 cr)

•**Area Specific Coursework**

Students interested in OLPD 5080 or OLPD 8087 should consult minor advisor prior to registration, as these courses can vary and may or may not be appropriate for this minor.

Take 6 or more credit(s) from the following:

- CI 5145 - Critical Pedagogy (3.0 cr)
- CI 5651 - Foundations of Second Languages and Cultures Education (3.0 cr)
- CI 8150 - Research Topics in Curriculum & Instruction (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- CI 8650 - Seminar: Special Topics in Second Languages and Cultures Research (1.0 - 3.0 cr)
- EPSY 5403 - Counseling Diverse Populations (3.0 cr)
- OLPD 5080 - Special Topics: Organizational Leadership, Policy, & Development (1.0 - 3.0 cr)
- OLPD 5121 - Educational Reform in International Context (3.0 cr)
- OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)
- OLPD 5612 - International Human Resource Development (3.0 cr)
- OLPD 8087 - Seminar: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)
- OLPD 8101 - International Education and Development (3.0 cr)
- OLPD 8842 - Comparative Systems in Organizational Leadership, Policy, and Development (3.0 cr)
- PA 5414 - Child Human Rights: Work and Education (3.0 cr)

**Doctoral**

**Core Courses**

Students interested in OLPD 8087 should consult minor advisor prior to registration, as this course can vary and may or may not be appropriate for this minor.

Take 2 or more course(s) from the following:

- OLPD 5103 - Comparative Education (3.0 cr)
- OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)
- OLPD 5121 - Educational Reform in International Context (3.0 cr)
- OLPD 5124 - Critical Issues in International Education and Educational Exchange (3.0 cr)
- OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)
- OLPD 8087 - Seminar: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)
- OLPD 8101 - International Education and Development (3.0 cr)
- OLPD 8103 - Comparative Education (3.0 cr)

•**Area specific coursework**

Students interested in OLPD 5080 should consult minor advisor prior to registration, as this course can vary and may or may not be appropriate for this minor.

Take 6 or more credit(s) from the following:

- CI 5145 - Critical Pedagogy (3.0 cr)
- CI 5651 - Foundations of Second Languages and Cultures Education (3.0 cr)
- CI 8150 - Research Topics in Curriculum & Instruction (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- CI 8650 - Seminar: Special Topics in Second Languages and Cultures Research (1.0 - 3.0 cr)
- EPSY 5403 - Counseling Diverse Populations (3.0 cr)
- OLPD 5080 - Special Topics: Organizational Leadership, Policy, & Development (1.0 - 3.0 cr)
- OLPD 5121 - Educational Reform in International Context (3.0 cr)
- OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)
- OLPD 5612 - International Human Resource Development (3.0 cr)
- OLPD 8101 - International Education and Development (3.0 cr)
- OLPD 8842 - Comparative Systems in Organizational Leadership, Policy, and Development (3.0 cr)
- PA 5414 - Child Human Rights: Work and Education (3.0 cr)



### *Twin Cities Campus*

## Interpersonal Relationships Research Minor

*Institute of Child Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Psychology, University of Minnesota, S354 Elliott Hall, 75 East River Parkway, Minneapolis, MN 55455 (612-626-0025)

Email: [simps108@umn.edu](mailto:simps108@umn.edu)

Website: <https://icd.umn.edu/academics/interpersonal-relationships-research-minor/>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 14
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The minor in interpersonal relationships research provides doctoral students with a broad theoretical and methodological foundation for research on behavioral interaction patterns between two persons and the impact of these interactions.

A recently recognized and rapidly advancing interdisciplinary field of scientific inquiry, interpersonal relationships research has its roots in psychology, sociology, family studies, communication, and nursing. The program brings together faculty and students from eight University departments and schools.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

Other requirements to be completed before admission:

Admission to the interpersonal relationships research graduate minor is contingent upon prior admission to a doctoral program in a degree-granting department. Admission to the minor program is limited and only by permission of the director of graduate studies in interpersonal relationships research.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### Doctoral

#### Required Coursework

[IREL 8001](#) - Proseminar in Interpersonal Relationships Research (2.0 cr)

[IREL 8021](#) - Seminar: Statistical and Methodological Issues in Research on Dyadic Relationships (3.0 cr)

[PSY 5204](#) - Psychology of Interpersonal Relationships (3.0 cr)

or [PSY 8202](#) - Close Relationships (3.0 cr)

**6 additional credits selected in consultation with minor adviser.**



### **Twin Cities Campus**

## **K-12 Technology Integration Postbaccalaureate Certificate**

Curriculum & Instruction

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, University of Minnesota, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-4006; fax: 612-624-8277)

Email: [Clinfo@umn.edu](mailto:Clinfo@umn.edu)

Website: <http://www.cehd.umn.edu/ci>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: T E L: K-12 Technology Integration PBacc Cert Grad

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The K-12 Technology Integration certificate program prepares students to use technology (computers and the web) to develop instructional materials for use in a wide range of educational contexts (note that a university certificate program or certificate is distinct from a state certificate or certification).

The program is designed for K-12 teachers or administrators interested in using technology in the classroom.

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A completed bachelor's degree is required for admission.

#### **Special Application Requirements:**

Applicants must submit transcripts from every college attended (even those where a degree wasn't earned), scores from the TOEFL/IELTS/MELAB (if applicable), a resume, and a one page goal statement. Certificate applications are reviewed by the department three times per academic year: Fall, Spring and Summer.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Core Courses (12 credits)

Required courses are listed; students will also take one additional CI 5xxx course for 3 credits that complements content area, elementary/secondary focus, and individual interests.

[CI 5330](#) - Special Topics in Learning Technologies (3.0 cr)

[CI 5351](#) - Technology Tools for Educators (3.0 cr)

[CI 5361](#) - Teaching and Learning with the Internet (2.0 - 3.0 cr)



### **Twin Cities Campus**

## **Kinesiology M.S.**

*Kinesiology, School of*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Kinesiology, 1900 University Avenue SE, Minneapolis, MN 55455 (612-625-5300; fax: 612-626-7700).

Email: [kin@umn.edu](mailto:kin@umn.edu)

Website: <http://cehd.umn.edu/kin>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The School of Kinesiology spans a wide range of inquiry connected by the common thread of the study of human movement. Graduate programs reflect a broad study of physical activity ranging from exercise science, movement science, and human performance, to physical activity and sport science and sport management. Much of the research conducted in the school is interdisciplinary in nature and involves collaborative partnerships with life science disciplines such as medicine, neuroscience, and epidemiology and fosters links with business, education, and social sciences. MS students pursue an individualized program with an emphasis in one of the following areas: behavioral aspects of physical activity; biomechanics and neuromotor control; exercise physiology; perceptual-motor control and learning; physical activity and health; sport and exercise psychology; sport sociology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Although prospective masters students generally have an undergraduate degree in kinesiology or the health sciences, others with a baccalaureate degree who have related preparation and a significant background and interest in the scientific study of physical activity may be admitted.

#### **Special Application Requirements:**

Applicants must submit a University of Minnesota Graduate Admissions application which includes a written statement of academic interests, goals, and objectives; scores from the General Test of the GRE (verbal, quantitative, and analytical writing) that are less than five years old; three letters of recommendation from persons familiar with their scholarship and research potential; a scholarly writing sample; and transcripts.

Priority deadline for submission of all application materials is December 1 for the following fall admission. Students generally are admitted for the fall semester only.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 153
  - General Test - Quantitative Reasoning: 153
  - General Test - Analytical Writing: 4.5

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21





- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 18 major credits and 12 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project is an independent research project with the advisor that meets the following guidelines: Involves a total of approximately 120 hours of work; demonstrates familiarity with the tools of research and scholarship in the field of kinesiology; demonstrates the ability to work independently; and demonstrates the ability to effectively present the results of the investigation.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

The MS is offered under Plan A and Plan B. Plan A requires 30 credits, including at least 14 course credits in kinesiology, 6 course credits in a minor or related field (either of which must include a minimum of 3 credits in statistics as determined by faculty advisor) and 10 thesis credits (8777). Plan B also requires 30 credits, including at least 14 major course credits in kinesiology, a capstone project of 4 credits in KIN 8995, at least 6 course credits in a minor or related field (either of which must include a minimum of 3 credits in statistics as determined by faculty advisor), and 6 additional credits in any of these areas.

For both Plan A and Plan B, students must take KIN 5981 (3 cr), KIN 8980 (3 cr), and in the related field or minor, at least 3 credits of statistics or equivalent as defined by the faculty advisor. A GPA of at least 3.00 is required to maintain good academic standing and to graduate.

A maximum of 9 credits of 4xxx-level courses is allowed at the discretion of the faculty advisor.

### Required courses

Students must complete the following courses and an area of emphasis listed below.

[KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)

[KIN 8980](#) - Graduate Research Seminar in Kinesiology (3.0 cr)

#### Plan A

Plan A students must take 10 credits of KIN 8777.

[KIN 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

#### Plan B

Plan B students must take 4 credits of KIN 8995.

[KIN 8995](#) - Research Problems in Kinesiology (1.0 - 12.0 cr)

### Emphasis Areas

Kinesiology MS students concentrate their studies in one of the following areas: behavioral aspects of physical activity, biomechanics and neuromotor control, exercise physiology, perceptual-motor control and learning, physical activity and health, sport and exercise psychology, or sport sociology.

### Behavioral Aspects of Physical Activity

This emphasis examines behavioral interventions for physical activity adoption and maintenance; the epidemiology of physical activity; psychosocial theories related to physical activity promotion; understanding sedentary behavior; and the objective and subjective



assessment of physical activity. In addition to the MS requirements, students choose courses from the following lists with advisor consultation.

#### Recommended courses

Plan A and Plan B students take a minimum of 8 major course credits chosen from the following list.

- [KIN 5123](#) - Motivational Interventions in Physical Activity (3.0 cr)
- or [KIN 5125](#) - Advances in Physical Activity and Health (3.0 cr)
- or [KIN 5126](#) - Social Psychology of Sport & Physical Activity (3.0 cr)
- or [KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)
- or [KIN 5371](#) - Sport and Society (3.0 cr)
- or [KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)
- or [KIN 5511](#) - Sport and Gender (3.0 cr)
- or [KIN 8126](#) - Sports Medicine Psychology (3.0 cr)
- or [KIN 8136](#) - Developmental Sport and Exercise Psychology (3.0 cr)

#### Minor or Related Field

Either minor or related field is chosen, Plan A and Plan B students must take one statistics course with the consultation with their advisor.

Plan A students take an additional 3 related-field (other emphasis areas of KIN or outside programs) credits and Plan B students take an additional 9 related-field credits in consultation with the advisor. Recommended courses for related fields are listed below.

Recommended minor is public health, child psychology, or psychology.

- [EPSY 5247](#) - Qualitative Methods in Educational Psychology (3.0 cr)
- or [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- or [EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)
- or [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- or [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- or [PUBH 6094](#) - Obesity and Eating Disorder Interventions (2.0 cr)
- or [PUBH 6450](#) - Biostatistics I (4.0 cr)
- or [PUBH 6451](#) - Biostatistics II (4.0 cr)
- or [PUBH 6636](#) - Qualitative Research Methods in Public Health Practice (2.0 cr)
- or [PUBH 6810](#) - Survey Research Methods (3.0 cr)
- or [PUBH 6914](#) - Community Nutrition Intervention (3.0 cr)

-OR-

#### Biomechanics and Neuromotor Control

The study of human biomechanics with its focus on the mechanical and electrophysiological analysis of human motion is combined with the study of movement neuroscience. This emphasis area provides advanced knowledge for understanding how the human nervous system controls movement and how the neurological disease affects motor function.

#### Recommended Courses

A minimum of 8 major course credits (not including KIN 8777) are needed outside of the requirements and may be chosen from the following list.

- [KIN 4441](#) - Movement Neuroscience (3.0 cr)
- or [KIN 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)
- or [KIN 5643](#) - Applied Motion Capture and Movement Analysis Technology (3.0 cr)
- or [KIN 5941](#) - Clinical Movement Neuroscience (3.0 cr)
- or [KIN 8132](#) - Seminar: Motor Development (3.0 cr)
- or [KIN 8135](#) - Seminar: Motor Control and Learning (3.0 cr)
- or [KIN 8211](#) - Seminar: Perception and Action (3.0 cr)
- or [KIN 8995](#) - Research Problems in Kinesiology (1.0 - 12.0 cr)
- or [RSC 5135](#) - Advanced Biomechanics I: Kinematics (3.0 cr)

#### Minor or related field

Either minor or related field is chosen, Plan A and Plan B students must take one statistics course with the consultation with their advisor. Plan A students take an additional 3 related-field (other emphasis areas of KIN or outside programs) credits and Plan B students take an additional 9 related-field credits in consultation with the advisor. Recommended courses for related fields are listed below. Recommended minor is clinical physiology and movement science.

- [EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)
- or [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)
- or [PUBH 6450](#) - Biostatistics I (4.0 cr)
- or [PUBH 6451](#) - Biostatistics II (4.0 cr)
- or [PUBH 7405](#) - Biostatistics: Regression (4.0 cr)
- or [PUBH 7406](#) - Advanced Regression and Design (4.0 cr)
- or [STAT 5021](#) - Statistical Analysis (4.0 cr)
- or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- or [STAT 5303](#) - Designing Experiments (4.0 cr)
- or [STAT 5601](#) - Nonparametric Methods (3.0 cr)
- or [KIN 5987](#) - Professional Skills and Grant Writing for Health Sciences (2.0 cr)



-OR-

### Exercise Physiology

Exercise physiology is the study of issues related to acute and chronic effects of physical activity on human physiological systems and health, and how fundamental concepts of human energetics and mechanics apply to exercise, sport, physical exertion, and health promotion. In addition to the MS requirements, students choose courses from the following lists with advisor consultation.

Plan A and Plan B students take a minimum of 8 major course credits chosen from the following list.

- [KIN 5122](#) - Applied Exercise Physiology (3.0 cr)
- or [KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)
- or [KIN 5142](#) - Applied Nutrition for Sport Performance and Optimal Health (3.0 cr)
- or [KIN 5328](#) - International Sport: The Impact of the Olympic Games [HIS, GP] (3.0 cr)
- or [KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)
- or [KIN 5435](#) - Advanced Theory and Techniques of Exercise Science (3.0 cr)
- or [KIN 5485](#) - Exercise Testing and Prescription (3.0 cr)
- or [KIN 5585](#) - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)
- or [KIN 8122](#) - Seminar: Exercise Physiology (2.0 cr)
- or [EDHD 8300](#) - Special Topics in Education and Human Development (1.0 - 8.0 cr)

### Minor or related field

Either minor or related field is chosen, Plan A and Plan B students must take one statistics course with the consultation with their advisor. Plan A students take an additional 3 related-field (other emphasis areas of KIN or outside programs) credits and Plan B students take an additional 9 related-field credits in consultation with the advisor. Recommended courses for related fields are listed below.

- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- or [PUBH 6450](#) - Biostatistics I (4.0 cr)
- or [PUBH 6451](#) - Biostatistics II (4.0 cr)
- or [PUBH 7405](#) - Biostatistics: Regression (4.0 cr)
- or [PUBH 7406](#) - Advanced Regression and Design (4.0 cr)
- or [PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)
- or [STAT 5021](#) - Statistical Analysis (4.0 cr)
- or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- or [STAT 5303](#) - Designing Experiments (4.0 cr)
- or [STAT 5601](#) - Nonparametric Methods (3.0 cr)

-OR-

### Perceptual-Motor Control and Learning

Students study the learning of movement skills and the factors that mediate learning as well as the changes in movement behavior over the life span and the processes or factors underlying these changes. In addition to the MS requirements, students choose courses from the following lists with advisor consultation. Registration for KIN 5992 is limited to 3 credits. A maximum of 9 4xxx level courses can be taken at the discretion of the advisor and used to satisfy master credit requirement.

#### Recommended courses

Plan A and Plan B students take a minimum of 8 major course credits chosen from the following list.

- [KIN 4133](#) - Perceptual-Motor Control and Learning (3.0 cr)
- or [KIN 4134](#) - The Aging Motor System (3.0 cr)
- or [KIN 4136](#) - Embodied Cognition (3.0 cr)
- or [KIN 4441](#) - Movement Neuroscience (3.0 cr)
- or [KIN 4520](#) - Current Topics in Kinesiology (2.0 - 4.0 cr)
- or [KIN 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)
- or [KIN 5643](#) - Applied Motion Capture and Movement Analysis Technology (3.0 cr)
- or [KIN 5941](#) - Clinical Movement Neuroscience (3.0 cr)
- or [KIN 5992](#) - Readings in Kinesiology (1.0 - 9.0 cr)
- or [KIN 8132](#) - Seminar: Motor Development (3.0 cr)
- or [KIN 8135](#) - Seminar: Motor Control and Learning (3.0 cr)
- or [KIN 8211](#) - Seminar: Perception and Action (3.0 cr)
- or [HUMF 5001](#) - Foundations of Human Factors/Ergonomics (3.0 cr)
- or [RSC 5135](#) - Advanced Biomechanics I: Kinematics (3.0 cr)

### Minor or related field

Either minor or related field is chosen, Plan A and Plan B students must take one statistics course with the consultation with their advisor. Plan A students take an additional 3 related-field (other emphasis areas of KIN or outside programs) credits and Plan B students take an additional 9 related-field credits in consultation with the advisor. Recommended courses for related fields are listed below.

- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)

-OR-

### Physical Activity and Health

The emphasis area in Physical Activity and Health is intended to provide students with advanced study in physical activity and health



promotion and disease prevention, as well as study designs from an epidemiological approach. The emphasis area provides a solid foundation sufficient to understand and conduct research in this field. In addition to the MS requirements, students choose courses from the following lists with advisor consultation.

#### **Recommended Courses**

A minimum of 8-semester course credits with KIN prefix and may be chosen from the following list.

- [KIN 4214](#) - Health Promotion (3.0 cr)
- or [KIN 5202](#) - Current Issues in Health (2.0 cr)
- or [KIN 5203](#) - Health Media, Consumerism, and Communication (2.0 cr)
- or [KIN 5122](#) - Applied Exercise Physiology (3.0 cr)
- or [KIN 5123](#) - Motivational Interventions in Physical Activity (3.0 cr)
- or [KIN 5125](#) - Advances in Physical Activity and Health (3.0 cr)
- or [KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)
- or [KIN 5142](#) - Applied Nutrition for Sport Performance and Optimal Health (3.0 cr)
- or [KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)
- or [KIN 8122](#) - Seminar: Exercise Physiology (2.0 cr)
- or [KIN 8211](#) - Seminar: Perception and Action (3.0 cr)

#### **Minor or related field**

Either minor or related field is chosen, Plan A and Plan B students must take one statistics course with the consultation with their advisor. Plan A students take an additional 3 related-field (other emphasis areas of KIN or outside programs) credits and Plan B students take an additional 9 related-field credits in consultation with the advisor. Recommended courses for related fields are listed below.

- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- or [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- or [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- or [PUBH 6450](#) - Biostatistics I (4.0 cr)
- or [PUBH 6451](#) - Biostatistics II (4.0 cr)

-OR-

#### **Sport and Exercise Psychology**

The Sport and Exercise Psychology emphasis focuses on the thoughts, feelings, and actions of participants and professionals within physical activity contexts such as competitive sports, sports medicine and rehabilitation, exercise, and physical education. Scholars seek to understand the cognitive, affective, behavioral, and social mechanisms underlying interactions between the psychology of individual participants and influences of psychological climates within physical activity settings.

#### **Recommended Courses**

For Plan A and Plan B, a minimum of 8 major course credits are needed and may be chosen from the following list.

- [KIN 5123](#) - Motivational Interventions in Physical Activity (3.0 cr)
- or [KIN 5126](#) - Social Psychology of Sport & Physical Activity (3.0 cr)
- or [KIN 5136](#) - Psychology of Coaching (3.0 cr)
- or [KIN 5723](#) - Psychology of Sport Injury and Rehabilitation (3.0 cr)
- or [KIN 8126](#) - Sports Medicine Psychology (3.0 cr)
- or [KIN 8136](#) - Developmental Sport and Exercise Psychology (3.0 cr)

#### **Minor or related field**

Either minor or related field is chosen, Plan A and Plan B students must take one statistics course with the consultation with their advisor. Plan A students take an additional 3 related-field (other emphasis areas of KIN or outside programs) credits and Plan B students take an additional 9 related-field credits in consultation with the advisor. Recommended courses for related fields are listed below.

Recommended minor is educational psychology.

- [CPSY 5301](#) - Advanced Developmental Psychology (3.0 cr)
- or [CPSY 5302](#) - Cognitive and Biological Development (3.0 cr)
- or [CSPH 5706](#) - Lifestyle Medicine (2.0 cr)
- or [CSPH 5807](#) - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)
- or [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- or [EPSY 5401](#) - Counseling Procedures (3.0 cr)
- or [EPSY 5402](#) - Counseling History and Theories (3.0 cr)
- or [EPSY 5406](#) - Ethics in Counseling (3.0 cr)
- or [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- or [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)
- or [GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)
- or [KIN 5371](#) - Sport and Society (3.0 cr)
- or [KIN 5511](#) - Sport and Gender (3.0 cr)
- or [KIN 5601](#) - Sport Management Ethics and Policy (3.0 cr)
- or [KIN 5725](#) - Organization and Management of Physical Education and Sport (3.0 cr)
- or [PREV 8001](#) - Prevention Science: Principles and Practices (3.0 cr)
- or [PREV 8002](#) - Prevention Science Research Methodology (3.0 cr)
- or [PREV 8003](#) - New Topics in Prevention: Implementation and Dissemination (3.0 cr)



- or [PSY 5207](#) - Personality and Social Behavior (3.0 cr)
- or [PSY 8208](#) - Social Psychology: The Self (3.0 cr)
- or [PSY 8542](#) - Professional Standards and Ethics in Clinical Psychology (3.0 cr)
- or [PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)
- or [PUBH 6120](#) - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- or [PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

-OR-

### **Sport Sociology**

Sport sociology is the scientific study of human behavior and social organization in the sport context, focusing on behavior patterns and social processes that occur in the organizational and management systems in which sport exists. The program is housed in the Tucker Center for Research on Girls & Women in Sport, an interdisciplinary research institute. In addition to the MS requirements, students choose courses from the following lists with advisor consultation.

#### **Recommended Courses**

For Plan A and Plan B, a minimum of 8 major course credits are needed may be chosen from the following list.

- [KIN 5123](#) - Motivational Interventions in Physical Activity (3.0 cr)
- or [KIN 5126](#) - Social Psychology of Sport & Physical Activity (3.0 cr)
- or [KIN 5136](#) - Psychology of Coaching (3.0 cr)
- or [KIN 5371](#) - Sport and Society (3.0 cr)
- or [KIN 5511](#) - Sport and Gender (3.0 cr)
- or [KIN 5725](#) - Organization and Management of Physical Education and Sport (3.0 cr)
- or [KIN 5801](#) - Legal Aspects of Sport and Recreation (4.0 cr)
- or [KIN 8136](#) - Developmental Sport and Exercise Psychology (3.0 cr)

#### **Minor or related field**

Either minor or related field is chosen, Plan A and Plan B students must take one statistics course with the consultation with their advisor. Plan A students take an additional 3 related-field (other emphasis areas of KIN or outside programs) credits and Plan B students take an additional 9 related-field credits in consultation with the advisor. Recommended courses for related fields are listed below.

- [AMST 5412](#) - Comparative Indigenous Feminisms [GP] (3.0 cr)
- or [COMM 5221](#) - Media, Race, and Identity (3.0 cr)
- or [EPSY 5247](#) - Qualitative Methods in Educational Psychology (3.0 cr)
- or [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- or [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- or [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- or [GWSS 5104](#) - Transnational Feminist Theory (3.0 cr)
- or [GWSS 5190](#) - Topics: Theory, Knowledge, and Power (3.0 cr)
- or [GWSS 5406](#) - Black Feminist Thought in the American and African Diasporas (3.0 cr)
- or [GWSS 8101](#) - Intellectual History of Feminism (3.0 cr)
- or [GWSS 8102](#) - Advanced Studies in Sexuality (3.0 cr)
- or [GWSS 8103](#) - Feminist Theories of Knowledge (3.0 cr)
- or [KIN 5601](#) - Sport Management Ethics and Policy (3.0 cr)
- or [PSY 8209](#) - Research Methods in Social Psychology (3.0 cr)
- or [SOC 4451](#) - Sport, Culture & Society (3.0 cr)
- or [SOC 8801](#) - Sociological Research Methods (4.0 cr)



### **Twin Cities Campus**

## **Kinesiology Minor**

*Kinesiology, School of*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Kinesiology, 1900 University Avenue S.E., Minneapolis, MN 55455 (612-625-5300; fax: 612-626-7700).

Email: [kin@umn.edu](mailto:kin@umn.edu)

Website: <https://www.cehd.umn.edu/kin/academics/default.html>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Master's students can choose a kinesiology minor in the following emphasis areas: behavioral aspects of physical activity, biomechanics and neuromotor control, exercise physiology, perceptual-motor control and learning, physical activity and health, sport and exercise psychology, and sport sociology. Doctoral students can pursue a kinesiology minor in these same emphasis areas, with the addition of the sport management emphasis.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A master's minor requires at least 6 credits of graduate-level kinesiology courses. A doctoral minor requires at least 12 credits of graduate-level kinesiology courses. Courses should be chosen in consultation with the student's major adviser and the School of Kinesiology's director of graduate studies.

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Master's**

#### **Minor Courses**

Minor requires at least 6 credits of graduate-level kinesiology courses. Courses should be chosen in consultation with the student's major adviser and the School of Kinesiology's director of graduate studies.

### **Doctoral**

#### **Minor Courses**

Minor requires at least 12 credits of graduate-level kinesiology courses. Courses should be chosen in consultation with the student's major adviser and the School of Kinesiology's director of graduate studies.



### **Twin Cities Campus**

## **Kinesiology Ph.D.**

*Kinesiology, School of*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Kinesiology, 1900 University Avenue SE, Minneapolis, MN 55455 (612-625-5300; fax: 612-626-7700)

Email: [kin@umn.edu](mailto:kin@umn.edu)

Website: <https://www.cehd.umn.edu/kin/academics/grad/phd.html>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60 to 72
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The School of Kinesiology spans a wide range of inquiry connected by the common thread of the study of human movement. Graduate programs reflect a broad study of physical activity ranging from exercise science, movement science, and human performance, to physical activity and sport science and sport management. Much of the research conducted in the school is interdisciplinary in nature and involves collaborative partnerships with life science disciplines such as medicine, neuroscience, and epidemiology and fosters links with business, education, and social sciences. MS students pursue an individualized program with an emphasis in one of the following areas: behavioral aspects of physical activity; biomechanics and neuromotor control; exercise physiology; perceptual-motor control and learning; physical activity and health; sport and exercise psychology; sport sociology.

PhD students pursue an individualized program with an emphasis in behavioral aspects of physical activity, biomechanics and neuromotor control, exercise physiology, perceptual-motor control and learning, physical activity and health, sport and exercise psychology, sport management, or sport sociology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

It is preferred that applicants have completed a master's degree in the field of kinesiology or a related field and achieved an overall minimum GPA of 3.50.

Other requirements to be completed before admission:

Applicants must have completed a baccalaureate degree, generally in the following areas: kinesiology; exercise science; sport management; sport psychology/sociology; movement science; or related preparation and significant background and interest in the scientific study of physical activity.

#### **Special Application Requirements:**

Applicants must submit a University of Minnesota application which includes a written statement of academic interests, goals, and objectives; scores from the General Test of the GRE (verbal, quantitative, and analytical writing) that are less than five years old; three recommendations from persons familiar with their scholarship and research potential; a scholarly writing sample; and transcripts. Submission of all application materials by December 1 ensures priority consideration for admission and for teaching and research assistantships awarded for the next academic year. Students are admitted for the fall semester only.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 153
  - General Test - Quantitative Reasoning: 153
  - General Test - Analytical Writing: 4.5



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 to 29 credits are required in the major.  
12 to 19 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

The PhD requires 36 to 48 course credits and 24 thesis credits. A minimum total of 60 credits and a maximum total of 72 credits are required to complete the program. Course credits include a minimum of 15 major program credits (including 3 credits of KIN 8980 Graduate Research Seminar), 6 credits in a supporting program or 12 credits in a doctoral minor, 6 research skills course credits, and 9 credits of mentored research experience. At least 6 major course credits, 6 research skills course credits, and 6 mentored experience course credits must be taken as a U of M enrolled student. A GPA of at least 3.00 is required to maintain good standing and to graduate.

### Required Kinesiology Courses

A minimum of 3 credits of KIN 8980 and a minimum of 9 credits of KIN 8995 are required over the course of the program for all emphasis areas listed below.

[KIN 8980](#) - Graduate Research Seminar in Kinesiology (3.0 cr)

[KIN 8995](#) - Research Problems in Kinesiology (1.0 - 12.0 cr)

### Emphasis Areas

Kinesiology PhD students pursue an individualized program with an emphasis in behavioral aspects of physical activity, biomechanics and neuromotor control, exercise physiology, perceptual-motor control and learning, physical activity and health, sport and exercise psychology, sport management, or sport sociology.

#### Behavioral Aspects of Physical Activity

Behavioral Aspects of Physical Activity examines behavioral interventions for physical activity adoption and maintenance; the epidemiology of physical activity; psycho-social theories related to physical activity promotion; understanding sedentary behavior; and the objective and subjective assessment of physical activity. Interdisciplinary research is conducted with other departments including medicine, nursing, public health, epidemiology, physiology, nutrition, psychology, etc.

#### Emphasis courses

A minimum of 12 course credits must be selected from the following list. At least 3 credits must be KIN 8xxx.

[KIN 5123](#) - Motivational Interventions in Physical Activity (3.0 cr)

or [KIN 5125](#) - Advances in Physical Activity and Health (3.0 cr)

or [KIN 5126](#) - Social Psychology of Sport & Physical Activity (3.0 cr)

or [KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)

or [KIN 5371](#) - Sport and Society (3.0 cr)





- or [KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)
- or [KIN 5511](#) - Sport and Gender (3.0 cr)
- or [KIN 8126](#) - Sports Medicine Psychology (3.0 cr)
- or [KIN 8136](#) - Developmental Sport and Exercise Psychology (3.0 cr)

#### Research skills courses

A minimum 6-9 research skills courses credits are required, selected from the following list or in consultation with the advisor. Courses taken to fulfill the research skills courses requirement cannot be double counted to fulfill the supporting program requirement.

- [KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)
- or [EPSY 5247](#) - Qualitative Methods in Educational Psychology (3.0 cr)
- or [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- or [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- or [EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)
- or [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- or [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)
- or [PUBH 6450](#) - Biostatistics I (4.0 cr)
- or [PUBH 6451](#) - Biostatistics II (4.0 cr)
- or [PUBH 6636](#) - Qualitative Research Methods in Public Health Practice (2.0 cr)
- or [PUBH 6673](#) - Grant Writing for Public Health (1.0 cr)
- or [PUBH 6810](#) - Survey Research Methods (3.0 cr)
- or [PUBH 7401](#) - Fundamentals of Biostatistical Inference (4.0 cr)
- or [PUBH 7405](#) - Biostatistics: Regression (4.0 cr)
- or [PUBH 7406](#) - Advanced Regression and Design (4.0 cr)

#### Minor

Choose either minor or supporting program. A minimum of 12 course credits is required for a University of Minnesota doctoral minor. Recommended minor is: CSPH, PSY, or PUBH.

#### Supporting program

Recommended supporting programs and courses include combining 6-13 credits of advisor-approved selections from other emphasis areas of kinesiology (KIN), such as (but not limited to) sport sociology or sport and exercise psychology.

- [PUBH 6094](#) - Obesity and Eating Disorder Interventions (2.0 cr)
- or [PUBH 6102](#) - Issues in Environmental Health (2.0 cr)
- or [PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)
- or [PUBH 6914](#) - Community Nutrition Intervention (3.0 cr)

-OR-

#### Biomechanics and Neuromotor Control

The study of human biomechanics with its focus on the mechanical and electrophysiological analysis of human motion is combined with the study of movement neuroscience. This emphasis area provides advanced knowledge for understanding how the human nervous system controls movement and how the neurological disease affects motor function.

#### Emphasis courses

A minimum of 12 course credits must be selected from the following list. At least 3 credits must be KIN 8xxx.

- [KIN 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)
- or [KIN 5643](#) - Applied Motion Capture and Movement Analysis Technology (3.0 cr)
- or [KIN 5941](#) - Clinical Movement Neuroscience (3.0 cr)
- or [KIN 8211](#) - Seminar: Perception and Action (3.0 cr)
- or [KIN 8132](#) - Seminar: Motor Development (3.0 cr)
- or [KIN 8135](#) - Seminar: Motor Control and Learning (3.0 cr)
- or [RSC 5135](#) - Advanced Biomechanics I: Kinematics (3.0 cr)
- or [NSC 5661W](#) - Behavioral Neuroscience [WI] (4.0 cr)

#### Research skills courses

A minimum of 6-9 research skills course credits are required, selected from the following list or in consultation with the advisor. Courses taken to fulfill the research skills courses requirement can't be double counted to fulfill the supporting program requirement.

- [EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)
- or [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)
- or [PUBH 6450](#) - Biostatistics I (4.0 cr)
- or [PUBH 6451](#) - Biostatistics II (4.0 cr)
- or [PUBH 7405](#) - Biostatistics: Regression (4.0 cr)
- or [PUBH 7406](#) - Advanced Regression and Design (4.0 cr)
- or [STAT 5021](#) - Statistical Analysis (4.0 cr)
- or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- or [STAT 5303](#) - Designing Experiments (4.0 cr)
- or [STAT 5601](#) - Nonparametric Methods (3.0 cr)

#### Minor

Choose either minor or supporting program. A minimum of 12 course credits are required for a University of Minnesota doctoral minor. Recommended minors include: CGSC, CPMS, GERO, HUMF, NSC, or PREV.



### Supporting program

Any combination of at least 6 KIN or non-KIN course credits may be used for the supporting program and must be approved by the advisor. Recommended kinesiology emphasis areas for supporting courses include exercise physiology, perceptual-motor control and learning, physical activity and sport science, or sport management. Recommended program areas for supporting courses include: BMEN, ME, NURS, OT, OTOL, PUBH, NSC, and RSC.

[KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)

or [KIN 5987](#) - Professional Skills and Grant Writing for Health Sciences (2.0 cr)

-OR-

### Exercise Physiology

Exercise physiology is the study of issues related to acute and chronic effects of physical activity on human physiological systems and health, and how fundamental concepts of human energetics and mechanics apply to exercise, sport, physical exertion, and health promotion. Doctoral students learn to apply principles of physiology to solving problems related to functional responses and adaptations involved in human skeletal muscular activity.

#### Emphasis courses

A minimum of 12 course credits must be selected from the following list. At least 3 credits must be KIN 8xxx. KIN 8122 may be taken multiple times.

[KIN 5122](#) - Applied Exercise Physiology (3.0 cr)

or [KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)

or [KIN 5142](#) - Applied Nutrition for Sport Performance and Optimal Health (3.0 cr)

or [KIN 5328](#) - International Sport: The Impact of the Olympic Games [HIS, GP] (3.0 cr)

or [KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)

or [KIN 5435](#) - Advanced Theory and Techniques of Exercise Science (3.0 cr)

or [KIN 5485](#) - Exercise Testing and Prescription (3.0 cr)

or [KIN 5585](#) - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)

or [KIN 5641](#) - Scientific Theory and Application of Training and Conditioning in Sport (3.0 cr)

or [KIN 8122](#) - Seminar: Exercise Physiology (2.0 cr)

or [EDHD 8300](#) - Special Topics in Education and Human Development (1.0 - 8.0 cr)

#### Research skills courses

A minimum of 6-9 research skills course credits are required, selected from the following list or in consultation with the advisor. It is recommended to take a statistical sequence in either EPSY, STAT, or PUBH. It is not recommended to switch courses between departments unless agreed to by the advisor. Courses taken to fulfill the research skills courses requirement can't be double counted to fulfill the supporting program requirement.

[EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)

or [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)

or [PUBH 6450](#) - Biostatistics I (4.0 cr)

or [PUBH 6451](#) - Biostatistics II (4.0 cr)

or [PUBH 7405](#) - Biostatistics: Regression (4.0 cr)

or [PUBH 7406](#) - Advanced Regression and Design (4.0 cr)

or [PUBH 7415](#) - Introduction to Clinical Trials (3.0 cr)

or [PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)

or [STAT 5021](#) - Statistical Analysis (4.0 cr)

or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)

or [STAT 5303](#) - Designing Experiments (4.0 cr)

or [STAT 5601](#) - Nonparametric Methods (3.0 cr)

#### Minor

Choose either a minor or supporting program. A minimum of 12 course credits are required for a University of Minnesota doctoral minor. Recommended minors include: CGSC, CPMS, GERO, HUMF, NSC, or PREV.

#### Supporting program

Any combination of at least 6 KIN or non-KIN course credits may be used for the supporting program and must be approved by the advisor. Recommended kinesiology emphasis areas for supporting courses include biomechanics and neuromotor control, perceptual-motor control and learning, physical activity and sport science, or sport management. Recommended areas for supporting program include: BIOC, FSCN, OT, PHSL, PUBH, NSC, and RSC.

-OR-

### Perceptual-Motor Control and Learning

Perceptual-motor control and learning includes related areas of movement behavior inquiry. Motor learning is the study of the learning of movement skills and the factors that mediate learning, such as practice, perceptual guidance, or knowledge of results. Although a lifespan approach is emphasized, students may focus on one or more specific age periods, such as early childhood, adolescence, adulthood, or aging.

#### Emphasis courses

A minimum of 12 course credits must be selected from the following list. At least 3 credits must be KIN 8xxx.

[KIN 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)

or [KIN 5643](#) - Applied Motion Capture and Movement Analysis Technology (3.0 cr)

or [KIN 5941](#) - Clinical Movement Neuroscience (3.0 cr)



- or [KIN 8211](#) - Seminar: Perception and Action (3.0 cr)
- or [KIN 8132](#) - Seminar: Motor Development (3.0 cr)
- or [KIN 8135](#) - Seminar: Motor Control and Learning (3.0 cr)
- or [RSC 5135](#) - Advanced Biomechanics I: Kinematics (3.0 cr)

#### Research skills courses

A minimum of 6-9 research skills course credits are required, selected from the following list or in consultation with the advisor. It is recommended to take a statistical sequence in either EPSY, STAT, or PUBH. It is not recommended to switch courses between departments unless agreed to by the advisor. Courses taken to fulfill the research skills courses can't be double counted to fulfill the supporting program requirement.

- [EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)
- or [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)
- or [EPSY 8282](#) - Statistical Analysis of Longitudinal Data (3.0 cr)
- or [PUBH 6450](#) - Biostatistics I (4.0 cr)
- or [PUBH 6451](#) - Biostatistics II (4.0 cr)
- or [PUBH 7405](#) - Biostatistics: Regression (4.0 cr)
- or [PUBH 7406](#) - Advanced Regression and Design (4.0 cr)
- or [STAT 5201](#) - Sampling Methodology in Finite Populations (3.0 cr)
- or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- or [STAT 5303](#) - Designing Experiments (4.0 cr)
- or [STAT 5601](#) - Nonparametric Methods (3.0 cr)

#### Minor

Choose either a minor or supporting program. All University of Minnesota doctoral minors require a minimum of 12 credits. Recommended minors include CGSC, CPMS, GERO, HUMF, NSC, or PREV.

#### Supporting program

Any combination of at least 6 KIN or non-KIN course credits may be used for the supporting program and must be approved by the advisor. Recommended kinesiology emphasis areas for supporting courses include biomechanics and neuromotor control, exercise physiology, physical activity and sport science, or sport management. Recommended programs for supporting courses include: BMEN, ME, NURS, OT, OTOL, PubH, NSC, and RSC. Specific KIN course recommendations include:

- [KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)
- or [KIN 5987](#) - Professional Skills and Grant Writing for Health Sciences (2.0 cr)

-OR-

#### Physical Activity and Health

The emphasis area in Physical Activity and Health is intended to provide students with advanced study in physical activity and health promotion and disease prevention, as well as study designs from an epidemiological approach. The emphasis area will provide a solid foundation sufficient to understand and conduct research in this field.

#### Emphasis courses

A minimum of 12 course credits must be selected from the following list. At least 3 credits must be KIN 8xxx.

- [KIN 5202](#) - Current Issues in Health (2.0 cr)
- or [KIN 5203](#) - Health Media, Consumerism, and Communication (2.0 cr)
- or [KIN 5122](#) - Applied Exercise Physiology (3.0 cr)
- or [KIN 5123](#) - Motivational Interventions in Physical Activity (3.0 cr)
- or [KIN 5125](#) - Advances in Physical Activity and Health (3.0 cr)
- or [KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)
- or [KIN 5142](#) - Applied Nutrition for Sport Performance and Optimal Health (3.0 cr)
- or [KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)
- or [KIN 5585](#) - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)
- or [KIN 5987](#) - Professional Skills and Grant Writing for Health Sciences (2.0 cr)
- or [KIN 8122](#) - Seminar: Exercise Physiology (2.0 cr)
- or [KIN 8211](#) - Seminar: Perception and Action (3.0 cr)

#### Research skills courses

A minimum of 6-9 research skills course credits are required, selected from the following list or in consultation with the advisor.

Courses taken to fulfill the research skills credits can't be double counted to fulfill the supporting program requirement.

- [KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)
- or [EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)
- or [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- or [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)
- or [EPSY 8282](#) - Statistical Analysis of Longitudinal Data (3.0 cr)
- or [PUBH 6450](#) - Biostatistics I (4.0 cr)
- or [PUBH 6451](#) - Biostatistics II (4.0 cr)
- or [PUBH 7405](#) - Biostatistics: Regression (4.0 cr)
- or [PUBH 7406](#) - Advanced Regression and Design (4.0 cr)
- or [STAT 5201](#) - Sampling Methodology in Finite Populations (3.0 cr)
- or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- or [STAT 5303](#) - Designing Experiments (4.0 cr)



### Minor

Choose either minor or supporting program, may include only 5xxx level courses or higher. A minimum of 12 course credits are required for a University of Minnesota doctoral minor. Recommended minors include: CGSC, CPMS, GERO, CSPH, NSC, PREV, or PUBH.

### Supporting program

Any combination of at least 6 KIN or non-KIN course credits may be used for the supporting program and must be approved by the advisor. Recommended kinesiology emphasis areas for supporting courses include biomechanics and neuromotor control, exercise physiology, physical activity and sport science, or sport management. Recommended programs for supporting courses include: NURS, PUBH, NSC, RSC, CSPH, or PREV.

-OR-

### Sport and Exercise Psychology

The Sport and Exercise Psychology emphasis focuses on the thoughts, feelings, and actions of participants and professionals within physical activity contexts such as competitive sports, sports medicine and rehabilitation, exercise, and physical education. Scholars seek to understand the cognitive, affective, behavioral, and social mechanisms underlying interactions between the psychology of individual participants and influences of psychological climates within physical activity settings.

### Emphasis courses

A minimum of 12 course credits must be selected from the following list. At least 3 credits must be KIN 8xxx.

- [KIN 5126](#) - Social Psychology of Sport & Physical Activity (3.0 cr)
- or [KIN 5136](#) - Psychology of Coaching (3.0 cr)
- or [KIN 5723](#) - Psychology of Sport Injury and Rehabilitation (3.0 cr)
- or [KIN 8126](#) - Sports Medicine Psychology (3.0 cr)
- or [KIN 8136](#) - Developmental Sport and Exercise Psychology (3.0 cr)

### Research skills courses

A minimum of 6-9 research skills course credits are required, selected from the following list or in consultation with the advisor.

Courses taken to fulfill the research skills courses requirement can't be double counted to fulfill the supporting program requirement.

- [KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)
- or [EPSY 5247](#) - Qualitative Methods in Educational Psychology (3.0 cr)
- or [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- or [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- or [EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)
- or [EPSY 8265](#) - Factor Analysis (3.0 cr)
- or [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- or [EPSY 8268](#) - Hierarchical Linear Modeling in Educational Research (3.0 cr)

### Minor

Choose either minor or supporting program. A minimum of 12 course credits are required for a University of Minnesota doctoral minor. Recommended minors include: CPSY, EPSY, or PSY.

### Supporting Program

Recommended supporting program courses include combining 6-13 credits of advisor-approved selections from other emphasis areas within kinesiology (KIN), such as (but not limited to) behavioral aspects of physical activity (e.g. KIN 5123), sport sociology (e.g. KIN 5371 or KIN 5511) or sport management (e.g. KIN 5601 or KIN 5725) and/or from other graduate programs [e.g., CPSY, EPSY, PSY, CSPH, GRAD, PREV, or PUBH.]

- [CPSY 5301](#) - Advanced Developmental Psychology (3.0 cr)
- or [CPSY 5302](#) - Cognitive and Biological Development (3.0 cr)
- or [CSPH 5706](#) - Lifestyle Medicine (2.0 cr)
- or [CSPH 5807](#) - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)
- or [EPSY 5401](#) - Counseling Procedures (3.0 cr)
- or [EPSY 5402](#) - Counseling History and Theories (3.0 cr)
- or [EPSY 5406](#) - Ethics in Counseling (3.0 cr)
- or [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)
- or [GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)
- or [KIN 5123](#) - Motivational Interventions in Physical Activity (3.0 cr)
- or [KIN 5371](#) - Sport and Society (3.0 cr)
- or [KIN 5511](#) - Sport and Gender (3.0 cr)
- or [KIN 5601](#) - Sport Management Ethics and Policy (3.0 cr)
- or [KIN 5725](#) - Organization and Management of Physical Education and Sport (3.0 cr)
- or [PREV 8001](#) - Prevention Science: Principles and Practices (3.0 cr)
- or [PREV 8002](#) - Prevention Science Research Methodology (3.0 cr)
- or [PREV 8003](#) - New Topics in Prevention: Implementation and Dissemination (3.0 cr)
- or [PSY 8208](#) - Social Psychology: The Self (3.0 cr)
- or [PSY 8542](#) - Professional Standards and Ethics in Clinical Psychology (3.0 cr)
- or [PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)
- or [PUBH 6120](#) - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- or [PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)



-OR-

### **Sport Management**

This emphasis concentrates on the theoretical and practical dimensions of the management of athletic events, sports teams and facilities, and the sporting process. The management areas studied include those in the public sector (interscholastic and intercollegiate sport) as well as fitness and facility management. Sport management policy and ethics are also a focus of this emphasis area and research agenda.

#### **Required courses**

[KIN 8128](#) - Doctoral Sport Management Seminar (3.0 cr)

#### **Program courses**

A minimum of 9 credits must be selected from the following list:

[KIN 5371](#) - Sport and Society (3.0 cr)

or [KIN 5421](#) - Sport Finance (3.0 cr)

or [KIN 5461](#) - Issues in the Sport Industry (3.0 cr)

or [KIN 5511](#) - Sport and Gender (3.0 cr)

or [KIN 5601](#) - Sport Management Ethics and Policy (3.0 cr)

or [KIN 5631](#) - Programming and Promotion in Sport (3.0 cr)

or [KIN 5725](#) - Organization and Management of Physical Education and Sport (3.0 cr)

or [KIN 5801](#) - Legal Aspects of Sport and Recreation (4.0 cr)

#### **Research skills courses**

A minimum of 6-9 research skills course credits are required, selected from the following list or in consultation with the advisor.

Courses taken to fulfill the research skills courses requirement can't be double counted to fulfill the supporting program requirement.

[KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)

or [OLPD 5056](#) - Case Studies for Policy Research (3.0 cr)

or [OLPD 5061](#) - Ethnographic Research Methods (3.0 cr)

or [OLPD 5528](#) - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)

or [EPSY 5244](#) - Survey Design, Sampling, and Implementation (3.0 cr)

or [EPSY 5247](#) - Qualitative Methods in Educational Psychology (3.0 cr)

or [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

or [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)

or [EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)

or [EPSY 8265](#) - Factor Analysis (3.0 cr)

or [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)

or [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)

or [EPSY 8268](#) - Hierarchical Linear Modeling in Educational Research (3.0 cr)

or [FSOS 8013](#) - Qualitative Family Research Methods (3.0 cr)

or [SOC 8801](#) - Sociological Research Methods (4.0 cr)

or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)

#### **Minor**

Choose either a minor or supporting program. A minimum of 12 course credits are required for a University of Minnesota doctoral minor. Recommended minors include: public policy, COMM, EPSY, BA, or CI.

#### **Supporting program**

Any combination of at least 6 KIN or non-KIN course credits may be used for the supporting program and must be approved by the advisor. Recommended kinesiology emphasis areas for supporting courses include biomechanics and neuromotor control, exercise physiology, physical activity and sport science, and perceptual-motor control and learning. Recommended program areas for supporting program courses include: OLPD, PA, COMM, marketing, and management.

-OR-

### **Sport Sociology**

Sport Sociology is the scientific study of human behavior and social organization in the sport context with the primary objective to attempt to identify, describe and explain the role and relationship of sport in society. It focuses on the behavior patterns and social processes that occur in the sporting domain and explores the organizational and management systems and structures in which sport exists.

#### **Emphasis courses**

A minimum of 12 course credits must be selected from the following list. At least 3 credits must be KIN 8xxx.

[KIN 5123](#) - Motivational Interventions in Physical Activity (3.0 cr)

or [KIN 5126](#) - Social Psychology of Sport & Physical Activity (3.0 cr)

or [KIN 5136](#) - Psychology of Coaching (3.0 cr)

or [KIN 5371](#) - Sport and Society (3.0 cr)

or [KIN 5511](#) - Sport and Gender (3.0 cr)

or [KIN 5723](#) - Psychology of Sport Injury and Rehabilitation (3.0 cr)

or [KIN 8126](#) - Sports Medicine Psychology (3.0 cr)

or [KIN 8136](#) - Developmental Sport and Exercise Psychology (3.0 cr)

#### **Research skills courses**

A minimum of 6-9 research skills course credits are required, selected from the following list or in consultation with the advisor.



Courses taken to fulfill the research skills courses requirement can't be double counted to fulfill the supporting program requirement.

- AMST 8250 - Popular Culture and Politics in the 20th Century: Research Strategies (3.0 cr)
- or AMST 8289 - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- or COMM 8211 - Critical Communication Studies: History, Theory, Method (3.0 cr)
- or COMM 8451 - Seminar: Intercultural and Diversity Research (3.0 cr)
- or COMM 8502 - Seminar: Communication Theory Construction (3.0 cr)
- or KIN 5981 - Research Methodology in Kinesiology and Sport Management (3.0 cr)
- or EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- or EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- or EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- or EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- or EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- or EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- or EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- or GWSS 8997 - Dissertation Seminar (3.0 cr)
- or PSY 8209 - Research Methods in Social Psychology (3.0 cr)
- or PUBH 6810 - Survey Research Methods (3.0 cr)
- or PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)
- or PUBH 7405 - Biostatistics: Regression (4.0 cr)
- or PUBH 7406 - Advanced Regression and Design (4.0 cr)
- or SOC 8801 - Sociological Research Methods (4.0 cr)
- or SOC 8811 - Advanced Social Statistics (4.0 cr)
- or SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)

#### Minor

Choose either minor or supporting program. A minimum of 12 course credits are required for a University of Minnesota doctoral minor. Recommended minors include: AMST, COMM, CPSY, CSPH, EPSY, GWSS, PUBH, PSY, or SOC.

#### Supporting program

Recommended supporting programs and courses include selections from EPSY, PSY, and CPSY minor programs as well as from other emphasis areas of kinesiology (KIN), such as behavioral aspects of physical activity, sport sociology, or sport management. Other relevant supporting program courses can be found in public health (PUBH), sociology (SOC), center for spirituality and healing (CSPH), or prevention science (PREV).

- AMST 5412 - Comparative Indigenous Feminisms [GP] (3.0 cr)
- or AMST 8202 - Theoretical Foundations and Current Practice in American Studies (3.0 cr)
- or AMST 8240 - Gender, Race, Class, Ethnicity, and Sexuality in the United States: Topical Development (3.0 cr)
- or COMM 5221 - Media, Race, and Identity (3.0 cr)
- or COMM 8210 - Seminar: Selected Topics in U.S. Electronic Media (3.0 cr)
- or COMM 8211 - Critical Communication Studies: History, Theory, Method (3.0 cr)
- or GWSS 5104 - Transnational Feminist Theory (3.0 cr)
- or GWSS 5190 - Topics: Theory, Knowledge, and Power (3.0 cr)
- or GWSS 5406 - Black Feminist Thought in the American and African Diasporas (3.0 cr)
- or GWSS 8101 - Intellectual History of Feminism (3.0 cr)
- or GWSS 8102 - Advanced Studies in Sexuality (3.0 cr)
- or GWSS 8103 - Feminist Theories of Knowledge (3.0 cr)
- or GWSS 8107 - Feminist Pedagogies (3.0 cr)
- or GWSS 8108 - Genealogies of Feminist Theory (3.0 cr)
- or GWSS 8109 - Feminist Knowledge Production (3.0 cr)
- or GWSS 8201 - Feminist Theory and Methods in the Social Sciences (3.0 cr)
- or GWSS 8230 - Seminar: Cultural Criticism and Media Studies (3.0 cr)
- or GWSS 8260 - Seminar: Race, Representation and Resistance (3.0 cr)
- or GWSS 8270 - Seminar: Theories of Body (3.0 cr)
- or SOC 4451 - Sport, Culture & Society (3.0 cr)
- or SOC 5455 - Sociology of Education (3.0 cr)
- or SOC 8001 - Sociology as a Profession (1.0 cr)
- or SOC 8011 - Teaching Sociology: Theory & Practice (3.0 cr)
- or SOC 8211 - The Sociology of Race & Racialization (3.0 cr)
- or SOC 8221 - Sociology of Gender (3.0 cr)
- or SOC 8290 - Topics in Race, Class, Gender and other forms of Durable Inequality (3.0 cr)
- or SOC 8701 - Sociological Theory (4.0 cr)



### **Twin Cities Campus**

## **Leadership in Education M.Ed.**

*Organizational Leadership, Policy and Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455 (612-624-1006; fax: 612-624-3377).

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of education (MEd)/professional studies program in leadership in education, offered jointly by the Department of Organizational Leadership, Policy, and Development (OLPD) and the Department of Curriculum and Instruction (C&I) in the College of Education and Human Development (CEHD), builds leadership skills and facilitates analysis of K-12 school culture, policies, and practice.

This program develops educational leaders who can serve in schools that foster continuous learning and improvement. Program participants are prepared to advance team, school-wide, and district-wide reform initiatives for coherent educational systems and programs. This program addresses formal and informal leadership methods, emphasizing the roles and contributions of teachers as leaders of instructional improvement, including ways that teachers and principals work together to promote collaborative school cultures.

This 30-semester credit program emphasizes the essential components of leadership, including collaboration, group dynamics, continuous professional learning, school policy, school culture, design and facilitation of improvement initiatives, innovations in teaching and assessment practice, creation of coherent learning experiences, cross-cultural education, and technology.

Students are encouraged to begin the program with other educators from the same school or district. Most students complete the degree in two to three years while continuing to teach full time. Some degree coursework is offered at convenient, off-campus sites in the Twin Cities area.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants must have teaching experience.

#### **Special Application Requirements:**

Applications are reviewed on an ongoing basis, but students are advised to submit application materials by the following preferred dates: November 1 (Spring), March 1 (Summer), July 1 (Fall). International students must apply six weeks earlier than those dates listed.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21



- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Course Requirements

- [OLPD 5364](#) - Context and Practice of Educational Leadership (3.0 cr)
- [OLPD 5374](#) - Leadership for Professional Development (4.0 cr)
- [CI 5155](#) - Contemporary Approaches to Curriculum: Instruction and Assessment (3.0 cr)
  - or [OLPD 5387](#) - Leadership for Teaching and Learning (3.0 cr)
- [CI 5177](#) - Practical Research (1.0 - 3.0 cr)
  - or [OLPD 5501](#) - Principles and Methods of Evaluation (3.0 cr)
- [OLPD 5361](#) - Project in Teacher Leadership (3.0 cr)

### Electives

14 or more credits of elective courses with adviser approval. Students often choose elective credits aligned with certificates in staff development, school technology, reading, and school administration.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Rochester

This sub-plan is not accepting new students at this time. Course requirements are the same as the Twin Cities program.

### Singapore

Course requirements are the same as the Twin Cities program.





### ***Twin Cities Campus***

## **Literacy Education M.Ed.**

*Curriculum & Instruction*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-4006; fax: 612-624-8277)

Email: [Clinfo@umn.edu](mailto:Clinfo@umn.edu)

Website: <http://cehd.umn.edu/ci>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of education (MED)/professional studies program in literacy education is designed to improve the quality of literacy education in K-12 schools. The program aims to address the growing state and national emphasis on pupils' reading skills and achievement.

The literacy education program provides instruction on current developments in literacy theory and research, as well as teaching methods for reading, writing, language, speech, and media studies. Students will learn to develop instructional units, evaluate and assess K-12 pupils' literacy skills, and develop technology tools to teach them. The program also encourages students to become "literacy leaders" in their schools and school systems.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

A bachelor's degree from an accredited college or university.

#### **Special Application Requirements:**

Applicants must submit transcripts from every college attended (even those where a degree wasn't earned), scores from the TOEFL/IELTS/MELAB (if applicable), a resume, and a clearly written statement of career interests, goals, and objectives. Master's applications are reviewed by department faculty three times per academic year: Fall, Spring and Summer.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Core Coursework (6 credits)

CI 5155 - Contemporary Approaches to Curriculum: Instruction and Assessment (3.0 cr)

CI 5351 - Technology Tools for Educators (3.0 cr)

### Literacy Education Requirements (18 credits)

Select from the courses listed below or choose another graduate level CI 54xx course with adviser approval.

Take 18 or more credit(s) from the following:

- CI 5402 - Introduction to Special Collections (3.0 cr)
- CI 5403 - Writing For and By Children (3.0 cr)
- CI 5404 - Multicultural Literature for Children and Adolescents (3.0 cr)
- CI 5410 - Special Topics in the Teaching of Literacy (1.0 - 3.0 cr)
- CI 5417 - Elementary literacy Instruction for ESL Students (3.0 cr)
- CI 5422 - Teaching Writing in Schools (3.0 cr)
- CI 5431 - Introduction to Instructional Leadership in K-12 Reading (3.0 cr)
- CI 5432 - Instructional Leadership in Reading in Kindergarten and the Elementary Grades (3.0 cr)
- CI 5433 - Instructional Leadership in Reading for the Middle and Secondary Grades (3.0 cr)
- CI 5434 - Professional Development and Evolving Practice in K-12 Reading (3.0 cr)
- CI 5435 - Instructional Leadership in Preventing Reading Difficulties (3.0 cr)
- CI 5441 - Teaching Literature in the Secondary School (2.0 - 3.0 cr)
- CI 5442 - Literature for Adolescents (3.0 cr)
- CI 5451 - Teaching Reading in Middle and Secondary Grades (3.0 cr)
- CI 5461 - Teaching Composition in the Secondary School (3.0 cr)
- CI 5472 - Teaching Critical Media Analysis in Schools (3.0 cr)
- CI 5475 - Teaching Digital Writing (3.0 cr)

### Electives (6 credits)

Courses will be selected in consultation with faculty advisor; students may also select other graduate level 5xxx courses with adviser approval. Students are advised to select courses that reflect learning issues faced in their classroom, including special education, secondary language, or cultural diversity issues.

Take 6 or more credit(s) from the following:

- CI 5331 - Introduction to Learning Technologies (3.0 cr)
- CI 5361 - Teaching and Learning with the Internet (2.0 - 3.0 cr)
- CI 5619 - Teaching World Languages and Cultures in Elementary Settings (2.0 cr)
- CI 5641 - Language, Culture, and Education (3.0 cr)
- CI 5642 - Assessing English Learners (3.0 cr)
- CI 5651 - Foundations of Second Languages and Cultures Education (3.0 cr)
- CI 5656 - Teaching Literacy in Second Language Classrooms (3.0 cr)
- CI 5657 - Teaching Speaking and Listening in Second Language Classrooms (3.0 cr)
- YOST 5952 - Everyday Lives of Youth (3.0 cr)
- YOST 5954 - Experiential Learning: Pedagogy for Community and Classroom (3.0 cr)
- ENGL 5090 - Readings in Special Subjects (1.0 - 4.0 cr)
- EPSY 5114 - Psychology of Student Learning (3.0 cr)
- EPSY 5151 - Cooperative Learning (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5613 - Foundations of Special Education I [DSJ] (3.0 cr)



### **Twin Cities Campus**

## **Multimedia Design and Development Postbaccalaureate Certificate**

Curriculum & Instruction

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, University of Minnesota, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-4006; fax: 612-624-8277)

Email: [Clinfo@umn.edu](mailto:Clinfo@umn.edu)

Website: <http://www.cehd.umn.edu/ci>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: T E L:Multimedia Design& Dev PBacc Cert Grad

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This certificate program in multimedia design and development prepares students to use technology (computers and the Internet) to develop instructional materials for use in a wide range of educational and training contexts (note that a university certificate program or certificate is distinct from a state certificate or certification).

The program is designed for K-12 teachers, higher education instructors, corporate trainers, and other professionals interested in using technology to support instruction.

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

A completed bachelor's degree is required for admission.

#### **Special Application Requirements:**

Applicants must submit transcripts from every college attended (even those where a degree wasn't earned), scores from the TOEFL/IELTS/MELAB (if applicable), a resume, and a one page goal statement. Certificate applications are reviewed by the department three times per academic year: Fall, Spring and Summer.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Core Courses (12 credits)

Take 4 or more course(s) totaling 12 or more credit(s) from the following:

- [CI 5336](#) - Planning for Multimedia Design and Development (3.0 cr)
- [CI 5362](#) - Foundations of Interactive Design for Web-based Learning (3.0 cr)
- [CI 5363](#) - New Media and Interaction Design for Online and Mobile Learning (3.0 cr)
- [CI 5365](#) - Contemporary Software Development Issues and Tools (3.0 cr)
- [CI 5367](#) - Interactive Multimedia Instruction (3.0 cr)



### **Twin Cities Campus**

## **Online Distance Learning Postbaccalaureate Certificate**

Curriculum & Instruction

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, 125 Peik Hall, 159 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-625-4006; fax: 612-624-8277)

Email: [Clinfo@umn.edu](mailto:Clinfo@umn.edu)

Website: <http://cehd.umn.edu/ci>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Online Distance Learning Postbaccalaureate Cert.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The online distance learning certificate is designed to prepare educators and other professionals to design and deliver distance learning opportunities in academic or business settings (note that a university certificate program or certificate is distinct from a state certificate or certification). Technology experience is not required, and courses are designed for learners with a wide range of experience.

This 12-credit certificate program will prepare students to successfully design, develop, and deliver curriculum on the Internet; use interactive online media; and create online learning communities for business and K-12 and postsecondary schools. As schools and businesses embrace online education, a variety of instructional design guidelines and pedagogical approaches have been developed to effectively guide online education and enhance learning.

Goals of the distance learning certificate include:

- Developing knowledge and skills in the best practices for designing and delivering online distance learning
- Engaging with current research about distance learning, current practices, and learning theory
- Providing opportunities to practice designing, developing, and delivering online distance learning
- Creating learning communities where students can reflect on their own teaching, reading, designing, and writing
- Allowing students to learn from each other

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

A completed bachelor's degree is required for admission.

#### **Special Application Requirements:**

Applicants must submit transcripts from every college attended (even those where a degree wasn't earned), scores from the TOEFL/IELTS/MELAB (if applicable), a resume, and a one page goal statement. Certificate applications are reviewed by the department three times per academic year: Fall, Spring and Summer.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5



- MELAB  
- Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Core Courses (12 credits)

- CI 5321 - Foundations of Distance Education (3.0 cr)
- CI 5323 - Online Learning Communities (3.0 cr)
- CI 5325 - Designing and Developing Online Distance Learning (3.0 cr)
- CI 5327 *(Inactive)*(3.0 cr)



### **Twin Cities Campus**

## **Organizational Leadership, Policy, and Development Ed.D.**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455  
(612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 58 to 72
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Admission to the Education Policy and Leadership track, the Higher Education track, and the Human Resource Development track of the Ed.D. are currently suspended.

The Department of Organizational Leadership, Policy, and Development is a leader in advancing knowledge about educational and organizational change in local, national, and international contexts. Its research, teaching, and outreach reflect a commitment to interdisciplinary and intercultural engagement with educators, scholars, and policy makers seeking to enhance leadership, policy, and development around the globe. Students in the EdD programs choose from one of three complementary but distinct program tracks: education policy and leadership (EPL), higher education (HE), and human resource development (HRD). The department offers M.A. and Ph.D. degrees in the tracks mentioned above, as well as comparative and international development education (CIDE) and evaluation studies (ES). Undergraduate programs focus on human resource development and business and marketing education. In addition, the department offers a variety of programs for practicing professionals and various licensure programs.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A master's degree is required. The preferred graduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

Applicants must submit scores from the General Test of the GRE, two letters of recommendation from persons familiar with their scholarship and research potential, a complete set of academic transcripts, and a current résumé, as well as answer required essay questions via the University's online application system. International students must also submit a TOEFL or IELTS score. Unofficial GRE scores, transcripts, and TOEFL/IELTS score may be submitted via the online application for admission review purposes only. Admitted students must submit official GRE scores (as applicable), transcripts (sent directly from institution[s]), and TOEFL/IELTS scores (as applicable) to the University as a condition of any admission offer. Applicants to the international cohorts should have at least three years of experience in international education.

### **Special Application Requirements:**

Admission to the Education Policy and Leadership track, the Higher Education track, and the Human Resource Development track of the Ed.D. are currently suspended.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21



- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

34 credits are required in the major.  
12 to 14 credits are required outside the major.  
12 to 24 thesis credits are required.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

The doctor of education (Ed.D.) is a professionally oriented degree program for those who will provide leadership in educational institutions and work and community education environments. Students combine study and related experiences to develop, apply, analyze, synthesize, and evaluate knowledge of the purposes, practices, issues, and problems of their program area. The Ed.D. is offered in 3 OLPD tracks: EPL (pre-K-12 schools), higher education and HRD. Cohorts for the EPL and higher education tracks include those in the metropolitan area, out state Minnesota, and international schools. Those two Ed.D. degree tracks are offered only in the context of cohort programs of 20-30 students each. All Ed.D. cohort programs include department core courses, program core courses, inquiry and research courses, supporting program or minor, and field research project credits. Through courses, seminars, and independent study, students learn to apply the products of disciplined inquiry to educational policy issues and practical situations in various educational environments and conduct types of research that contribute and/or apply that knowledge to the specialization. Within the overall framework (some credits may be brought in from previous graduate work), specific course requirements are developed for each program area and cohort when applicable. See the department website for requirements in specific cohorts. Preliminary written and oral exams are required. Students must complete a professional field project that contributes to the improvement of policy or practice.

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Education Policy and Leadership

The EPL EdD track is not accepting new students at this time. Information about degree requirements for current students can be found at <http://www.cehd.umn.edu/olpd/grad-programs/>.

### Higher Education

The higher education EdD track is not accepting new students at this time. Information about degree requirements for current students can be found at <http://www.cehd.umn.edu/olpd/grad-programs/>.

### Human Resource Development

The HRD EdD track is not accepting new students at this time. Information about degree requirements for current students can be found at <http://www.cehd.umn.edu/olpd/grad-programs/>.

### Research Courses

Students should consult with advisers about the appropriate time to register for each course.





[OLPD 8015](#) - Inquiry strategies in educational and organizational research (3.0 cr)  
a 3 credit statistics course to be determined by student and adviser (3 cr inside or outside department)  
a qualitative course to be determined by student and adviser (3 cr; inside or outside department)  
a quantitative course to be determined by student and adviser (3 cr inside or outside department)  
[OLPD 8890](#) - Research Seminar (1.0 cr)

**Additional Rsch Course**

a 3 credits qualitative course taken with adviser approval  
or [OLPD 8812](#) - Quantitative Research in Education (3.0 cr)

**Skills and Special Topics**

19 credits minimum. OLPD 8011 must be taken during the first year of the program.

[OLPD 8011](#) - Doctoral Research Seminar I (1.0 cr)

18 credits of HRD elective coursework jointly determined by student and adviser based around the student's professional role

**Specialization**

Must total 12 credits.

A 3 credit OLPD 8xxx level theory seminar course as determined by the adviser

9 additional credits of appropriate coursework as determined by the faculty adviser

**Rochester**

This sub-plan is optional and does not fulfill the sub-plan requirement for this program.

Same as general program description.

This sub-plan is not accepting new students.



### **Twin Cities Campus**

## **Organizational Leadership, Policy, and Development M.A.**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455  
(612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 36
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Organizational Leadership, Policy, and Development is a leader in advancing knowledge about educational and organizational change in local, national, and international contexts. Our research, teaching, and outreach reflect a commitment to interdisciplinary and intercultural engagement with educators, scholars, and policy makers seeking to enhance leadership, policy, and development around the globe. Students in the MA and PhD programs choose from one of five complementary but distinct program tracks: education policy and leadership (EPL), evaluation studies (ES), higher education (HE), comparative and international development education (CIDE), and human resource development (HRD). Our undergraduate programs focus on human resource development and business and marketing education. In addition, the department offers a variety of programs for practicing professionals and various licensure programs.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

### **Special Application Requirements:**

Applicants must submit scores from the General Test of the GRE, two letters of recommendation from persons familiar with their scholarship and research potential, transcripts, a current résumé, and answer to two essay questions found within the University's online application. The GRE is not required for EPL and MCTL M.A. applicants but is required for application to other M.A. program tracks (CIDE, ES, HE, and HRD). International students must also submit a TOEFL or IELTS score, but international applicants to the M.A. program are exempt from the GRE. All applications for admission are reviewed once a year. All new students begin in fall semester unless permission to start earlier is granted by the track coordinator. The annual deadline is February 1 for the two-year MA program. The annual deadline is February 1 for one-year MA program options (not available for the HRD or MCTL tracks).

Letters of recommendation, résumé, essays, and other department application materials are submitted via the University online application system. Unofficial GRE scores, transcripts, and TOEFL/IELTS score may also be submitted via the online application for admission review purposes only. Admitted students must submit official GRE scores (as applicable), transcripts (sent directly from institution[s]), and TOEFL/IELTS scores (as applicable) to the University as a condition of any admission offer.

Applicants must have completed appropriate undergraduate and graduate study. In some cases, where previous coursework or degrees are marginally related, otherwise qualified applicants will be asked to complete additional background courses after admission. Applications are encouraged from individuals who may have completed undergraduate and/or master's programs in social science, liberal arts, public affairs, and business fields. The department offers study opportunities for professionals who are employed full time as well as for those who wish to pursue graduate studies full time.

International applicants must submit score(s) from one of the following tests:

- TOEFL



- Internet Based - Total Score: 79
- Internet Based - Writing Score: 21
- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 15 to 26 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 to 28 major credits and 6 credits outside the major. The final exam is written.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Comparative and International Development Education

#### Plan A

Total Plan A CIDE Credits: 34 credits

#### Plan A or Plan B

#### Plan A

Total Plan A CIDE Credits: 34 credits

##### Program Core

Offered only in the fall term and normally taken during the year in which the student is writing the masters thesis. Student must take 3 credits of OLPD 5087

[OLPD 5087](#) - MA Research Seminar (3.0 cr)

##### Program Specialization

Select one of the specializations below and choose two of its three core courses.

##### Comparative and international development education

[OLPD 5103](#) - Comparative Education (3.0 cr)

[OLPD 5104](#) - Strategies for International Development of Education Systems (3.0 cr)

[OLPD 5121](#) - Educational Reform in International Context (3.0 cr)

##### or Intercultural/international education

[OLPD 5048](#) - Cross-Cultural Perspectives on Leadership (3.0 cr)

[OLPD 5124](#) - Critical Issues in International Education and Educational Exchange (3.0 cr)

[OLPD 5132](#) - Intercultural Education and Training: Theory and Application (3.0 cr)

##### Research Design and Methods

3 credits to be selected in consultation with advisor.

##### Related Fields (6 cr outside CIDE)

The master's degree requires 6 semester credits taken outside the CIDE program track that directly relate to the student's area of study. These credits should be selected in consultation with the advisor and should constitute a solid coursework foundation for the student's thesis. These courses may include additional methods courses taught outside the department.

##### Electives

Take 6 or more credit(s) from the following list with advisor approval as needed to reach 34 credits total in the program:



Note: 8xxx courses should be taken only with the consent of the instructor.

- OLPD 5044 - Introduction to the Economics of Education (3.0 cr)
- or OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- or OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- or OLPD 5080 - Special Topics: Organizational Leadership, Policy, & Development (1.0 - 3.0 cr)
- or OLPD 5095 - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)
- or OLPD 5107 - Gender, Education, and International Development (3.0 cr)
- or OLPD 5128 - Anthropology of Education (3.0 cr)
- or OLPD 8022 - Education and Globalization: Anthropological Perspectives (3.0 cr)
- or OLPD 8087 - Seminar: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)
- or OLPD 8101 - International Education and Development (3.0 cr)
- or OLPD 8102 - Dynamics of Intercultural Communication in Education (3.0 cr)
- or OLPD 8103 - Comparative Education (3.0 cr)
- or OLPD 8104 - Innovative Systems Thinking in Education and Culture (3.0 cr)
- or OLPD 8302 - Educational Policy Perspectives (3.0 cr)

#### Thesis Credits

Take 10 or more credit(s) from the following:

- OLPD 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

Total Plan B CIDE Credits: 30 credits

##### Program Core

This is a course (OLPD 5087) or an independent study under the adviser (OLPD 5095) to prepare Plan B paper. Students pursuing the degree as a one-year program must take a total of 6 cr of OLPD 5087 over 3 semesters (three of those credits will count towards the electives requirement). Students pursuing the degree as a two-year program must take a minimum of 3 credits of OLPD 5087 or OLPD 5095.

- OLPD 5087 - MA Research Seminar (3.0 cr)
- or OLPD 5095 - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)

##### Program Specializations

Select one of the specializations below and choose two of its three core courses.

##### Comparative and international development education

- OLPD 5103 - Comparative Education (3.0 cr)
- OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)
- OLPD 5121 - Educational Reform in International Context (3.0 cr)

##### or Intercultural/international education

- OLPD 5048 - Cross-Cultural Perspectives on Leadership (3.0 cr)
- OLPD 5124 - Critical Issues in International Education and Educational Exchange (3.0 cr)
- OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)

##### Research Design and Methods

3 credits to be selected in consultation with advisor.

##### Electives

Take 12 or more credit(s) from the following list with advisor approval as needed to reach 30 credits total in the program:

Note: 8xxx courses should be taken only with the consent of the instructor.

- OLPD 5044 - Introduction to the Economics of Education (3.0 cr)
- or OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- or OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- or OLPD 5080 - Special Topics: Organizational Leadership, Policy, & Development (1.0 - 3.0 cr)
- or OLPD 5095 - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)
- or OLPD 5107 - Gender, Education, and International Development (3.0 cr)
- or OLPD 5128 - Anthropology of Education (3.0 cr)
- or OLPD 8022 - Education and Globalization: Anthropological Perspectives (3.0 cr)
- or OLPD 8087 - Seminar: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)
- or OLPD 8101 - International Education and Development (3.0 cr)
- or OLPD 8102 - Dynamics of Intercultural Communication in Education (3.0 cr)
- or OLPD 8103 - Comparative Education (3.0 cr)
- or OLPD 8104 - Innovative Systems Thinking in Education and Culture (3.0 cr)
- or OLPD 8302 - Educational Policy Perspectives (3.0 cr)

##### Related Fields (6 cr outside CIDE)

The master's degree requires 6 semester credits taken outside the CIDE program track that directly relate to the student's area of study. These courses should be selected in consultation with the advisor and should constitute a solid coursework foundation for the student's thesis. These courses may include additional methods courses taught outside the department.



## Education Policy and Leadership

### Plan A or Plan B

#### Plan A

##### Program Core (Minimum 6 cr)

Take from the following including subgroup 1:

- OLPD 5041 - Sociology of Education (3.0 cr)
- or OLPD 5044 - Introduction to the Economics of Education (3.0 cr)
- or OLPD 5048 - Cross-Cultural Perspectives on Leadership (3.0 cr)
- or OLPD 5344 - School Law (3.0 cr)
- or OLPD 5364 - Context and Practice of Educational Leadership (3.0 cr)
- or OLPD 8302 - Educational Policy Perspectives (3.0 cr)

##### or Subgroup 1

Take OLPD 5001 if it is being offered or one of the two alternatives if OLPD 5001 is not being offered. Note: OLPD 5011 should be taken only with advisor approval.

- OLPD 5001 - Formal Organizations in Education (3.0 cr)
- or OLPD 5011 - Leading Organizational Change: Theory and Practice (3.0 cr)
- or OLPD 5607 - Organization Development (3.0 cr)

##### Research Design and Methods (6 cr)

Selected in consultation with advisor.

##### Related Fields (6 cr outside EPL)

The master's degree requires 6 credits taken outside of the EPL program track that directly relate to the student's area of study. These courses should be selected in consultation with the advisor.

##### Electives (2-8 cr)

Selected in consultation with advisor.

##### Thesis Credits (10 cr)

- OLPD 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

##### Research Project

Plan A students will develop and carry out an empirical research project under the supervision of their advisor.

**Total = 30 - 36 credits**

-OR-

#### Plan B

##### Required Coursework (Minimum 6 cr)

Take a minimum of 6 credits from the following including subgroup 1:

- OLPD 5607 - Organization Development (3.0 cr)
- or OLPD 8302 - Educational Policy Perspectives (3.0 cr)

##### or Subgroup 1

Take OLPD 5001 if it is being offered or the alternative if OLPD 5001 is not being offered. Note OLPD 5011 should only be taken with advisor approval.

- OLPD 5001 - Formal Organizations in Education (3.0 cr)
- or OLPD 5011 - Leading Organizational Change: Theory and Practice (3.0 cr)

##### Program Core (6 cr)

Choose one course from each of the following two areas:

##### Leadership courses

Choose one of the following:

- OLPD 5048 - Cross-Cultural Perspectives on Leadership (3.0 cr)
- or OLPD 5364 - Context and Practice of Educational Leadership (3.0 cr)

##### Other Coursework

Choose one of the following:

- OLPD 5041 - Sociology of Education (3.0 cr)
- or OLPD 5044 - Introduction to the Economics of Education (3.0 cr)
- or OLPD 5128 - Anthropology of Education (3.0 cr)
- or OLPD 5324 - Strategic Financial Planning and Policy for Educational Leaders (3.0 cr)
- or OLPD 5344 - School Law (3.0 cr)
- or OLPD 5346 - Politics of Education (3.0 cr)

##### Research Design and Methods (3 cr)

- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)

##### Related Fields (6 cr outside EPL)

6 additional credits outside of the EPL program track, selected in consultation with advisor. These usually include additional courses from the program core or other OLPD courses.

##### Electives (3-8 cr)

Selected in consultation with advisor to meet required 30-32 total credit requirement for this track.



### Colloquium Paper (3-6)

Students prepare a paper on an issue of relevance in school administration or revise and expand three course papers. Total of 120 hours of work required. Students in the two-year program must take 3 or more credits of OLPD 5095. Students in the one-year program must take a total of 6 cr of OLPD 5087 or OLPD 5095 over 3 semesters with advisor approval (three of those credits will count towards the electives requirement).

[OLPD 5087](#) - MA Research Seminar (3.0 cr)

or [OLPD 5095](#) - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)

## Evaluation Studies

### Plan A or Plan B

#### Plan A

Total Plan A ES Credits: 31-32 credits

##### Program Core (6 cr)

[OLPD 5501](#) - Principles and Methods of Evaluation (3.0 cr)

[OLPD 5502](#) - Theory and Models of Evaluation (3.0 cr)

or [OLPD 8502](#) - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)

##### Research Design and Methods (Minimum 6 cr)

Two qualitative methods courses selected in consultation with advisor for a minimum of 6 credits.

##### Related Fields (6 cr outside ES)

The master's degree requires 6 semester credits taken outside the ES program track that directly relate to the student's area of study. These courses should be selected in consultation with the advisor. These courses may include additional methods courses taught outside the department such as:

EPSY 5261-Introductory Statistical Methods (3 cr) or comparable stats course required

One additional EPSY measurement or methods course

##### Electives ( Minimum 3 cr)

At least 3 cr selected in consultation with advisor to meet required 31-32 total credit requirement.

##### Thesis Credits (10 cr)

[OLPD 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

Total Plan B ES Credits: 30-32 credits

##### Program Core (9 credits)

[OLPD 5501](#) - Principles and Methods of Evaluation (3.0 cr)

[OLPD 5521](#) - Cost and Economic Analysis in Educational Evaluation (3.0 cr)

[OLPD 5502](#) - Theory and Models of Evaluation (3.0 cr)

or [OLPD 8502](#) - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)

##### Research Design and Methods (Minimum 6 cr)

Two qualitative methods courses selected in consultation with advisor.

##### Related Fields (6 cr outside ES)

The master's degree requires 6 semester credits taken outside the ES program track that directly relate to the student's area of study. These courses should be selected in consultation with the advisor and should constitute a solid coursework foundation for the student's thesis.

##### Electives (6-7 cr)

Coursework related to the student's specialization, selected in consultation with the advisor. This will total 6-7 credits for students in the one-year or two-year program. These may be OLPD or outside courses.

##### Colloquium Paper (3-6 cr)

Total of 120 hours of work required. Students in the two-year program must take 3 or more credits of OLPD 5095. Students in the one-year program must take a total of 6 cr of OLPD 5087 or OLPD 5095 over 3 semesters with advisor approval (three of those credits will count towards the electives requirement).

[OLPD 5087](#) - MA Research Seminar (3.0 cr)

or [OLPD 5095](#) - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)

## Higher Education

### Plan A or Plan B

#### Plan A

Total Plan A HE Credits: 34 credits

##### Required Coursework (6 cr)

[OLPD 5701](#) - U.S. Higher Education (3.0 cr)

[OLPD 5709](#) - Critical Issues in Higher Education (3.0 cr)

##### Program Area (9 cr minimum)



From the following with advisor consultation and approval. Other courses as offered by HE program track faculty may also meet this requirement.

- OLPD 5001 - Formal Organizations in Education (3.0 cr)
- or OLPD 5080 - Special Topics: Organizational Leadership, Policy, & Development (1.0 - 3.0 cr)
- or OLPD 5704 - College Students Today (3.0 cr)
- or OLPD 5721 - Race and Ethnicity in Higher Education (3.0 cr)
- or OLPD 5724 - Leadership and Administration of Student Affairs (2.0 - 3.0 cr)
- or OLPD 5732 - The Law and Postsecondary Institutions (3.0 cr)
- or OLPD 5734 - Institutional Research in Postsecondary Education (2.0 - 3.0 cr)
- or OLPD 5736 - Public Engagement and Higher Education (3.0 cr)

**Related Fields (6 cr outside HE)**

The master's degree requires 6 semester credits taken outside the HE program track that directly relate to the student's area of study. These courses should be selected in consultation with the advisor and should constitute a solid coursework foundation for the student's thesis. These courses may include additional methods courses taught outside the department.

**Research Design and Methods (3 cr minimum)**

Select courses in consultation with their advisor.

- CI 8148 - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- or EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- or EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- or EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- or EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- or OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- or OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- or OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)
- or OLPD 8812 - Quantitative Research in Education (3.0 cr)
- or CI 5116 - Action Research in Educational Settings (3.0 cr)

**Thesis Credits (10 cr)**

Take 10 or more credit(s) from the following:

- OLPD 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan B**

Total Plan B HE Credits: 30 credits

**Required Coursework (6 cr)**

- OLPD 5701 - U.S. Higher Education (3.0 cr)
- OLPD 5709 - Critical Issues in Higher Education (3.0 cr)

**Program Area (12 cr minimum)**

Selected from the following with advisor consultation and approval. Other courses as offered by HE program track faculty may also meet this requirement.

- OLPD 5001 - Formal Organizations in Education (3.0 cr)
- or OLPD 5080 - Special Topics: Organizational Leadership, Policy, & Development (1.0 - 3.0 cr)
- or OLPD 5704 - College Students Today (3.0 cr)
- or OLPD 5721 - Race and Ethnicity in Higher Education (3.0 cr)
- or OLPD 5724 - Leadership and Administration of Student Affairs (2.0 - 3.0 cr)
- or OLPD 5732 - The Law and Postsecondary Institutions (3.0 cr)
- or OLPD 5734 - Institutional Research in Postsecondary Education (2.0 - 3.0 cr)
- or OLPD 5736 - Public Engagement and Higher Education (3.0 cr)

**Related Fields (6 cr)**

The master's degree requires 6 semester credits taken outside the HE track that directly relate to the student's area of study. These courses should be selected in consultation with the advisor and should constitute a solid coursework foundation for the student's thesis. These courses may include additional methods courses taught outside the department.

**Methods Course (3 cr minimum)**

Select courses in consultation with advisor for a minimum of 3 credits. It is strongly recommended that students in the one year program take a methods course with a course designator other than OLPD.

- CI 8148 - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- or EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- or EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- or EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- or EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- or OLPD 5056 - Case Studies for Policy Research (3.0 cr)
- or OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- or OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)
- or OLPD 8812 - Quantitative Research in Education (3.0 cr)
- or CI 5116 - Action Research in Educational Settings (3.0 cr)

**Colloquium Paper (3 - 6 cr)**



Plan B paper is prepared under the guidance of advisor and committee. The final paper must represent no fewer than 120 hours of work. Students in the two-year program must take 3 or more credits of OLPD 5087 or 5795. Students in the one-year program must take a total of 6 cr of OLPD 5087 or OLPD 5795 over 3 semesters with advisor approval (three of those credits will count toward the related fields requirement).

[OLPD 5087](#) - MA Research Seminar (3.0 cr)

## Human Resource Development

### Plan A or Plan B

#### Plan A

The masters degree requires 6 credits taken outside the program track that directly relate to the students area of study. Courses totaling 6+ credits should be selected in consultation with the advisor. These courses may include additional methods courses taught outside the department.

##### General Aspects (3 cr)

[OLPD 5801](#) - Survey: Human Resource Development and Adult Education (3.0 cr)

##### Research (7 cr)

[OLPD 5819](#) - Evaluating and Using Research in Organizations and Education (3.0 cr)

[OLPD 8815](#) - Ethics and Responsible Research (1.0 cr)

an 8xxx qualitative or quantitative research course (3 cr)

##### Program Core (16 cr minimum)

Student must take 4 credits of OLPD 5696. Advisor can substitute courses as appropriate.

[OLPD 5605](#) - Strategic Planning through Human Resources (3.0 cr)

[OLPD 5696](#) - Internship: Human Resource Development (1.0 - 10.0 cr)

[OLPD 5615](#) - Training and Development of Human Resources (3.0 cr)

[OLPD 5607](#) - Organization Development (3.0 cr)

[OLPD 5201](#) - Strategies for Teaching Adults (3.0 cr)

##### Thesis Credits (10 cr)

[OLPD 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

##### Electives

Credits to total a minimum of 36 graduate-level coursework credits

**Total = 36 cr**

-OR-

#### Plan B

The masters degree requires 6 credits taken outside the program track that directly relate to the students area of study. Courses totaling 6+ credits should be selected in consultation with the advisor. These courses may include additional methods courses taught outside the department.

##### General Aspects (3 cr)

[OLPD 5801](#) - Survey: Human Resource Development and Adult Education (3.0 cr)

##### Research (7 cr)

[OLPD 5819](#) - Evaluating and Using Research in Organizations and Education (3.0 cr)

[OLPD 8815](#) - Ethics and Responsible Research (1.0 cr)

an 8xxx qualitative or quantitative research course (3 cr)

##### Program Core (16 cr minimum)

Student must take 4 credits of OLPD 5696. Advisor can substitute courses as appropriate.

[OLPD 5605](#) - Strategic Planning through Human Resources (3.0 cr)

[OLPD 5696](#) - Internship: Human Resource Development (1.0 - 10.0 cr)

[OLPD 5615](#) - Training and Development of Human Resources (3.0 cr)

[OLPD 5607](#) - Organization Development (3.0 cr)

[OLPD 5201](#) - Strategies for Teaching Adults (3.0 cr)

##### Plan B Project Paper (3 - 6 cr)

Plan B project/paper is prepared under the guidance of advisor & committee - must represent no fewer than 120 hours of work.

Students should register for between 3-6 credits

[OLPD 5095](#) - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)

##### Electives

With approval of advisor as needed to total a minimum of 34 graduate-level coursework credits overall for this plan.

**Total = 34 cr**





### **Twin Cities Campus**

## **Organizational Leadership, Policy, and Development Ph.D.**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

The Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455 (612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 70 to 72
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Organizational Leadership, Policy, and Development is a leader in advancing knowledge about educational and organizational change in local national, and international contexts. Its research, teaching, and outreach reflect a commitment to interdisciplinary and intercultural engagement with educators, scholars, and policy makers seeking to enhance leadership, policy, and development around the globe. Students in the MA and PhD programs choose from one of five complementary but distinct program tracks: education policy and leadership (EPL), evaluation studies (ES), higher education (HE), comparative and international development education (CIDE), and human resource development (HRD). Undergraduate programs focus on human resource development and business and marketing education. In addition, the department offers a variety of programs for practicing professionals and various licensure programs.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants must have completed appropriate undergraduate and graduate study. In some cases, where previous coursework or degrees are marginally related, otherwise qualified applicants will be asked to complete additional background courses after admission. Applications are encouraged from individuals who may have completed undergraduate and/or master's programs in social science, liberal arts, business, and education fields. The department offers study opportunities for professionals who are employed full-time, as well as for those who wish to pursue graduate studies full-time.

### **Special Application Requirements:**

Applicants must submit scores from the General Test of the GRE, two letters of recommendation from persons familiar with their scholarship and research potential, a complete set of academic transcripts, and a current résumé; as well as answer required essay questions via the University online application system. Unofficial GRE scores, transcripts, and TOEFL/IELTS score may be submitted via the online application for admission review purposes only. Admitted students must submit official GRE scores (as applicable), transcripts (sent directly from institution[s]), and TOEFL/IELTS scores (as applicable) to the University as a condition of any admission offer.

The GRE is required for all tracks in the doctoral degree programs (Ed.D. and Ph.D.). International students must also submit a TOEFL or IELTS score. All applications for admission are reviewed once per year for Fall admission. Submission of all application materials for all tracks by December 1 is strongly encouraged to ensure priority consideration for assistantships awarded for the next academic year. All new students begin in fall semester unless special permission to start earlier is granted by the program coordinator.

International applicants must submit score(s) from one of the following tests:

- TOEFL



- Internet Based - Total Score: 79
- Internet Based - Writing Score: 21
- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

30 to 48 credits are required in the major.  
0 to 18 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Credits required by the major vary by track. The PhD is available in five program tracks: education policy and leadership, evaluation studies, higher education, comparative and international development education, and human resource development. All PhD programs include 16 credits in department core courses (which include 15 credits of research methodology courses), 18 or more credits in program core courses, 12-14 credits program approved electives, and 24 thesis credits. The minimum total of course credits varies by track (see the student handbook on the department website for details). Preliminary written and oral exams are required. Students must complete a dissertation. Within the general framework for PhD requirements, the degree program is developed by the student and his or her advisor and is subject to approval by the department's director of Graduate Studies and the University.

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Comparative and International Development Education

The doctor of philosophy (PhD) degree with a program emphasis in comparative and international development education (CIDE) is offered by the Department of Organizational Leadership, Policy, and Development (OLPD). CIDE uses an interdisciplinary approach to the study of education's role in economic, political, and sociocultural development; international educational exchange; and the internationalization of education. The two specializations within CIDE are comparative and international development education and intercultural/international education.

#### Department Core (16 cr)

##### Professional socialization seminar

Taken fall term of first year.

[OLPD 8011](#) - Doctoral Research Seminar I (1.0 cr)

##### Research courses

Take OLPD 8015 spring term of first year.

[OLPD 8015](#) - Inquiry strategies in educational and organizational research (3.0 cr)

Quantitative course to be determined by student and adviser (3 cr in or outside of department)

Qualitative course to be determined by student and adviser (3 cr in or outside of department)

6 credits of additional methods courses to be determined by student and adviser (in or outside of department)

#### Doctoral Seminars in CIDE (6 cr)

Students take 6 credits; 2 credits in each of 3 semesters starting in the spring term of the first year in the program; course numbers are listed as OLPD 8121, section 002; OLPD 8121, section 003; and OLPD 8121, section 004.

#### Specialization Courses (6 cr minimum)

Students choose two courses, with a minimum of one 8xxx course for specializations. Any specialization core course not being used as core class can become a CIDE elective.

#### Comparative and International Development Education

Take 6 or more credit(s) from the following:



OLPD 5103 - Comparative Education (3.0 cr)  
or OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)  
or OLPD 5121 - Educational Reform in International Context (3.0 cr)  
or OLPD 8101 - International Education and Development (3.0 cr)  
or OLPD 8103 - Comparative Education (3.0 cr)

**Intercultural/international education**

Take 6 or more credit(s) from the following:

OLPD 5048 - Cross-Cultural Perspectives on Leadership (3.0 cr)  
or OLPD 5124 - Critical Issues in International Education and Educational Exchange (3.0 cr)  
or OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)  
or OLPD 8087 - Seminar: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)

**CIDE Elective Courses (8 cr minimum)**

OLPD 5044 - Introduction to the Economics of Education (3.0 cr)  
or OLPD 5056 - Case Studies for Policy Research (3.0 cr)  
or OLPD 5061 - Ethnographic Research Methods (3.0 cr)  
or OLPD 5080 - Special Topics: Organizational Leadership, Policy, & Development (1.0 - 3.0 cr)  
or OLPD 5095 - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)  
or OLPD 5107 - Gender, Education, and International Development (3.0 cr)  
or OLPD 5128 - Anthropology of Education (3.0 cr)  
or OLPD 8022 - Education and Globalization: Anthropological Perspectives (3.0 cr)  
or OLPD 8087 - Seminar: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)  
or OLPD 8104 - Innovative Systems Thinking in Education and Culture (3.0 cr)  
or OLPD 8302 - Educational Policy Perspectives (3.0 cr)

**Additional Coursework (12 cr minimum)**

These credits can be used to meet the requirement that a minimum of 12 credits be taken outside the CIDE track or for a minor. Courses not specifically listed should have advisor approval.

**Education Policy and Leadership**

The doctor of philosophy (PhD) degree with a program emphasis in education policy and leadership (EPL) provides an opportunity for intensive study of the field of education. It is especially suitable for students who wish to pursue careers in policy, research, or college and university teaching. It is also available to students who are interested in careers in school, district, and statewide administration, though it is more theory and research-oriented than the doctorate of education (Ed.D.) degree, which is also offered by OLPD. Educational administration offers coursework and research opportunities for those interested in making a difference in educational systems and settings that involve PreK-12 children and youth. The program is committed to supporting the development of leaders and scholars who work to continuously improve educational quality and effectiveness so that young people graduate from secondary education well prepared to continue their learning and to contribute to their communities. The program promotes understanding of schools as organizations and emphasizes application of knowledge and research to varied contexts of educational practice.

**Department Core (16 cr)**

**Professional socialization seminar**

Taken fall term of first year.

OLPD 8011 - Doctoral Research Seminar I (1.0 cr)

**Research courses**

Take OLPD 8015 spring term of first year.

OLPD 8015 - Inquiry strategies in educational and organizational research (3.0 cr)  
3 credit quantitative course (in or outside of department) in consultation with adviser  
3 credit qualitative course (in or outside of department) in consultation with adviser  
6 credits of additional methods courses in consultation with adviser

**Program Core: Education Policy and Leadership (18 cr)**

OLPD 5346 - Politics of Education (3.0 cr)  
OLPD 8021 - Leadership: From Theory to Reflective Practice (3.0 cr)  
OLPD 8104 - Innovative Systems Thinking in Education and Culture (3.0 cr)  
OLPD 8302 - Educational Policy Perspectives (3.0 cr)

**Subgroup 1**

Take OLPD 5001 if it is being offered or one of the two alternatives if OLPD 5001 is not being offered.

OLPD 5001 - Formal Organizations in Education (3.0 cr)  
or OLPD 5011 - Leading Organizational Change: Theory and Practice (3.0 cr)  
or OLPD 5607 - Organization Development (3.0 cr)

**OLPD Electives (Minimum 3 cr)**

Electives selected with approval of advisor.

**Additional Coursework (12 cr minimum)**

These credits can be used to meet the requirement that a minimum of 12 credits be taken outside the EPL track or for a minor. Courses not specifically listed should have adviser approval. Students who have successfully completed enrollment in the University of Minnesota's Principals Academy may use transfer credits to fulfill this requirement.



### Evaluation Studies

The doctor of philosophy (PhD) degree with a program emphasis in evaluation studies (ES) provides an opportunity for intensive study of the techniques and process of evaluation and policy research and of the social and political context within which program evaluation occurs. Graduates leave with a portfolio filled with evidence of their expertise with the tools of the evaluation trade--qualitative and quantitative inquiry methods, communication skills, and computer database analysis experience. Evaluation knowledge and skills are gleaned not only from time in the classroom but also from internships and collaboration with evaluation professionals in real-world settings. Evaluation studies students have access to some of the best evaluators in the field.

#### Department Core (16 cr)

Taken fall term of first year.

[OLPD 8011](#) - Doctoral Research Seminar I (1.0 cr)

#### Research Courses

Take OLPD 8015 spring term of first year.

[OLPD 8015](#) - Inquiry strategies in educational and organizational research (3.0 cr)

3 credit quantitative course (in or outside of department) in consultation with adviser

3 credit qualitative course (in or outside of department) in consultation with adviser

6 credits of additional methods courses in consultation with adviser

#### Program Core: Evaluation Studies (15 cr)

Student must take OLPD 8595 for 3 credits. Student must take OLPD 8596 twice in two different semesters for 3 credits each time.

[OLPD 5501](#) - Principles and Methods of Evaluation (3.0 cr)

[OLPD 8502](#) - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)

[OLPD 8595](#) - Evaluation Problems (1.0 - 6.0 cr)

[OLPD 8596](#) - Evaluation Internship (1.0 - 9.0 cr)

#### Additional Coursework (17 cr minimum)

These credits can be used to meet the requirement that a minimum of 12 credits be taken outside the ES track or for a minor. Courses not specifically listed should have advisor approval.

### Higher Education

The doctor of philosophy (PhD) degree with a program emphasis in higher education (HIED) provides an opportunity for intensive study of the policies and organizational issues in higher education institutions and systems. HIED focuses on the experiences, practices, and decisions of those involved in postsecondary education, as well as on the sociopolitical contexts in which higher education exists. Areas of specialization include administration and organization, policy, college students, external relations, equity-oriented change, and research integrity.

#### Department Core (16 cr)

##### Professional socialization seminar

Taken fall term of first year.

[OLPD 8011](#) - Doctoral Research Seminar I (1.0 cr)

##### Research Design and Methods

Take OLPD 8015 spring term of first year.

[OLPD 8015](#) - Inquiry strategies in educational and organizational research (3.0 cr)

3 credit quantitative course (in or outside of department) in consultation with adviser

3 credit qualitative course (in or outside of department) in consultation with adviser

6 credits of additional methods courses in consultation with adviser

#### Program Core: Higher Education (12 cr)

[OLPD 5701](#) - U.S. Higher Education (3.0 cr)

[OLPD 5704](#) - College Students Today (3.0 cr)

[OLPD 8702](#) - Administration and Leadership in Higher Education (3.0 cr)

[OLPD 8703](#) - Public Policy in Higher Education (3.0 cr)

#### Electives (9 cr)

Focused on issues relevant to the HE track with advisor approval.

#### Additional Coursework (11 cr minimum)

These credits can be used to meet the requirement that a minimum of 12 credits be taken outside the HE track or for a minor. Courses not specifically listed should have advisor approval.

### Human Resource Development

The doctor of philosophy (PhD) degree with a program emphasis in human resource development (HRD) is offered by the Department of Organizational Leadership, Policy, and Development (OLPD). Students in HRD combine study and related experiences to develop, apply, analyze, synthesize, and evaluate knowledge of the purposes, practices, issues, and problems of work and community education; social, economic, historical, political, cultural, educational, technological, and psychological contexts within which work and community education exist; and types of research that contribute to or apply that knowledge to the specialization.

#### Department Core (16 cr)

##### Professional socialization seminar

Taken fall term of first year.



[OLPD 8011](#) - Doctoral Research Seminar I (1.0 cr)

**Dept Research Courses**

Take OLPD 8015 spring term of first year.

[OLPD 8015](#) - Inquiry strategies in educational and organizational research (3.0 cr)

3 credit quantitative foundations course (in or outside of department) in consultation with adviser

3 credit qualitative foundations course (in or outside of department) in consultation with adviser

6 credits of additional methods courses in consultation with adviser

**Specialization (9 cr)**

Courses must have advisor approval.

One 8xxx level theory seminar (3 cr)

2 or 3 8xxx level seminars offered by various HRD faculty (2-3 credits each for a total of 6 cr)

**Additional Research Courses (9 cr)**

In addition to the research/methodology courses mentioned in the department core, the following are required for students in HRD:

- 3 credit statistics course selected in consultation with advisor

- The Capstone Research Experience Course(OLPD 8603) is offered every other year. When it is offered take six credits over two semesters, three credits to be taken in fall semester and three credits to be taken in spring semester. Is usually taken during the second year if student is full time.

[OLPD 8603](#) - HRD Capstone Research Experience (3.0 cr)

**Additional Coursework (14 cr minimum)**

These credits can be used to meet the requirement that a minimum of 12 credits be taken outside the HRD track or for a minor.

Courses not specifically listed should have advisor approval.



### **Twin Cities Campus**

## **Parent Education Postbaccalaureate Certificate**

*Family Social Science*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Family Social Science, 290 McNeal Hall, 1985 Buford Avenue, St Paul MN 55108 (612-625-2705; fax: 612-625-4227)

Email: [famed@umn.edu](mailto:famed@umn.edu)

Website: <http://www.cehd.umn.edu/fsos/programs/index.html>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 15 to 18
- This program does not require summer semesters for timely completion.
- Degree: Parent Education PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The parent education certificate prepares well-qualified, parent education professionals to deliver programs designed to address the intellectual, emotional, cultural, social, and physical needs of parents and children in a variety of educational settings. These professionals will be positioned to work in a wide variety of areas, including some school-based parent education programs, preschools, child care centers, Head Start programs, health care and social-service agencies and institutions, and faith-based settings.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

A bachelor's degree from an accredited institution in family studies, child psychology, early childhood education, nutrition, or related fields. A 2.80 overall GPA in undergraduate work.

#### **Special Application Requirements:**

Application deadlines are March 1 and October 1. Apply online at: <https://choose.umn.edu/apply/>

For program specific application details see: <http://www.cehd.umn.edu/fsos/programs/professional/certificate/how-to-apply.html>

Complete the equivalent of three semester undergraduate or graduate credits in child development courses before entering the parent education certificate program. If these credits have not been completed at the time of application, the applicant may be admitted conditionally until they are completed and recorded on a transcript. Prerequisite coursework cannot be applied toward the certificates credit requirements. Possible CEHD courses that meet the child development requirement include:

CPSY 5301 - Advanced Developmental Psychology  
CPSY 5261 - Early Learning in Infancy and Toddlerhood  
CPSY 5302 - Cognitive and Biological Development  
CPSY 5303 - Social and Emotional Development

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB



- Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Required Courses (15 credits)

Take the following courses:

[FSOS 5937](#) - Parent-Child Interaction (3.0 cr)

[FSOS 5942](#) - Diverse Family Experiences (3.0 cr)

[FSOS 5944](#) - Curricular Design in Parent Education (3.0 cr)

[FSOS 5945](#) - Teaching and Learning in Parent Education (3.0 cr)

[FSOS 5946](#) - Assessment and Evaluation in Parent Education (3.0 cr)

### Optional Coursework (0-3 credits)

Professionals who desire additional classroom experience are recommended to take the following additional course:

[FSOS 5949](#) - Student Teaching in Parent Education (3.0 cr)



### **Twin Cities Campus**

## **Physical Activity and Health M.Ed.**

*Kinesiology, School of*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Website: <https://www.cehd.umn.edu/kin/academics/grad/med-pah.html>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The M.Ed. in physical activity and Health relates to the M.P.H. in community health promotion in the School of Public Health in the following ways:

1. The ultimate goals of the programs are to promote health and prevent chronic diseases;
2. Both programs study the distribution and determinants of health-related states or events in specified populations; and
3. Both programs adopt population-based interventions.

However, they are essentially different in that the M.P.H. in community health promotion focuses on designing community-based program and policy interventions that improved the health of communities while the proposed M.Ed. in physical activity and health focuses on applied training of physical activity professionals to increase physical activity in various populations.

There are limited prerequisites for this program. Students with a background in kinesiology, exercise science, public health, biology, and/or psychology will be able apply for the program. There is minimal overlap with the existing M.Ed. programs at School of Kinesiology and the existing M.P.H. programs at School of Public Health.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Kinesiology, exercise science, public health, biology, psychology

Master degree

Other requirements to be completed before admission:

There are no course requirements for admission except for a Bachelor degree and acceptance to the University of Minnesota Graduate School.

#### **Special Application Requirements:**

The School reviews applications on an ongoing basis. Application reviews for specific academic terms begin by the following dates:

November 1: spring semester admission

March 1: summer session admission

July 1: fall semester admission (priority deadline May1)

Admission requirements for this program include the following criteria:

A bachelor's degree, preferably in kinesiology, exercise science, public health, biology, psychology, with a 3.0 minimum grade point average (GPA) from an accredited institution.

All applicants must submit the following items:





- Online application
- Application fee (\$75 for U.S. applicants; \$95 for international applicants)
- Unofficial transcripts of all previous post-secondary academic study must be downloaded to the application (official transcripts will be required if accepted)
- Personal statement describing career goals and rationale for interest in the program
- Diversity statement
- Resume

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 26 major credits and 4 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Students will enroll in 3 hrs of KIN 5995 Research Problems in Kinesiology to complete their Capstone project. The requirement is a literature review on a particular topic approved by their advisor. Below are the details for the literature review.

1. Research Question Development: (20% of Capstone grade)
2. Literature Review Matrix: (20% of Capstone grade)
3. Literature Review Final Draft: (60% of Capstone grade)

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Required Courses

Students are required to take at least 9 credits in this category. Students need to take at least 3 credits of KIN 5995 after the majority of the coursework is completed.

- [KIN 5181](#) - Understanding Kinesiology Research (3.0 cr)
- [KIN 5125](#) - Advances in Physical Activity and Health (3.0 cr)
- [KIN 5995](#) - Research Problems in Applied Kinesiology (1.0 - 6.0 cr)

### Selected Courses

Students must take at least 21 credits for selected courses, of which a minimum of 17 credits from KIN and 4 credits from PUBH courses.

- [KIN 4134](#) - The Aging Motor System (3.0 cr)
- [KIN 4214](#) - Health Promotion (3.0 cr)
- [KIN 4385](#) - Exercise Physiology (4.0 cr)
- [KIN 4687](#) - Principles and Theory of Sports Coaching (3.0 cr)
- [KIN 5104](#) - Physical Activities for Persons with Disabilities (3.0 cr)
- [KIN 5122](#) - Applied Exercise Physiology (3.0 cr)
- [KIN 5123](#) - Motivational Interventions in Physical Activity (3.0 cr)
- [KIN 5125](#) - Advances in Physical Activity and Health (3.0 cr)
- [KIN 5126](#) - Social Psychology of Sport & Physical Activity (3.0 cr)
- [KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)



- [KIN 5202](#) - Current Issues in Health (2.0 cr)
- [KIN 5203](#) - Health Media, Consumerism, and Communication (2.0 cr)
- [KIN 5328](#) - International Sport: The Impact of the Olympic Games [HIS, GP] (3.0 cr)
- [KIN 5385](#) - Exercise for Healthy Aging & Disease Prevention and Management (3.0 cr)
- [KIN 5485](#) - Exercise Testing and Prescription (3.0 cr)
- [KIN 5585](#) - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)
- [PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)
- [PUBH 6074](#) - Mass Communication and Public Health (3.0 cr)
- [PUBH 6094](#) - Obesity and Eating Disorder Interventions (2.0 cr)
- [PUBH 6914](#) - Community Nutrition Intervention (3.0 cr)
- [PUBH 6954](#) - Personal, Social and Environmental Influences on the Weight-Related Health of Pediatric Populations (2.0 cr)



### ***Twin Cities Campus***

## **PK-12 Administration Postbaccalaureate Certificate**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Organizational Leadership, Policy, and Leadership, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455 (612-626-8647; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd/grad-programs/Adm-Licensure/default.html>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 20 to 23
- This program requires summer semesters for timely completion.
- Degree: PK-12 Administration PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The PK-12 Administration post-baccalaureate certificate, housed within the University's Department of Organizational Leadership, Policy, and Development, offers coursework specifically designed to address competencies required by the state of Minnesota for the following licenses: K-12 Principal; Superintendent; Director of Special Education; and Director of Community Education.

### **Accreditation**

This program is accredited by Minnesota Board of School Administrators and the NCATE.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

### **Special Application Requirements:**

Applications are reviewed on a rolling basis.

Please visit <http://www.cehd.umn.edu/OLPD/apply/certificate/administrative-licensure/> for information about application process and related fees.

Please note: The PK-12 Administration certificate is not offered full-time and therefore is not intended for international students needing a visa to study in the United States.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

A grade of C or better is required for coursework taken on the A/F grading basis.

An electronic portfolio, presented to a review panel made up of representatives from the University and licensed practitioners, is required.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

Please refer to <https://www.cehd.umn.edu/teaching/> for the most up to date licensure requirements, as they are subject to change.

## Focus Areas

### K-12 Principal (23 credits)

Take the following courses:

- OLPD 5321 - The Principal as Leader of High-Performing Schools (3.0 cr)
- OLPD 5324 - Strategic Financial Planning and Policy for Educational Leaders (3.0 cr)
- OLPD 5344 - School Law (3.0 cr)
- OLPD 5348 - Leaders of Human Resources Administration (3.0 cr)
- OLPD 5384 - Special Education Law for Leaders (1.0 cr)
- OLPD 5385 - Licensure Seminar: Program Policies and Inclusionary Leadership (1.0 cr)
- OLPD 5386 - Leadership Portfolio Seminar (1.0 cr)
- OLPD 5387 - Leadership for Teaching and Learning (3.0 cr)
- OLPD 5388 - Leadership for Master(ful) Scheduling (2.0 cr)
- OLPD 5396 - Field Experience in PK-12 Administration: Authentic Practice in Leadership (3.0 cr)

-OR-

### Superintendent (22 credits)

Take the following courses:

- OLPD 5322 - Leaders in the Superintendency and Central Office (3.0 cr)
- OLPD 5324 - Strategic Financial Planning and Policy for Educational Leaders (3.0 cr)
- OLPD 5344 - School Law (3.0 cr)
- OLPD 5348 - Leaders of Human Resources Administration (3.0 cr)
- OLPD 5376 - Leading School Tax Elections (1.0 cr)
- OLPD 5384 - Special Education Law for Leaders (1.0 cr)
- OLPD 5385 - Licensure Seminar: Program Policies and Inclusionary Leadership (1.0 cr)
- OLPD 5386 - Leadership Portfolio Seminar (1.0 cr)
- OLPD 5387 - Leadership for Teaching and Learning (3.0 cr)
- OLPD 5396 - Field Experience in PK-12 Administration: Authentic Practice in Leadership (3.0 cr)

-OR-

### Director of Special Education (22 credits)

Take the following courses:

- OLPD 5324 - Strategic Financial Planning and Policy for Educational Leaders (3.0 cr)
- OLPD 5344 - School Law (3.0 cr)
- OLPD 5348 - Leaders of Human Resources Administration (3.0 cr)
- OLPD 5368 - Leadership for Special Education Services (3.0 cr)
- OLPD 5375 - Special Education Finance: Program Models, Policy, and Law (2.0 cr)
- OLPD 5385 - Licensure Seminar: Program Policies and Inclusionary Leadership (1.0 cr)
- OLPD 5386 - Leadership Portfolio Seminar (1.0 cr)
- OLPD 5387 - Leadership for Teaching and Learning (3.0 cr)
- OLPD 5396 - Field Experience in PK-12 Administration: Authentic Practice in Leadership (3.0 cr)

-OR-



**Director of Community Education (20 credits)**

Take the following courses:

- [OLPD 5389](#) - Community Education Leadership (3.0 cr)
- [OLPD 5377](#) - Leadership in Community Education Finance and Law (1.0 cr)
- [OLPD 5396](#) - Field Experience in PK-12 Administration: Authentic Practice in Leadership (3.0 cr)
- [OLPD 5095](#) - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)
- [OLPD 5324](#) - Strategic Financial Planning and Policy for Educational Leaders (3.0 cr)
- [OLPD 5344](#) - School Law (3.0 cr)
- [OLPD 5348](#) - Leaders of Human Resources Administration (3.0 cr)
- [OLPD 5385](#) - Licensure Seminar: Program Policies and Inclusionary Leadership (1.0 cr)
- [OLPD 5386](#) - Leadership Portfolio Seminar (1.0 cr)



### **Twin Cities Campus**

## **Prevention Science Minor**

*Family Social Science*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Prevention Science Program, 290 McNeal Hall, 1985 Buford Avenue St Paul, MN 55108 (612-625-1900; fax: 612-625-4227)

Email: [fsosgrad@umn.edu](mailto:fsosgrad@umn.edu)

Website: <https://www.cehd.umn.edu/fsos/programs/phd/prev-sci-minor.html>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Prevention science is defined for the purposes of this program as the scientific study of systematic efforts to reduce the incidence of unhealthy or maladaptive behavior, and to promote health and adaptive behavior in populations across the life span through designing and evaluating interventions, and utilizing knowledge about them more strategically.

The fundamental assumption of this free-standing minor is that future researchers and scholars will be most able to meet the challenges and changes occurring in society and in their chosen professions and disciplines if their training is comprehensive and transdisciplinary.

Prevention science is a rapidly expanding interdisciplinary field and this program will increase opportunities for the University's academic researchers to partner with communities to address the complex issues facing society.

Six areas of concentration will be offered. Students will be expected to select one as a major emphasis. Areas of concentration are: 1) promotion of mental health and well being across the life span; 2) interventions in education, health, and social services; 3) social policy; 4) family and community studies (early stage research, needs assessments, action research); 5) methodology; 6) individualized concentration.

For more information about these areas of concentration, visit <https://www.cehd.umn.edu/fsos/programs/phd/prev-sci-minor.html>

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Students must have gained admission to a doctoral degree-granting program, and have prepared a minor program of coursework approved by the director of graduate studies in prevention science. Students are required to make formal application to the program. Doctoral students must apply prior to submitting their graduate degree program in the Graduate Planner and Audit System (GPAS) for approval. Instructions and form can be found at <https://www.cehd.umn.edu/fsos/programs/phd/prev-sci-minor.html>

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

The doctoral minor is developed in consultation with, and should be approved in advance by, the director of graduate studies for prevention science.



The purpose of the minor is to provide students with interdisciplinary training in prevention science; therefore, all students will be required to fulfill the elective requirements for the minor by taking courses outside their major. Courses counting toward a student's major may not be counted toward the minor. All minor coursework must be taken A-F and completed with a GPA of at least 3.0.

#### **Required Courses**

**PREV 8001** - Prevention Science: Principles and Practices (3.0 cr)

or **FSOS 5701** - Prevention Science: Principles and Practices (3.0 cr)

**PREV 8002** - Prevention Science Research Methodology (3.0 cr)

or **FSOS 5702** - Prevention Science Research Methodology (3.0 cr)

**PREV 8003** - New Topics in Prevention: Implementation and Dissemination (3.0 cr)

or **FSOS 5703** - New Topics in Prevention: Implementation and Dissemination (3.0 cr)

#### **ELECTIVE**

Elective course from area of concentration (3.0 cr)

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Doctoral**



### **Twin Cities Campus**

## **Private College Leadership Postbaccalaureate Certificate**

*Organizational Leadership, Policy and Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Organizational Leadership, Policy, and Development

University of Minnesota--Twin Cities

206 Burton Hall, 178 Pillsbury Dr. S.E.,

Univ of Minnesota, Minneapolis Mn, 55455

612-624-1006

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd/default.html>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- For now the courses will be based on the UM Twin Cities campus.
- Degree: Private College Leadership PBacc Cer

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Private College Leadership Certificate is not accepting new students at this time.

Created for professionals who are in faculty positions or beginning levels of college administration, this graduate-level certificate offers specific knowledge and skills related to organizational development, leadership, entrepreneurship, and decision-making necessary for leading independent colleges. The Emerging Leaders in Independent Colleges curriculum is designed for individuals who seek to move into leadership positions but do not have formal training related to leadership and management of independent colleges.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree from an accredited institution. The Private College Leadership Certificate is not accepting new students at this time.

Other requirements to be completed before admission:

Two years of experience in a professional position in higher education.

#### **Special Application Requirements:**

The Private College Leadership Certificate is not accepting new students at this time.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

The Private College Leadership Certificate is not accepting new students at this time.





**Course List**

Take exactly 4 course(s) totaling exactly 12 credit(s) from the following:

- [OLPD 5002](#) - Private Colleges as Formal Organizations (3.0 cr)
- [OLPD 5332](#) - Personal Leadership and the Private College (3.0 cr)
- [OLPD 5845](#) - The Entrepreneurial Private College (3.0 cr)
- [OLPD 5902](#) - Leading Change in Private Colleges (3.0 cr)



### **Twin Cities Campus**

## **Professional Development Postbaccalaureate Certificate**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. S.E., Minneapolis, MN 55455  
(612-626-8647; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12 to 15
- This program does not require summer semesters for timely completion.
- Degree: Professional Development PBacc Certificate Grad

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The certificate in professional development is designed to prepare leaders in designing, implementing, and evaluating learning opportunities for preK-12 educators and related staff.

This 12- to 15-credit graduate-level program offers professional development opportunities for teachers, administrators, and others involved in school improvement initiatives. Throughout the program, students are required to reflect on their learning, make explicit connections between theory and practice, and design staff development processes and materials for use in their own work contexts.

Through the program, participants will:

Learn to apply research-based standards for staff development,

Be prepared for the multifaceted roles and competencies of staff developers,

Identify organizational and leadership capacities for effective staff development policies and practices,

Be able to articulate effective staff learning principles, designs, and strategies,

Evaluate staff development, including its effects on students, staff, and systems,

Learn to work effectively with groups, including both facilitation and training models of learning,

Identify and access staff development resources, including current research and best practices literature,

Gain awareness of individual strengths and areas for continuous improvement as a professional educator and leader of staff learning.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

### **Special Application Requirements:**

Admission to the professional development certificate is open to both degree-seeking or non-degree seeking students. Students may pursue the certificate alone or concurrently with a UM masters or doctoral degree. Applicants must have at least three years of experience working as education or related professionals in preK-12 education. Please note that this program is not offered full-time and therefore is not intended for international students needing a visa to study in the United States. Admission for this program is done on a rolling basis.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.



A minimum GPA of 2.80 is required for students to remain in good standing.

#### Required Courses

- [OLPD 5201](#) - Strategies for Teaching Adults (3.0 cr)
- [OLPD 5374](#) - Leadership for Professional Development (4.0 cr)
- [OLPD 5501](#) - Principles and Methods of Evaluation (3.0 cr)

#### Additional Coursework

With certificate coordinator approval, students choose and complete 2-5 credits of coursework focusing on a topic that interests them. Students can complete this requirement in one of two ways.

Independently designed study or project [OLPD 5095]

Focused elective coursework

Take 2 - 5 credit(s) from the following:

##### Independently designed study or project: OLPD 5095

OLPD 5095 Problems: OLPD (1-3 cr). Students submit a proposal for an independently designed study or project to the certificate coordinator for approval by submitting the Proposal for Independent Study or Project as Elective Option [PDF].

Examples of independently designed studies or projects include:

Comprehensive site-level design for staff development, including learning, implementation, and evaluation components.

##### Independently designed study or project: OLPD 5095 Cont'd

Evaluation of a current staff development or curricular initiative

Internship focused on staff development research, policy, or practice with personnel in school districts, state departments, or higher education

Individualized study or research review of a staff development-related topic

Attendance at a national conference with documentation, reflection on learning, and specified follow-up application

##### Focused elective coursework

In consultation with the certificate coordinator, students can choose elective coursework that aligns with individual interests and best practices in the staff development field. Students may choose from the wide range of offerings at the University of Minnesota, including coursework with the following course designators:

Curriculum and Instruction (CI)

Educational Psychology (EPSY)

Organizational Leadership, Policy, and Development (OLPD)

Public Affairs (PA)

Sociology (SOC)

##### Please Note:

The certificate coordinator must approve elective coursework. Courses taken before formal admission into the program may be accepted as program credits at a later date. Relevant graduate coursework from other graduate institutions may be approved to fulfill the elective requirement after review of relevant course syllabi. However, all coursework must have been taken within five years from the date of acceptance into the certificate program.



### *Twin Cities Campus*

## Program Evaluation Minor

*Organizational Leadership, Policy and Development*

### College of Education and Human Development

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 178 Pillsbury Dr S E, Minneapolis, MN 55455 (612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 15
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Program evaluation is an area of inquiry that uses both quantitative and qualitative methods to address questions of concern to policy makers, administrators, managers, and, in some cases, program participants. In this era of competing developments--increased accountability and the democratization of research activity--knowledge of program evaluation is a useful and valuable commodity. The program evaluation minor is an interdisciplinary effort providing intensive study of the techniques and process of evaluation and policy research, in addition to the social and political context within which program evaluation occurs. The graduate minor in program evaluation offers a coordinated set of courses designed for students who wish to have the knowledge and skills necessary to conduct evaluations combined with their graduate majors or professional fields of study. Courses include readings, discussions, and assignments designed to develop the skills essential to professionals intending to use or conduct evaluation in nonprofit and for-profit organizations.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

Other requirements to be completed before admission:

Prior admission into an established MA or PhD is required. Students in the existing evaluation-related concentrations in organizational leadership, policy, and development or educational psychology are not allowed into the minor. Admission to the minor program will therefore be contingent upon enrollment in good standing within a recognized University of Minnesota degree-granting program.

#### **Special Application Requirements:**

Students interested in admission to the minor should contact the minor's Director of Graduate Studies. Students must demonstrate relevant academic background and experience.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

Use of 4xxx courses towards program requirements is not permitted.

The program for an individual student will be developed by the student, the major advisor, and the director of graduate studies (DGS) of the program evaluation minor. With permission of the program evaluation minor DGS, students with sufficient background and previous course experience equivalent to one or more courses within the minor field curriculum may apply for a waiver of appropriate requirements, and replace waived courses with additional electives to meet the minimum number of credits required for the minor.



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Masters

#### Minor Requirements

- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)  
*or* An alternative course approved by program evaluation steering committee
- OLPD 5502 - Theory and Models of Evaluation (3.0 cr)  
*or* OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)
- OLPD 8596 - Evaluation Internship (1.0 - 9.0 cr)

### Doctoral

#### Minor Requirements

- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)  
*or or* an alternative course approved by program evaluation steering committee
- OLPD 5502 - Theory and Models of Evaluation (3.0 cr)  
*or* OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)
- OLPD 5521 - Cost and Economic Analysis in Educational Evaluation (3.0 cr)
- OLPD 8596 - Evaluation Internship (1.0 - 9.0 cr)

#### Additional coursework

Additional coursework must be selected in conjunction with, and approved by, the minor adviser.



### **Twin Cities Campus**

## **Program Evaluation Postbaccalaureate Certificate**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455  
(612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12 to 13
- This program does not require summer semesters for timely completion.
- Degree: Program Evaluation Postbaccalaureate Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The program evaluation certificate program offers intensive study of applied methods of evaluating programs and services in school, health, government, nonprofit agencies, and market research settings. This interdisciplinary program surveys program evaluation techniques and processes, and examines the social and political contexts of the studies. The program allows working professionals from a variety of disciplines to formalize their training in program evaluation by earning a certificate in this area. Demand for trained professionals in program evaluation has increased steadily to meet the reporting needs of funding agencies, policy makers, and program managers in the public and private sectors. Graduates of evaluation studies programs have found employment in county government, social service agencies, state departments, and research consulting firms and businesses.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A completed graduate-level degree, master of education (MEd) or master of arts (MA), in an appropriate content area, including education, social work, public health, or public policy.

Other requirements to be completed before admission:

Students must demonstrate relevant academic background, including research methodology and experience in a field in which program evaluation is practiced (e.g., public health, social work, or education). Admission will be based on an assessment of the applicant's advanced knowledge and level of professional experience in the field of program evaluation. Applications are reviewed on a rolling basis.

### **Special Application Requirements:**

Enrollment in the certificate program will be limited to a maximum of 10 students per calendar year.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Certificate coursework completed with undergraduate student status cannot be applied to graduate-level degree programs.

### **Required Coursework**

8-9 credits required. The following courses (or equivalents approved by the certificate coordinator) are required.



### Foundations of evaluation

Take 1 course from the following:

[OLPD 5501](#) - Principles and Methods of Evaluation (3.0 cr)

[PA 5311](#) - Program Evaluation (3.0 cr)

[PUBH 6852](#) - Program Evaluation in Health and Mental Health Settings (2.0 cr)

### Evaluation theory

[OLPD 5502](#) - Theory and Models of Evaluation (3.0 cr)

or [OLPD 8502](#) - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)

### Internship in evaluation

Only 3 credits of this course can count towards this certificate.

[OLPD 8596](#) - Evaluation Internship (1.0 - 9.0 cr)

### Elective Coursework

Students may choose 3-4 credits of elective coursework from the following list to meet the overall program minimum of 12 credits.

Additional courses may be approved by the certificate coordinator.

Take 3 or more credit(s) from the following:

• [CI 8148](#) - Conducting Qualitative Studies in Educational Contexts (3.0 cr)

• [CI 8914](#) - Critical Science Research (3.0 cr)

• [EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)

• [EPSY 5244](#) - Survey Design, Sampling, and Implementation (3.0 cr)

• [FSOS 8013](#) - Qualitative Family Research Methods (3.0 cr)

• [OLPD 5056](#) - Case Studies for Policy Research (3.0 cr)

• [OLPD 5061](#) - Ethnographic Research Methods (3.0 cr)

• [OLPD 5521](#) - Cost and Economic Analysis in Educational Evaluation (3.0 cr)

• [OLPD 8595](#) - Evaluation Problems (1.0 - 6.0 cr)

• [PUBH 6724](#) - The Health Care System and Public Health (3.0 cr)

• [PUBH 7250](#) - Designing and Conducting Focus Group Interviews (1.0 cr)

• [PUBH 7251](#) - Data Analysis From Focus Groups (1.0 cr)



### ***Twin Cities Campus***

## **Social Work M.S.W.**

*School of Social Work*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Social Work

105 Peters Hall

1404 Gortner Avenue

St. Paul, MN 55108

612-625-1220

Email: [swadmis@umn.edu](mailto:swadmis@umn.edu)

Website: <https://www.cehd.umn.edu/ssw/graduate/master-of-social-work/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 34 to 53
- This program does not require summer semesters for timely completion.
- Degree: Master of Social Work

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MSW prepares students for advanced social work practice. A 53 credit program and a 34 credit advanced standing program are available. The curriculum offers specializations in clinical mental health; community practice; families and children; and health, disabilities and aging.

### **Accreditation**

This program is accredited by Council on Social Work Education

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

An undergraduate degree with liberal arts background that includes course work in history and social sciences, the humanities and the arts, physical and biological sciences, and mathematics.

Other requirements to be completed before admission:

One year of work experience in human services that has provided the applicant with opportunities to gain skills used in direct work with clients. Work experience may include paid, volunteer, and intern positions.

Please see the School of Social Work website for more information.

#### **Special Application Requirements:**

Applicants are required to submit a specified personal statement, writing sample, resume, transcripts, and three letters of recommendation. Applicants to the advanced standing MSW program who do not have at least one year of post-BSW full-time practice must submit the following as part of their application:

- BSW practicum evaluation OR
- Letter of reference from BSW practicum supervisor OR
- Letter of reference from BSW Field Faculty OR
- Letter of explanation as to why one of the above cannot be submitted

Important information for advanced standing applicants who choose the clinical mental health specialization:

The advanced standing curriculum is designed to be completed in three semesters (summer-fall-spring or fall-spring-summer). Advanced standing students in the clinical mental health specialization (CMH) have the option to start the program in summer, depending on when they want to complete the MSW field practicum.





- Advanced standing CMH students who want to do their field practicum during the fall and spring semesters must start taking classes in the summer semester so they can complete the pre-requisites for field. They should plan to complete about six to seven credits in the summer session. (Summer-fall-spring)

- Advanced standing CMH students who want to do a summer field practicum can begin taking classes in either the summer or the fall semester. Their final semester will be summer field practicum of 9 credits.(Fall-spring-summer)

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 34 to 53 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

The MSW requires 53 credits; a 34 credit advanced standing program is available to graduates of undergraduate social work programs accredited by the Council on Social Work Education. All credits for the MSW can be completed in two years of full-time study, or three years to four years of part-time study, and must be completed within five years of the date of the earliest coursework taken for the degree.

The 53 credit program includes a set of required foundation courses (19 cr), courses from a selected specialization, two field internships, and social work electives.

A maximum of 21 credits may be transferred from the following sources with School of Social Work approval: up to 8 credits as a non-degree-seeking student registered for social work graduate credit at the University of Minnesota; up to 21 credits from another regionally and professionally accredited school of social work if the student was registered as a graduate student in the program.

The 34 credit advanced standing program includes courses from a selected specialization, one field internship, and social work electives. A maximum of 13 credits may be transferred from the following sources with School of Social Work approval: 13 credits completed as a graduate student in another accredited MSW program; up to 6 credits as a non-degree-seeking student registered for social work graduate credit at the University of Minnesota.

### Foundation Curriculum for Full Program Students

The 19 cr foundation curriculum is required for full program students. The foundation curriculum is waived for advanced standing students, unless required in a student's conditions of admission. Advanced standing students who receive a grade of B- or less in a BSW class that is comparable to one of our foundation classes may be asked to repeat that content in our MSW program. Students should take 8010 for 3 cr in fall; 3 cr in spring or 6 cr in summer.

Take exactly 19 credit(s) from the following:

- SW 5051 - Human Behavior and the Social Environment (2.0 cr)
- SW 5101 - Historical Origins and Contemporary Policies in Social Welfare (3.0 cr)
- SW 8151 - Social Work Methods: Practice With Individuals and Systems (2.0 cr)
- SW 8152 - Social Work Practice Methods: Families and Groups (2.0 cr)
- SW 8153 - Social Work Practice Methods: Macro Practice and Organizations (2.0 cr)
- SW 8841 - Social Work Research Methods (2.0 cr)
- SW 8010 - Seminar: Field Practicum I (1.0 - 8.0 cr)

### Specialization Areas

#### Clinical Mental Health Specialization

Prepares students for advanced clinical social work practice with children, adults and families across diverse settings and populations. Students learn contextually based approaches to mental health diagnostic assessment, treatment and practice evaluation, with a strong focus on client systems experiencing significant mental health risk.

#### Anchor and Boost

[SW 8451](#) - Assessment and Engagement in Clinical Social Work Practice (3.0 cr)

[SW 8452](#) - Core Concepts in Clinical Social Work Practice (3.0 cr)

#### Specialization Electives



Take 2 or more course(s) totaling 6 or more credit(s) from the following:

- SW 8352 - Intervention Methods with Families (3.0 cr)
- SW 8461 - Advanced Clinical Social Work Practice with Adults (3.0 cr)
- SW 8462 - Advanced Clinical Practice With Children and Adolescents (3.0 cr)
- SW 8463 - Social Work Practice With Severe and Persistent Mental Illness and Severe Emotional Disturbance (3.0 cr)

**Diversity**

SW 8821 - Social Work and Difference, Diversity and Privilege (2.0 cr)

**Advanced Policy**

SW 8806 - Health and Mental Health Policy (3.0 cr)  
or SW 8807 - International and Comparative Social Welfare Policy (3.0 cr)

**2nd Focus Anchor**

Students must choose one course from this list. Dual degree students may substitute a course from their other degree program with approval from the MSW program director.

SW 8251 - Social Work Practice in Health, Disabilities, and Aging (3.0 cr)  
or SW 8351 - Assessment and Engagement with Families and Children (3.0 cr)  
or SW 8551 - Advanced Community Practice: Assessment, Organizing, and Advocacy (3.0 cr)

**Specialization Field Practicum and Seminar**

Students complete 6 credits of SW 8020. The credits are either split between fall and spring semesters, or 6 credits are taken during summer. Advanced Standing students take SW 8030.

Take exactly 6 credit(s) from the following:

- SW 8020 - Field Practicum II (1.0 - 6.0 cr)

**Advanced Research**

Students must complete 3 credits of SW 8842. The credits are split between fall and spring semesters, or 3 credits are taken during the summer. Dual degree program students may substitute PA 5311 or PUBH 6034. This course must be taken concurrently with SW 8020 or 8030.

Take exactly 3 credit(s) from the following:

- SW 8842 - Advanced Social Work Evaluation (1.0 - 3.0 cr)
- PA 5311 - Program Evaluation (3.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)

**Free Electives**

Students must complete at least 5 credits of 5000-level or 8000-level courses not used for another program requirement.

-OR-

**Community Practice Specialization**

Specialization of human service systems to mobilize groups for social change, and to serve as catalysts for sustainable development and social justice. Students are prepared to fill a variety of community practice roles-leaders, planners, policy advocates, community organizers, mediators, evaluators, and agency administrators in a range of settings.

**Anchor and Boost**

SW 8551 - Advanced Community Practice: Assessment, Organizing, and Advocacy (3.0 cr)  
SW 8552 - Advanced Community Practice: Leadership, Planning, and Program Development (3.0 cr)

**Specialization Electives**

Take 2 or more course(s) totaling 6 or more credit(s) from the following:

- PA 5101 - Management and Governance of Nonprofit Organizations (3.0 cr)
- SW 5562 - Global Social Work and Social Development (3.0 cr)
- SW 8563 - Advanced Policy Advocacy (3.0 cr)

**Diversity**

SW 8821 - Social Work and Difference, Diversity and Privilege (2.0 cr)

**Advanced Policy**

SW 8804 - Child Welfare Policy (3.0 cr)  
or SW 8805 - Aging and Disability Policy (3.0 cr)  
or SW 8806 - Health and Mental Health Policy (3.0 cr)  
or SW 8807 - International and Comparative Social Welfare Policy (3.0 cr)

**2nd Focus Anchor**

Students must choose one course from this list. Dual degree students may substitute a course from their other program with approval of the MSW Program Director.

SW 8251 - Social Work Practice in Health, Disabilities, and Aging (3.0 cr)  
or SW 8351 - Assessment and Engagement with Families and Children (3.0 cr)  
or SW 8451 - Assessment and Engagement in Clinical Social Work Practice (3.0 cr)

**Specialization Field Practicum and Seminar**

Students complete 6 credits of SW 8020. The credits are split between fall and spring semesters, or 6 credits are taken during summer. Advanced standing students take SW 8030.

Take exactly 6 credit(s) from the following:

- SW 8020 - Field Practicum II (1.0 - 6.0 cr)

**Advanced Research**

Students must complete 3 cr of SW 8843. The credits are split between fall and spring semesters. Dual degree students may



substitute PA 5311 or PUBH 6034.

Take 3 or more credit(s) from the following:

- SW 8843 - Social Work Program Evaluation (1.0 - 2.0 cr)
- PA 5311 - Program Evaluation (3.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)

**Free Electives**

Students must complete at least 5 credits of 5000-level or 8000-level courses not used for another program requirement.

-OR-

**Families and Children Specialization**

Prepares students to work with families and children in a range of settings and organizations, as well as influence relevant organizational structures and policies. Students will be able to identify protective supports and develop interventions that mediate risk and promote resilience.

**Anchor and Boost**

- SW 8351 - Assessment and Engagement with Families and Children (3.0 cr)
- SW 8352 - Intervention Methods with Families (3.0 cr)

**Specialization Electives**

Students must take two courses (6 cr) from the list of specialization electives.

Take 6 or more credit(s) from the following:

- SW 8361 - Identification and Assessment of Family Violence (3.0 cr)
- SW 8363 - Social Work in Child Welfare (3.0 cr)
- SW 8462 - Advanced Clinical Practice With Children and Adolescents (3.0 cr)

**Diversity**

- SW 8821 - Social Work and Difference, Diversity and Privilege (2.0 cr)

**Advanced Policy**

- SW 8804 - Child Welfare Policy (3.0 cr)
- or SW 8805 - Aging and Disability Policy (3.0 cr)
- or SW 8806 - Health and Mental Health Policy (3.0 cr)
- or SW 8807 - International and Comparative Social Welfare Policy (3.0 cr)

**2nd Focus Anchor**

Students must complete one course from this list. Dual degree students may substitute a course from their other degree program with approval from the MSW program director.

- SW 8251 - Social Work Practice in Health, Disabilities, and Aging (3.0 cr)
- or SW 8451 - Assessment and Engagement in Clinical Social Work Practice (3.0 cr)
- or SW 8551 - Advanced Community Practice: Assessment, Organizing, and Advocacy (3.0 cr)

**Specialization Field Practicum and Seminar**

Students complete 6 credits of 8020. The credits are either split between fall and spring semesters or 6 credits are taken during summer. Advanced standing students take SW 8030

Take exactly 6 credit(s) from the following:

- SW 8020 - Field Practicum II (1.0 - 6.0 cr)

**Advanced Research**

Students must complete 3 credits of SW 8842. The credits are split between fall and spring semesters, or all 3 credits are taken during summer. Dual degree program students may substitute PA 5311 or PUBH 6034. This course must be taken concurrently with SW 8020 or 8030.

Take exactly 3 credit(s) from the following:

- SW 8842 - Advanced Social Work Evaluation (1.0 - 3.0 cr)
- PA 5311 - Program Evaluation (3.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)

**Free Electives**

Students must take at least 5 credits of 5000-level or 8000-level courses not used for another program requirement.

-OR-

**Health, Disability and Aging Specialization**

Prepares students to work with people affected by distinct and interconnected issues related to health, disability and aging. Students are prepared to work in a variety of settings such as hospitals, primary care clinics, residential care facilities, hospice, community-based programs, and in policy and advocacy organizations.

**Anchor and Boost**

- SW 8251 - Social Work Practice in Health, Disabilities, and Aging (3.0 cr)
- SW 8261 - Advanced Social Work Practice in Health Care (3.0 cr)

**Specialization Electives**

Students must take two courses (6 cr) from this list.

Take 6 or more credit(s) from the following:

- SW 8262 - Empowerment Practice With Persons With Disabilities (3.0 cr)
- SW 8263 - Advanced Direct Practice and Community-Based Interventions in Gerontology (3.0 cr)
- SW 8463 - Social Work Practice With Severe and Persistent Mental Illness and Severe Emotional Disturbance (3.0 cr)



**Diversity**

[SW 8821](#) - Social Work and Difference, Diversity and Privilege (2.0 cr)

**Advanced Policy**

[SW 8805](#) - Aging and Disability Policy (3.0 cr)

or [SW 8806](#) - Health and Mental Health Policy (3.0 cr)

or [SW 8807](#) - International and Comparative Social Welfare Policy (3.0 cr)

**2nd Focus Anchor**

Students should choose one course from this list. Dual degree students may substitute a course from their other degree program with approval from the MSW program director.

[SW 8351](#) - Assessment and Engagement with Families and Children (3.0 cr)

or [SW 8451](#) - Assessment and Engagement in Clinical Social Work Practice (3.0 cr)

or [SW 8551](#) - Advanced Community Practice: Assessment, Organizing, and Advocacy (3.0 cr)

**Specialization Field Practicum and Seminar**

Students complete 6 credits of SW 8020. These credits are either split between fall and spring, or 6 credits are taken during summer.

Advanced Standing students will take SW 8030.

Take 6 or more credit(s) from the following:

• [SW 8020](#) - Field Practicum II (1.0 - 6.0 cr)

**Advanced Research**

Students must complete 3 credits of SW 8842. The credits are split between fall and spring, or all 3 credits are taken during summer.

Dual degree students may substitute PA 5311 or PUBH 6034.

This course must be taken concurrently with SW 8020 or 8030.

Take 3 or more credit(s) from the following:

• [SW 8842](#) - Advanced Social Work Evaluation (1.0 - 3.0 cr)

• [PA 5311](#) - Program Evaluation (3.0 cr)

• [PUBH 6034](#) - Evaluation (3.0 cr)

**Free Electives**

Students must complete at least 5 credits of 5000-level or 8000-level courses not used for another degree requirement.

**Joint- or Dual-degree Coursework:** Master of Social Work/Master of Public Health/Master of Social Work/Master of Public Policy/Master of Social Work/Master of Urban & Regional Planning. Student may take a total of 22 credits in common among the academic programs.



### **Twin Cities Campus**

## **Social Work Ph.D.**

*School of Social Work*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Social Work  
105 Peters Hall  
1404 Gortner Avenue  
St. Paul, MN 55108  
(612-625-1220; fax: 612-624-3744)  
Email: [swadmis@umn.edu](mailto:swadmis@umn.edu)  
Website: <https://www.cehd.umn.edu/ssw/graduate/phd-in-social-work/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 64
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The PhD program in social work prepares students to provide intellectual leadership for the social work profession through advanced levels of scholarship, research, theory development, and policy analysis. Students are expected to acquire skill in research design and statistics and to develop a comprehensive knowledge of social work and social welfare history, theory, and policy.

The PhD program does not focus on the development of advanced skills for clinical practice. However, students gain knowledge of practice theory and research related to social work practice. Many graduates assume positions as university faculty. Consequently, the program offers opportunities for students to acquire skills in teaching and curriculum development.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A master's degree is required.

#### **Special Application Requirements:**

Priority application deadline is early January in the appropriate year. Final deadline is early March. Applications received by second deadline will be reviewed and applicants accepted on a space-available basis.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

28 to 32 credits are required in the major.  
8 to 12 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

The PhD program emphasizes mastery of student and program determined objectives rather than an accumulation of course credits. Degree requirements vary according to the student's background and educational goals. A minimum of 40 credits plus 24 required thesis credits beyond the MSW are required. Required courses include core seminars in social work research, social welfare history, social welfare policy, and theory and model development; a teaching course; a supervised research practicum and practicum seminar (two-semester sequence); supporting program courses (12 credits of supporting program course work is required - eight credits must be taken outside of social work while four credits may be taken in social work); and statistics courses. Students must also have teaching experience in the School of Social Work while in the program. Students are expected to attend PhD Colloquia and research colloquia for at least the first two years of their participation in the program.

### Required Courses

SW 8875, Research Practicum, must be taken two semesters for a total of four credits.

[SW 8871](#) - Social Work Research Seminar I (3.0 cr)

[SW 8872](#) - Social Work Research Seminar II (3.0 cr)

[SW 8875](#) - Research Practicum (2.0 cr)

[SW 8861](#) - Theory and Model Development in Social Work (3.0 cr)

[SW 8855](#) - Social Policy Formulation and Analysis (3.0 cr)

[SW 8851](#) - Social Welfare History and Historical Research Methods (3.0 cr)

[GRAD 8101](#) - Teaching in Higher Education (3.0 cr)

### Required Statistics Courses

6 credits of graduate level statistics coursework, as approved by the Program Director.

### Supporting Program Coursework

Students must take 12 credits of supporting course work in consultation with their advisor. 8 credits must be taken outside of social work while 4 credits may be taken in social work.



### **Twin Cities Campus**

## **Sociocultural Studies in Education Minor**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 178 Pillsbury Dr SE, Minneapolis, MN 55455 (612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The sociocultural studies in education (SCSE) minor (previously known as the social and philosophic studies of education minor) provides a multidisciplinary foundation for the study of social and cultural phenomena that shape educational ideologies and practices. The minor enables students to take courses from a variety of social science, humanities, and interdisciplinary fields in order to generate a particular perspective, lens, or optic that can illuminate problems or processes of interest to them.

The SCSE minor program is shaped to suit the particular needs and interests of the student at either the master's or doctoral level. Courses at either the 5xxx or 8xxx level are selected in consultation with an SCSE faculty member and approved by the SCSE director of graduate studies (DGS). Courses are generally of two types: those that explicitly draw upon a disciplinary or interdisciplinary perspective to examine educational processes (e.g. economics of education); and those that provide an in-depth exploration of a disciplinary or interdisciplinary perspective itself (e.g. contemporary political thought).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Admission to the SCSE minor is contingent upon prior admission to a University masters or doctoral degree-granting program.

Interested students should consult with a SCSE faculty member to develop a proposed course of study, then formally declare the minor when they file their degree plan. Students who declare the minor are required to include a member of the SCSE faculty on their masters or doctoral committee. Students may apply to this minor throughout the year.

### **Special Application Requirements:**

The director of graduate studies (DGS) of the SCSE minor must approve the applicant's proposed course of study by signing the student's degree program form in addition to the student's major DGS.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.



Students may not complete the program with more than one sub-plan.

## Masters

### Minor Requirements

Master's students complete at least 9 graduate credits from the list of approved courses below. These must include a minimum of 3 OLPD course credits and 3 credits from courses outside of OLPD (these courses may be within CEHD). Additional courses may be approved by SCSE faculty in consultation with the SCSE minor DGS.

#### OLPD Courses

Must take at least 3 credits from the list below.

Take 1 - 2 course(s) from the following:

- OLPD 5041 - Sociology of Education (3.0 cr)
- OLPD 5044 - Introduction to the Economics of Education (3.0 cr)
- OLPD 5103 - Comparative Education (3.0 cr)
- OLPD 5107 - Gender, Education, and International Development (3.0 cr)
- OLPD 5323 - Women in Leadership (3.0 cr)
- OLPD 5128 - Anthropology of Education (3.0 cr)
- OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)
- OLPD 5346 - Politics of Education (3.0 cr)
- OLPD 5721 - Race and Ethnicity in Higher Education (3.0 cr)
- OLPD 8022 - Education and Globalization: Anthropological Perspectives (3.0 cr)
- OLPD 8103 - Comparative Education (3.0 cr)

#### •Non-OLPD Courses

Must take at least 3 credits from the list below.

Take 1 - 2 course(s) from the following:

- AFRO 5103 - World History and Africa (3.0 cr)
- AFRO 5120 - Social and Intellectual Movements in the African Diaspora (3.0 cr)
- AFRO 8554 - Seminar: Gender, Race, Nation, and Policy--Perspectives from Within the African Diaspora (3.0 cr)
- AMIN 5890 - Readings in American Indian and Indigenous History (3.0 cr)
- AMST 8288 - Working in the Global Economy: Readings (3.0 cr)
- ANTH 8001 - Ethnography, Theory, History (3.0 cr)
- ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)
- ANTH 8207 - Political and Social Anthropology (3.0 cr)
- ANTH 8215 - Anthropology of Gender (3.0 cr)
- CI 5156 - Popular Culture, Teaching, and Learning (3.0 cr)
- CI 5641 - Language, Culture, and Education (3.0 cr)
- CI 8111 - Representations of Knowledge in Curriculum and Culture (1.0 - 3.0 cr)
- CI 8461 - Sociocultural Theory, Education, and Literacy (3.0 cr)
- COMM 5451W - Intercultural Communication Processes [WI] (3.0 cr)
- CPSY 5251W - Social and Philosophical Foundations of Early Childhood Education [WI] (3.0 cr)
- CSCL 5555 - Introduction to Semiotics (3.0 cr)
- CSCL 5833 - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)
- DSSC 8111 - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)
- DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)
- EPSY 5157 - Social & Developmental Psychology of Education (3.0 cr)
- GLOS 5403 - Human Rights Advocacy (3.0 cr)
- GLOS 5602 - Other Worlds: Globality and Culture (3.0 cr)
- GWSS 5190 - Topics: Theory, Knowledge, and Power (3.0 cr)
- GWSS 8101 - Intellectual History of Feminism (3.0 cr)
- GWSS 8103 - Feminist Theories of Knowledge (3.0 cr)
- GWSS 8107 - Feminist Pedagogies (3.0 cr)
- GWSS 8108 - Genealogies of Feminist Theory (3.0 cr)
- GWSS 8109 - Feminist Knowledge Production (3.0 cr)
- HIST 5871 - Readings in U.S. Intellectual History: 19th-20th Centuries (3.0 cr)
- HIST 5932 - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)
- HIST 8239 - Readings in Gender, Race, Class, and/or Ethnicity in the United States (3.0 cr)
- HIST 8630 - Seminar in World History (3.0 cr)
- HIST 8961 - Research Seminar: Intellectual History (3.0 cr)
- KIN 5371 - Sport and Society (3.0 cr)
- PA 5001 - Intellectual Foundations of Public Action (1.5 cr)
- PA 5414 - Child Human Rights: Work and Education (3.0 cr)
- PHIL 5601 - History of the Philosophy of Science (3.0 cr)
- PHIL 8130 - Seminar: Epistemology (3.0 cr)
- PHIL 8131 - Epistemology Survey (3.0 cr)
- PHIL 8133 - Feminist Theories of Knowledge (3.0 cr)
- POL 8101 - Introduction to Political Science (3.0 cr)





- POL 8215 - Philosophy of Political Inquiry (3.0 cr)
- POL 8225 - American Political Thought (3.0 cr)
- POL 8235 - Democratic Theory (3.0 cr)
- POL 8253 - Late Modern Political Thought (3.0 cr)
- POL 8275 - Contemporary Political Thought (3.0 cr)
- POL 8305 - Interest Groups and Social Movements (3.0 cr)
- SOC 8211 - The Sociology of Race & Racialization (3.0 cr)
- SOC 8731 - Sociology of Knowledge (3.0 cr)
- SOC 8735 - Sociology of Culture (3.0 cr)
- SW 5101 - Historical Origins and Contemporary Policies in Social Welfare (3.0 cr)

### Doctoral

#### Minor Requirements

Doctoral students complete at least 12 graduate credits from the list of approved courses below. These must include a minimum of 6 OLPD course credits and 3 credits from courses outside of OLPD (these courses may be within CEHD).

#### OLPD Courses

Must take at least 6 credits from the list below.

Take 2 - 3 course(s) from the following:

- OLPD 5041 - Sociology of Education (3.0 cr)
- OLPD 5044 - Introduction to the Economics of Education (3.0 cr)
- OLPD 5103 - Comparative Education (3.0 cr)
- OLPD 5107 - Gender, Education, and International Development (3.0 cr)
- OLPD 5128 - Anthropology of Education (3.0 cr)
- OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)
- OLPD 5323 - Women in Leadership (3.0 cr)
- OLPD 5346 - Politics of Education (3.0 cr)
- OLPD 5721 - Race and Ethnicity in Higher Education (3.0 cr)
- OLPD 8022 - Education and Globalization: Anthropological Perspectives (3.0 cr)
- OLPD 8103 - Comparative Education (3.0 cr)

#### Non-OLPD Courses

Must take at least 3 credits from the list below.

Take 1 - 2 course(s) from the following:

- AFRO 5103 - World History and Africa (3.0 cr)
- AFRO 5120 - Social and Intellectual Movements in the African Diaspora (3.0 cr)
- AFRO 8554 - Seminar: Gender, Race, Nation, and Policy--Perspectives from Within the African Diaspora (3.0 cr)
- AMIN 5890 - Readings in American Indian and Indigenous History (3.0 cr)
- AMST 8288 - Working in the Global Economy: Readings (3.0 cr)
- ANTH 8001 - Ethnography, Theory, History (3.0 cr)
- ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)
- ANTH 8207 - Political and Social Anthropology (3.0 cr)
- ANTH 8215 - Anthropology of Gender (3.0 cr)
- CI 5156 - Popular Culture, Teaching, and Learning (3.0 cr)
- CI 5641 - Language, Culture, and Education (3.0 cr)
- CI 8111 - Representations of Knowledge in Curriculum and Culture (1.0 - 3.0 cr)
- CI 8461 - Sociocultural Theory, Education, and Literacy (3.0 cr)
- COMM 5451W - Intercultural Communication Processes [WI] (3.0 cr)
- CPSY 5251W - Social and Philosophical Foundations of Early Childhood Education [WI] (3.0 cr)
- CSCL 5555 - Introduction to Semiotics (3.0 cr)
- CSCL 5833 - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)
- DSSC 8111 - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)
- DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)
- EPSY 5157 - Social & Developmental Psychology of Education (3.0 cr)
- GLOS 5403 - Human Rights Advocacy (3.0 cr)
- GLOS 5602 - Other Worlds: Globality and Culture (3.0 cr)
- GWSS 5190 - Topics: Theory, Knowledge, and Power (3.0 cr)
- GWSS 8101 - Intellectual History of Feminism (3.0 cr)
- GWSS 8103 - Feminist Theories of Knowledge (3.0 cr)
- GWSS 8107 - Feminist Pedagogies (3.0 cr)
- GWSS 8108 - Genealogies of Feminist Theory (3.0 cr)
- GWSS 8109 - Feminist Knowledge Production (3.0 cr)
- GWSS 8201 - Feminist Theory and Methods in the Social Sciences (3.0 cr)
- HIST 5871 - Readings in U.S. Intellectual History: 19th-20th Centuries (3.0 cr)
- HIST 5932 - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)
- HIST 8239 - Readings in Gender, Race, Class, and/or Ethnicity in the United States (3.0 cr)
- HIST 8630 - Seminar in World History (3.0 cr)



- [HIST 8961](#) - Research Seminar: Intellectual History (3.0 cr)
- [KIN 5371](#) - Sport and Society (3.0 cr)
- [PA 5001](#) - Intellectual Foundations of Public Action (1.5 cr)
- [PA 5414](#) - Child Human Rights: Work and Education (3.0 cr)
- [PHIL 5601](#) - History of the Philosophy of Science (3.0 cr)
- [PHIL 8130](#) - Seminar: Epistemology (3.0 cr)
- [PHIL 8131](#) - Epistemology Survey (3.0 cr)
- [PHIL 8133](#) - Feminist Theories of Knowledge (3.0 cr)
- [POL 8101](#) - Introduction to Political Science (3.0 cr)
- [POL 8215](#) - Philosophy of Political Inquiry (3.0 cr)
- [POL 8225](#) - American Political Thought (3.0 cr)
- [POL 8235](#) - Democratic Theory (3.0 cr)
- [POL 8253](#) - Late Modern Political Thought (3.0 cr)
- [POL 8275](#) - Contemporary Political Thought (3.0 cr)
- [POL 8305](#) - Interest Groups and Social Movements (3.0 cr)
- [SOC 8211](#) - The Sociology of Race & Racialization (3.0 cr)
- [SOC 8731](#) - Sociology of Knowledge (3.0 cr)
- [SOC 8735](#) - Sociology of Culture (3.0 cr)
- [SW 5101](#) - Historical Origins and Contemporary Policies in Social Welfare (3.0 cr)



### **Twin Cities Campus**

## **Special Education Initial License M.Ed.**

*Educational Psychology*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Educational Psychology, 250 Educational Science Building, 56 East River Road, Minneapolis, MN 55455 (612-624-6083)

Email: [sped-adm@umn.edu](mailto:sped-adm@umn.edu)

Website: <http://www.cehd.umn.edu/edpsych/Programs/SpecialEd/MEd-prospective.html>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- All practica related to the residency-based sub-plan in EBD are delivered off-campus. Practica are located in public school settings of our partner districts in Federal Setting III and IV EBD classrooms and take place during regular school hours.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Graduates of the University's Special Education Initial License MEd are student-centered, collaborative professionals who deliver robust, high-quality, and specialized educational services, adding value to the learning and development of infants, children, and adults with disabilities from diverse cultural backgrounds.

Program graduates are knowledgeable in the following areas:

Engaging in collaborative problem solving with families and professionals to meet the academic, social, behavioral, and life skills needs of individuals with disabilities;

Implementing, and supporting others' implementation of, evidence-based instruction and intervention with fidelity to improve student outcomes;

Using reliable and valid assessment data to make individualized educational decisions;

Systematically selecting and adapting instructional supports to meet individual needs, based on data and knowledge of individual learning, developmental, and cultural differences;

Maximizing expectations and learning opportunities for individuals with disabilities in the Least Restrictive using the full continuum of services; and

Upholding principles of professionalism and ethics in their practice.

### **Accreditation**

This program is accredited by PELSB, Council of Exceptional Children (CEC) and Council on Education of the Deaf (CED).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

Other requirements to be completed before admission:

Experience in working with children and/or people with disabilities is preferred.

#### **Special Application Requirements:**

The application deadline is March 1 for summer or fall admission.

Upload the following additional materials into the appropriate areas of the online application:

- One to two page applicant statement outlining goals, interests, experiences, etc.
- Résumé



- Two letters of recommendation [.pdf], preferably from individuals in the education field (for the online application, applicant's will be asked to enter recommenders' information into the online application; a message will be automatically sent to those recommenders with further instructions on how to submit their letters)
- Unofficial transcripts from all collegiate institutions attended (Students who are accepted will need to send official transcripts in a sealed envelope. University of Minnesota graduates need not submit University of Minnesota transcripts to Student Services.)
- International applicants should submit a foreign transcript evaluation from an accredited reviewer (ECS <http://www.ece.org/> or WES <http://www.wes.org/students/index.asp>)

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and 0 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** A portfolio is required in conjunction with registration for EPSY 5699. The student and advisor will develop the individual's MEd graduate plan.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may complete the program with more than one sub-plan.

### Academic Behavioral Strategist

Additional requirements and credits will be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

### Required Courses (19 credits)

Take the following courses:

- [EPSY 5605W](#) - Collaborative Practices for the Special Educator [WI] (3.0 cr)
- [EPSY 5613](#) - Foundations of Special Education I [DSJ] (3.0 cr)
- [EPSY 5614W](#) - Assessment and Due Process in Special Education [WI] (3.0 cr)
- [EPSY 5616W](#) - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)
- [EPSY 5618](#) - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)
- [EPSY 5631](#) - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)
- [MTHE 5355](#) - Mathematics for Diverse Learners (3.0 cr)

### Student Teaching (6 credits)

Take the following for a total of 6 credits:

- [EPSY 5741](#) - Student Teaching: Academic and Behavioral Strategist (3.0 - 6.0 cr)

### Practicum (3 credits)



Take EPSY 5704 for 2 credits and EPSY 5705 for 1 credit.

[EPSY 5704](#) - Practicum: Special Education Field Experience in Middle and Secondary School Classrooms (1.0 - 2.0 cr)

[EPSY 5705](#) - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)

**Capstone Course (2 credits)**

Take the following course:

[EPSY 5699](#) - Experimental Teaching Seminar (2.0 cr)

**Autism Spectrum Disorder**

Note: New student applications are not currently being accepted.

Additional requirements and credits will be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

**Required Courses (19 credits)**

Take the following courses:

[EPSY 5605W](#) - Collaborative Practices for the Special Educator [WI] (3.0 cr)

[EPSY 5613](#) - Foundations of Special Education I [DSJ] (3.0 cr)

[EPSY 5614W](#) - Assessment and Due Process in Special Education [WI] (3.0 cr)

[EPSY 5616W](#) - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)

[EPSY 5618](#) - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)

[EPSY 5631](#) - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)

[MTHE 5355](#) - Mathematics for Diverse Learners (3.0 cr)

**Student Teaching (6 credits)**

Take the following course:

[EPSY 5742](#) - Student Teaching: Autism Spectrum Disorders (6.0 cr)

**Practicum (3 credits)**

Take EPSY 5704 for 1 credit and EPSY 5705 for 2 credits.

[EPSY 5704](#) - Practicum: Special Education Field Experience in Middle and Secondary School Classrooms (1.0 - 2.0 cr)

[EPSY 5705](#) - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)

**Capstone Course (2 credits)**

Take the following course:

[EPSY 5699](#) - Experimental Teaching Seminar (2.0 cr)

**Deaf and Hard of Hearing**

Additional requirements and credits will be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

**Required Courses (19 credits)**

Take the following courses:

[EPSY 5614W](#) - Assessment and Due Process in Special Education [WI] (3.0 cr)

[EPSY 5616W](#) - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)

[EPSY 5641](#) - Foundations of Deaf Education (3.0 cr)

[EPSY 5644](#) - Early Childhood Language and Literacy Development and Best Practices: Deaf and Hard of Hearing (3.0 cr)

[EPSY 5646](#) - Best Practices Teaching Reading and Writing for School Age: Deaf and Hard of Hearing (3.0 cr)

[EPSY 5653](#) - ASL/English Structure and Application (3.0 cr)

[EPSY 5654](#) - Current Research, Issues Trends in Deaf Education (1.0 cr)

**Student Teaching (6 credits)**

Take 6 credits of the following:

[EPSY 5751](#) - Student Teaching for Deaf Education (1.0 - 6.0 cr)

**Practicum (3 credits)**

Take EPSY 5704 for 1 credit and EPSY 5705 for 2 credits.

[EPSY 5704](#) - Practicum: Special Education Field Experience in Middle and Secondary School Classrooms (1.0 - 2.0 cr)

[EPSY 5705](#) - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)

**Capstone Course (2 credits)**

Take the following course:



[EPSY 5699](#) - Experimental Teaching Seminar (2.0 cr)

### Developmental Disabilities

Note: New student applications are not currently being accepted.

Additional requirements and credits will be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

### Required Courses (19 credits)

Take the following courses:

[EPSY 5605W](#) - Collaborative Practices for the Special Educator [WI] (3.0 cr)

[EPSY 5613](#) - Foundations of Special Education I [DSJ] (3.0 cr)

[EPSY 5614W](#) - Assessment and Due Process in Special Education [WI] (3.0 cr)

[EPSY 5616W](#) - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)

[EPSY 5618](#) - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)

[EPSY 5631](#) - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)

[MTHE 5355](#) - Mathematics for Diverse Learners (3.0 cr)

### Student Teaching (6 credits)

Take each of the following courses for 3 credits:

[EPSY 5755](#) - Student Teaching: Developmental Disabilities, Mild/Moderate (1.0 - 6.0 cr)

[EPSY 5756](#) - Student Teaching: Developmental Disabilities, Moderate/Severe (1.0 - 6.0 cr)

### Practicum (1-2 credits)

Take 1 to 2 credits of [EPSY 5705](#) in consultation with the advisor.

[EPSY 5705](#) - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)

### Electives (2 to 3 credits)

Select at least 2 credits from the following in consultation with the advisor:

[EPSY 5604](#) - Transition From School to Work and Community Living for Persons With Special Needs (3.0 cr)

[EPSY 5621](#) - Assessment and Instructional Design for Students with Developmental Disabilities (3.0 cr)

[EPSY 5622](#) - Programs and Curricula for Students with Developmental Disabilities (3.0 cr)

[EPSY 5624](#) - Biomedical and Physical Impairments of Students with Developmental Disabilities (2.0 cr)

[EPSY 5632](#) - Module 2: Evidence-based Methods for AAC Assessment and Intervention (2.0 cr)

[EPSY 5636](#) - Sensory Impairments of Students With Developmental Disabilities (2.0 cr)

[EPSY 5661](#) - Introduction to Autism Spectrum Disorder (3.0 cr)

[EPSY 5720](#) - Special Topics: Special Education (1.0 - 4.0 cr)

[CI 5645](#) - Methods for Teaching English Learners (3.0 cr)

### Capstone Course (2 credits)

Take the following course:

[EPSY 5699](#) - Experimental Teaching Seminar (2.0 cr)

### Early Childhood Special Education

Additional requirements and credits will be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

### Required Courses (19 credits)

Take the following courses:

[EPSY 5609](#) - Family-centered Services (3.0 cr)

[EPSY 5613](#) - Foundations of Special Education I [DSJ] (3.0 cr)

[EPSY 5614W](#) - Assessment and Due Process in Special Education [WI] (3.0 cr)

[EPSY 5616W](#) - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)

[EPSY 5618](#) - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)

[EPSY 5631](#) - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)

[MTHE 5355](#) - Mathematics for Diverse Learners (3.0 cr)

### Student Teaching (6 credits)

Take each of the following courses for 3 credits:

[EPSY 5761](#) - Student Teaching in Early Childhood Special Education Settings for Children Aged Three to Five Years (3.0 cr)



**EPSY 5762** - Student Teaching in Early Childhood Special Education for Children Aged Birth to Three Years (3.0 cr)

**Practicum (3 credits)**

Take 3 credits of the following:

**EPSY 5705** - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)

**Capstone Course (2 credits)**

Take the following course:

**EPSY 5699** - Experimental Teaching Seminar (2.0 cr)

**Learning Disabilities**

Note: New student applications are not currently being accepted.

Additional requirements and credits will be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

**Required Courses (19 credits)**

Take the following courses:

**EPSY 5605W** - Collaborative Practices for the Special Educator [WI] (3.0 cr)

**EPSY 5613** - Foundations of Special Education I [DSJ] (3.0 cr)

**EPSY 5614W** - Assessment and Due Process in Special Education [WI] (3.0 cr)

**EPSY 5616W** - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)

**EPSY 5618** - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)

**EPSY 5631** - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)

**MTHE 5355** - Mathematics for Diverse Learners (3.0 cr)

**Practicum (3 credits)**

Take EPSY 5704 for 2 credits and EPSY 5705 for 1 credit.

**EPSY 5704** - Practicum: Special Education Field Experience in Middle and Secondary School Classrooms (1.0 - 2.0 cr)

**EPSY 5705** - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)

**Electives (6 credits)**

Select at least 6 credits from the following in consultation with the advisor:

**EPSY 5604** - Transition From School to Work and Community Living for Persons With Special Needs (3.0 cr)

**EPSY 5617** - Academic and Social Interventions for Students with Mild to Moderate Disabilities (3.0 cr)

**EPSY 5627** - Seminar: Advanced issues in Learning Disabilities (3.0 cr)

**EPSY 5628** - Characteristics of Moderate to Severe Learning Disabilities (3.0 cr)

**EPSY 5629** - Strategic Instructional Methods for Students Academically At-Risk (3.0 cr)

**EPSY 5657** - Interventions for Behavioral Problems in School Settings (3.0 cr)

**CI 5645** - Methods for Teaching English Learners (3.0 cr)

**Capstone Course (2 credits)**

Take the following course:

**EPSY 5699** - Experimental Teaching Seminar (2.0 cr)

**Emotional and Behavioral Disabilities Residency-Based**

Additional requirements and credits will be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

**Required Courses (30 credits)**

Take the following courses. Take EPSY 5991 for 3 credits.

**EPSY 5614W** - Assessment and Due Process in Special Education [WI] (3.0 cr)

**EPSY 5616W** - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)

**EPSY 5618** - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)

**EPSY 5637** - Core Practices in Special Education: Foundations of Special Education (1.0 cr)

**EPSY 5638** - Core Practices in Special Education: IEP Writing (1.0 cr)

**EPSY 5656** - Advanced Issues in Emotional Behavior Disorders (3.0 cr)

**EPSY 5657** - Interventions for Behavioral Problems in School Settings (3.0 cr)

**EPSY 5699** - Experimental Teaching Seminar (2.0 cr)

**EPSY 5708** - Practicum in Moderate to Severe Emotional/Behavioral Disorders (2.0 cr)



[EPSY 5991](#) - Independent Study in Educational Psychology (1.0 - 8.0 cr)

[CI 5645](#) - Methods for Teaching English Learners (3.0 cr)

[MTHE 5355](#) - Mathematics for Diverse Learners (3.0 cr)





### **Twin Cities Campus**

## **Special Education M.Ed.**

*Educational Psychology*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Educational Psychology, 250 Educational Science Building, 56 East River Road, Minneapolis, MN 55455 (612-624-6083)

Email: [sped-adm@umn.edu](mailto:sped-adm@umn.edu)

Website: <http://www.cehd.umn.edu/edpsych/Programs/SpecialEd/MEd-prospective.html>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Graduates of the University's Special Education MEd program are student-centered, collaborative professionals who deliver robust, high-quality, and specialized educational services, adding value to the learning and development of infants, children, and adults with disabilities from diverse cultural backgrounds.

Program graduates are knowledgeable in the following areas:

Engaging in collaborative problem solving with families and professionals to meet the academic, social, behavioral, and life skills needs of individuals with disabilities;

Implementing, and supporting others' implementation of, evidence-based instruction and intervention with fidelity to improve student outcomes;

Using reliable and valid assessment data to make individualized educational decisions;

Systematically selecting and adapting instructional supports to meet individual needs, based on data and knowledge of individual learning, developmental, cultural differences;

Maximizing expectations and learning opportunities for individuals with disabilities in the Least Restrictive using the full continuum of services; and

Upholding principles of professionalism and ethics in their practice.

## **Accreditation**

This program is accredited by PELSB, Council of Exceptional Children (CEC) and Council on Education of the Deaf (CED).

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

Other requirements to be completed before admission:

Experience in working with children and/or people with disabilities is preferred.

#### **Special Application Requirements:**

The application deadline is March 1 for summer or fall admission.

Upload the following additional materials into the appropriate areas of the online application:

- One to two page applicant statement outlining goals, interests, experiences, etc.

- Résumé

- Two letters of recommendation [.pdf], preferably from individuals in the education field (for the online application, applicant's will be asked to enter recommenders' information into the online application; a message will be automatically sent to those recommenders with further instructions on how to submit their letters)



- Unofficial transcripts from all collegiate institutions attended (Students who are accepted will need to send official transcripts in a sealed envelope. University of Minnesota graduates need not submit University of Minnesota transcripts to Office of Graduate Admissions.)
- International applicants should submit a foreign transcript evaluation from an accredited reviewer (ECS <http://www.ece.org/> or WES <http://www.wes.org/students/index.asp>)

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and 0 credits outside the major. There is no final exam. A capstone project is required.  
**Capstone Project:** A portfolio and integrated paper/mini research project/comprehensive exam is required in conjunction with registration for EPSY 5991. The student and advisor will develop the individual's MEd graduate plan.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Full Program: Students with a bachelor's degree from outside the University of Minnesota Special Education ABS BS program will complete a required program of core courses, electives, and a capstone course.

Advanced Standing Anchor Program (ASD, DD or LD subplans): Students with a bachelor's degree from the University of Minnesota Special Education ABS BS program or with a Minnesota issued Tier 3 or 4 ABS license will complete a program of courses specific to their subplan designed with their academic adviser and a capstone course.

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may complete the program with more than one sub-plan.

### Academic Behavioral Strategist

Additional requirements and credits may be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

### Required Courses (19 credits)

Take the following courses:

- [EPSY 5605W](#) - Collaborative Practices for the Special Educator [WI] (3.0 cr)
- [EPSY 5613](#) - Foundations of Special Education I [DSJ] (3.0 cr)
- [EPSY 5614W](#) - Assessment and Due Process in Special Education [WI] (3.0 cr)
- [EPSY 5616W](#) - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)
- [EPSY 5618](#) - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)
- [EPSY 5631](#) - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)



**MTHE 5355** - Mathematics for Diverse Learners (3.0 cr)

**Electives (9 credits)**

Select at least 9 elective credits from the following in consultation with the advisor:

**EPSY 5604** - Transition From School to Work and Community Living for Persons With Special Needs (3.0 cr)

**EPSY 5617** - Academic and Social Interventions for Students with Mild to Moderate Disabilities (3.0 cr)

**EPSY 5641** - Foundations of Deaf Education (3.0 cr)

**EPSY 5661** - Introduction to Autism Spectrum Disorder (3.0 cr)

**EPSY 5657** - Interventions for Behavioral Problems in School Settings (3.0 cr)

**EPSY 5704** - Practicum: Special Education Field Experience in Middle and Secondary School Classrooms (1.0 - 2.0 cr)

**EPSY 5705** - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)

**EPSY 5720** - Special Topics: Special Education (1.0 - 4.0 cr)

**EPSY 5741** - Student Teaching: Academic and Behavioral Strategist (3.0 - 6.0 cr)

**CI 5645** - Methods for Teaching English Learners (3.0 cr)

**Capstone Course (2 credits)**

Take EPSY 5991 for a minimum of 2 credits.

**EPSY 5991** - Independent Study in Educational Psychology (1.0 - 8.0 cr)

**Autism Spectrum Disorder**

Note: New student applications are not currently being accepted.

Additional requirements and credits may be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

**Courses for Full Program and Advanced Standing Anchor Programs**

**Full Program (30 credits)**

**Required Courses (19 credits)**

Take the following courses:

**EPSY 5605W** - Collaborative Practices for the Special Educator [WI] (3.0 cr)

**EPSY 5613** - Foundations of Special Education I [DSJ] (3.0 cr)

**EPSY 5614W** - Assessment and Due Process in Special Education [WI] (3.0 cr)

**EPSY 5616W** - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)

**EPSY 5618** - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)

**EPSY 5631** - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)

**MTHE 5355** - Mathematics for Diverse Learners (3.0 cr)

**Electives (9 credits)**

Select at least 9 elective credits from the following in consultation with the advisor:

**EPSY 5604** - Transition From School to Work and Community Living for Persons With Special Needs (3.0 cr)

**EPSY 5625** - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)

**EPSY 5632** - Module 2: Evidence-based Methods for AAC Assessment and Intervention (2.0 cr)

**EPSY 5641** - Foundations of Deaf Education (3.0 cr)

**EPSY 5661** - Introduction to Autism Spectrum Disorder (3.0 cr)

**EPSY 5663** - Assessment and Intervention for Individuals with Autism Spectrum Disorder (3.0 cr)

**EPSY 5681** - Educating Preschoolers with Disabilities: Specialized Approaches and Interventions (3.0 cr)

**EPSY 5704** - Practicum: Special Education Field Experience in Middle and Secondary School Classrooms (1.0 - 2.0 cr)

**EPSY 5705** - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)

**EPSY 5720** - Special Topics: Special Education (1.0 - 4.0 cr)

**EPSY 5742** - Student Teaching: Autism Spectrum Disorders (6.0 cr)

**CI 5645** - Methods for Teaching English Learners (3.0 cr)

**Capstone Course (2 credits)**

Take EPSY 5991 for a minimum of 2 credits.

**EPSY 5991** - Independent Study in Educational Psychology (1.0 - 8.0 cr)

-OR-

**Advanced Standing Anchor Program (30 credits)**

**Electives (28 credits)**

Select 28 elective credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.



- EPSY 5625 - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)
- EPSY 5632 - Module 2: Evidence-based Methods for AAC Assessment and Intervention (2.0 cr)
- EPSY 5641 - Foundations of Deaf Education (3.0 cr)
- EPSY 5661 - Introduction to Autism Spectrum Disorder (3.0 cr)
- EPSY 5663 - Assessment and Intervention for Individuals with Autism Spectrum Disorder (3.0 cr)
- EPSY 5681 - Educating Preschoolers with Disabilities: Specialized Approaches and Interventions (3.0 cr)
- EPSY 5705 - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)
- EPSY 5720 - Special Topics: Special Education (1.0 - 4.0 cr)
- EPSY 5742 - Student Teaching: Autism Spectrum Disorders (6.0 cr)
- CI 5645 - Methods for Teaching English Learners (3.0 cr)
- Capstone Course (2 credits)**  
Take EPSY 5991 for a minimum of 2 credits.  
EPSY 5991 - Independent Study in Educational Psychology (1.0 - 8.0 cr)

### Deaf and Hard of Hearing

Additional requirements and credits may be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

### Required Courses (19 credits)

Take the following courses:

- EPSY 5614W - Assessment and Due Process in Special Education [WI] (3.0 cr)
- EPSY 5616W - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)
- EPSY 5641 - Foundations of Deaf Education (3.0 cr)
- EPSY 5644 - Early Childhood Language and Literacy Development and Best Practices: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5646 - Best Practices Teaching Reading and Writing for School Age: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5653 - ASL/English Structure and Application (3.0 cr)
- EPSY 5654 - Current Research, Issues Trends in Deaf Education (1.0 cr)

### Electives (9 credits)

Select at least 9 elective credits from the following in consultation with the advisor:

- EPSY 5642 - Early Intervention for Infants, Toddlers and Families: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5643 - Seminar: Identity, Culture and Diversity in Deaf Education (2.0 cr)
- EPSY 5645 - Deaf Plus: Educating and Understanding Deaf Students with Disabilities (1.0 cr)
- EPSY 5647 - Spoken Language Practices and Assistive Technology: Deaf and Hard of Hearing (2.0 cr)
- EPSY 5651 - Best Practices Teaching Content Areas: Deaf Education (3.0 cr)
- EPSY 5652 - Incorporating Academic ASL in the Classroom: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5704 - Practicum: Special Education Field Experience in Middle and Secondary School Classrooms (1.0 - 2.0 cr)
- EPSY 5705 - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)
- EPSY 5720 - Special Topics: Special Education (1.0 - 4.0 cr)
- EPSY 5751 - Student Teaching for Deaf Education (1.0 - 6.0 cr)
- CI 5404 - Multicultural Literature for Children and Adolescents (3.0 cr)
- CI 5417 - Elementary literacy Instruction for ESL Students (3.0 cr)
- CI 5620 - Introduction to Second Language Acquisition for Language Teachers (3.0 cr)
- CI 5645 - Methods for Teaching English Learners (3.0 cr)
- MTHE 5355 - Mathematics for Diverse Learners (3.0 cr)

### Capstone Course (2 credits)

Take EPSY 5991 for a minimum of 2 credits.

- EPSY 5991 - Independent Study in Educational Psychology (1.0 - 8.0 cr)

### Developmental Disabilities

Note: New student applications are not currently being accepted.

Additional requirements and credits may be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.



## Courses for Full Program and Advanced Standing Anchor Programs

### Full Program (30 credits)

#### Required Courses (19 credits)

Take the following courses:

- EPSY 5605W - Collaborative Practices for the Special Educator [WI] (3.0 cr)
- EPSY 5613 - Foundations of Special Education I [DSJ] (3.0 cr)
- EPSY 5614W - Assessment and Due Process in Special Education [WI] (3.0 cr)
- EPSY 5616W - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)
- EPSY 5618 - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)
- EPSY 5631 - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)
- MTHE 5355 - Mathematics for Diverse Learners (3.0 cr)

#### Electives (9 credits)

Select at least 9 elective credits from the following in consultation with the advisor:

- EPSY 5604 - Transition From School to Work and Community Living for Persons With Special Needs (3.0 cr)
- EPSY 5621 - Assessment and Instructional Design for Students with Developmental Disabilities (3.0 cr)
- EPSY 5622 - Programs and Curricula for Students with Developmental Disabilities (3.0 cr)
- EPSY 5624 - Biomedical and Physical Impairments of Students with Developmental Disabilities (2.0 cr)
- EPSY 5625 - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)
- EPSY 5632 - Module 2: Evidence-based Methods for AAC Assessment and Intervention (2.0 cr)
- EPSY 5636 - Sensory Impairments of Students With Developmental Disabilities (2.0 cr)
- EPSY 5641 - Foundations of Deaf Education (3.0 cr)
- EPSY 5661 - Introduction to Autism Spectrum Disorder (3.0 cr)
- EPSY 5705 - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)
- EPSY 5706 - Practicum in Moderate to Severe Developmental Disabilities (2.0 cr)
- EPSY 5720 - Special Topics: Special Education (1.0 - 4.0 cr)
- EPSY 5755 - Student Teaching: Developmental Disabilities, Mild/Moderate (1.0 - 6.0 cr)
- EPSY 5756 - Student Teaching: Developmental Disabilities, Moderate/Severe (1.0 - 6.0 cr)
- CI 5645 - Methods for Teaching English Learners (3.0 cr)

#### Capstone Course (2 credits)

Take EPSY 5991 for a minimum of 2 credits.

- EPSY 5991 - Independent Study in Educational Psychology (1.0 - 8.0 cr)

-OR-

### Advanced Standing Anchor Program (30 credits)

#### Electives (28 credits)

Select 28 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

- EPSY 5621 - Assessment and Instructional Design for Students with Developmental Disabilities (3.0 cr)
- EPSY 5622 - Programs and Curricula for Students with Developmental Disabilities (3.0 cr)
- EPSY 5624 - Biomedical and Physical Impairments of Students with Developmental Disabilities (2.0 cr)
- EPSY 5625 - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)
- EPSY 5632 - Module 2: Evidence-based Methods for AAC Assessment and Intervention (2.0 cr)
- EPSY 5636 - Sensory Impairments of Students With Developmental Disabilities (2.0 cr)
- EPSY 5641 - Foundations of Deaf Education (3.0 cr)
- EPSY 5661 - Introduction to Autism Spectrum Disorder (3.0 cr)
- EPSY 5706 - Practicum in Moderate to Severe Developmental Disabilities (2.0 cr)
- EPSY 5720 - Special Topics: Special Education (1.0 - 4.0 cr)
- CI 5645 - Methods for Teaching English Learners (3.0 cr)

#### Capstone Course (2 credits)

Take EPSY 5991 for a minimum of 2 credits.

- EPSY 5991 - Independent Study in Educational Psychology (1.0 - 8.0 cr)

### Early Childhood Special Education

Additional requirements and credits may be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

### Required Courses (19 credits)



Take the following courses:

- EPSY 5609 - Family-centered Services (3.0 cr)
- EPSY 5613 - Foundations of Special Education I [DSJ] (3.0 cr)
- EPSY 5614W - Assessment and Due Process in Special Education [WI] (3.0 cr)
- EPSY 5616W - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)
- EPSY 5618 - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)
- EPSY 5631 - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)
- MTHE 5355 - Mathematics for Diverse Learners (3.0 cr)

**Electives (9 credits)**

Select at least 9 elective credits from the following in consultation with the advisor:

- EPSY 5625 - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)
- EPSY 5681 - Educating Preschoolers with Disabilities: Specialized Approaches and Interventions (3.0 cr)
- EPSY 5682 - Education of Infants and Toddlers with Disabilities: Specialized Approaches and Intervention (1.0 cr)
- EPSY 5704 - Practicum: Special Education Field Experience in Middle and Secondary School Classrooms (1.0 - 2.0 cr)
- EPSY 5705 - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)
- EPSY 5720 - Special Topics: Special Education (1.0 - 4.0 cr)
- EPSY 5761 - Student Teaching in Early Childhood Special Education Settings for Children Aged Three to Five Years (3.0 cr)
- EPSY 5762 - Student Teaching in Early Childhood Special Education for Children Aged Birth to Three Years (3.0 cr)
- CPSY 5252 - Facilitating Social and Emotional Learning in Early Childhood Education (3.0 cr)
- CPSY 5253 - Facilitating Cognitive and Language Learning in Early Childhood Education (3.0 cr)
- CPSY 5254 - Facilitating Creative and Motor Learning in Early Childhood Education (2.0 cr)
- CI 5645 - Methods for Teaching English Learners (3.0 cr)

**Capstone Course (2 credits)**

Take EPSY 5991 for a minimum of 2 credits.

- EPSY 5991 - Independent Study in Educational Psychology (1.0 - 8.0 cr)

**Learning Disabilities**

Note: New student applications are not currently being accepted.

Additional requirements and credits may be required to be recommended for licensure. Required licensure coursework is subject to change. Please visit <https://www.cehd.umn.edu/teaching/> for the most up to date requirements and coursework.

The University of Minnesota does not award licensure. The Professional Educator Licensing and Standards Board (PELSB) determines licensure for the state of Minnesota in the areas of teacher education and related services. For school administrative licensure, the Minnesota Board of School Administrators (BOSA) determines licensure in Minnesota.

**Courses for Full Program and Advanced Standing Anchor Programs**

**Full Program (30 credits)**

**Required Courses (19 credits)**

Take the following courses:

- EPSY 5605W - Collaborative Practices for the Special Educator [WI] (3.0 cr)
- EPSY 5613 - Foundations of Special Education I [DSJ] (3.0 cr)
- EPSY 5614W - Assessment and Due Process in Special Education [WI] (3.0 cr)
- EPSY 5616W - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)
- EPSY 5618 - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)
- EPSY 5631 - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)
- MTHE 5355 - Mathematics for Diverse Learners (3.0 cr)

**Electives (9 credits)**

Select at least 9 elective credits from the following in consultation with the advisor

- EPSY 5604 - Transition From School to Work and Community Living for Persons With Special Needs (3.0 cr)
- EPSY 5617 - Academic and Social Interventions for Students with Mild to Moderate Disabilities (3.0 cr)
- EPSY 5625 - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)
- EPSY 5627 - Seminar: Advanced issues in Learning Disabilities (3.0 cr)
- EPSY 5628 - Characteristics of Moderate to Severe Learning Disabilities (3.0 cr)
- EPSY 5629 - Strategic Instructional Methods for Students Academically At-Risk (3.0 cr)
- EPSY 5641 - Foundations of Deaf Education (3.0 cr)
- EPSY 5657 - Interventions for Behavioral Problems in School Settings (3.0 cr)
- EPSY 5661 - Introduction to Autism Spectrum Disorder (3.0 cr)
- EPSY 5705 - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)
- EPSY 5707 - Practicum in Moderate to Severe Learning Disabilities (3.0 cr)
- EPSY 5720 - Special Topics: Special Education (1.0 - 4.0 cr)



[CI 5645](#) - Methods for Teaching English Learners (3.0 cr)

**Capstone Course (2 credits)**

Take EPSY 5991 for a minimum of 2 credits.

[EPSY 5991](#) - Independent Study in Educational Psychology (1.0 - 8.0 cr)

-OR-

**Advanced Standing Anchor Program (30 credits)**

**Electives (28 credits)**

Select at least 28 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

[EPSY 5625](#) - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)

[EPSY 5627](#) - Seminar: Advanced issues in Learning Disabilities (3.0 cr)

[EPSY 5628](#) - Characteristics of Moderate to Severe Learning Disabilities (3.0 cr)

[EPSY 5629](#) - Strategic Instructional Methods for Students Academically At-Risk (3.0 cr)

[EPSY 5641](#) - Foundations of Deaf Education (3.0 cr)

[EPSY 5661](#) - Introduction to Autism Spectrum Disorder (3.0 cr)

[EPSY 5707](#) - Practicum in Moderate to Severe Learning Disabilities (3.0 cr)

[EPSY 5720](#) - Special Topics: Special Education (1.0 - 4.0 cr)

[CI 5645](#) - Methods for Teaching English Learners (3.0 cr)

**Capstone Course (2 credits)**

Take EPSY 5991 for a minimum of 2 credits.

[EPSY 5991](#) - Independent Study in Educational Psychology (1.0 - 8.0 cr)

**Emotional and Behavioral Disabilities**

Note: New student applications are not currently being accepted.

**Required Courses (19 credits)**

Take the following courses:

[EPSY 5605W](#) - Collaborative Practices for the Special Educator [WI] (3.0 cr)

[EPSY 5613](#) - Foundations of Special Education I [DSJ] (3.0 cr)

[EPSY 5614W](#) - Assessment and Due Process in Special Education [WI] (3.0 cr)

[EPSY 5616W](#) - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)

[EPSY 5618](#) - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)

[EPSY 5631](#) - Module 1: Introduction to Augmentative and Alternative Communication (1.0 cr)

[MTHE 5355](#) - Mathematics for Diverse Learners (3.0 cr)

**Electives (9 credits)**

Select at least 9 credits from the following in consultation with the advisor:

[EPSY 5604](#) - Transition From School to Work and Community Living for Persons With Special Needs (3.0 cr)

[EPSY 5617](#) - Academic and Social Interventions for Students with Mild to Moderate Disabilities (3.0 cr)

[EPSY 5629](#) - Strategic Instructional Methods for Students Academically At-Risk (3.0 cr)

[EPSY 5656](#) - Advanced Issues in Emotional Behavior Disorders (3.0 cr)

[EPSY 5657](#) - Interventions for Behavioral Problems in School Settings (3.0 cr)

[EPSY 5705](#) - Practicum: Special Ed Field Experience in Early Childhood SpEd (ECSE) & Elementary School Classrooms (1.0 - 2.0 cr)

[EPSY 5708](#) - Practicum in Moderate to Severe Emotional/Behavioral Disorders (2.0 cr)

[EPSY 5720](#) - Special Topics: Special Education (1.0 - 4.0 cr)

[CI 5645](#) - Methods for Teaching English Learners (3.0 cr)

**Capstone Course (2 credits)**

Take EPSY 5991 for a minimum of 2 credits.

[EPSY 5991](#) - Independent Study in Educational Psychology (1.0 - 8.0 cr)



### **Twin Cities Campus**

## **Specialist in Education and General Education Administration Certificate**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455 (612-624-1006; fax 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Certificate of Specialist in Educ/Genl Educ/Admin

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Applications to this certificate currently are not being accepted.

The Department of Organizational Leadership, Policy, and Development is a leader in advancing knowledge about educational and organizational change in local, national, and international contexts. Our research, teaching, and outreach reflect a commitment to interdisciplinary and intercultural engagement with educators, scholars, and policy makers seeking to enhance leadership, policy, and development around the globe. Students in the MA and PhD programs choose from one of five complementary but distinct program tracks: education policy and leadership (EPL), evaluation studies (ES), higher education (HE), comparative and international development education (CIDE), and Human Resource Development (HRD). Our undergraduate programs focus on human resource development and business and marketing education. In addition, the department offers a variety of programs for practicing professionals and various licensure programs.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Note: Applications to this certificate currently are not being accepted.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

This program's structure is currently under review. In the past, it has been customized based on the student's prior coursework. A final paper is required for completion.





### **Twin Cities Campus**

## **Sport and Exercise Science M.Ed.**

*Kinesiology, School of*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Email: [kin@umn.edu](mailto:kin@umn.edu)

Website: <https://www.cehd.umn.edu/kin/academics/grad/med-ses.html>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The sport and exercise science MEd is a practitioner-oriented, graduate-level program designed to prepare students for advanced study or careers in the coaching of sport, sport or physical performance, or professions related to health and physical activity. Students may focus their studies on one of three career tracks: sports performance, sports medicine, and health promotion.

With guidance from faculty advisors, students choose at least 30-semester credits, which may include coursework, independent study, internships, workshops, and professional, site-based experiences.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.50.

A bachelor's degree, preferably in kinesiology or physical education.

#### **Special Application Requirements:**

The department reviews applications on an ongoing basis. Application reviews for specific academic terms begin by the following dates:

November 1: spring semester admission

March 1: summer session admission

July 1: fall semester admission (priority deadline May 1)

Admission requirements for this program include the following criteria:

A bachelor's degree, preferably in physical education or kinesiology, with a 2.50 minimum grade point average (GPA) from an accredited institution. Applicants who do not hold a degree in physical education or kinesiology may need to take some undergraduate prerequisite courses after admission.

All applicants must submit the following items:

-Online application

\_Application fee

-Unofficial transcripts of all previous post-secondary academic study must be uploaded to the application (official transcripts will be required if accepted)

-Personal statement describing career goals and rationale for interest in the program

-Diversity statement

-Resume

International applicants must submit score(s) from one of the following tests:

- TOEFL

- Internet Based - Total Score: 79



- Internet Based - Writing Score: 21
- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 20 major credits and 10 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** See the department for more details.

<http://www.cehd.umn.edu/kin/academics/grad/professional/kin5995.html>

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Required Courses

Students must consult with their advisor to determine their appropriate coursework. Students register for 3 credits of KIN 5995 and must consult with their advisor before registering for the course.

#### Research Method Course

Can choose to take either KIN 5181 or KIN 5441 to fulfill this requirement.

[KIN 5181](#) - Understanding Kinesiology Research (3.0 cr)

or [KIN 5441](#) - Applied Sport Science Research (3.0 cr)

#### Final Capstone Project

Credits taken should be consulted with the MEd Director.

[KIN 5995](#) - Research Problems in Applied Kinesiology (1.0 - 6.0 cr)

### Elective Courses

Students choose the following electives based on one of the three career tracks below. A maximum of 9 credits of 4xxx courses may count towards the 30 credits required for the MEd degree.

#### Sports Performance

Examples of careers in this area include sports coach, exercise physiologist, sport analyst, personal trainer, group fitness instructor, strength and conditioning staff, sports training facility manager, team conditioning coach.

[KIN 4385](#) - Exercise Physiology (4.0 cr)

[KIN 4641](#) - Training Theory & Analytics I for Sport Performance (3.0 cr)

[KIN 4687](#) - Principles and Theory of Sports Coaching (3.0 cr)

[KIN 4741](#) - Training Theory & Analytics 2 for Sport Performance (3.0 cr)

[KIN 5104](#) - Physical Activities for Persons with Disabilities (3.0 cr)

[KIN 5122](#) - Applied Exercise Physiology (3.0 cr)

[KIN 5136](#) - Psychology of Coaching (3.0 cr)

[KIN 5142](#) - Applied Nutrition for Sport Performance and Optimal Health (3.0 cr)

[KIN 5328](#) - International Sport: The Impact of the Olympic Games [HIS, GP] (3.0 cr)

[KIN 5371](#) - Sport and Society (3.0 cr)

[KIN 5441](#) - Applied Sport Science Research (3.0 cr)

[KIN 5435](#) - Advanced Theory and Techniques of Exercise Science (3.0 cr)

[KIN 5485](#) - Exercise Testing and Prescription (3.0 cr)

[KIN 5511](#) - Sport and Gender (3.0 cr)

[KIN 5585](#) - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)

[KIN 5641](#) - Scientific Theory and Application of Training and Conditioning in Sport (3.0 cr)

[KIN 5696](#) - Practicum in Kinesiology (1.0 - 6.0 cr)



KIN 5723 - Psychology of Sport Injury and Rehabilitation (3.0 cr)  
KIN 5841 - Elite Performance and Environmental Considerations (3.0 cr)  
KIN 8122 - Seminar: Exercise Physiology (2.0 cr)  
KIN 8285 - Cellular and Molecular Exercise Physiology (3.0 cr)  
PHSL 5444 - Muscle (3.0 cr)

or **Sports Medicine**

Examples of careers in this area include athletic trainer, sports therapist, massage therapist, clinical support staff, kinesiologist, health fitness specialist.

KIN 4133 - Perceptual-Motor Control and Learning (3.0 cr)  
KIN 4441 - Movement Neuroscience (3.0 cr)  
KIN 5104 - Physical Activities for Persons with Disabilities (3.0 cr)  
KIN 5122 - Applied Exercise Physiology (3.0 cr)  
KIN 5125 - Advances in Physical Activity and Health (3.0 cr)  
KIN 5141 - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)  
KIN 5142 - Applied Nutrition for Sport Performance and Optimal Health (3.0 cr)  
KIN 5235 - Advanced Biomechanics II: Kinetics (3.0 cr)  
KIN 5441 - Applied Sport Science Research (3.0 cr)  
KIN 5485 - Exercise Testing and Prescription (3.0 cr)  
KIN 5585 - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)  
KIN 5643 - Applied Motion Capture and Movement Analysis Technology (3.0 cr)  
KIN 5696 - Practicum in Kinesiology (1.0 - 6.0 cr)  
KIN 5723 - Psychology of Sport Injury and Rehabilitation (3.0 cr)  
KIN 5841 - Elite Performance and Environmental Considerations (3.0 cr)  
KIN 5941 - Clinical Movement Neuroscience (3.0 cr)  
KIN 8122 - Seminar: Exercise Physiology (2.0 cr)  
KIN 8132 - Seminar: Motor Development (3.0 cr)  
KIN 8135 - Seminar: Motor Control and Learning (3.0 cr)  
KIN 8211 - Seminar: Perception and Action (3.0 cr)  
RSC 5135 - Advanced Biomechanics I: Kinematics (3.0 cr)

or **Health Promotion**

Examples of careers in this area include fitness center manager, fitness instructor, personal trainer, health educator, sports development officer.

KIN 4134 - The Aging Motor System (3.0 cr)  
KIN 4214 - Health Promotion (3.0 cr)  
KIN 5104 - Physical Activities for Persons with Disabilities (3.0 cr)  
KIN 5122 - Applied Exercise Physiology (3.0 cr)  
KIN 5123 - Motivational Interventions in Physical Activity (3.0 cr)  
KIN 5125 - Advances in Physical Activity and Health (3.0 cr)  
KIN 5126 - Social Psychology of Sport & Physical Activity (3.0 cr)  
KIN 5142 - Applied Nutrition for Sport Performance and Optimal Health (3.0 cr)  
KIN 5202 - Current Issues in Health (2.0 cr)  
KIN 5328 - International Sport: The Impact of the Olympic Games [HIS, GP] (3.0 cr)  
KIN 5371 - Sport and Society (3.0 cr)  
KIN 5441 - Applied Sport Science Research (3.0 cr)  
KIN 5485 - Exercise Testing and Prescription (3.0 cr)  
KIN 5511 - Sport and Gender (3.0 cr)  
KIN 5585 - Pediatric Physiology and Health: Concepts and Applications (2.0 cr)  
KIN 5696 - Practicum in Kinesiology (1.0 - 6.0 cr)  
KIN 5723 - Psychology of Sport Injury and Rehabilitation (3.0 cr)  
KIN 5804 - National Collegiate Athletic Association (NCAA) Compliance (2.0 cr)  
PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)



### **Twin Cities Campus**

## **Sport Management M. A.**

*Kinesiology, School of*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Kinesiology, 1900 University Avenue SE, Minneapolis, MN 55455 (612-625-5300; fax: 612-626-7700)

Email: [kin@umn.edu](mailto:kin@umn.edu)

Website: <https://www.cehd.umn.edu/kin/academics/grad/ma-smgt.html>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of arts in sport management provides academic excellence by combining theoretical instruction and practical experience to prepare tomorrow's leaders for success in the sports industry and marketplace. Students develop the tools of research and learn core concepts through an interdisciplinary curriculum with an emphasis on cultivating new ideas and improving operations in the sport industry.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Applicants must submit a University of Minnesota application which includes a written statement of academic interests, goals, and objectives; scores from the General Test of the GRE (verbal, quantitative, and analytical writing) or the GMAT (verbal, quantitative, and analytical writing) that are less than five years old; three letters of recommendation from persons familiar with their scholarship and research potential; a scholarly writing sample; and unofficial transcripts. Submission of all application materials by December 1 is strongly encouraged to ensure priority consideration for admission and for teaching and research assistantships awarded for the next academic year. Students are admitted for the fall semester.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 153
  - General Test - Quantitative Reasoning: 153
  - General Test - Analytical Writing: 4.5
- GMAT
  - Verbal section score: 33
  - Quantitative section score: 44
  - Analytical writing assessment score: 5

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5



- MELAB
- Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, GMAT, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 26 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 36 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required.  
**Capstone Project:** The Plan B project is an independent research project with the advisor that meets the following guidelines: involves a total of approximately 120 hours of work; demonstrates familiarity with the tools of research and scholarship in the field of sport management; demonstrates the ability to work independently; demonstrates the ability to effectively present the results of the investigation.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Core Coursework (16 Credits)

Students in both plan A and B are required to take the following courses.

- [KIN 5421](#) - Sport Finance (3.0 cr)
- [KIN 5631](#) - Programming and Promotion in Sport (3.0 cr)
- [KIN 5601](#) - Sport Management Ethics and Policy (3.0 cr)
- [KIN 5725](#) - Organization and Management of Physical Education and Sport (3.0 cr)
- [KIN 5801](#) - Legal Aspects of Sport and Recreation (4.0 cr)

### Required Research Course (6 Credits)

Students in both plan A and B are required to take at least 6 credits from one of the following courses or in consultation with your faculty advisor.

- [CI 8148](#) - Conducting Qualitative Studies in Educational Contexts (3.0 cr)
- or [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- or [EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)
- or [FSOS 8013](#) - Qualitative Family Research Methods (3.0 cr)
- or [KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)

### Electives (4 to 10 Credits)

Plan A students take at least 4 credits, and Plan B students take at least 10 credits from the following list or in consultation with the faculty advisor.

- [KIN 5371](#) - Sport and Society (3.0 cr)
- or [KIN 5461](#) - Issues in the Sport Industry (3.0 cr)
- or [KIN 5511](#) - Sport and Gender (3.0 cr)
- or [KIN 5992](#) - Readings in Kinesiology (1.0 - 9.0 cr)
- or [KIN 5995](#) - Research Problems in Applied Kinesiology (1.0 - 6.0 cr)
- or [MKTG 6088](#) - Strategic Marketing (2.0 cr)

### Plan Options

#### Plan A

Students must take at least 10 credits of KIN 8777.  
Take 10 master's thesis credits.  
[KIN 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B



Students must take at least 4 credits of KIN 8995.

Take KIN 8995 for 4 credits.

[KIN 8995](#) - Research Problems in Kinesiology (1.0 - 12.0 cr)



### **Twin Cities Campus**

## **Sport Management M.Ed.**

*Kinesiology, School of*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Email: [kin@umn.edu](mailto:kin@umn.edu)

Website: <https://www.cehd.umn.edu/kin/academics/grad/med-smgt.html>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The sport management master of education (MEd) is a practitioner-oriented, graduate-level program designed to prepare students for advanced study or careers in sport administration, sport management, or sport and fitness related professions. With guidance from professional program advisers, students choose at least 30 semester credits, which may include coursework, independent study, internships, workshops, and professional site-based experiences. Required courses will provide students with a well-balanced perspective of the industry; multiple options in elective courses allow students to focus on topics they find applicable and interesting in relation to the sport and physical activity industry. Students must maintain a minimum 3.0 GPA.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.50.

A bachelor's degree, preferably in kinesiology or physical education.

#### **Special Application Requirements:**

The college reviews applications on an ongoing basis. Application reviews for specific academic terms begin by the following dates:

November 1: spring semester admission

March 1: summer session admission

July 1: fall semester admission (priority deadline May 1)

Admission requirements for this program include the following criteria:

A bachelors degree, preferably in physical education or kinesiology, with a 2.50 minimum grade point average (GPA) from an accredited institution. Applicants who do not hold a degree in physical education or kinesiology may need to take some undergraduate prerequisite courses after admission.

All applicants must submit the following items:

- Online application
- Application fee (\$75 for U.S. applicants; \$95 for international applicants)
- Unofficial transcripts of all previous post-secondary academic study must be downloaded to the application (official transcripts will be required if accepted)
- Personal statement describing career goals and rationale for interest in the program
- Resume

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19



- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 22 major credits and 8 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Students work with teaching faculty on this final project. It is recommended that students complete the project during the final semester of the program.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Departmental Core Courses (22 credits)

Take the following courses:

- [KIN 5421](#) - Sport Finance (3.0 cr)
  - [KIN 5601](#) - Sport Management Ethics and Policy (3.0 cr)
  - [KIN 5631](#) - Programming and Promotion in Sport (3.0 cr)
  - [KIN 5725](#) - Organization and Management of Physical Education and Sport (3.0 cr)
  - [KIN 5801](#) - Legal Aspects of Sport and Recreation (4.0 cr)
  - [KIN 5995](#) - Research Problems in Applied Kinesiology (1.0 - 6.0 cr)
- Take either [KIN 5181](#) or [KIN 5981](#) in consultation with advisor.
- [KIN 5181](#) - Understanding Kinesiology Research (3.0 cr)
  - or [KIN 5981](#) - Research Methodology in Kinesiology and Sport Management (3.0 cr)

### Elective Courses (8 credits)

Select 8 credits from the following list in consultation with the advisor. One course may be selected from outside kinesiology, such as from the Department of Organizational Leadership, Policy and Development, or Carlson School of Management.

- [KIN 5111](#) - Sports Facilities (3.0 cr)
- or [KIN 5115](#) - Event Management in Sport (3.0 cr)
- or [KIN 5371](#) - Sport and Society (3.0 cr)
- or [KIN 5461](#) - Issues in the Sport Industry (3.0 cr)
- or [KIN 5511](#) - Sport and Gender (3.0 cr)
- or [KIN 5696](#) - Practicum in Kinesiology (1.0 - 6.0 cr)
- or [KIN 5804](#) - National Collegiate Athletic Association (NCAA) Compliance (2.0 cr)
- or [KIN 5992](#) - Readings in Kinesiology (1.0 - 9.0 cr)
- or [PA 5101](#) - Management and Governance of Nonprofit Organizations (3.0 cr)





### **Twin Cities Campus**

## **Sport Management Minor**

*Kinesiology, School of*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Kinesiology, 1900 University Avenue S.E., Minneapolis, MN 55455 (612-625-5300; fax: 612-626-7700)

Email: [kin@umn.edu](mailto:kin@umn.edu)

Website: <https://www.cehd.umn.edu/kin/academics/default.html>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Sport management is an interdisciplinary field that provides students with academic training and field experience for careers in sport and fitness management professions. The sport management program encompasses many different subjects, including sociology, business, marketing, communications, and psychology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Master's**

Take at least 6 sport management course credits, selected in consultation with the major advisor and the School of Kinesiology director of graduate studies, for the master's-level minor.

#### **Doctoral**

Take at least 12 sport management credits, selected in consultation with the major advisor and the School Kinesiology director of graduate studies, for the doctoral-level minor.



### **Twin Cities Campus**

## **Talent Development and Gifted Education Postbaccalaureate Certificate**

*Educational Psychology*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Educational Psychology, 56 East River Road, Minneapolis, MN 55455; 612-624-6083

Email: [psyf-adm@umn.edu](mailto:psyf-adm@umn.edu)

Website: <https://www.cehd.umn.edu/edpsych/programs/foundations/talent/>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Talent Development/Gifted Education PBac Cert Grad

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This 12-credit certificate program is intended to give teachers, administrators, education professionals, and other individuals with an interest in the education of gifted and talented students the opportunity to obtain the knowledge and skills necessary to develop, implement, and supervise programs in the education of gifted and talented students.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Applicants to this post-baccalaureate certificate must have completed a bachelor's degree from an accredited institution. Student applications will be reviewed by William Bart, Ph.D., Program Coordinator, [bartx001@umn.edu](mailto:bartx001@umn.edu). Detailed application instructions are available at the website listed above. Applications are accepted for fall semester (March 1 deadline) and spring semester (October 15 deadline).

Applicants must submit the following application materials:

- Online application
- Unofficial transcripts from all post-secondary institutions attended or currently attending, including the University of Minnesota. (transcripts can be uploaded directly into the online application).
- For coursework completed outside of the United States, transcripts must be evaluated by a professional credential evaluation center. Request a "course-by-course" evaluation. This process can take 4-6 weeks; please plan accordingly. Students can use any provider that is an accredited member of the National Association of Credential Evaluation Services (NACES). A suggested provider is Educational Credential Evaluators (ECE), P.O. Box 514070, Milwaukee, WI 53203-3470 (414-289-3400, fax: 414-289-3411).
- Applicant statement outlining interests and professional goals. The statement should minimally answer the following questions and be uploaded into the online application system: 1) Why are you interested in the talent development and gifted education certificate program? 2) What are your primary areas of interest related to talent development and gifted education?

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

#### **Required Courses (9 credits)**

(EPSY 5991 must be taken for 3 credits)

[EPSY 5101](#) - Intelligence and Creativity (3.0 cr)

[EPSY 5116](#) - Education of the Gifted and Talented (3.0 cr)

[EPSY 5991](#) - Independent Study in Educational Psychology (1.0 - 8.0 cr)



**Elective course (3 credits)**

One course (minimum 3 credits) selected with the approval of the certificate program director. Examples include coursework in learning and cognition, social psychology of education, measurement, or coursework in another discipline such as curriculum and instruction, educational administration, child development, or psychology.



### ***Twin Cities Campus***

## **Teaching M.Ed.**

*Curriculum & Instruction*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Curriculum and Instruction, University of Minnesota, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-4006; fax: 612-624-8277)

Email: [Clinfo@umn.edu](mailto:Clinfo@umn.edu)

Website: <http://www.cehd.umn.edu/ci>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 55
- This program requires summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Master of Education and Initial Teaching License curriculum earn you a master's degree and will train you to become a teacher in your field of choice. The master of education (MEd)/initial licensure programs are for individuals with bachelor's degrees who want to become teachers. These graduate-level programs provide rigorous, professional teacher preparation in accordance with the Standards of Effective Practice for Teachers (SEPT) and content standards adopted by Minnesota's Professional Licensing and Standards Board.

### **Accreditation**

This program is accredited by Minnesota's Professional Education and Licensing Board

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Each track has a subset of prerequisite courses. Prerequisite information can be found at:

<https://www.cehd.umn.edu/ci/admissions/ILP-admissions/prerequisites.html>

A transcript review is recommended to be completed before applying in order to determine if an applicant is ready to apply or should continue to work on additional prerequisite coursework. Unofficial transcript(s) can be submitted for evaluation to the attention of the appropriate C&I MEd advisor. Adviser information is available with the current requirement and coursework link provided for each track.

Students with international coursework must arrange for a transcript evaluation from a foreign transcript evaluation service.

Submit the following materials using the University's online application system:

Unofficial transcripts from all schools attended, even if a degree was not earned

Resume

Essay

One letter of recommendation

Extenuating circumstances statement (if applicable)

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79



- Internet Based - Writing Score: 21
- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 to 55 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: For specific language sub-plans only

A minimum GPA of 2.80 is required for students to remain in good standing.

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may complete the program with more than one sub-plan.

### Arts in Education

This sub-plan is limited to students completing the program under Plan C.

The Arts in Education track is multidimensional, focusing on design and implementation of conceptually significant performing and visual arts education curricula grounded in current theory, knowledge of emerging technologies, understanding of equity-based practices in respective arts disciplines. Graduates of the program will be prepared to teach in diverse classrooms across a scope of K-12 learning environments.

The University of Minnesota does not award licensure. Minnesota's Professional Licensing and Standards Board determines licensure for the state of Minnesota for PreK-12 visual arts, dance, or theatre arts programs. Upon satisfactory completion of coursework and program requirements, the Office of Teacher Education can recommend the student for state licensure. Required licensure coursework is subject to change. Please visit [<https://www.cehd.umn.edu/ci/academics/artsined/ILP-ArtsinEd.html>] for current requirements and coursework.

### Arts in Education (32 credits)

#### Summer Session (11 credits)

Take the following courses:

- CI 5049 - Digital Media & Technology Integration: Arts Education Theory & Practice (3.0 cr)
- CI 5078 - Application of Aesthetic Theory in Education (2.0 cr)
- CI 5102 - Culture, Schools, & Communities: Human Relations I (3.0 cr)
- CI 5163 - Child and Adolescent Development for Teaching and Learning I (1.0 cr)
- CI 5617 - Academic Language and English Learners I (1.0 cr)
- EPSY 5015 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)

#### Fall Session (14 credits)

Take the following courses:

- CI 5065 - Improving Arts Programs in the Schools (3.0 cr)
- CI 5069 - Curriculum Innovations in Arts Education (3.0 cr)
- CI 5075 - The Social, Historical and Cultural Foundations of Arts Education (3.0 cr)
- CI 5103 - Culture, Schools, & Communities: Human Relations II (1.0 cr)



CI 5164 - Child and Adolescent Development for Teaching and Learning II (2.0 cr)  
CI 5618 - Academic Language and English Learners II (1.0 cr)  
EPSY 5016 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)

**Spring Session (4 credits)**

Take each of the following courses for 2 credits:

CI 5008 - Theory and Practice of Arts Teaching (1.0 - 2.0 cr)  
CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)

**MEd Completion Coursework (3 credits)**

Take the following course for 3 credits:

CI 5050 - Issues in Art Education (1.0 - 4.0 cr)

**Elementary**

This sub-plan is limited to students completing the program under Plan C.

The Elementary Education track is designed to help students become inquiring, analytical, and reflective professional educators who can help students succeed in school. The program seeks to develop thoughtful practitioners who are engaged with children, communities, colleagues, and the field of education as advocates and leaders.

The University of Minnesota does not award licensure. Minnesotas Professional Licensing and Standards Board determines licensure for the state of Minnesota in K-6 elementary teaching. Upon satisfactory completion of coursework and program requirements, the Office of Teacher Education can recommend the student for state licensure. Required licensure coursework is subject to change. Please visit [<https://www.cehd.umn.edu/ci/academics/elementaryed/ILP-ElementaryEd.html>] for current requirements and coursework.

**Elementary Education sub-plans**

**Elementary Education (54.5 credits)**

The 54.5-credit track is for students with a bachelors degree other than the University of Minnesota Elementary Education Foundations degree.

**May Session (6 credits)**

Take the following courses:

CI 5111 - Introduction to Elementary School Teaching (3.0 cr)  
EPSY 5001 - Learning, Cognition, and Assessment (3.0 cr)

**Summer Session (9.5 credits)**

Take the following courses:

CI 5307 - Technology for Teaching and Learning (1.5 cr)  
CPSY 5301 - Advanced Developmental Psychology (3.0 cr)  
EPSY 5017 - Teaching Exceptional Students in General Education Classrooms (2.0 cr)  
OLPD 5005 - School and Society (2.0 cr)  
OLPD 5009 - Human Relations: Applied Skills for School and Society (1.0 cr)

**Fall Session (21 credits)**

Take the following courses:

CI 5283 - Practicum: Applying Instructional Methods in the Elementary Classroom (3.0 cr)  
CI 5425 - Reading Instruction in the Elementary Grades (3.0 cr)  
CI 5426 - Language Arts Instruction in the Elementary Grades (3.0 cr)  
CI 5502 - Science Instruction in the Elementary Grades (3.0 cr)  
CI 5645 - Methods for Teaching English Learners (3.0 cr)  
CI 5702 - Social Studies Instruction in the Elementary Grades (3.0 cr)  
CI 5822 - Mathematics Instruction in the Elementary Grades (3.0 cr)

**Spring Session (18 credits)**

Take the following courses:

CI 5285 - Clinical Experience in Elementary School Teaching (12.0 cr)  
CI 5286 - Student Teaching Seminar: Elementary Education (3.0 cr)  
CI 5287 - Capstone Project: Improvement of Teaching in Elementary and Pre-Kindergarten Schools (3.0 cr)

-OR-

**Elementary Education - U of M BS Degree Transitioners (39 credits)**

The 39-credit track is for students with a University of Minnesota Elementary Education Foundations BS degree.

**Fall Session (21 credits)**

Take the following courses:

CI 5283 - Practicum: Applying Instructional Methods in the Elementary Classroom (3.0 cr)  
CI 5425 - Reading Instruction in the Elementary Grades (3.0 cr)  
CI 5426 - Language Arts Instruction in the Elementary Grades (3.0 cr)



- CI 5502 - Science Instruction in the Elementary Grades (3.0 cr)
- CI 5645 - Methods for Teaching English Learners (3.0 cr)
- CI 5702 - Social Studies Instruction in the Elementary Grades (3.0 cr)
- CI 5822 - Mathematics Instruction in the Elementary Grades (3.0 cr)

**Spring Session (18 credits)**

Take the following courses:

- CI 5285 - Clinical Experience in Elementary School Teaching (12.0 cr)
- CI 5286 - Student Teaching Seminar: Elementary Education (3.0 cr)
- CI 5287 - Capstone Project: Improvement of Teaching in Elementary and Pre-Kindergarten Schools (3.0 cr)

**English**

This sub-plan is limited to students completing the program under Plan C.

The English Education track is designed to develop inquiring, analytical, and reflective professional educators prepared to teach in the classroom. Our students explore the personal and political nature of reading, communication, language, and literacies. Instructors use critical literacy as a catalyst for examining how educational experiences are shaped by race, language, culture, identity, and codes of power.

The University of Minnesota does not award licensure. Minnesotas Professional Licensing and Standards Board determines licensure for the state of Minnesota in 5-12 middle and high school English education. Upon satisfactory completion of coursework and program requirements, the Office of Teacher Education can recommend the student for state licensure. Required licensure coursework is subject to change. Please visit [<https://www.cehd.umn.edu/ci/academics/literacy/ILP-English.html>] for current requirements and coursework.

**English Education (39.5 credits)**

**Summer Session (7.5 credits)**

Take the following courses:

- CI 5102 - Culture, Schools, & Communities: Human Relations I (3.0 cr)
- CI 5163 - Child and Adolescent Development for Teaching and Learning I (1.0 cr)
- CI 5307 - Technology for Teaching and Learning (1.5 cr)
- CI 5617 - Academic Language and English Learners I (1.0 cr)
- EPSY 5015 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)

**Fall Session (14 credits)**

Take the following courses. Take CI 5441 for 3 credits.

- CI 5103 - Culture, Schools, & Communities: Human Relations II (1.0 cr)
- CI 5164 - Child and Adolescent Development for Teaching and Learning II (2.0 cr)
- CI 5441 - Teaching Literature in the Secondary School (2.0 - 3.0 cr)
- CI 5451 - Teaching Reading in Middle and Secondary Grades (3.0 cr)
- CI 5471 - Clinical Experience in Teaching Secondary English (3.0 cr)
- CI 5618 - Academic Language and English Learners II (1.0 cr)
- EPSY 5016 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)

**Spring Session (6 credits)**

Take the following courses:

- CI 5461 - Teaching Composition in the Secondary School (3.0 cr)
- CI 5481 - Developments in Teaching English and Speech (3.0 cr)

**MEd Completion Coursework (12 credits)**

Select 12 credits from the following courses. If selected, take CI 5150 or 5410 for 3 credits. CI 5485 is recommended when CI 5484 is selected.

- CI 5150 - Curriculum Topics (1.0 - 4.0 cr)
- CI 5156 - Popular Culture, Teaching, and Learning (3.0 cr)
- CI 5404 - Multicultural Literature for Children and Adolescents (3.0 cr)
- CI 5410 - Special Topics in the Teaching of Literacy (1.0 - 3.0 cr)
- CI 5422 - Teaching Writing in Schools (3.0 cr)
- CI 5442 - Literature for Adolescents (3.0 cr)
- CI 5464 - The Politics of Literacy and Race in Schools (3.0 cr)
- CI 5472 - Teaching Critical Media Analysis in Schools (3.0 cr)
- CI 5474 - New Literacies Frameworks and Instruction: Digital Texts and Digital Reading (3.0 cr)
- CI 5475 - Teaching Digital Writing (3.0 cr)
- CI 5484 - Improving Secondary English Language Arts Instruction: Part I (1.5 cr)
- CI 5485 - Improving Secondary English Language Arts Instruction: Part II (1.5 cr)
- CI 5641 - Language, Culture, and Education (3.0 cr)



## Mathematics

This sub-plan is limited to students completing the program under Plan C.

The Mathematics Education track is designed to help future teachers inquire and reflect on how children learn and use this knowledge to design instructional experiences that challenge, engage, and empower. Candidates will work in a variety of school settings with experienced teachers to make connections between educational strategies discussed in coursework and students. Our graduates value an ethos of vulnerability, recognizing their knowledge and pedagogical skills as wide-ranging, ever-evolving, and in collaboration with their students.

The University of Minnesota does not award licensure. Minnesotas Professional Licensing and Standards Board determines licensure for the state of Minnesota in 5-12 middle and high school Math education. Upon satisfactory completion of coursework and program requirements, the Office of Teacher Education can recommend the student for state licensure. Required licensure coursework is subject to change. Please visit [<https://www.cehd.umn.edu/ci/academics/mathed/ILP-MathEd.html>] for current requirements and coursework.

### Mathematics Education (37.5 credits)

#### Summer Session (13.5 credits)

Take the following courses:

- CI 5102 - Culture, Schools, & Communities: Human Relations I (3.0 cr)
- CI 5307 - Technology for Teaching and Learning (1.5 cr)
- CI 5617 - Academic Language and English Learners I (1.0 cr)
- EPSY 5001 - Learning, Cognition, and Assessment (3.0 cr)
- EPSY 5017 - Teaching Exceptional Students in General Education Classrooms (2.0 cr)
- MTHE 5011 - Arithmetic Structures in School Mathematics (3.0 cr)

#### Fall Session (10 credits)

Take the following courses. Take CI 5452 for 2 credits.

- CI 5103 - Culture, Schools, & Communities: Human Relations II (1.0 cr)
- CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)
- CI 5618 - Academic Language and English Learners II (1.0 cr)
- MTHE 5021 - Algebraic Structures in School Mathematics (3.0 cr)
- MTHE 5115 - Applications of Teaching Mathematics (3.0 cr)

#### Spring Session (3 credits)

Take the following course:

- MTHE 5031 - Geometric Structures in School Mathematics (3.0 cr)

#### MEd Completion Coursework (8 credits)

Take the following courses:

- MTHE 5314 - Teaching and Learning Mathematics (3.0 cr)
- MTHE 5366 - Technology-Assisted Mathematics Instruction (3.0 cr)
- MTHE 5993 - Directed Studies in Mathematics Education (2.0 cr)

#### Elective (3 credits)

Select at least 3 credits from the following courses:

- MTHE 5155 - Rational Number Concepts and Proportionality (3.0 cr)
- MTHE 5171 - Teaching Problem Solving (3.0 cr)
- MTHE 5172 - Teaching Probability and Statistics (3.0 cr)
- MTHE 5355 - Mathematics for Diverse Learners (3.0 cr)

## Science

This sub-plan is limited to students completing the program under Plan C.

Science teachers are in high demand. The Science track will prepare students to step into the classroom ready to begin teaching in diverse classrooms. The program offers a mix of theory and practice, to prepare teachers to provide equitable student-centered science instruction for all students.

The University of Minnesota does not award licensure. Minnesotas Professional Licensing and Standards Board determines licensure for the state of Minnesota in 9-12 high school and 5-8 general science education. Upon satisfactory completion of coursework and program requirements, the Office of Teacher Education can recommend the student for state licensure. Required licensure coursework is subject to change. Please visit [<https://www.cehd.umn.edu/ci/academics/scienceed/ILP-Science.html>] for current requirements and coursework.





### Science Education (39.5 credits)

#### Summer Session (12 credits)

Take the following courses:

- CI 5102 - Culture, Schools, & Communities: Human Relations I (3.0 cr)
- CI 5530 - Secondary Science Methods I (3.0 cr)
- CI 5617 - Academic Language and English Learners I (1.0 cr)
- EPSY 5001 - Learning, Cognition, and Assessment (3.0 cr)
- EPSY 5017 - Teaching Exceptional Students in General Education Classrooms (2.0 cr)

#### Fall Session (15.5 credits)

Take the following courses. Take CI 5452 for 2 credits.

- CI 5103 - Culture, Schools, & Communities: Human Relations II (1.0 cr)
- CI 5307 - Technology for Teaching and Learning (1.5 cr)
- CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)
- CI 5531 - Secondary Science Methods II (3.0 cr)
- CI 5541 - Teaching History and Nature of Science (3.0 cr)
- CI 5596 - Clinical Experience in Middle School Science (4.0 cr)
- CI 5618 - Academic Language and English Learners II (1.0 cr)

#### Spring Session (3 credits)

Take the following course:

- CI 5532 - Secondary Science Methods III (3.0 cr)

#### MEd Completion Coursework (9 credits)

Select 9 credits from the following. If CI 5540 is selected it must be taken for 3 credits.

- CI 5533 - Current Developments in Science Teaching (3.0 cr)
- CI 5535 - Foundations of Science Education (3.0 cr)
- CI 5536 - Equity, Policy, and Assessment in Science Education (3.0 cr)
- CI 5538 - Action Research in Science Education (3.0 cr)
- CI 5540 - Special Topics: Science Education (1.0 - 4.0 cr)
- CI 5551 - Reflecting on Science Classroom Practices I (1.5 cr)
- CI 5552 - Reflecting on Science Classroom Practices II (1.5 cr)

### Second Language Education

This sub-plan is limited to students completing the program under Plan C.

The Second Language Education track integrates the fields of world languages and English as a Second Language (ESL), enabling students studying in either field to learn from each other. Theory and practice are also linked through concurrent coursework and student teaching, a nationally recognized approach to teacher education. In addition to ESL, students can study one or more world/classical languages including Arabic, Chinese (Mandarin), French, German, Hebrew, Italian, Japanese, Norwegian, Ojibwe, Classical Greek and Latin, Russian, Spanish, and Swedish.

The University of Minnesota does not award licensure. Minnesotas Professional Licensing and Standards Board determines licensure for the state of Minnesota in K-12 second language education. Upon satisfactory completion of coursework and program requirements, the Office of Teacher Education can recommend the student for state licensure. Required licensure coursework is subject to change. Please visit [<https://www.cehd.umn.edu/ci/academics/SLE/ILP-SLE.html>] for current requirements and coursework.

### Second Language Education (33.5 credits)

#### Summer Session (14 credits)

Take the following courses. Take CI 5452 and CI 5631 for 1 credit.

- CI 5102 - Culture, Schools, & Communities: Human Relations I (3.0 cr)
- CI 5163 - Child and Adolescent Development for Teaching and Learning I (1.0 cr)
- CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)
- CI 5620 - Introduction to Second Language Acquisition for Language Teachers (3.0 cr)
- CI 5631 - Second Language Curriculum Development and Assessment (1.0 - 3.0 cr)
- EPSY 5015 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)
- LING 5001 - Introduction to Linguistics (4.0 cr)

#### Fall Session (12.5 credits)

CI 5631 will be required again in Fall session, this time for 2 credits.

- CI 5103 - Culture, Schools, & Communities: Human Relations II (1.0 cr)
- CI 5164 - Child and Adolescent Development for Teaching and Learning II (2.0 cr)
- CI 5307 - Technology for Teaching and Learning (1.5 cr)



- CI 5361 - Teaching and Learning with the Internet (2.0 - 3.0 cr)
- CI 5632 - Literacy and Language Development in Second Language Classrooms (3.0 cr)
- CI 5646 - English Grammar for ESL Teachers (3.0 cr)

**Spring Session (7 credits)**

Take the following courses:

- CI 5634 - Content-Based Instruction in Second Language Settings (3.0 cr)
- CI 5635 - Culture and Diversity in Second Language Classrooms (3.0 cr)
- EPSY 5016 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)

**Second Language Education for Working Professionals**

This sub-plan is limited to students completing the program under Plan C.

The Second Language Education (SLE) for working professionals track is designed for practicing teachers in the areas of ESL and/or any of the following 14 languages: Arabic, Chinese (Mandarin), French, German, Hebrew, Italian, Japanese, Norwegian, Ojibwe, Classical Greek and Latin, Russian, Spanish, and Swedish. This part-time program provides educators with the specific knowledge base and skill set needed to be a K-12 teacher of ESL or a world language.

The University of Minnesota does not award licensure. Minnesotas Professional Licensing and Standards Board determines licensure for the state of Minnesota in ESL or a world/classical language license. Upon satisfactory completion of coursework and program requirements, the Office of Teacher Education can recommend the student for state licensure. Required licensure coursework is subject to change. Please visit [<https://www.cehd.umn.edu/ci/academics/SLE/ILP-SLE-Working-Professionals.html>] for current requirements and coursework.

**ESL or World Languages**

**SLE Working Professionals - ESL (37.5 to 44.5 credits)**

100 hours of experience in schools across elementary, middle and high school language classrooms which must be completed before practicum and student teaching.

**M.Ed. Required Coursework (5.5 credits)**

Take the following courses. Take CI 5452 for 1 credit.

- CI 5307 - Technology for Teaching and Learning (1.5 cr)
- CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)
- OLPD 5005 - School and Society (2.0 cr)
- OLPD 5009 - Human Relations: Applied Skills for School and Society (1.0 cr)

**Special Education Focus (2 credits)**

Select EPSY 5017 or both EPSY 5015 and EPSY 5016 to complete the 2-credit requirement.

- EPSY 5015 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)
- EPSY 5016 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)
- EPSY 5017 - Teaching Exceptional Students in General Education Classrooms (2.0 cr)

**Psychology Focus (3 to 6 credits)**

Select EPSY 5001 and CPSY 5301 for a total of 6 credits, or CI 5163 and 5164 for a total of 3 credits.

- CI 5163 - Child and Adolescent Development for Teaching and Learning I (1.0 cr)
- CI 5164 - Child and Adolescent Development for Teaching and Learning II (2.0 cr)
- CPSY 5301 - Advanced Developmental Psychology (3.0 cr)
- EPSY 5001 - Learning, Cognition, and Assessment (3.0 cr)

**Additional Required Experiences/Coursework (27 to 31 credits)**

Take the following courses. The number of credits required for CI 5697 will be dependent upon the current teaching position.

- CI 5620 - Introduction to Second Language Acquisition for Language Teachers (3.0 cr)
- CI 5642 - Assessing English Learners (3.0 cr)
- CI 5646 - English Grammar for ESL Teachers (3.0 cr)
- CI 5651 - Foundations of Second Languages and Cultures Education (3.0 cr)
- CI 5656 - Teaching Literacy in Second Language Classrooms (3.0 cr)
- CI 5657 - Teaching Speaking and Listening in Second Language Classrooms (3.0 cr)
- CI 5662 - Second Language Curriculum Design (3.0 cr)
- CI 5697 - Practicum: ESL in the Elementary School (2.0 - 6.0 cr)
- LING 5001 - Introduction to Linguistics (4.0 cr)

-OR-

**SLE Working Professionals - World Languages (33.5 to 39.5 credits)**

**MEd Required Coursework (5.5 credits)**

Take the following courses. Take CI 5452 for 1 credit.

- CI 5307 - Technology for Teaching and Learning (1.5 cr)
- CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)



OLPD 5005 - School and Society (2.0 cr)

OLPD 5009 - Human Relations: Applied Skills for School and Society (1.0 cr)

**Special Education Focus (2 credits)**

Select EPSY 5017 or both EPSY 5015 and EPSY 5016 to complete the 2-credit requirement.

EPSY 5015 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)

EPSY 5016 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)

EPSY 5017 - Teaching Exceptional Students in General Education Classrooms (2.0 cr)

**Psychology Focus (3 to 6 credits)**

Select EPSY 5001 and CPSY 5301 for a total of 6 credits, or CI 5163 and 5164 for a total of 3 credits.

CI 5163 - Child and Adolescent Development for Teaching and Learning I (1.0 cr)

CI 5164 - Child and Adolescent Development for Teaching and Learning II (2.0 cr)

CPSY 5301 - Advanced Developmental Psychology (3.0 cr)

EPSY 5001 - Learning, Cognition, and Assessment (3.0 cr)

**Additional Required Experiences/Coursework (23 to 26 credits)**

Take the following courses. The number of credits required for CI 5696 will be dependent upon current teaching position.

CI 5619 - Teaching World Languages and Cultures in Elementary Settings (2.0 cr)

CI 5651 - Foundations of Second Languages and Cultures Education (3.0 cr)

CI 5656 - Teaching Literacy in Second Language Classrooms (3.0 cr)

CI 5657 - Teaching Speaking and Listening in Second Language Classrooms (3.0 cr)

CI 5696 - Practicum: Teaching World Languages and Cultures in Elementary Schools (2.0 - 6.0 cr)

CI 5624 - Content-based Language Instruction and Curriculum Development (2.0 cr)

or CI 5662 - Second Language Curriculum Design (3.0 cr)

If CI 5660 Special Topics is selected, take STARTALK for Mandarin Chinese for 2 credits.

CI 5621 - Culture as the Core in the Second Language Classroom (2.0 cr)

or CI 5641 - Language, Culture, and Education (3.0 cr)

or CI 5660 - Special Topics in the Teaching of Second Languages and Cultures (1.0 - 4.0 cr)

CI 5625 - Assessing Language Learners' Communication Skills via Authentic Communicative Performance Tasks (2.0 cr)

or CI 5658 - Foreign Language Testing and Assessment (3.0 cr)

**Social Studies**

This sub-plan is limited to students completing the program under Plan C.

The Social Studies track is designed to foster a community of support for all students in the program. Through a lens of social justice education, students will join a diverse cohort of candidates who want to study pedagogy and educational approaches as they relate to contemporary social studies instruction. You will be paired with experienced teachers to complete your field experience and will enter the classroom prepared to teach.

The University of Minnesota does not award licensure. Minnesotas Professional Licensing and Standards Board determines licensure for the state of Minnesota in 5-12 middle and high school Social Studies education. Upon satisfactory completion of coursework and program requirements, the Office of Teacher Education can recommend the student for state licensure. Required licensure coursework is subject to change. Please visit [<https://www.cehd.umn.edu/ci/academics/socialstudies/ILP-socialstudies.html>] for current requirements and coursework.

**Social Studies Education (32.5 credits)**

**Summer Session (14 credits)**

Take the following courses. Take CI 5452 for 2 credits.

CI 5102 - Culture, Schools, & Communities: Human Relations I (3.0 cr)

CI 5163 - Child and Adolescent Development for Teaching and Learning I (1.0 cr)

CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)

CI 5617 - Academic Language and English Learners I (1.0 cr)

CI 5741 - Introduction to Social Studies Education (3.0 cr)

CI 5743 - The Social Sciences and the Social Studies (3.0 cr)

EPSY 5015 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)

**Fall Session (12.5 credits)**

Take the following courses:

CI 5103 - Culture, Schools, & Communities: Human Relations II (1.0 cr)

CI 5164 - Child and Adolescent Development for Teaching and Learning II (2.0 cr)

CI 5307 - Technology for Teaching and Learning (1.5 cr)

CI 5618 - Academic Language and English Learners II (1.0 cr)

CI 5742 - Advanced Methods of Teaching the Social Studies (3.0 cr)

CI 5745 - Engaging Youth With Social Studies Texts (3.0 cr)

EPSY 5016 - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)



### Spring Session (3 credits)

Take the following course:

CI 5744 - Seminar: Reflecting on Professional Development in Social Studies Education (3.0 cr)

### Elective (3 credits)

Select one of the following courses:

CI 5746 - Global and Multicultural Education in the Secondary Classroom (3.0 cr)

CI 5762 - Developing Civic Discourse in the Social Studies (3.0 cr)

### Alternative Pathway: Elementary Education

This sub-plan is limited to students completing the program under Plan C.

The Alternative Pathway: Elementary Education track requires 36 credits.

The University of Minnesota does not award licensure. Teaching licenses are granted by the Minnesota Professional Licensing Standards Board (PELSB). For more information on PELSB, please visit <https://mn.gov/pelsb/>. For the Minnesota Grow Your Own Teachers program, please visit <https://www.cehd.umn.edu/teaching/grow/teacher/> for current licensure requirements and coursework. For the Dual Language and Immersion Licensure program, please visit <https://www.cehd.umn.edu/ci/academics/SLE/ILP-Dual-Language-Immersion.html> for current licensure requirements and coursework.

### Coursework (36 credits)

Take the following courses. Take 1 credit of CI 5980 four times for a total of 4 credits. Take CI 5452 for 1 credit. MNGOT students take CI 5186 two times for a total of 6 credits. DLI students take CI 5672 and CI 5676.

CI 5980 - Clinical Experiences for K-12 Teaching (1.0 - 4.0 cr)

CI 5981 - Introduction to Equity-Based Pedagogy (1.0 cr)

CI 5982 - Enacting Equity-Based Pedagogy (2.0 cr)

CI 5983 - Equity-Based Pedagogy/Advocacy (1.0 cr)

CI 5984 - Planning Design and Management (1.0 cr)

CI 5985 - Academic Language and English Learners in the Content Areas (1.0 cr)

CI 5986 - Foundations of Special Education (1.0 cr)

CI 5987 - Child and Adolescent Development for Teaching, Learning, and Assessment (1.0 cr)

CI 5988 - Clinical Experience: Improvement of Teaching (2.0 cr)

CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)

CI 5211 - Elementary Education Content and Pedagogy I (4.0 cr)

CI 5212 - Elementary Education Content and Pedagogy II (3.0 cr)

CI 5213 - Elementary Education Content and Pedagogy III (3.0 cr)

CI 5214 - Elementary Education Content and Pedagogy IV (3.0 cr)

CI 5215 - Elementary Education Content and Pedagogy V (2.0 cr)

CI 5186 - School-Related Projects (1.0 - 4.0 cr)

CI 5672 - Language-Focused Instructional Practices and Strategies for Dual Language/Immersion Classrooms (3.0 cr)

CI 5676 - Biliteracy Development in Dual Language/Immersion Classrooms (3.0 cr)

### Alternative Pathway: Secondary Mathematics

This sub-plan is limited to students completing the program under Plan C.

The University of Minnesota does not award licensure. Teaching licenses are granted by the Minnesota Professional Licensing Standards Board (PELSB). For more information on PELSB, please visit <https://mn.gov/pelsb/>. For the Minnesota Grow Your Own Teachers program, please visit <https://www.cehd.umn.edu/teaching/grow/teacher/> for current licensure requirements and coursework.

The Alternative Pathway: Secondary Mathematics track requires 36 credits.

### Coursework (36 credits)

Take the following courses. Take 1 credit of CI 5980 4 times for a total of 4 credits. Take CI 5452 for 1 credit. Take CI 5186 2 times for a total of 6 credits.

CI 5980 - Clinical Experiences for K-12 Teaching (1.0 - 4.0 cr)

CI 5981 - Introduction to Equity-Based Pedagogy (1.0 cr)

CI 5982 - Enacting Equity-Based Pedagogy (2.0 cr)

CI 5983 - Equity-Based Pedagogy/Advocacy (1.0 cr)

CI 5984 - Planning Design and Management (1.0 cr)

CI 5985 - Academic Language and English Learners in the Content Areas (1.0 cr)

CI 5986 - Foundations of Special Education (1.0 cr)



- CI 5987 - Child and Adolescent Development for Teaching, Learning, and Assessment (1.0 cr)
- CI 5988 - Clinical Experience: Improvement of Teaching (2.0 cr)
- CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)
- CI 5511 - Introduction to Secondary Science: Laboratory-based Instruction (4.0 cr)
- CI 5812 - Teaching Algebra (3.0 cr)
- CI 5813 - Teaching Geometry (3.0 cr)
- CI 5814 - Teaching and Learning Mathematics (3.0 cr)
- CI 5815 - Leadership in Mathematics Education (2.0 cr)
- CI 5186 - School-Related Projects (1.0 - 4.0 cr)

#### Alternative Pathway: Secondary Science

This sub-plan is limited to students completing the program under Plan C.

The University of Minnesota does not award licensure. Teaching licenses are granted by the Minnesota Professional Licensing Standards Board (PELSB). For more information on PELSB, please visit <https://mn.gov/pelsb/>. For the Minnesota Grow Your Own Teachers program, please visit <https://www.cehd.umn.edu/teaching/grow/teacher/> for current licensure requirements and coursework.

The Alternative Pathway: Secondary Science track requires 36 credits.

#### Coursework (36 credits)

Take the following courses. Take 1 credit of CI 5980 4 times for a total of 4 credits. Take CI 5452 for 1 credit. Take CI 5186 two times for a total of 6 credits.

- CI 5980 - Clinical Experiences for K-12 Teaching (1.0 - 4.0 cr)
- CI 5981 - Introduction to Equity-Based Pedagogy (1.0 cr)
- CI 5982 - Enacting Equity-Based Pedagogy (2.0 cr)
- CI 5983 - Equity-Based Pedagogy/Advocacy (1.0 cr)
- CI 5984 - Planning Design and Management (1.0 cr)
- CI 5985 - Academic Language and English Learners in the Content Areas (1.0 cr)
- CI 5986 - Foundations of Special Education (1.0 cr)
- CI 5987 - Child and Adolescent Development for Teaching, Learning, and Assessment (1.0 cr)
- CI 5988 - Clinical Experience: Improvement of Teaching (2.0 cr)
- CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)
- CI 5511 - Introduction to Secondary Science: Laboratory-based Instruction (4.0 cr)
- CI 5512 - Secondary Science Methods: Understanding the Nature of Science (3.0 cr)
- CI 5513 - Secondary Science Methods: Equity in Science Teaching (3.0 cr)
- CI 5514 - Secondary Science Methods: The Science Learning Environment (2.0 cr)
- CI 5515 - Secondary Science Methods: Developing Adaptive Expertise (3.0 cr)
- CI 5186 - School-Related Projects (1.0 - 4.0 cr)

#### Alternative Pathway: English as a Second Language

This sub-plan is limited to students completing the program under Plan C.

The University of Minnesota does not award licensure. Teaching licenses are granted by the Minnesota Professional Licensing Standards Board (PELSB). For more information on PELSB, please visit <https://mn.gov/pelsb/>. For the Minnesota Grow Your Own Teachers program, please visit <https://www.cehd.umn.edu/teaching/grow/teacher/> for current licensure requirements and coursework.

The Alternative Pathway: English as a Second Language track requires 36 credits.

#### Coursework (36 credits)

Take the following courses. Take 1 credit of CI 5980 4 times for a total of 4 credits. Take CI 5452 for 1 credit. Take CI 5186 two times for a total of 6 credits.

- CI 5980 - Clinical Experiences for K-12 Teaching (1.0 - 4.0 cr)
- CI 5981 - Introduction to Equity-Based Pedagogy (1.0 cr)
- CI 5982 - Enacting Equity-Based Pedagogy (2.0 cr)
- CI 5983 - Equity-Based Pedagogy/Advocacy (1.0 cr)
- CI 5984 - Planning Design and Management (1.0 cr)
- CI 5985 - Academic Language and English Learners in the Content Areas (1.0 cr)
- CI 5986 - Foundations of Special Education (1.0 cr)
- CI 5987 - Child and Adolescent Development for Teaching, Learning, and Assessment (1.0 cr)
- CI 5988 - Clinical Experience: Improvement of Teaching (2.0 cr)
- CI 5452 - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)
- CI 5622 - Exploring Learner Language: Puzzles and Tools for the Classroom (2.0 cr)



- CI 5611 - Principles of Linguistics (2.0 cr)
- CI 5612 - ESL Methods for Multilingual Development (3.0 cr)
- CI 5613 - Testing and Assessment for English Learners (3.0 cr)
- CI 5614 - Curriculum and Materials Development for English Learners (3.0 cr)
- CI 5615 - Academic English for English Learners: Planning, Assessment, Instruction (2.0 cr)
- CI 5186 - School-Related Projects (1.0 - 4.0 cr)



### **Twin Cities Campus**

## **Teaching Writing and Critical Literacy Postbaccalaureate Certificate**

Curriculum & Instruction

College of Education and Human Development

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Curriculum and Instruction, University of Minnesota, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-4006; fax: 612-624-8277)

Email: [Clinfo@umn.edu](mailto:Clinfo@umn.edu)

Website: <http://www.cehd.umn.edu/ci>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 15
- This program requires summer semesters for timely completion.
- Degree: Teaching, Writing & Critical Literacy PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The certificate in teaching writing and critical literacy prepares preK-college educators to strengthen their skills and knowledge of current practice and research in the teaching of critical reading and writing (note that a university certificate program or certificate is distinct from a state certificate or certification).

Writing and reading complement one another, and their interconnectedness is critical to literacy instruction. This certificate will offer advanced knowledge of the teaching of literacy through a focused, rigorous program while developing practicing educators' skills as teachers and writers in a supportive learning community.

Changing literacy needs of students from all socioeconomic and educational backgrounds demand highly qualified teachers of reading and writing at the K-12 and postsecondary levels. Educators must prepare K-12 students to meet testing requirements at the state and national levels. In addition, teachers must meet the increasing literacy needs that accompany Minnesota's changing demographics of growing immigrant and English language learner (ELL) populations. Educators also must prepare students to communicate effectively by using new technologies.

The certificate program seeks to accomplish the following goals:

Develop effective strategies for teaching the writing process to English-language learners and diverse populations, as well as reading and writing across the curriculum.

Engage educators in current research about composition, reading, and learning theory.

Create learning communities where educators reflect on their own teaching, reading, and writing.

Give educators opportunities to learn from other practicing educators.

This program begins with a three-week, 3-credit Minnesota Writing Project (MWP) Invitational Institute and then extends to allow educators to choose from a wider range of courses from multiple University departments throughout the academic year.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

A completed bachelor's degree is required for admission.

Applicants must be licensed teachers or administrators. Non-licensed teachers may be admitted with faculty letters of recommendation if program space is available.

### **Special Application Requirements:**

Applicants must submit transcripts from every college attended (even those where a degree wasn't earned), scores from the TOEFL/IELTS/MELAB (if applicable), a resume, a goal statement that explains the relationship of courses and research to your



professional goals, and two letters of recommendation addressing your teaching accomplishments and potential for further study. Certificate applications are reviewed by the department three times per academic year: Fall, Spring and Summer.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Core Courses (9 credits)

[CI 5463](#) - Minnesota Writing Project Annual Invitational Summer Institute (3.0 cr)

[CI 5422](#) - Teaching Writing in Schools (3.0 cr)

#### Directed Study

3 credits of "directed study" will be taken in consultation with faculty adviser

### Elective Courses (6 credits)

Take 2 or more course(s) totaling 6 or more credit(s) from the following:

- [CI 5145](#) - Critical Pedagogy (3.0 cr)
- [CI 5404](#) - Multicultural Literature for Children and Adolescents (3.0 cr)
- [CI 5410](#) - Special Topics in the Teaching of Literacy (1.0 - 3.0 cr)
- [CI 5417](#) - Elementary literacy Instruction for ESL Students (3.0 cr)
- [CI 5442](#) - Literature for Adolescents (3.0 cr)
- [CI 5475](#) - Teaching Digital Writing (3.0 cr)
- [CI 5641](#) - Language, Culture, and Education (3.0 cr)
- [CI 5656](#) - Teaching Literacy in Second Language Classrooms (3.0 cr)
- [CI 5660](#) - Special Topics in the Teaching of Second Languages and Cultures (1.0 - 4.0 cr)
- [ENGL 5790](#) - Topics in Rhetoric, Composition, and Language (3.0 cr)
- [LING 5001](#) - Introduction to Linguistics (4.0 cr)
- [LING 5461](#) - Conversation Analysis (3.0 cr)
- [LING 5900](#) - Topics in Linguistics (3.0 cr)
- [WRIT 5531](#) - Introduction to Writing Theory and Pedagogy (3.0 cr)
- [EPSY 5618](#) - Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language (3.0 cr)
- [EPSY 5644](#) - Early Childhood Language and Literacy Development and Best Practices: Deaf and Hard of Hearing (3.0 cr)
- [EPSY 5646](#) - Best Practices Teaching Reading and Writing for School Age: Deaf and Hard of Hearing (3.0 cr)
- [EPSY 8116](#) - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)
- [EPSY 8117](#) - Writing Empirical Paper and Research/Grant Proposals in Education and Psychology (3.0 cr)





### **Twin Cities Campus**

## **Undergraduate Multicultural Teaching and Learning Postbaccalaureate Certificate**

*Organizational Leadership, Policy and Development*

**College of Education and Human Development**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455  
(612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd/>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Ugrd Multicultural Tchng & Lrnng PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The post baccalaureate certificate in undergraduate multicultural teaching and learning aims to improve the quality of instruction and academic support for all undergraduates, particularly those who traditionally have been underprepared for and underserved in higher education. The required core courses are designed to provide opportunities to apply multicultural theory to practice and engage as reflective practitioners.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students may apply to the undergraduate multicultural teaching and learning graduate certificate any time; there is no set application deadline. All applicants must complete the ApplyYourself online application and submit a personal statement. The personal statement should address: interest in the program; professional/academic or community qualifications; what the student will bring to the program, and; how completion of the certificate will build on the applicant's capacity to transform.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.



To obtain the undergraduate multicultural teaching and learning graduate certificate, students must take 3 core courses (9 credits) and 1 elective course (3 credits), for a minimum of 12 course credits. The 3 core courses are listed below. Contact the director of Graduate Studies for information regarding the 3-credit elective requirement.

**Core Courses**

[CI 5105](#) - Increasing Access and Success in Undergraduate Classrooms (3.0 cr)

[CI 5106](#) - Multicultural Teaching and Learning in Diverse College Contexts (3.0 cr)

[OLPD 5712](#) - Multicultural Theories of College Student Development Applied to Teaching and Learning (3.0 cr)



### **Twin Cities Campus**

## **Work and Human Resource Education M.Ed.**

*Organizational Leadership, Policy and Development*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Organizational Leadership, Policy, and Development, 206 Burton Hall, 178 Pillsbury Dr. SE, Minneapolis, MN 55455  
(612-624-1006; fax: 612-624-3377)

Email: [olpd@umn.edu](mailto:olpd@umn.edu)

Website: <http://www.cehd.umn.edu/olpd/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Admission to the Work and Human Resource Education(WHRE) MED program is currently suspended.

The Department of Organizational Leadership, Policy, and Development is a leader in advancing knowledge about educational and organizational change in local, national, and international contexts. The department's research, teaching, and outreach reflect a commitment to interdisciplinary and intercultural engagement with educators, scholars, and policy makers seeking to enhance leadership, policy, and development around the globe. Students in the MA and PhD programs choose from one of five complementary but distinct program tracks: education policy and leadership (EPL), evaluation studies (ES), higher education (HE), comparative and international development education (CIDE), and human resource development (HRD). Undergraduate programs focus on human resource development and business and marketing education. In addition, the department offers a variety of programs for practicing professionals and various licensure programs.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

Other requirements to be completed before admission:

Professional experience in a work and human resource education field or an undergraduate major in education with an appropriate content field.

#### **Special Application Requirements:**

Admission to the Work and Human Resource Education(WHRE) MED program are currently suspended.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

**Plan C:** Plan C requires 17 to 21 major credits and 9 to 13 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

The work and human resource education (WHRE) MEd program is not accepting new students at this time. Information about degree requirements for current students can be found at <http://www.cehd.umn.edu/olpd/grad-programs/>.

### Required Coursework

Two plans are offered:

Plan I is for licensed educators planning to pursue advanced professional study and requires a minimum of 17 semester credits of OLPD courses.

Plan II is for professionals seeking additional education and requires a minimum of 21 semester credits. Students must complete all Plan I requirements. However, the Plan II specialization area must include at least one methods of instruction course.

#### General Aspects

[OLPD 5806](#) - Philosophy and Practice of Career and Technical Education (2.0 cr)

or [OLPD 5811](#) - Education for Work (3.0 cr)

or [OLPD 5813](#) - Enhancing Work-based Learning Through Collaboration (2.0 cr)

or [OLPD 5823](#) - Work-Based Learning Policies (2.0 cr)

#### Specialization

8-12 credits of OLPD courses with advisor approval depending if Plan I or Plan II.

#### Research

[OLPD 5819](#) - Evaluating and Using Research in Organizations and Education (3.0 cr)

Students electing Plan II must take an advisor approved methods of instruction course.

#### Electives

Up to 13 credits with advisor approval, a minimum of 6 credits must come from outside the OLPD department.

#### Integrating Project

Students work with their faculty advisor to select specialization courses consistent with their professional goals, select the course(s) to meet the general aspects requirement, and design and complete the integrating project. The proposed program must be reviewed and approved by departmental faculty.

[OLPD 5893](#) - Directed Study in OLPD (1.0 - 4.0 cr)

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Comprehensive Work and Human Resource Education

This sub-plan is limited to students completing the program under Plan C.

All subplans in this major use same curriculum. The work and human resource education (WHRE) MEd program is not accepting new students at this time. Information about degree requirements for current students can be found at <http://www.cehd.umn.edu/olpd/grad-programs/>.

### Rochester

This sub-plan is limited to students completing the program under Plan C.

Requirements for this sub-plan are the same as those listed in general description. Students may take courses on the Twin Cities or Rochester campuses. The work and human resource education (WHRE) MEd program is not accepting new students at this time.



Information about degree requirements for current students can be found at <http://www.cehd.umn.edu/olpd/grad-programs/>.



### **Twin Cities Campus**

## **Youth Development Leadership M.Ed.**

*School of Social Work*

### **College of Education and Human Development**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Social Work, University of Minnesota, 182 Peters Hall, 1404 Gortner Avenue, St. Paul, MN 55108 (612-624-8785)

Email: [rossvr@umn.edu](mailto:rossvr@umn.edu)

Website: <http://www.cehd.umn.edu/SSW/Graduate/ydl.html>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- N/A
- Degree: Master of Education

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Youth development leadership (YDL) understands leadership as a practice everyone does every day, regardless of age. You will be invited to reflect on your own leadership experiences within a learning community that includes fellow students, community practitioners, and faculty. You will learn about your own leadership, deepen your understanding of the young people you work with, and expand your connection within the larger youth work community both locally and globally. You will be invited to think critically about how communities often understand and respond to young people and work to create innovative interventions for young people in schools, community organizations, and the workplace that challenge these typical understandings and create opportunities for young people to fully flourish. How can we collaborate with young people when responding to the most pressing current issues and needs? What organizational structures and strategies support and sustain young people's authentic and meaningful involvement in inclusive, socially just, and equitable opportunities? How can organizations, schools, and communities transform to provide developmentally rich and meaningful opportunities for young people?

Utilizing the most current understanding of youth development joined to issues of inclusion, equity, and social justice, you will graduate with the necessary knowledge and skills to work collaboratively, think critically, and act intentionally to create sustainable opportunities for young people and their communities. By the time you graduate, you will know what it takes to effectively partner with young people and to transform youth-serving organizations to better respond to all young people and the communities they live in.

The YDL M.Ed. emphasizes:

- A community-based model of positive youth development;
- Experiential learning models;
- Leadership and community building by encouraging consultation among faculty, professional youth workers, fellow students, and young people;
- Diverse, flexible, and interdisciplinary faculty and curriculum that provide an informed understanding of practices, policies, and ethics of youth development work;
- Positive professional development;
- Collaborative approach to learning;
- Interdisciplinary curriculum;
- Cohort of other youth work professionals, for supportive learning environment;
- Diverse faculty dedicated to healthy youth development and committed to helping students develop a course of study that meets their professional and personal needs and interests.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

A bachelor's degree from an accredited institution.



Other requirements to be completed before admission:  
At least two years of experience working with youth.

**Special Application Requirements:**

All applicants must upload the following items to their online application in Apply Yourself:

- Résumé
  - Personal statement describing career goals and rationale for interest in the M.Ed. program (limit two pages)
  - Unofficial transcripts from all post-secondary institutions you have attended or are currently attending, including the University of Minnesota
  - Letters of recommendation from at least two persons (e.g., administrators, colleagues, instructors) familiar with the applicant's performance who can attest to his or her capacity for youth development leadership
  - Application fee, charged when the online application is submitted. Fee must be paid with a credit card.
- Applications are accepted on a year-round basis.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 21 major credits and 9 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The portfolio is a demonstration and personal assessment of individual learning and leadership in youth development work and in the YDL program. Successful completion of the portfolio presentation to the student's faculty committee of two or more faculty is the final requirement of the YDL program.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Coursework

NOTE: Students must take a total two credits of YOST 5960, in one credit increments, during their time in the program.

- [YOST 5950](#) - Ways of Knowing in Youth Development Leadership: Using Research and Evaluation to Support Community (3.0 cr)
- [YOST 5952](#) - Everyday Lives of Youth (3.0 cr)
- [YOST 5954](#) - Experiential Learning: Pedagogy for Community and Classroom (3.0 cr)
- [YOST 5956](#) - Organizational Approaches to Youth Development (3.0 cr)
- [YOST 5958](#) - Community: Context for Youth Development Leadership (3.0 cr)
- [YOST 5960](#) - Seminar in Youth Development Leadership (1.0 cr)
- [YOST 5962](#) - Leadership Field Experience: Youth Development (4.0 cr)

### Elective Credits

9 or more 5xxx level elective credits must be selected with approval of faculty adviser.



### **Twin Cities Campus**

## **Agricultural Education M.S.**

*Applied Economics*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Agricultural Education

146 Ruttan Hall

1994 Buford Ave.

St. Paul, MN 55108

Email: [ageddgs@umn.edu](mailto:ageddgs@umn.edu)

Website: <http://ag-ed.cfans.umn.edu/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 45
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This Master's degree leads to an initial licensure in Agricultural Education. Master of Science (MS)/initial licensure programs are for individuals with bachelor's degrees who want to become licensed teachers. These graduate-level programs provide rigorous, professional teacher preparation in accordance with Standards of Effective Practice for Teachers (SEPT) and content standards of the Minnesota Board of Teaching.

The agricultural education initial licensure program at the University of Minnesota is designed to help students become accomplished professional educators who can help students succeed in the classroom. The program prepares inquiring, analytical, and reflective professional educators who can teach in the classroom and lead in the schools.

Students enter a 12 to 15-month program integrating educational theory with classroom practice. Working closely with experienced teachers, students observe firsthand the daily rewards and pressures of their profession.

Flexibility is an important advantage of this program. Students may enroll in any semester and are welcomed into the entire agriculture education program, building valuable professional support. A second advantage is that most program credits may be applied toward completion of the MS degree.

This program includes two components: initial licensure and the MS degree. After successfully completing licensure requirements and appropriate work experience, students are recommended for state licensure to teach agricultural education in grades 5-12.

### **Accreditation**

This program is accredited by Minnesota Professional Educator Licensing and Standards Board (PELSB)

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.50.

Relevant professional experience and/or a relevant undergraduate major is required.

Other requirements to be completed before admission:

A minimum of 100 hours of experience in youth education.

### **Special Application Requirements:**

In addition to other required materials, applicants must submit a personal statement, diversity statement, course history form, youth





experience form, a résumé and two letters of recommendation from individuals who can attest to the applicant's potential in the field.

Admissions is done on a rolling basis with the following semester deadlines: March 1 (Summer), July 1 (Fall), and November 1 (Spring).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 to 45 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Courses must be taken A - F (unless only offered S/N) and students must earn a grade of C- or better.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Initial Licensure

This sub-plan is limited to students completing the program under Plan C.

In addition to the required coursework, content course credits are required for licensure. Students can take these courses as an undergrad prior to entering the program or enroll in these courses concurrently (totaling 42 credits).

Animal Science (7)

Applied Economics and Agribusiness (7)

Food Science (3)

Natural Resources (3)

Plant Science (7)

Soil Science (4)

Technology [Ag Mechanics] (8)

General Psychology (3)

### Agricultural Education Licensure Courses

[AECM 5115](#) - Foundations of Agricultural Education (3.0 cr)

[AECM 5125W](#) - Designing Curriculum & Instruction for Agricultural Education [WI] (3.0 cr)

[AECM 5135](#) - Instructional Methodology for Agricultural Education (3.0 cr)

[AECM 5145](#) - Agricultural Education Classroom & Program Leadership (3.0 cr)

[AECM 5155](#) - Agricultural Education Teaching Seminar (3.0 cr)

[AECM 5697](#) - Teaching Internship: School and Classroom Setting (2.0 cr)

[AECM 5696](#) - Teaching Internship (2.0 - 10.0 cr)

[CI 4602](#) - English Learners and Academic Language (1.0 cr)

[CI 5163](#) - Child and Adolescent Development for Teaching and Learning I (1.0 cr)

[CI 5164](#) - Child and Adolescent Development for Teaching and Learning II (2.0 cr)

[CI 5307](#) - Technology for Teaching and Learning (1.5 cr)

[CI 5452](#) - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)

[EPSY 4001](#) - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)

[OLPD 5005](#) - School and Society (2.0 cr)

[OLPD 5009](#) - Human Relations: Applied Skills for School and Society (1.0 cr)

### Post-Licensure Courses

[AECM 5995](#) - Integrating Paper--Master of Education: Agricultural and Extension Education (1.0 - 5.0 cr)

[AECM 5220](#) - Special Topics in Agriculture Education and Extension (1.0 - 3.0 cr)

[AECM 5280](#) - Current Issues for the Beginning Agricultural Education Teacher (1.0 - 3.0 cr)

[AECM 5993](#) - Directed Study in Agricultural Education and Extension (1.0 - 4.0 cr)



### *Twin Cities Campus*

## Animal Sciences M.S.

*Animal Science*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Animal Science, 305 Haecker Hall, 1364 Eckles Avenue, Saint Paul, MN 55108 (612-624-3491; fax: 612-625-5789)

Email: [ansci@umn.edu](mailto:ansci@umn.edu)

Website: <http://www.ansci.umn.edu/graduate-program>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Animal Science MS program concentrates on one of the animal sciences emphasis areas: genetics; growth biology; nutrition; physiology; or production systems. Students have the option of tailoring their individual programs to include study in more than one emphasis area.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The Plan B project requires approximately 120 hours to complete. The nature and extent of the project is agreed



upon in advance by the student and faculty advisor.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

**Ethics Course (0.5 to 3 credits)**

Select one course from the following in consultation with the advisor:

[ANSC 8134](#) - Ethical Conduct of Animal Research (3.0 cr)

[APEC 8901](#) - Graduate Seminar: MS & PhD (1.0 cr)

[APEC 8902](#) - Graduate Research Development Seminar (1.0 cr)

[APSC 8123](#) - Research Ethics in the Plant and Environmental Sciences (0.5 cr)

[BBE 8001](#) - Seminar I (1.0 cr)

[BBE 8002](#) - Seminar II (1.0 cr)

[CONS 8001](#) - Conservation Biology Seminar (1.0 cr)

[FSCN 8318](#) - Current Issues in Food Science (2.0 cr)

[NUTR 8621](#) - Presentation Skills (1.0 cr)

[PLPA 8123](#) - Research Ethics in Plant and Environmental Sciences (0.5 cr)

[SOIL 8123](#) - Research Ethics in the Plant and Environmental Sciences (0.5 cr)

[WRS 8581](#) - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

**Seminar (3 credits)**

Take 1 credit of ANSC 8510 3 times.

[ANSC 8510](#) - Graduate Seminar (1.0 cr)

**Additional Coursework (17 to 27 credits)**

Plan A students select at least 17 credits, and Plan B students at least 27 credits from the following in consultation with the advisor:

AGRO 5xxx

AGRO 8xxx

ANSC 5xxx

ANSC 8xxx

FSCN 5xxx

FSCN 8xxx

GRAD 8xxx

NUTR 5xxx

NUTR 8xxx

PUBH 6xxx

**Plan Options**

**Plan A**

**Thesis Credits**

Take 10 master's thesis credits.

[ANSC 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan B**



### **Twin Cities Campus**

## **Animal Sciences Minor**

*Animal Science*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Animal Science, 305 Haecker Hall, 1364 Eckles Avenue, Saint Paul, MN 55108 (612-624-3491; fax: 612-625-5789)

Email: [ansci@umn.edu](mailto:ansci@umn.edu)

Website: <https://www.ansci.umn.edu/graduate-program>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students pursuing the Animal Sciences minor concentrate on one of the animal sciences emphasis areas: genetics; growth biology; nutrition; physiology; or production systems. Students have the option of tailoring their minor to include study in more than one emphasis area.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Requirements are designed to fit the student's needs. A master's minor requires 6 credits in areas not closely related to the major; no more than 2 of these credits may be in research or special problems. A doctoral minor requires 12 credits in areas not closely related to the major; no more than 3 of these credits may be in research or special problems.

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Masters**

#### **Minor Requirements**

The AnSci program does not require specific courses for completion of the minor. The minor requires at least 6 credits of graduate-level courses to be chosen in consultation with the student's major adviser, the AnSci faculty member who will serve on the student's examination committee as the minor program representative, and the AnSci Director of Graduate Studies.

### **Doctoral**

#### **Minor Requirements**

The AnSci program does not require specific courses for completion of the minor. The minor requires at least 12 credits of graduate-level courses to be chosen in consultation with the student's major adviser, the AnSci faculty member who will serve on the student's examination committee as the minor program representative, and the AnSci Director of Graduate Studies.



### *Twin Cities Campus*

## Animal Sciences Ph.D.

*Animal Science*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Animal Science, 305 Haecker Hall, 1364 Eckles Avenue, Saint Paul, MN 55108 (612-624-3491; fax: 612-625-5789)

Email: [ansci@umn.edu](mailto:ansci@umn.edu)

Website: <https://www.ansci.umn.edu/graduate-program>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Animal Science PhD program concentrates on one of the animal sciences emphasis areas: genetics, nutrition, physiology, or production systems. Students have the option of tailoring their program to include study in more than one emphasis area and to emphasize basic or applied science.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree in agriculture or a biological field with training in biology, chemistry, physics, and mathematics is required.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

24 thesis credits are required.



This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

**Ethics Course (.5 to 3 credits)**

Select 1 course from the following in consultation with the advisor:

[ANSC 5091](#) - Research Proposals: From Ideas to Strategic Plans [WI] (3.0 cr)

[ANSC 8134](#) - Ethical Conduct of Animal Research (3.0 cr)

[APSC 8123](#) - Research Ethics in the Plant and Environmental Sciences (0.5 cr)

[PLPA 8123](#) - Research Ethics in Plant and Environmental Sciences (0.5 cr)

[SOIL 8123](#) - Research Ethics in the Plant and Environmental Sciences (0.5 cr)

[WRS 8581](#) - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

**Seminar (5 credits)**

Take 1 credit of ANSC 8510 5 times.

[ANSC 8510](#) - Graduate Seminar (1.0 cr)

**Additional Coursework (16 to 19 credits)**

Select from the following in consultation with the advisor. Other coursework may be applied to this requirement with adviser approval.

AGRO 5xxx

AGRO 8xxx

ANSC 5xxx

ANSC 8xxx

FSCN 5xxx

FSCN 8xxx

GRAD 8xxx

NUTR 5xxx

NUTR 8xxx

PUBH 5xxx

PUBH 6xxx

PUBH 8xxx

**Thesis Credits**

Take 24 doctoral thesis credits

[ANSC 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Applied Economics M.S.**

*Applied Economics*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Applied Economics Graduate Program, 231 Ruttan Hall, 1994 Buford Avenue, Saint Paul, MN 55108-6040 (612-625-3777; fax: 612-625-6245)

Email: [apecdgs@umn.edu](mailto:apecdgs@umn.edu)

Website: <https://www.apec.umn.edu/graduate-program/ms>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MS degree in applied economics prepares students for employment opportunities in the public and private sectors and for further graduate study. This rigorous but flexible program includes core coursework in economic theory and quantitative methods, and offers opportunities for specialized coursework and research in all the fields of study offered by the program.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

The following coursework is considered the minimum preparation for the MS program: micro and macroeconomic theory at the intermediate undergraduate level, statistics, two semesters of calculus, and introductory linear algebra. Additional coursework in economics, statistics, and math is highly desirable and recommended, especially for students who intend to apply for the doctoral program after completion of the MS degree.

### **Special Application Requirements:**

Applicants must submit scores from the General Test of the GRE, three letters of recommendation from persons familiar with the applicant's scholarship and research potential, a complete set of college or university transcripts, and a clearly written statement of academic and career interests, goals, and objectives, and a diversity statement. For complete application instructions, visit the website: <https://www.apec.umn.edu/graduate-program/admissions>. Students should apply by the December 10 deadline to ensure priority consideration for admissions and funding.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language



Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project demonstrates familiarity with the theoretical and empirical tools of economics. Completed in consultation with the advisor, the project requires 4 to 6 credits of APEC 8793.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Coursework offered on both the A/F and S/N grading basis must be taken A/F.

### Required Coursework (11 to 14 credits)

#### Econometrics (3 to 4 credits)

Select APEC 5031 (3 credits) or APEC 8211 and APEC 8212 (4 credits total) in consultation with the advisor.

[APEC 5031](#) - Methods of Economic Data Analysis (3.0 cr)

or [APEC 8211](#) - Econometric Analysis I (2.0 cr)

[APEC 8212](#) - Econometric Analysis II (2.0 cr)

#### Macroeconomic Theory (3 to 4 credits)

Select APEC 5152 or APEC 5032 (3 credits), or ECON 8105 and ECON 8106 (4 credits total) in consultation with the advisor.

[APEC 5152](#) - Applied Macroeconomics: Income and Employment (3.0 cr)

or [APEC 5032](#) - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)

or [ECON 8105](#) - Macroeconomic Theory (2.0 cr)

[ECON 8106](#) - Macroeconomic Theory (2.0 cr)

#### Microeconomics Theory (3 to 4 credits)

Select APEC 5151 (3 credits) or APEC 8001 and APEC 8002 (4 credits total) in consultation with the advisor.

[APEC 5151](#) - Applied Microeconomics: Firm and Household (3.0 cr)

or [APEC 8001](#) - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)

[APEC 8002](#) - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)

#### Seminars (2 credits)

Take the following seminars:

[APEC 8901](#) - Graduate Seminar: MS & PhD (1.0 cr)

[APEC 8902](#) - Graduate Research Development Seminar (1.0 cr)

### Electives (9 to 13 credits)

Plan A students select at least 9 credits, and Plan B students select at least 13 credits from the following, in consultation with the advisor. At least 3 credits must be APEC, ECON, or STAT courses. STAT 5021 cannot be applied to this requirement.

APEC 5xxx

APEC 8xxx

ECON 5xxx

ECON 8xxx

STAT 5xxx

STAT 8xxx

### Plan Options

#### Plan A

##### Thesis Credits

Take 10 masters thesis credits.

[APEC 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B





**Plan B Project (4 to 6 credits)**

Take 4 to 6 credits in consultation with the advisor.

[APEC 8793](#) - Master's Paper: Plan B Project (1.0 - 6.0 cr)

**Joint- or Dual-degree Coursework:** MS-Applied Economics/MBA Student may take a total of 18 credits in common among the academic programs.



### **Twin Cities Campus**

## **Applied Economics Minor**

*Applied Economics*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Applied Economics Graduate Program, 231 Ruttan Hall, 1994 Buford Avenue, Saint Paul, MN 55108-6040 (612-625-3777; fax: 612-625-6245)

Email: [apecdgs@umn.edu](mailto:apecdgs@umn.edu)

Website: <https://www.apec.umn.edu/graduate-program/phd/phd-minor-requirements>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 15
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Graduate study in applied economics requires an operational knowledge of economic theory and modern methods of quantitative analysis, as well as practical application in specialized fields of inquiry, which include food and agricultural economics; health economics; labor economics; policy analysis; resource and environmental economics; and trade and development economics.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Applied Economics director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Coursework applied to the minor must be approved by the Applied Economics director of graduate studies; and taken on the A/F grading basis with a minimum grade of B for each course.

The minimum cumulative GPA for minor field coursework is 3.00.

### **Required Coursework (3 to 4 credits)**

Select credits from the following in consultation with the Applied Economics director of graduate studies:

[APEC 5031](#) - Methods of Economic Data Analysis (3.0 cr)

[APEC 5151](#) - Applied Microeconomics: Firm and Household (3.0 cr)

[APEC 8001](#) - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)

[APEC 8002](#) - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)

[APEC 8211](#) - Econometric Analysis I (2.0 cr)

[APEC 8212](#) - Econometric Analysis II (2.0 cr)



### Electives (6 to 12 credits)

Masters students select 6 credits, and doctoral students select 12 credits from the following with approval of the Applied Economics director of graduate studies.

- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 5151 - Applied Microeconomics: Firm and Household (3.0 cr)
- APEC 5152 - Applied Macroeconomics: Income and Employment (3.0 cr)
- APEC 5321 - Regional Economic Analysis (3.0 cr)
- APEC 5451 - Food Marketing Economics (3.0 cr)
- APEC 5481 - Futures and Options Markets (3.0 cr)
- APEC 5511 - Labor Economics (3.0 cr)
- APEC 5711 - Agricultural and Environmental Policy (3.0 cr)
- APEC 5721 - Economics of Science and Technology Policy (3.0 cr)
- APEC 5751 - Global Trade and Policy (3.0 cr)
- APEC 5821 - Business Economics and Strategy (3.0 cr)
- APEC 5831 - Food and Agribusiness Marketplace (2.0 cr)
- APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)
- APEC 8002 - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)
- APEC 8003 - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)
- APEC 8004 - Applied Microeconomic Analysis of Social Choice and Welfare (2.0 cr)
- APEC 8202 - Mathematical Optimization in Applied Economics (3.0 cr)
- APEC 8203 - Applied Welfare Economics and Public Policy (3.0 cr)
- APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- APEC 8213 - Econometric Analysis III (2.0 cr)
- APEC 8214 - Econometric Analysis IV (2.0 cr)
- APEC 8341 - Applied Public Finance (3.0 cr)
- APEC 8401 - Agricultural Markets and Policy (2.0 cr)
- APEC 8402 - Information and Behavioral Economics (2.0 cr)
- APEC 8403 - Applied Consumer Theory (3.0 cr)
- APEC 8404 - Applied Production Theory (3.0 cr)
- APEC 8501 - Labor Economics I (2.0 cr)
- APEC 8502 - Labor Economics II (2.0 cr)
- APEC 8601 - Natural Resource Economics (3.0 cr)
- APEC 8602 - Economics of the Environment (3.0 cr)
- APEC 8701 - Trade and Development I (2.0 cr)
- APEC 8702 - Trade and Development II (2.0 cr)
- APEC 8703 - Trade and Development III (2.0 cr)
- APEC 8704 - Trade and Development IV (2.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### *Twin Cities Campus*

## Applied Economics Ph.D.

*Applied Economics*

### College of Food, Agricultural and Natural Resource Sciences

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Applied Economics Graduate Program, 231 Ruttan Hall, 1994 Buford Avenue, Saint Paul, MN 55108-6040 (612-625-3777; fax: 612-625-6245)

Email: [apecdgs@umn.edu](mailto:apecdgs@umn.edu)

Website: <https://www.apec.umn.edu/graduate-program>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 66
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Applied Economics PhD program prepares students for careers in academia, government, and the private sector. Required coursework includes microeconomic theory and modeling, application of statistical methods to economics (econometrics), and macroeconomic theory and modeling. Students pursue specialized elective coursework covering additional optimization methods, natural resource and environmental economics, food and agricultural economics, labor economics, development economics, health economics, and policy analysis. The emphasis of the program is on rigorous empirical testing of economics hypotheses and quantitative policy evaluation.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

A relevant master's degree or an especially strong undergraduate record is required for admission to the PhD program. Prior training should include micro- and macro-economic theory at the master's level, econometrics, multivariate calculus, differential equations, and linear algebra. Students lacking background in economics or quantitative methods may be required to complete additional coursework before entering the program.

#### **Special Application Requirements:**

Applicants must submit scores from the General Test of the GRE, three letters of recommendation from persons familiar with the applicant's scholarship and research potential, a complete set of college or university transcripts, a clearly written statement of academic and career interests, goals, and objectives, and a diversity statement. For complete application instructions, visit the website: <https://www.apec.umn.edu/graduate-program/admissions>.

Students should apply by the December 10 to ensure priority consideration for admissions and funding.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB



- Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

42 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

All courses offered on both the A/F and S/N grade basis must be taken A/F.

Students must pass a written preliminary examination in microeconomics theory and at least one field examination in one of the following: Agricultural and Food Economics, Trade and Development, Health Economics, Labor and Population, Policy Analysis, or Resource and Environmental Economics.

Students must satisfy the qualifying paper requirement during the second year of study.

### Microeconomic Theory (8 credits)

Select 1 of the following microeconomics theory sequences:

#### APEC - Applied Microeconomic Theory

[APEC 8001](#) - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)

[APEC 8002](#) - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)

[APEC 8003](#) - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)

[APEC 8004](#) - Applied Microeconomic Analysis of Social Choice and Welfare (2.0 cr)

#### or ECON - Microeconomic Theory (Majors Sequence)

[ECON 8101](#) - Microeconomic Theory (2.0 cr)

[ECON 8102](#) - Microeconomic Theory (2.0 cr)

[ECON 8103](#) - Microeconomic Theory (2.0 cr)

[ECON 8104](#) - Microeconomic Theory (2.0 cr)

### Macroeconomic Theory (8 credits)

Take the following courses:

[ECON 8105](#) - Macroeconomic Theory (2.0 cr)

[ECON 8106](#) - Macroeconomic Theory (2.0 cr)

### Econometrics (8 credits)

Take the following courses:

[APEC 8211](#) - Econometric Analysis I (2.0 cr)

[APEC 8212](#) - Econometric Analysis II (2.0 cr)

[APEC 8213](#) - Econometric Analysis III (2.0 cr)

[APEC 8214](#) - Econometric Analysis IV (2.0 cr)

### First Year Seminars (2 credits)

Take the following:

[APEC 8901](#) - Graduate Seminar: MS & PhD (1.0 cr)

[APEC 8902](#) - Graduate Research Development Seminar (1.0 cr)

### Second Year Seminars (2 credits)

Take the following:

[APEC 8903](#) - PhD Qualifying Paper Seminar I (1.0 cr)



APEC 8904 - PhD Qualifying Paper Seminar II (1.0 cr)

**Electives (18 credits)**

Select 18 credits, which can include a maximum of 6 ECON credits, from the following in consultation with the advisor.

- APEC 8202 - Mathematical Optimization in Applied Economics (3.0 cr)
- APEC 8203 - Applied Welfare Economics and Public Policy (3.0 cr)
- APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)
- APEC 8221 - Programming for Econometrics (2.0 cr)
- APEC 8222 - Big Data Methods in Economics (2.0 cr)
- APEC 8341 - Applied Public Finance (3.0 cr)
- APEC 8401 - Agricultural Markets and Policy (2.0 cr)
- APEC 8402 - Information and Behavioral Economics (2.0 cr)
- APEC 8403 - Applied Consumer Theory (3.0 cr)
- APEC 8404 - Applied Production Theory (3.0 cr)
- APEC 8501 - Labor Economics I (2.0 cr)
- APEC 8502 - Labor Economics II (2.0 cr)
- APEC 8601 - Natural Resource Economics (3.0 cr)
- APEC 8602 - Economics of the Environment (3.0 cr)
- APEC 8701 - Trade and Development I (2.0 cr)
- APEC 8702 - Trade and Development II (2.0 cr)
- APEC 8703 - Trade and Development III (2.0 cr)
- APEC 8704 - Trade and Development IV (2.0 cr)
- APEC 8803 - Marketing Economics (3.0 cr)
- APEC 8804 - Managerial Economics (3.0 cr)
- ECON 8119 - Cooperative Game Theory (2.0 cr)
- ECON 8205 - Applied Econometrics (2.0 cr)
- ECON 8206 - Applied Econometrics (2.0 cr)
- ECON 8207 - Applied Econometrics (2.0 cr)
- ECON 8208 - Applied Econometrics (2.0 cr)
- ECON 8401 - International Trade and Payments Theory (2.0 cr)
- ECON 8402 - International Trade and Payments Theory (2.0 cr)
- ECON 8403 - International Trade and Payments Theory (2.0 cr)
- ECON 8501 - Wages and Employment (2.0 cr)
- ECON 8502 - Wages and Employment (2.0 cr)
- ECON 8503 - Wages and Employment (2.0 cr)
- ECON 8581 - Advanced Topics in Labor Economics (2.0 cr)
- ECON 8601 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8602 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8603 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8701 - Monetary Economics (2.0 cr)
- ECON 8702 - Monetary Economics (2.0 cr)
- ECON 8704 - Financial Economics (2.0 cr)
- ECON 8705 - Financial Economics (2.0 cr)
- ECON 8801 - Public Economics (2.0 cr)
- ECON 8803 - Public Economics (2.0 cr)
- HRIR 8801 - Core Seminar: Fundamentals of Economic Analysis for Work and Organizations (4.0 cr)
- PA 8302 - Applied Policy Analysis (4.0 cr)
- PA 8312 - Analysis of Discrimination (4.0 cr)
- PA 8331 - Economic Demography (3.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 8811 - Research Methods in Health Care (3.0 cr)
- PUBH 8821 - Health Economics II (3.0 cr)

**Doctoral Thesis Credits**

Students must enroll for a minimum of 24 thesis credits.

Take 24 or more credit(s) from the following:

- APEC 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Applied Plant Sciences M.S.**

*Agronomy & Plant Genetics, Horticultural Science*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Agronomy and Plant Genetics, 411 Borlaug Hall, 1991 Upper Buford Circle, St. Paul, MN 55108-6026 (612-625-4742; fax: 612-625-1268)

Email: [apsc@umn.edu](mailto:apsc@umn.edu)

Website: <http://www.appliedplantsciences.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Applied Plant Sciences is an interdisciplinary program for educating students to become professional scientists well-grounded in the applied disciplines of agronomy/agroecology, horticulture, and plant breeding/molecular genetics. Graduates of the program are able to provide innovative leadership and contribute to problem solving within their disciplines in the public or private sector and within society at large. The program develops the quantitative and qualitative research skills necessary to conduct high quality research and scholarship. Students choose from among four specialization tracks: agronomy/agroecology, applied plant sciences, horticulture, or plant breeding/plant molecular genetics. Students gain broad familiarity with all of the disciplines within the program and gain in-depth knowledge within their area of expertise. The program's graduate faculty is drawn primarily from the Department of Agronomy and Plant Genetics and the Department of Horticultural Science; but also from the Departments of Plant and Microbial Biology; Plant Pathology; Soil, Water, and Climate; Ecology, Evolution and Behavior; and Fisheries, Wildlife and Conservation Biology. The faculty embrace the University of Minnesota's position that promoting and supporting diversity among the student body is central to our academic mission.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Students entering the program should have a foundation in the physical and biological sciences, preferably with some emphasis in plant science. A minimum of 10 credits of math and physics, 12 credits of chemistry and biochemistry, and 15 credits of biological and/or agricultural sciences are recommended for admission. In addition, students should have completed a BS or BA degree in agriculture, biology, or other related life science. Students with a BS or BA degree outside these areas may be admitted with the requirement that they take the prerequisite courses noted above at the undergraduate level in addition to their graduate coursework.

#### **Special Application Requirements:**

Applicants must submit three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of transcripts; and a clearly written personal statement of career interests, goals, and objectives as part of the online application. Students should apply by December 5 for admission into fall semester of the following year. Students should apply by October 1 for admission into spring semester of the following year.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5



- MELAB
- Final score: 550

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** Determined in consultation with advisor.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

MS students must complete the core curriculum, requirements for their specialization track, and present one graduate seminar. Additional course requirements are flexible and determined in consultation with the students advisor(s) and advisory committee.

### Coursework (6.5 credits)

#### Required Courses (3.5 credits)

Take the following courses:

- AGRO 5311 - Research Methods in Crop Improvement and Production (1.0 cr)
- APSC 8123 - Research Ethics in the Plant and Environmental Sciences (0.5 cr)
- APSC 8270 - Graduate Seminar (2.0 cr)

Select at least 3 credits from the following in consultation with the advisor:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- BIOL 5272 - Applied Biostatistics (4.0 cr)
- ENT 5126 - Spatial and Temporal Analysis of Ecological Data (3.0 cr)
- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- PUBH 6450 - Biostatistics I (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)

#### Plan A Thesis Credits

Plan A students must take at least 10 master's thesis credits.

- APSC 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Agronomy and Agroecology

Students conduct research to increase their knowledge of cropping systems and weed science, including alternative approaches and





management strategies. Emphasis is on improving production efficiency and profitability in an environmentally sound approach that benefits society. Mechanisms of crop physiology and ecology underlying plant responses to the environment are a particular emphasis of this track.

Plan A students complete 13.5 credits, and Plan B students complete 23.5 credits for this sub-plan in consultation with the advisor.

Other courses can be applied to sub-plan requirements with agreement of the advisor, the advisory committee, and director of graduate studies.

### Agroecology/Agronomy Courses

Take at least 2 courses from the following:

- [AGRO 4505](#) - Biology, Ecology, and Management of Invasive Plants (3.0 cr)
- [AGRO 4605](#) - Strategies for Agricultural Production and Management (3.0 cr)
- [AGRO 5021](#) - Plant Breeding Principles (3.0 cr)
- [AGRO 5321](#) - Ecology of Agricultural Systems (3.0 cr)
- [AGRO 5999](#) - Special Topics: Workshop in Agronomy (1.0 - 6.0 cr)
- [APSC 8201](#) - Advanced Plant Breeding (3.0 cr)
- [APSC 8280](#) - Current Topics in Applied Plant Sciences (1.0 - 3.0 cr)
- [GCC 5017](#) - World Food Problems: Agronomics, Economics and Hunger [GP] (3.0 cr)
- [SAGR 8010](#) - Colloquium in Sustainable Agriculture (2.0 cr)

### Plant Biology Course

Take 1 course from the following:

- [PMB 5412](#) - Plant Physiology (3.0 cr)
- [PMB 5516](#) - Plant Cell Biology (3.0 cr)
- [PMB 5601](#) - Topics in Plant Biochemistry (3.0 cr)

### Additional Courses

Take at least 1 course from the following:

- [BIOL 5407](#) - Ecology (3.0 cr)
- [EEB 4068](#) - Plant Physiological Ecology (3.0 cr)
- [EEB 5053](#) - Ecology: Theory and Concepts (4.0 cr)
- [EEB 5609](#) - Ecosystem Ecology (3.0 cr)
- [ESPM 5108](#) - Ecology of Managed Systems (4.0 cr)
- [ESPM 5245](#) - Sustainable Land Use Planning and Policy (3.0 cr)
- [ESPM 5295](#) - GIS in Environmental Science and Management (4.0 cr)
- [HORT 4071W](#) - Applications of Biotechnology to Plant Improvement [WI] (4.0 cr)
- [HORT 5071](#) - Ecological Restoration (4.0 cr)
- [PLPA 5103](#) - Plant-Microbe Interactions (3.0 cr)
- [PLPA 5202](#) - Field Plant Pathology (2.0 cr)
- [PLPA 5480](#) - Principles of Plant Pathology (3.0 cr)
- [PLPA 5660](#) - Plant Disease Resistance and Applications (3.0 cr)
- [SOIL 4111](#) - Introduction to Precision Agriculture (3.0 cr)
- [SOIL 5611](#) - Soil Biology and Fertility (4.0 cr)

### Horticulture

Students conduct research related to fruits, vegetables, potatoes, flowers, ornamental trees and shrubs, or turf; on the physiology, production, environmental impact of cropping systems; and use of horticultural crops. Research areas include the effect of horticultural commodities on human health, hormonal, and stress physiology; flower development and flowering physiology; integrated pest management; post harvest physiology; and cropping system strategies. Students get a broad range of experiences in the field, greenhouse, and/or laboratory using genetic, molecular, biochemical, and ecological tools to answer research questions.

Plan A students complete 13.5 credits, and Plan B students complete 23.5 credits for this sub-plan in consultation with the advisor.

Other courses can be applied to sub-plan requirements with agreement of the advisor, the advisory committee, and director of graduate studies.

### Area 1: Cross Commodity Horticulture

Take at least 1 course from the following:

- [AGRO 4505](#) - Biology, Ecology, and Management of Invasive Plants (3.0 cr)
- [AGRO 5321](#) - Ecology of Agricultural Systems (3.0 cr)
- [HORT 4071W](#) - Applications of Biotechnology to Plant Improvement [WI] (4.0 cr)
- [HORT 4461](#) - Horticultural Marketing (3.0 cr)
- [HORT 5007](#) - Advanced Plant Propagation (3.0 cr)



HORT 5023 - Public Garden Management (2.0 cr)  
HORT 8044 - Manipulation of Plant Growth and Reproduction (2.0 cr)  
MBA 6210 - Marketing Management (3.0 cr)  
MKTG 6051 - Marketing Research - Rapid Insights (2.0 cr)  
MKTG 6055 - Buyer Behavior (2.0 cr)  
MKTG 6082 - Brand Strategy (2.0 cr)  
SAGR 8010 - Colloquium in Sustainable Agriculture (2.0 cr)

#### Area 2: Commodity-based Horticulture

Take at least 1 course from the following:  
HORT 4061W - Turfgrass Management [WI] (3.0 cr)  
HORT 4063 - Turfgrass Science (3.0 cr)  
HORT 5011 - Common Medicinal Plants: Classification, Identification, and Application (3.0 cr)  
HORT 5012 - Common Medicinal Plants: Growing and Processing (3.0 cr)  
HORT 5031 - Fruit Production and Viticulture for Local and Organic Markets (3.0 cr)  
HORT 5032 - Organic Vegetable Production (3.0 cr)  
HORT 5061 - Advanced Turfgrass Science (2.0 cr)  
HORT 5071 - Ecological Restoration (4.0 cr)

#### Area 3: Additional Coursework

Other courses can be substituted with agreement of the advisor, advisory committee, and director of graduate studies.

AGRO 5021 - Plant Breeding Principles (3.0 cr)  
AGRO 8023 - Evolution of Crop Plants (3.0 cr)  
APSC 8201 - Advanced Plant Breeding (3.0 cr)  
BIOL 5407 - Ecology (3.0 cr)  
EEB 4068 - Plant Physiological Ecology (3.0 cr)  
EEB 5053 - Ecology: Theory and Concepts (4.0 cr)  
EEB 5609 - Ecosystem Ecology (3.0 cr)  
ESPM 5108 - Ecology of Managed Systems (4.0 cr)  
ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)  
ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)  
HORT 5058 - Plant Cytogenetics (3.0 cr)  
PLPA 5103 - Plant-Microbe Interactions (3.0 cr)  
PLPA 5202 - Field Plant Pathology (2.0 cr)  
PLPA 5480 - Principles of Plant Pathology (3.0 cr)  
PLPA 5660 - Plant Disease Resistance and Applications (3.0 cr)  
PMB 5412 - Plant Physiology (3.0 cr)  
PMB 5516 - Plant Cell Biology (3.0 cr)  
PMB 5601 - Topics in Plant Biochemistry (3.0 cr)  
SOIL 4111 - Introduction to Precision Agriculture (3.0 cr)  
SOIL 5611 - Soil Biology and Fertility (4.0 cr)

#### Plant Breeding/Plant Molecular Genetics

This sub-plan allows students to select from genetic research projects ranging from applied plant breeding projects emphasizing breeding procedures and methodologies to molecular genetic projects doing biotechnology, genetic engineering, and genomic research in agronomic and horticultural crops. These research projects give students the opportunity to integrate the latest developments in the laboratory with applied applications in the field to reach the overarching goal of developing new germplasm that will improve the sustainability of our food/feed/fiber/fuel systems.

Plan A students complete 13.5 credits, and Plan B students complete 23.5 credits for this sub-plan in consultation with the advisor.

Other courses can be applied to sub-plan requirements with agreement of the advisor, the advisory committee, and director of graduate studies.

#### Plant Breeding

Take at least 1 course from the following:  
AGRO 5021 - Plant Breeding Principles (3.0 cr)  
AGRO 8202 - Breeding for Quantitative Traits in Plants (3.0 cr)  
APSC 8201 - Advanced Plant Breeding (3.0 cr)

#### Genetics and Genomics

Take at least 2 courses from the following:  
AGRO 5431 - Applied Plant Genomics and Bioinformatics (3.0 cr)  
AGRO 8241 - Chromosomal and Molecular Genetics of Plant Improvement (3.0 cr)  
EEB 5042 - Quantitative Genetics (3.0 cr)  
HORT 5058 - Plant Cytogenetics (3.0 cr)

#### Additional Coursework



Other courses can be substituted with approval of the advisor, advisory committee, and director of graduate studies.

- AGRO 5321 - Ecology of Agricultural Systems (3.0 cr)
- AGRO 5999 - Special Topics: Workshop in Agronomy (1.0 - 6.0 cr)
- HORT 5012 - Common Medicinal Plants: Growing and Processing (3.0 cr)
- HORT 5023 - Public Garden Management (2.0 cr)
- HORT 5031 - Fruit Production and Viticulture for Local and Organic Markets (3.0 cr)
- HORT 5032 - Organic Vegetable Production (3.0 cr)
- HORT 5071 - Ecological Restoration (4.0 cr)
- HORT 6141 - Scheduling Crops for Protected Environments (4.0 cr)
- SAGR 8010 - Colloquium in Sustainable Agriculture (2.0 cr)
- BIOC 8001 - Biochemistry: Structure, Catalysis, and Metabolism (3.0 cr)
- BIOC 8002 - Molecular Biology and Regulation of Biological Processes (3.0 cr)
- PMB 5601 - Topics in Plant Biochemistry (3.0 cr)
- GCD 4034 - Molecular Genetics and Genomics (3.0 cr)
- GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)
- HORT 4071W - Applications of Biotechnology to Plant Improvement [WI] (4.0 cr)
- HORT 5007 - Advanced Plant Propagation (3.0 cr)
- HORT 5058 - Plant Cytogenetics (3.0 cr)
- PLPA 5301 - Large Scale Omic Data in Plant Biology (3.0 cr)
- PLPA 5303 - Data Visualization in Plant and Microbial Biology (3.0 cr)

#### **Computational Biology/Bioinformatics**

- BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)
- CSCI 4041 - Algorithms and Data Structures (4.0 cr)
- CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
- CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)
- EEB 5221 - Molecular Evolution (3.0 cr)
- PMB 5412 - Plant Physiology (3.0 cr)
- PLPA 5103 - Plant-Microbe Interactions (3.0 cr)
- PLPA 5202 - Field Plant Pathology (2.0 cr)
- PLPA 5203 - Introduction to Fungal Biology (3.0 cr)
- PLPA 5444 - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)
- PLPA 5480 - Principles of Plant Pathology (3.0 cr)
- PLPA 5660 - Plant Disease Resistance and Applications (3.0 cr)
- PLPA 8103 - Plant-Microbe Interactions (3.0 cr)
- PLPA 8104 - Plant Virology (2.0 cr)
- PLPA 8105 - Plant Bacteriology (2.0 cr)

#### **Applied Plant Sciences**

This sub-plan is optional and does not fulfill the sub-plan requirement for this program.

Plan A students complete 13.5 credits, and Plan B students complete 23.5 credits for this sub-plan in consultation with the advisor.

Other courses can be applied to sub-plan requirements with agreement of the advisor, the advisory committee, and director of graduate studies.

#### **Genetics and Plant Breeding**

Take at least 1 course from the following:

- AGRO 5021 - Plant Breeding Principles (3.0 cr)
- AGRO 5431 - Applied Plant Genomics and Bioinformatics (3.0 cr)
- AGRO 8023 - Evolution of Crop Plants (3.0 cr)
- AGRO 8202 - Breeding for Quantitative Traits in Plants (3.0 cr)
- AGRO 8241 - Chromosomal and Molecular Genetics of Plant Improvement (3.0 cr)
- APSC 8201 - Advanced Plant Breeding (3.0 cr)
- EEB 5042 - Quantitative Genetics (3.0 cr)
- GCD 4034 - Molecular Genetics and Genomics (3.0 cr)
- GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)
- HORT 4071W - Applications of Biotechnology to Plant Improvement [WI] (4.0 cr)
- HORT 5058 - Plant Cytogenetics (3.0 cr)
- PLPA 5301 - Large Scale Omic Data in Plant Biology (3.0 cr)

#### **Organismal Biology**

Take at least 1 course from the following:

- HORT 5007 - Advanced Plant Propagation (3.0 cr)
- PLPA 5203 - Introduction to Fungal Biology (3.0 cr)



PLPA 5480 - Principles of Plant Pathology (3.0 cr)  
PLPA 5660 - Plant Disease Resistance and Applications (3.0 cr)  
PLPA 8103 - Plant-Microbe Interactions (3.0 cr)  
PLPA 8104 - Plant Virology (2.0 cr)  
PLPA 8105 - Plant Bacteriology (2.0 cr)  
PMB 5412 - Plant Physiology (3.0 cr)  
PMB 5516 - Plant Cell Biology (3.0 cr)  
PMB 5601 - Topics in Plant Biochemistry (3.0 cr)

**Cropping Systems, Communities, and Commodities**

Take at least one course from the following:

AGRO 4505 - Biology, Ecology, and Management of Invasive Plants (3.0 cr)  
AGRO 5321 - Ecology of Agricultural Systems (3.0 cr)  
HORT 4062 - Turfgrass Weed and Disease Science (3.0 cr)  
HORT 4063 - Turfgrass Science (3.0 cr)  
HORT 4141W - Scheduling Crops for Protected Environments [WI] (4.0 cr)  
HORT 5031 - Fruit Production and Viticulture for Local and Organic Markets (3.0 cr)  
HORT 5032 - Organic Vegetable Production (3.0 cr)

**Integrated BS Plant Science/MS APS Plant Breeding**

This sub-plan is optional and does not fulfill the sub-plan requirement for this program.

CFANS offers an integrated Bachelor of Science (BS) in Plant Science and Master of Science (MS) in Applied Plant Sciences (Plant Breeding and Molecular Genetics track). The integrated BS/MS program offers students the opportunity to complete coursework for both degrees in five years by working toward a master's degree while simultaneously working toward their undergraduates degree. Plant Science undergraduate students in the Plant Breeding and Genetics sub-plan are welcome to apply to this program during their 3rd year of undergraduate study. During the 4th year, students take undergraduate and graduate courses concurrently and are advised by an undergraduate and graduate program adviser. Students must complete undergraduate degree requirements before the end of their fourth year.

Students in this program will complete the 120 undergraduate credits required for a BS degree in Plant Science by the end of the 4th year and must be awarded an undergraduate degree at the 4th year mark or earlier. During the 4th and 5th years, students will complete 30 graduate credits and a Plan A or B research project with a final oral defense as required for the Applied Plant Sciences MS degree. Students cannot double-count credits to meet credit requirements for both the undergraduate and graduate degrees. At least one course must be taken from each of the Plant Breeding areas and at least two courses from the Genetics & Genomics area. Additional course requirements are flexible and are determined in consultation with the student's advisor(s) and advisory committee.



### *Twin Cities Campus*

## Applied Plant Sciences Minor

*Agronomy & Plant Genetics, Horticultural Science*

### College of Food, Agricultural and Natural Resource Sciences

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Agronomy and Plant Genetics, 411 Borlaug Hall, 1991 Upper Buford Circle, St. Paul, MN 55108-6026 (612-625-4742; fax: 612-625-1268)

Email: [apsc@umn.edu](mailto:apsc@umn.edu)

Website: <http://www.appliedplantsciences.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 7
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Applied Plant Sciences minor provides students in other fields an opportunity to gain knowledge and expertise in plant sciences at the molecular, organismal, and community levels with applications to sustainable production of horticultural and agronomic crops.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Applied Plant Sciences director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Coursework is determined in consultation with the Applied Plant Sciences director of graduate studies.

#### **Required Course (1 Credit)**

Select 1 of the following courses in consultation with the Applied Plant Sciences director of graduate studies:

[APSC 8270](#) - Graduate Seminar (2.0 cr)

or [APSC 8280](#) - Current Topics in Applied Plant Sciences (1.0 - 3.0 cr)

#### **Electives (6 to 11 credits)**

Master's students select at least 6 credits, and doctoral students select at least 11 credits from the following to meet minimum credit requirements. Courses are selected in consultation with the Applied Plant Sciences director of graduate studies.

[AGRO 4505](#) - Biology, Ecology, and Management of Invasive Plants (3.0 cr)

[AGRO 4605](#) - Strategies for Agricultural Production and Management (3.0 cr)

[AGRO 4888](#) - Issues in Sustainable Agriculture (2.0 cr)

[AGRO 5021](#) - Plant Breeding Principles (3.0 cr)

[AGRO 5311](#) - Research Methods in Crop Improvement and Production (1.0 cr)

[AGRO 5321](#) - Ecology of Agricultural Systems (3.0 cr)

[AGRO 5431](#) - Applied Plant Genomics and Bioinformatics (3.0 cr)



AGRO 5999 - Special Topics: Workshop in Agronomy (1.0 - 6.0 cr)  
AGRO 8023 - Evolution of Crop Plants (3.0 cr)  
AGRO 8202 - Breeding for Quantitative Traits in Plants (3.0 cr)  
AGRO 8241 - Chromosomal and Molecular Genetics of Plant Improvement (3.0 cr)  
APSC 8201 - Advanced Plant Breeding (3.0 cr)  
EEB 5042 - Quantitative Genetics (3.0 cr)  
GCD 4034 - Molecular Genetics and Genomics (3.0 cr)  
GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)  
HORT 4062 - Turfgrass Weed and Disease Science (3.0 cr)  
HORT 4063 - Turfgrass Science (3.0 cr)  
HORT 4071W - Applications of Biotechnology to Plant Improvement [WI] (4.0 cr)  
HORT 4141W - Scheduling Crops for Protected Environments [WI] (4.0 cr)  
HORT 4461 - Horticultural Marketing (3.0 cr)  
HORT 5007 - Advanced Plant Propagation (3.0 cr)  
HORT 5011 - Common Medicinal Plants: Classification, Identification, and Application (3.0 cr)  
HORT 5012 - Common Medicinal Plants: Growing and Processing (3.0 cr)  
HORT 5023 - Public Garden Management (2.0 cr)  
HORT 5031 - Fruit Production and Viticulture for Local and Organic Markets (3.0 cr)  
HORT 5032 - Organic Vegetable Production (3.0 cr)  
HORT 5058 - Plant Cytogenetics (3.0 cr)  
HORT 5061 - Advanced Turfgrass Science (2.0 cr)  
HORT 5071 - Ecological Restoration (4.0 cr)  
HORT 5131 - Student Organic Farm Planning, Growing, and Marketing (3.0 cr)  
HORT 8044 - Manipulation of Plant Growth and Reproduction (2.0 cr)  
PLPA 5202 - Field Plant Pathology (2.0 cr)  
PLPA 5203 - Introduction to Fungal Biology (3.0 cr)  
PLPA 5301 - Large Scale Omic Data in Plant Biology (3.0 cr)  
PLPA 5444 - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)  
PLPA 5480 - Principles of Plant Pathology (3.0 cr)  
PLPA 5660 - Plant Disease Resistance and Applications (3.0 cr)  
PLPA 8103 - Plant-Microbe Interactions (3.0 cr)  
PLPA 8104 - Plant Virology (2.0 cr)  
PLPA 8105 - Plant Bacteriology (2.0 cr)  
PMB 5412 - Plant Physiology (3.0 cr)  
PMB 5516 - Plant Cell Biology (3.0 cr)  
PMB 5601 - Topics in Plant Biochemistry (3.0 cr)  
SAGR 8010 - Colloquium in Sustainable Agriculture (2.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Applied Plant Sciences Ph.D.**

*Agronomy & Plant Genetics, Horticultural Science*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Agronomy and Plant Genetics, 411 Borlaug Hall, 1991 Upper Buford Circle, St. Paul, MN 55108-6026 (612-625-4742; fax: 612-625-1268)

Email: [apsc@umn.edu](mailto:apsc@umn.edu)

Website: <http://www.appliedplantsciences.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 54
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Applied Plant Sciences is an interdisciplinary program for educating students to become professional scientists well-grounded in the applied disciplines of agronomy/agroecology, horticulture, and plant breeding/molecular genetics. Graduates of the program are able to provide innovative leadership and contribute to problem solving within their disciplines in the public or private sector and within society at large. The program develops the quantitative and qualitative research skills necessary to conduct high quality research and scholarship. Students choose from among four specialization tracks: agronomy/agroecology, applied plant sciences, horticulture, or plant breeding/plant molecular genetics. Students gain broad familiarity with all of the disciplines within the program and gain in-depth knowledge within their area of expertise. The program's graduate faculty is drawn primarily from the Department of Agronomy and Plant Genetics and the Department of Horticultural Science; but also from the Departments of Plant and Microbial Biology; Plant Pathology; Soil, Water, and Climate; Ecology, Evolution and Behavior; and Fisheries, Wildlife and Conservation Biology. The faculty embrace the University of Minnesota's position that promoting and supporting diversity among the student body is central to our academic mission.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Students entering the program should have a foundation in the physical and biological sciences, preferably with some emphasis in plant science. A minimum of 10 credits of math and physics, 12 credits of chemistry and biochemistry, and 15 credits of biological and/or agricultural sciences are recommended for admission. In addition, students should have completed a BS or BA degree in agriculture, biology, or other related life science. Students with a BS or BA degree outside these areas may be admitted with the requirement that they take the prerequisite courses noted above at the undergraduate level in addition to their graduate coursework.

#### **Special Application Requirements:**

Applicants must submit three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of official transcripts; and a clearly written personal statement of career interests, goals, and objectives as part of the online application. Students should apply by December 1 for admission into fall semester of the following year. Students should apply by October 1 for admission into spring semester of the following year.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5



- MELAB
- Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

30 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

PhD students must complete the core curriculum, requirements for their specialization, and present one graduate seminar. Additional course requirements are flexible and determined in consultation with the students advisor(s) and advisory committee.

### Required Courses

Take the following courses:

[AGRO 5311](#) - Research Methods in Crop Improvement and Production (1.0 cr)

[APSC 8123](#) - Research Ethics in the Plant and Environmental Sciences (0.5 cr)

[APSC 8270](#) - Graduate Seminar (2.0 cr)

Select at least 3 credits from the following:

[AGRO 5121](#) - Applied Experimental Design (4.0 cr)

[BIOL 5272](#) - Applied Biostatistics (4.0 cr)

[ENT 5126](#) - Spatial and Temporal Analysis of Ecological Data (3.0 cr)

[ESPM 5211](#) - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)

[FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)

[GIS 5555](#) - Basic Spatial Analysis (3.0 cr)

[NR 5021](#) - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[STAT 5021](#) - Statistical Analysis (4.0 cr)

[STAT 5201](#) - Sampling Methodology in Finite Populations (3.0 cr)

[STAT 5302](#) - Applied Regression Analysis (4.0 cr)

[STAT 5303](#) - Designing Experiments (4.0 cr)

[STAT 5401](#) - Applied Multivariate Methods (3.0 cr)

[STAT 5421](#) - Analysis of Categorical Data (3.0 cr)

[STAT 5601](#) - Nonparametric Methods (3.0 cr)

Take 1 of the following courses. If APSC 8280 is selected, consult with the advisor regarding the number of credits needed.

[APSC 8280](#) - Current Topics in Applied Plant Sciences (1.0 - 3.0 cr)

[SAGR 8010](#) - Colloquium in Sustainable Agriculture (2.0 cr)

Take 1 of the following courses:

[GRAD 8101](#) - Teaching in Higher Education (3.0 cr)

[CFAN 8101](#) - Professional Skills for Scientists (2.0 cr)

### Electives

Select courses in consultation with the advisor, as needed, to complete 30 course credits.

### Thesis Credits

Take at least 24 doctoral thesis credits.

[APSC 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

## Program Sub-plans





A sub-plan is not required for this program.  
Students may not complete the program with more than one sub-plan.

### Agronomy and Agroecology

Students conduct research to increase their knowledge of cropping systems and weed science, including alternative approaches and management strategies. Emphasis is on improving production efficiency and profitability in an environmentally sound approach that benefits society. Mechanisms of crop physiology and ecology underlying plant responses to the environment are a particular emphasis of this track.

Courses listed within agroecology/agronomy, plant biology, and ecology/plant pathology/soil science groups are provided as a guide for students and faculty. Other specialization courses can be substituted with agreement of the advisor, the advisory committee, and director of graduate studies.

### Agronomy/Agroecology

Take 2 courses from the following list. If AGRO 5999 is selected, consult with the advisor regarding the number of credits needed.

- AGRO 4505 - Biology, Ecology, and Management of Invasive Plants (3.0 cr)
- AGRO 4605 - Strategies for Agricultural Production and Management (3.0 cr)
- AGRO 5021 - Plant Breeding Principles (3.0 cr)
- AGRO 5321 - Ecology of Agricultural Systems (3.0 cr)
- AGRO 5999 - Special Topics: Workshop in Agronomy (1.0 - 6.0 cr)
- APSC 8201 - Advanced Plant Breeding (3.0 cr)
- SAGR 8010 - Colloquium in Sustainable Agriculture (2.0 cr)

### Plant Biology

Take 1 of the following courses or another course selected in consultation with the advisor:

- PMB 5412 - Plant Physiology (3.0 cr)
- PMB 5516 - Plant Cell Biology (3.0 cr)

### Ecology/Plant Pathology/Soil Science

Take at least 1 course from the following list:

- BIOL 5407 - Ecology (3.0 cr)
- EEB 4068 - Plant Physiological Ecology (3.0 cr)
- EEB 5053 - Ecology: Theory and Concepts (4.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- ESPM 5108 - Ecology of Managed Systems (4.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)
- HORT 4071W - Applications of Biotechnology to Plant Improvement [WI] (4.0 cr)
- HORT 5071 - Ecological Restoration (4.0 cr)
- PLPA 5103 - Plant-Microbe Interactions (3.0 cr)
- PLPA 5202 - Field Plant Pathology (2.0 cr)
- PLPA 5480 - Principles of Plant Pathology (3.0 cr)
- PLPA 5660 - Plant Disease Resistance and Applications (3.0 cr)
- SOIL 4111 - Introduction to Precision Agriculture (3.0 cr)
- SOIL 5611 - Soil Biology and Fertility (4.0 cr)

### Horticulture

Students conduct research related to fruits, vegetables, potatoes, flowers, ornamental trees and shrubs, or turf; and on the physiology, production, environmental impact of cropping systems, and use of horticultural crops. Research areas include the effect of horticultural commodities on human health, hormonal, and stress physiology; flower development and flowering physiology; integrated pest management; post harvest physiology; and cropping system strategies. Students get a broad range of experiences in the field, greenhouse, and/or laboratory using genetic, molecular, biochemical, and ecological tools to answer research questions.

### Area 1 - Cross Commodity Horticulture

Take at least 1 course from the following:

- AGRO 4505 - Biology, Ecology, and Management of Invasive Plants (3.0 cr)
- AGRO 5321 - Ecology of Agricultural Systems (3.0 cr)
- HORT 4071W - Applications of Biotechnology to Plant Improvement [WI] (4.0 cr)
- HORT 4461 - Horticultural Marketing (3.0 cr)
- HORT 5007 - Advanced Plant Propagation (3.0 cr)
- HORT 5023 - Public Garden Management (2.0 cr)
- MBA 6210 - Marketing Management (3.0 cr)
- MKTG 6051 - Marketing Research - Rapid Insights (2.0 cr)
- MKTG 6055 - Buyer Behavior (2.0 cr)
- MKTG 6082 - Brand Strategy (2.0 cr)



### Area 2 - Commodity-based Horticulture

Take at least 1 course from the following:

- [HORT 4062](#) - Turfgrass Weed and Disease Science (3.0 cr)
- [HORT 4063](#) - Turfgrass Science (3.0 cr)
- [HORT 5011](#) - Common Medicinal Plants: Classification, Identification, and Application (3.0 cr)
- [HORT 5012](#) - Common Medicinal Plants: Growing and Processing (3.0 cr)
- [HORT 5031](#) - Fruit Production and Viticulture for Local and Organic Markets (3.0 cr)
- [HORT 5032](#) - Organic Vegetable Production (3.0 cr)
- [HORT 5061](#) - Advanced Turfgrass Science (2.0 cr)
- [HORT 5071](#) - Ecological Restoration (4.0 cr)

### Area 3 - Related Fields

Take at least 1 course from the following. Courses other than those listed below can be substituted with agreement of the advisor, advisory committee, and director of graduate studies.

- [AGRO 5021](#) - Plant Breeding Principles (3.0 cr)
- [AGRO 8023](#) - Evolution of Crop Plants (3.0 cr)
- [APSC 8201](#) - Advanced Plant Breeding (3.0 cr)
- [BIOL 5407](#) - Ecology (3.0 cr)
- [EEB 4068](#) - Plant Physiological Ecology (3.0 cr)
- [EEB 5053](#) - Ecology: Theory and Concepts (4.0 cr)
- [EEB 5609](#) - Ecosystem Ecology (3.0 cr)
- [ESPM 5108](#) - Ecology of Managed Systems (4.0 cr)
- [ESPM 5245](#) - Sustainable Land Use Planning and Policy (3.0 cr)
- [ESPM 5295](#) - GIS in Environmental Science and Management (4.0 cr)
- [HORT 5058](#) - Plant Cytogenetics (3.0 cr)
- [PMB 5412](#) - Plant Physiology (3.0 cr)
- [PMB 5516](#) - Plant Cell Biology (3.0 cr)
- [PMB 5601](#) - Topics in Plant Biochemistry (3.0 cr)
- [PLPA 5103](#) - Plant-Microbe Interactions (3.0 cr)
- [PLPA 5202](#) - Field Plant Pathology (2.0 cr)
- [PLPA 5480](#) - Principles of Plant Pathology (3.0 cr)
- [PLPA 5660](#) - Plant Disease Resistance and Applications (3.0 cr)
- [SOIL 4111](#) - Introduction to Precision Agriculture (3.0 cr)
- [SOIL 5611](#) - Soil Biology and Fertility (4.0 cr)

### Plant Breeding and Plant Molecular Genetics

This track allows students to select from genetic research projects ranging from applied plant breeding projects emphasizing breeding procedures and methodologies to molecular genetic projects doing biotechnology, genetic engineering, and genomic research in agronomic and horticultural crops. These research projects give students the opportunity to integrate the latest developments in the laboratory with applied applications in the field to reach the overarching goal of developing new germplasm that will improve the sustainability of our food/feed/fiber/fuel systems.

#### Plant Breeding

Take at least 1 course from the following:

- [AGRO 5021](#) - Plant Breeding Principles (3.0 cr)
- [AGRO 8202](#) - Breeding for Quantitative Traits in Plants (3.0 cr)
- [APSC 8201](#) - Advanced Plant Breeding (3.0 cr)

#### Genetics and Genomics

Take at least 1 course from the following:

- [AGRO 5431](#) - Applied Plant Genomics and Bioinformatics (3.0 cr)
- [AGRO 8023](#) - Evolution of Crop Plants (3.0 cr)
- [AGRO 8241](#) - Chromosomal and Molecular Genetics of Plant Improvement (3.0 cr)
- [EEB 5042](#) - Quantitative Genetics (3.0 cr)
- [GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)
- [HORT 5058](#) - Plant Cytogenetics (3.0 cr)

#### Additional Coursework

Courses other than those listed below can be substituted with approval of the advisor, advisory committee, and director of graduate studies.

#### Agroecology and Cropping Systems

Consult with the advisor regarding number of credits to take if AGRO 5999 is selected.

- [AGRO 5321](#) - Ecology of Agricultural Systems (3.0 cr)
- [AGRO 5999](#) - Special Topics: Workshop in Agronomy (1.0 - 6.0 cr)
- [HORT 5011](#) - Common Medicinal Plants: Classification, Identification, and Application (3.0 cr)
- [HORT 5012](#) - Common Medicinal Plants: Growing and Processing (3.0 cr)
- [HORT 5023](#) - Public Garden Management (2.0 cr)
- [HORT 5031](#) - Fruit Production and Viticulture for Local and Organic Markets (3.0 cr)



HORT 5032 - Organic Vegetable Production (3.0 cr)  
HORT 5071 - Ecological Restoration (4.0 cr)  
HORT 6141 - Scheduling Crops for Protected Environments (4.0 cr)

or **Biochemistry**

BIOC 8001 - Biochemistry: Structure, Catalysis, and Metabolism (3.0 cr)  
BIOC 8002 - Molecular Biology and Regulation of Biological Processes (3.0 cr)  
PMB 5601 - Topics in Plant Biochemistry (3.0 cr)

or **Biotechnology/Genetics/Genomics**

GCD 4034 - Molecular Genetics and Genomics (3.0 cr)  
GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)  
HORT 4071W - Applications of Biotechnology to Plant Improvement [WI] (4.0 cr)  
HORT 5007 - Advanced Plant Propagation (3.0 cr)  
PLPA 5301 - Large Scale Omic Data in Plant Biology (3.0 cr)

or **Computational Biology/Bioinformatics**

Consult with the advisor regarding number of credits to take if CSCI 5980 is selected.

BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)  
CSCI 4041 - Algorithms and Data Structures (4.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)  
CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)  
PLPA 5303 - Data Visualization in Plant and Microbial Biology (3.0 cr)

or **Evolution**

EEB 5221 - Molecular Evolution (3.0 cr)

or **Physiology**

PMB 5412 - Plant Physiology (3.0 cr)  
PMB 5516 - Plant Cell Biology (3.0 cr)

or **Plant Pathology**

PLPA 5202 - Field Plant Pathology (2.0 cr)  
PLPA 5444 - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)  
PLPA 5480 - Principles of Plant Pathology (3.0 cr)  
PLPA 5660 - Plant Disease Resistance and Applications (3.0 cr)  
PLPA 8103 - Plant-Microbe Interactions (3.0 cr)  
PLPA 8104 - Plant Virology (2.0 cr)  
PLPA 8105 - Plant Bacteriology (2.0 cr)

### Applied Plant Sciences

Students who choose to pursue the PhD without a specialization track must complete the APS required core curriculum and at least one course from these three areas: genetics and plant breeding; organismal biology; and cropping systems, communities, and commodities.

#### Genetics and Plant Breeding

Take at least 1 course from the following:

AGRO 5021 - Plant Breeding Principles (3.0 cr)  
AGRO 5431 - Applied Plant Genomics and Bioinformatics (3.0 cr)  
AGRO 8023 - Evolution of Crop Plants (3.0 cr)  
AGRO 8202 - Breeding for Quantitative Traits in Plants (3.0 cr)  
AGRO 8241 - Chromosomal and Molecular Genetics of Plant Improvement (3.0 cr)  
APSC 8201 - Advanced Plant Breeding (3.0 cr)  
EEB 5042 - Quantitative Genetics (3.0 cr)  
GCD 4034 - Molecular Genetics and Genomics (3.0 cr)  
GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)  
HORT 5058 - Plant Cytogenetics (3.0 cr)  
PLPA 5301 - Large Scale Omic Data in Plant Biology (3.0 cr)

#### Organismal Biology

Take at least 1 course from the following:

HORT 5007 - Advanced Plant Propagation (3.0 cr)  
HORT 8044 - Manipulation of Plant Growth and Reproduction (2.0 cr)  
PLPA 5103 - Plant-Microbe Interactions (3.0 cr)  
PLPA 5203 - Introduction to Fungal Biology (3.0 cr)  
PLPA 5444 - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)  
PLPA 5480 - Principles of Plant Pathology (3.0 cr)  
PLPA 5660 - Plant Disease Resistance and Applications (3.0 cr)  
PLPA 8103 - Plant-Microbe Interactions (3.0 cr)  
PLPA 8104 - Plant Virology (2.0 cr)  
PLPA 8105 - Plant Bacteriology (2.0 cr)



[PMB 5412](#) - Plant Physiology (3.0 cr)

[PMB 5516](#) - Plant Cell Biology (3.0 cr)

[PMB 5601](#) - Topics in Plant Biochemistry (3.0 cr)

**Cropping Systems, Communities, and Commodities**

Take at least 1 course from the following:

[AGRO 4505](#) - Biology, Ecology, and Management of Invasive Plants (3.0 cr)

[AGRO 5321](#) - Ecology of Agricultural Systems (3.0 cr)

[HORT 4062](#) - Turfgrass Weed and Disease Science (3.0 cr)

[HORT 4063](#) - Turfgrass Science (3.0 cr)

[HORT 4141W](#) - Scheduling Crops for Protected Environments [WI] (4.0 cr)

[HORT 5031](#) - Fruit Production and Viticulture for Local and Organic Markets (3.0 cr)

[HORT 5032](#) - Organic Vegetable Production (3.0 cr)

[HORT 5071](#) - Ecological Restoration (4.0 cr)

[HORT 5131](#) - Student Organic Farm Planning, Growing, and Marketing (3.0 cr)

[PLPA 5202](#) - Field Plant Pathology (2.0 cr)

[PLPA 5444](#) - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)

[SAGR 8010](#) - Colloquium in Sustainable Agriculture (2.0 cr)



### **Twin Cities Campus**

## **Bioproducts and Biosystems Science, Eng and Mgmt M.S.**

*Bioproducts and Biosystems Engineering*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Bioproducts and Biosystems Engineering, Biosystems and Agricultural Engineering Building, 1390 Eckles Avenue, St. Paul, MN 55108 (612-625-7733; fax: 612-624-3005)

Email: [bbe@umn.edu](mailto:bbe@umn.edu)

Website: <http://www.bbe.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Bioproducts and Biosystems Science Engineering and Management (BBSEM) graduate program provides a strong foundation in the basic sciences, engineering, and management in support of the renewable bio-resources utilization, environmental quality, and national security, while improving our global competitiveness. The areas of specialization include bioproducts science and engineering, biosystems science and engineering, and bioproducts marketing and management.

Bioproducts science and engineering specialization focuses on the fundamental science and engineering of the various manufacturing processes used in sustainable conversion of biomass into bio-based industrial and consumer products, and their effective end-use applications. Bioproducts include "green" materials, chemicals and energy derived from bio-resources, including biofuels, bioenergy, biocomposites, bio-based plastics, adhesives, pulp and paper, building materials, and more.

Biosystems science and engineering specialization is designed for students who seek to develop a strong foundation in physical sciences and engineering principles, which are applied to important problems involving biological systems. Potential areas of interest include water and soil management and protection; livestock environment; food engineering and value-added processing; machinery systems design; grain quality; safety, health, and risk management; renewable energy systems; and waste management.

Bioproducts marketing and management specialization is designed for graduate students who seek to build on a strong diverse background encompassing liberal arts, basic sciences, communications and product development, and marketing and management of bioproducts.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

A bachelor's degree in engineering, mathematics, the physical or biological sciences, or a related field from a recognized U.S. or international university, is preferred. Applicants should have a performance level of at least a 3.0 GPA (on a 4.0 grading scale) on previous academic work required for a degree.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21



- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** Students complete a project that involves a total of about 120 hours of work, and write a Plan B paper on their project.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

A maximum of 4 special- or advanced-problems credits can be applied to degree requirements. Exception requests must be in writing, specify the circumstances that argue for an exception, and be supported by the student's advisor(s). Final approval for the exception is the responsibility of the director of graduate studies.

### Required Courses (5 credits)

Take the following courses. BBE 8013 is required; however, under special circumstances, and with approval of the BBE 8013 instructor, an alternative statistics course can be applied to the statistics requirement.

[BBE 8001](#) - Seminar I (1.0 cr)

[BBE 8002](#) - Seminar II (1.0 cr)

[BBE 8013](#) - Parameter Estimation in Biosystems and Agricultural Engineering (3.0 cr)

### Electives (15 to 25 credits)

Plan A students select 15 credits, and Plan B students select 25 credits in consultation with their graduate advisor to meet academic and career goals.

### Plan Options

#### Plan A

Take 10 master's thesis credits.

[BBE 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Integrated B.S.-Bioproducts & Biosystems Eng/M.S.-Bioproducts & Biosystems Sci, Eng & Mgmt

The College of Food, Agricultural and Natural Resource Sciences and the College of Science and Engineering offer an BS-Bioproducts and Biosystems Engineering/MS-Bioproducts & Biosystems Science, Engineering, and Management (BS-BBE/MS-BBSEM) program.

This program allows students to complete their undergraduate and graduate degrees in five years. Applicants must be enrolled students in the University of Minnesota Twin Cities BS-BBE program. Applicants must be within 32 credits of completing the



undergraduate degree, have a minimum GPA of 3.30, and have a strong recommendation from a BBE faculty member or instructor. Full application instructions can be found at: [bbe.umn.edu/integrated](http://bbe.umn.edu/integrated)

Students admitted to BS-BBE/MS-BBSEM will complete and be awarded an undergraduate degree within 4 years, with a fifth year as a graduate student to complete the masters degree. At least 14 credit hours need to be taken after the completion of the undergraduate degree. Please refer to [bbe.umn.edu/integrated](http://bbe.umn.edu/integrated) for additional information.

#### **Integrated B.S. - Sustainable Systems Management /M.S. -Bioproducts & Biosystems Sci, Eng, & Mgmt**

The College of Food, Agricultural and Natural Resource Sciences offers an BS-Sustainable Systems Management/MS-Bioproducts & Biosystems Science, Engineering, and Management (BS-SSM/MS-BBSEM) program. This program allows students to complete their undergraduate and graduate degrees in five years. Applicants must be enrolled students in the University of Minnesota Twin Cities BS-SSM program. Applicants must be within 32 credits of completing the undergraduate degree, have a minimum GPA of 3.30, and have a strong recommendation from an SSM faculty member or instructor. Full application instructions can be found at: [bbe.umn.edu/integrated](http://bbe.umn.edu/integrated).

Students admitted to BS-SSM/MS-BBSEM will complete and be awarded an undergraduate degree within 4 years, with a fifth year as a graduate student to complete the masters degree. At least 14 credit hours need to be taken after the completion of the undergraduate degree. Please refer to [bbe.umn.edu/integrated](http://bbe.umn.edu/integrated) for additional information.



### **Twin Cities Campus**

## **Bioproducts and Biosystems Science, Engineering and Management Minor**

*Bioproducts and Biosystems Engineering*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Bioproducts and Biosystems Engineering, Biosystems and Agricultural Engineering Building, 1390 Eckles Avenue, St. Paul, MN 55108 (612-625-7733; fax: 612-624-3005)

Email: [bbe@umn.edu](mailto:bbe@umn.edu)

Website: <http://www.bbe.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The bioproducts and biosystems science engineering and management (BBSEM) graduate program provides a strong foundation in the basic sciences, engineering, and management in support of the renewable bio-resources utilization, environmental quality, and national security while improving our global competitiveness. The areas of specialization include bioproducts science and engineering, biosystems science and engineering, and bioproducts marketing and management.

Bioproducts science and engineering specialization focuses on the fundamental science and engineering of the various manufacturing processes used in the sustainable conversion of biomass into bio-based industrial and consumer products and their effective end-use applications. Bioproducts include "green" materials, chemicals and energy derived from bio-resources including biofuels, bioenergy, biocomposites, bio-based plastics, adhesives, pulp and paper, building materials, and more. Biosystems science and engineering specialization is designed for students who seek to develop a strong foundation in physical sciences and engineering principles, which are applied to important problems involving biological systems. Potential areas of interest include water and soil management and protection; livestock environment; food engineering and value-added processing; machinery systems design; grain quality; safety, health, and risk management; renewable energy systems; and waste management. Bioproducts marketing and management specialization is designed for graduate students who seek to build on a strong diverse background encompassing liberal arts, basic sciences, communications and product development, and marketing and management of bioproducts.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

The student must be in good standing in their degree program to apply for this minor.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Masters**





Select at least 6 credits of graduate-level BBE coursework in consultation with an adviser and approved by the director of graduate studies in bioproducts and biosystems science engineering and management.

**Doctoral**

Select at least 12 credits of graduate-level BBE coursework in consultation with an adviser and approved by the director of graduate studies in bioproducts and biosystems science engineering and management.



### **Twin Cities Campus**

## **Bioproducts and Biosystems Science, Engineering and Management Ph.D.**

*Bioproducts and Biosystems Engineering*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Bioproducts and Biosystems Engineering, Biosystems and Agricultural Engineering Building, 1390 Eckles Avenue, St. Paul, MN 55108 (612-625-7733; fax: 612-624-3005)

Email: [bbe@umn.edu](mailto:bbe@umn.edu)

Website: <http://www.bbe.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 54
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The PhD offered by the bioproducts and biosystems science engineering and management (BBSEM) graduate program provides a strong foundation in the basic sciences, engineering, and management in support of the renewable bio-resources utilization, environmental quality, and national security while improving our global competitiveness. The areas of specialization include bioproducts science and engineering, biosystems science and engineering, and bioproducts marketing and management.

Bioproducts science and engineering specialization focuses on the fundamental science and engineering of the various manufacturing processes used in the sustainable conversion of biomass into bio-based industrial and consumer products and their effective end-use applications. Bioproducts include "green" materials, chemicals and energy derived from bio-resources, including biofuels, bioenergy, biocomposites, bio-based plastics, adhesives, pulp and paper, building materials, and more.

Biosystems science and engineering specialization is designed for students who seek to develop a strong foundation in physical sciences and engineering principles, which are applied to important problems involving biological systems. Potential areas of interest include water and soil management and protection; livestock environment; food engineering and value-added processing; machinery systems design; grain quality; safety, health, and risk management; renewable energy systems; and waste management.

Bioproducts marketing and management specialization is designed for graduate students who seek to build on a strong, diverse background encompassing liberal arts, basic sciences, communications and product development, and marketing and management of bioproducts.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

Students seeking the PhD should have a bachelor's degree in engineering, mathematics, the physical or biological sciences, or a related field from a recognized U.S. or international university.

### **Special Application Requirements:**

Students seeking the PhD should also have a master's degree in engineering, mathematics, the physical or biological sciences, or a related field from a recognized U.S. or international university. Applicants should have a performance level on previous academic work required for a degree of at least a 3.2 GPA (on a 4.0 grading scale). Students expecting to pursue a PhD normally complete a master of science Plan A degree before starting their PhD programs. Exceptional students who want to go straight to the PhD from the bachelor's level may be admitted subject to conditions agreed upon by the advisor, the director of graduate studies, and the graduate program coordinator.

Applicants must submit their test score(s) from the following:

- GRE



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

30 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

All doctoral level students must take BBE 8001, Seminar I (1 cr), and BBE 8002, Seminar II (1 cr), and BBE 8013, Parameter Estimation (3 cr), unless they can demonstrate to the BBE 8013 instructor that they have already mastered the course material, or have justified the selection of a suitable alternative.

BBE 8001, BBE 8002, and BBE 8013, if taken at the master's level, count toward the PhD and do not have to be retaken.

The PhD in bioproducts and biosystems science engineering and management requires extended study and intense intellectual effort, conducting cutting-edge research and advancing the forefront of knowledge in the subject matter area. Students develop skills that enable them to define problems or research questions, plan research, conduct independent research and/or lead research efforts, analyze data, and effectively communicate research results to a variety of audiences.

All PhD degree programs must include a minimum of 30 graduate course credits beyond the B.S. degree, and a minimum of 24 doctoral thesis credits (BBE 8888). PhD degree programs may contain up to 3 credits of enrichment courses.

### Required Courses

[BBE 8001](#) - Seminar I (1.0 cr)

[BBE 8002](#) - Seminar II (1.0 cr)

[BBE 8013](#) - Parameter Estimation in Biosystems and Agricultural Engineering (3.0 cr)

### 25 Credits in Major Area of Study

25 credits in major area of study selected with advisor, and approved by the director of Graduate Studies. The student is encouraged to take up to 3 credits of enrichment courses, which are included in the 25-credit requirement.

### 24 Thesis Credits

[BBE 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Conservation Sciences M.S.**

*Fisheries, Wildlife, and Conservation Biology*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Fisheries, Wildlife, and Conservation Biology, 135 B Skok Hall, 2003 Upper Buford Circle, St. Paul, MN 55108 (612-624-7751)

Email: [conssci@umn.edu](mailto:conssci@umn.edu)

Website: <http://www.conssci.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The conservation sciences (CS) program has two complementary objectives leading to a unique multidisciplinary program. The first is to provide students with sound graduate training in the biological sciences relevant to the global conservation of plants, animals, and ecosystems. The second objective promotes the study of social, political, and economic sciences that relate to recognition and solution of conservation problems. Students may select one of the three tracks, 1) conservation science or 2) fisheries and aquatic biology or 3) wildlife ecology & management. Students may also pursue a joint degree in law and conservation sciences through the joint law degree program. The overall goal of the program is to prepare students to develop solutions or approaches to address problems that are scientifically and environmentally sound and likely to be acted upon or implemented within their social and political context.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A BS/BA degree in biology or a closely related field is preferred. Applicants with a baccalaureate degree in another field are accepted, but may be required to take selected courses in biology.

#### **Special Application Requirements:**

A statement of career goals and three letters of recommendation evaluating the applicant's potential for graduate study are required. TOEFL is required for applicants who speak English as a second language. Applicants to the joint law degree program must also apply to the Law School. Application deadline is December 15. Typically, students only are admitted for fall semester.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80
- MN Batt

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB, MN Batt).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** Plan B master's students must demonstrate familiarity with the tools of research or scholarship in their major field, the ability to work independently, and the ability to present the results of their investigation effectively, by completing at least one Plan B project. The Plan B project should involve a combined total of approximately 120 hours (the equivalent of three full-time weeks) of work. The advisory committee specifies both the nature and extent of the options available to satisfy this requirement, subject to approval by the director of graduate studies. The Plan B project must be satisfied independent of the courses in the student's program.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

### Core Course (3 credits)

Take the following course:

[FW 8452](#) - Conservation Biology (3.0 cr)

### Seminar (2 credits)

Take CBIO 2 times for a total of 2 credits. Students pursuing the Fisheries and Aquatic Biology track may substitute 1 credit of CBIO 8001 with 1 credit of FS 8200.

[CONS 8001](#) - Conservation Biology Seminar (1.0 cr)

[FW 8200](#) - Seminar (1.0 - 4.0 cr)

### Statistics (3 credits)

Select at least 3 credits from the following. Other 5- or 8-level coursework can be applied to this requirement in consultation with the advisory committee.

[BIOL 5272](#) - Applied Biostatistics (4.0 cr)

[EEB 5371](#) - Principles of Systematics (3.0 cr)

[FW 4001](#) - Biometry (4.0 cr)

[FW 8051](#) - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)

[STAT 5021](#) - Statistical Analysis (4.0 cr)

[STAT 5302](#) - Applied Regression Analysis (4.0 cr)

[STAT 5303](#) - Designing Experiments (4.0 cr)

[STAT 5421](#) - Analysis of Categorical Data (3.0 cr)

[STAT 5601](#) - Nonparametric Methods (3.0 cr)

## Plan Options

### Plan A

Take at least 10 master's thesis credits.

[CONS 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

**Joint- or Dual-degree Coursework:** JD/Conservation Sciences-MSS student may take a total of 12 credits in common among the academic programs.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Conservation Science

The conservation science track is available for students wishing to emphasize this concentration within the conservation sciences degree. The track provides structure and oversight for students interested in the interface of population, species, and ecosystem biology with disciplines of social sciences, education, economics.

### Electives (12 to 22 credits)



Plan A students select at least 12 credits, and Plan B students select at least 22 credits from the following list. Other 5- or 8-level courses can be applied to this requirement in consultation with the advisory committee.

[APEC 5151](#) - Applied Microeconomics: Firm and Household (3.0 cr)  
[EEB 4129](#) - Mammalogy (4.0 cr)  
[EEB 4134](#) - Introduction to Ornithology (4.0 cr)  
[EEB 5042](#) - Quantitative Genetics (3.0 cr)  
[EEB 5409](#) - Evolution (3.0 cr)  
[EEB 5609](#) - Ecosystem Ecology (3.0 cr)  
[ENT 5011](#) - Insect Structure and Function (4.0 cr)  
[ENT 5041](#) - Insect Ecology (3.0 cr)  
[EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)  
[EPSY 5243](#) - Principles and Methods of Evaluation (3.0 cr)  
[FNRM 5104](#) - Forest Ecology (4.0 cr)  
[FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)  
[FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
[FNRM 5203](#) - Forest Fire and Disturbance Ecology (3.0 cr)  
[FNRM 5204](#) - Landscape Ecology and Management (3.0 cr)  
[FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)  
[FW 5003](#) - Human Dimensions of Biological Conservation (3.0 cr)  
[FW 5051](#) - Analysis of Populations (4.0 cr)  
[FW 5603W](#) - Habitats and Regulation of Wildlife [WI] (3.0 cr)  
[FW 5625](#) - Wildlife Handling and Immobilization for Research and Management (2.0 cr)  
[GEOG 8280](#) - Biogeography (3.0 cr)  
[HORT 5071](#) - Ecological Restoration (4.0 cr)  
[LA 5202](#) - Landscape Analysis Workshop (1.0 cr)  
[LA 5204](#) - Metropolitan Landscape Ecology (3.0 cr)  
[PA 5251](#) - Strategic Planning and Management (3.0 cr)  
[PA 5253](#) - Designing Planning and Participation Processes (3.0 cr)  
[PA 5501](#) - Theories and Policies of Development (3.0 cr)  
[PA 5511](#) - Community Economic Development (3.0 cr)  
[VMED 5181](#) - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)

### Fisheries and Aquatic Biology

Three-quarters of the global ecosystem is water and most is a global commons. Many biologists and economists argue that freshwater is one of the most critical global resources and that the functional integrity and biodiversity within freshwater and marine ecosystems are highly threatened. The fisheries and aquatic biology (FAB) track is available for MS, PhD, and joint degree students wishing to emphasize this concentration. The track name will be posted to the transcript, and may be useful to the graduate for obtaining jobs with many federal and state agencies where such expertise is specified in job announcements or hiring criteria. The track designation clearly indicates that the student has specialized coursework and research or project experience leading to expertise in fisheries or aquatic biology. Combined with a typical undergraduate degree in biology or natural resource science, careful selection of courses in the graduate program will satisfy the educational requirements for professional certification by the American Fisheries Society.

Students in the track must be advised or co-advised by a faculty member affiliated with the track. Requests for admission to the track may be made during the application process or at any time after the student is admitted to conservation sciences.

### Required Coursework (6 credits)

Select at least 6 credits from the following list. Other advanced fisheries or aquatic biology courses or colloquia may be applied to this required in consultation with the track coordinator.

[EEB 5601](#) - Limnology (3.0 cr)  
[EEB 5605](#) - Limnology Laboratory (2.0 cr)  
[EEB 8601](#) - Introduction to Stream Restoration (3.0 cr)  
[EEB 8602](#) - Stream Restoration Practice (2.0 cr)  
[ENT 5361](#) - Aquatic Insects (4.0 cr)  
[FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)  
[FNRM 5153](#) - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)  
[FW 4401](#) - Fish Physiology and Behavior (3.0 cr)  
[FW 5003](#) - Human Dimensions of Biological Conservation (3.0 cr)  
[FW 5136](#) - Ichthyology (4.0 cr)  
[FW 5601](#) - Fisheries Population Analysis (3.0 cr)  
[FW 8459](#) - Stream and River Ecology (3.0 cr)  
[FW 8465](#) - Fish Habitats and Restoration (3.0 cr)

### Electives (6 to 16 credits)

Plan A students select at least 6 credits, and Plan B students select at least 16 credits from the following list. Other 5- or 8-level courses can be applied to this requirement in consultation with the advisory committee.

[APEC 5151](#) - Applied Microeconomics: Firm and Household (3.0 cr)



EEB 5042 - Quantitative Genetics (3.0 cr)  
EEB 5409 - Evolution (3.0 cr)  
EEB 5609 - Ecosystem Ecology (3.0 cr)  
ENT 5011 - Insect Structure and Function (4.0 cr)  
ENT 5041 - Insect Ecology (3.0 cr)  
EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)  
EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)  
FNRM 5114 - Hydrology and Watershed Management (3.0 cr)  
FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
FNRM 5204 - Landscape Ecology and Management (3.0 cr)  
FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)  
FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)  
FW 5051 - Analysis of Populations (4.0 cr)  
GEOG 8280 - Biogeography (3.0 cr)  
HORT 5071 - Ecological Restoration (4.0 cr)  
LA 5202 - Landscape Analysis Workshop (1.0 cr)  
LA 5204 - Metropolitan Landscape Ecology (3.0 cr)  
PA 5251 - Strategic Planning and Management (3.0 cr)  
PA 5253 - Designing Planning and Participation Processes (3.0 cr)  
PA 5511 - Community Economic Development (3.0 cr)  
VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)

### Wildlife Ecology and Management

The Wildlife Ecology and Management track is available for students wishing to emphasize this concentration within the conservation sciences degree. The track provides structure and oversight for students interested in the ecology and management of both game and non-game wildlife species. The track name will be posted to the transcript, and may be useful to the graduate for obtaining jobs with many federal and state agencies where such expertise is specified in job announcements or hiring criteria. The track designation clearly indicates that the student has specialized coursework and research or project experience leading to expertise in wildlife ecology & management.

Students in the track must be advised or co-advised by a faculty member affiliated with the track. Requests for admission to the track may be made during the application process or at any time after the student is admitted to conservation sciences. Students who designate this track will be expected to work closely with their Student Advisory Committee (SAC) to develop an appropriate course of study.

### Electives (12 to 22 credits)

Plan A students select at least 12 credits, and Plan B students select at least 22 credits from the following list. Other 5- or 8-level courses can be applied to this requirement in consultation with the advisory committee.

APEC 5151 - Applied Microeconomics: Firm and Household (3.0 cr)  
EEB 4129 - Mammalogy (4.0 cr)  
EEB 4134 - Introduction to Ornithology (4.0 cr)  
EEB 5042 - Quantitative Genetics (3.0 cr)  
EEB 5409 - Evolution (3.0 cr)  
EEB 5609 - Ecosystem Ecology (3.0 cr)  
ENT 5011 - Insect Structure and Function (4.0 cr)  
ENT 5041 - Insect Ecology (3.0 cr)  
EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)  
FNRM 5104 - Forest Ecology (4.0 cr)  
FNRM 5114 - Hydrology and Watershed Management (3.0 cr)  
FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)  
FNRM 5204 - Landscape Ecology and Management (3.0 cr)  
FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)  
FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)  
FW 5051 - Analysis of Populations (4.0 cr)  
FW 5603W - Habitats and Regulation of Wildlife [WI] (3.0 cr)  
FW 5625 - Wildlife Handling and Immobilization for Research and Management (2.0 cr)  
GEOG 8280 - Biogeography (3.0 cr)  
HORT 5071 - Ecological Restoration (4.0 cr)  
LA 5202 - Landscape Analysis Workshop (1.0 cr)  
LA 5204 - Metropolitan Landscape Ecology (3.0 cr)  
PA 5251 - Strategic Planning and Management (3.0 cr)  
PA 5253 - Designing Planning and Participation Processes (3.0 cr)  
PA 5501 - Theories and Policies of Development (3.0 cr)  
PA 5511 - Community Economic Development (3.0 cr)



VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)





### **Twin Cities Campus**

## **Conservation Sciences Minor**

*Fisheries, Wildlife, and Conservation Biology*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Fisheries, Wildlife, and Conservation Biology, 135 B Skok Hall, 2003 Upper Buford Circle, St. Paul, MN 55108 (612-624-7751)

Email: [consbio@umn.edu](mailto:consbio@umn.edu)

Website: <http://www.consbio.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 7
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The conservation sciences (CS) program has two complementary objectives leading to a unique multidisciplinary program. The first is to provide students with sound graduate training in the biological sciences relevant to the global conservation of plants, animals, and ecosystems. The second objective promotes the study of social, political, and economic sciences that relate to recognition and solution of conservation problems. Students may select a named track, fisheries and aquatic biology, which offers an aquatic specialization. Students may also pursue a joint degree in law and conservation biology through the joint law degree program. The overall goal of the program is to prepare students to develop solutions or approaches to address problems that are scientifically and environmentally sound and likely to be acted upon or implemented within their social and political context.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **Core Course**

[FW 8452](#) - Conservation Biology (3.0 cr)

##### **Seminar**

[CONS 8001](#) - Conservation Biology Seminar (1.0 cr)

##### **Electives**

Three credits of electives in consultation with the director of graduate studies.

#### **Doctoral**

##### **Core Course**



[FW 8452](#) - Conservation Biology (3.0 cr)

**Seminar**

2 credits required including at least one credit of CBIO 8001.

Take 2 or more credit(s) from the following:

- [CONS 8001](#) - Conservation Biology Seminar (1.0 cr)
- [FW 8200](#) - Seminar (1.0 - 4.0 cr)

**Electives**

7 credits of electives in consultation with the director of graduate studies.



### **Twin Cities Campus**

## **Conservation Sciences Ph.D.**

*Fisheries, Wildlife, and Conservation Biology*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Fisheries, Wildlife, and Conservation Biology, 135 B Skok Hall, 2003 Upper Buford Circle, St. Paul, MN 55108 (612-624-7751)

Email: [conssci@umn.edu](mailto:conssci@umn.edu)

Website: <http://www.conssci.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The conservation sciences (CS) program has two complementary objectives leading to a unique multidisciplinary program. The first is to provide students with sound graduate training in the biological sciences relevant to the global conservation of plants, animals, and ecosystems. The second objective promotes the study of social, political, and economic sciences that relate to recognition and solution of conservation problems. Students may select one of three tracks, conservation science track or fisheries and aquatic biology track or wildlife ecology and management track. Students may also pursue a joint degree in law and conservation sciences through the joint law degree program. The overall goal of the program is to prepare students to develop solutions or approaches to address problems that are scientifically and environmentally sound and likely to be acted upon or implemented within their social and political context.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

A BS/BA degree in biology or a closely related field is preferred. Applicants with a baccalaureate degree in another field are accepted, but these individuals may be required to take selected courses in biology. In general, PhD applicants holding a baccalaureate degree are first expected to complete a master's degree.

### **Special Application Requirements:**

A statement of career goals and three letters of recommendation evaluating the applicant's potential for graduate study are required. Three letters of recommendation are required. TOEFL is required for applicants who speak English as a second language. Applicants to the joint law degree program must also apply to the Law School. Application deadline is January 1. Typically, students are admitted only for fall semester.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language



Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

12 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Students are expected to show competency in both the biological and social sciences. With their advisory committee, students develop a program that emphasizes the ecological and social aspects of conservation. Dissertation research may require proficiency in supporting areas (e.g., statistics, computing, communications).

### Core Courses

Take following core courses:

[FW 8452](#) - Conservation Biology (3.0 cr)

[CONS 8095](#) - Contemporary Problems in Conservation Biology (1.0 cr)

### Seminar Requirement

Take CONS 8001 3 times. Students pursuing the FAB track may substitute up to 2 semesters of FW 8200 toward this requirement.

Take 3 or more credit(s) from the following:

•[CONS 8001](#) - Conservation Biology Seminar (1.0 cr)

•[FW 8200](#) - Seminar (1.0 - 4.0 cr)

### Statistics Requirement

Select at least 3 credits from the following. Other coursework can be applied to this requirement with advisor and/or SAC approval.

Take 3 or more credit(s) from the following:

•[BIOL 5272](#) - Applied Biostatistics (4.0 cr)

•[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

•[EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)

•[FW 8051](#) - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)

•[PSY 8960](#) - Graduate Seminar in Psychology (1.0 - 4.0 cr)

•[PUBH 6810](#) - Survey Research Methods (3.0 cr)

•[PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)

•[STAT 5021](#) - Statistical Analysis (4.0 cr)

•[STAT 5302](#) - Applied Regression Analysis (4.0 cr)

•[STAT 5303](#) - Designing Experiments (4.0 cr)

•[STAT 5421](#) - Analysis of Categorical Data (3.0 cr)

•[STAT 5601](#) - Nonparametric Methods (3.0 cr)

### Thesis Credits

Take 24 thesis semester credits

[CONS 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:** Joint degree in conservation sciences and law Student may take a total of 12 credits in common among the academic programs.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Conservation Science



Conservation science track is available for MS, PhD, and joint degree students wishing to emphasize this concentration within a conservation sciences. This track name will be indicated on the student's transcript. This track provides structure and oversight for students interested in the interface of population, species, and ecosystem biology with disciplines of social sciences, education, economics.

### Conservation Science - Electives

Doctoral students should take a minimum of 14 credits from the following list, or choose 5- or 8-xxx level courses from other departments in consultation with SAC to meet minimum credit requirements.

Take 14 or more credit(s) from the following:

- APEC 5151 - Applied Microeconomics: Firm and Household (3.0 cr)
- EEB 4129 - Mammalogy (4.0 cr)
- EEB 4134 - Introduction to Ornithology (4.0 cr)
- EEB 5042 - Quantitative Genetics (3.0 cr)
- EEB 5409 - Evolution (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- ENT 4021 - Honey Bees and Insect Societies (3.0 cr)
- ENT 5011 - Insect Structure and Function (4.0 cr)
- ENT 5041 - Insect Ecology (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
- FW 5051 - Analysis of Populations (4.0 cr)
- FW 5401 - Fish Physiology and Behavior (3.0 cr)
- FW 5603W - Habitats and Regulation of Wildlife [WI] (3.0 cr)
- FW 5625 - Wildlife Handling and Immobilization for Research and Management (2.0 cr)
- GEOG 8280 - Biogeography (3.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8102 - Practicum for Future Faculty (3.0 cr)
- HORT 5071 - Ecological Restoration (4.0 cr)
- ISG 5010 - Risk Analysis for Introduced Species and Genotypes (3.0 cr)
- ISG 5020 - Risk Analysis Modeling for Introduced Species and Genotypes (1.0 cr)
- ISG 8001 - Discussions in Introduced Species and Genotypes (1.0 cr)
- ISG 8021 - Problem Solving Practicum in Risk Analysis (3.0 cr)
- ISG 8031 - Cooperative Learning Practicum (1.0 cr)
- LA 5202 - Landscape Analysis Workshop (1.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- PA 5251 - Strategic Planning and Management (3.0 cr)
- PA 5253 - Designing Planning and Participation Processes (3.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5511 - Community Economic Development (3.0 cr)
- VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)

### Fisheries and Aquatic Biology

Three-quarters of the global ecosystem is water and most is a global commons. Many biologists and economists argue that freshwater is one of the most critical global resources and that the functional integrity and biodiversity within freshwater and marine ecosystems are highly threatened. The fisheries and aquatic biology (FAB) track is available for MS, PhD, and joint degree students wishing to emphasize this concentration within a CS major. The track name will be indicated on the student's transcript and may be useful to the graduate for obtaining jobs with many federal and state agencies where such expertise is specified in job announcements or hiring criteria. The track designation clearly indicates that the student has specialized coursework and research or project experience leading to expertise in fisheries or aquatic biology. Combined with a typical undergraduate degree in biology or natural resource science, careful selection of courses in the graduate program will satisfy the educational requirements for professional certification by the American Fisheries Society.

Students in the track must be advised or co-advised by a faculty member affiliated with the track. Request for admission to the track may be made during the application process or any time after the student is admitted to the CS graduate program. Students in the track must meet all requirements for the PhD in CS.

Students who designate this track will be expected to work closely with their Student Advisory Committee (SAC) to develop an



appropriate course of study. The track coordinator will review each student's academic program to examine how track expectations are met and forward it with a recommendation to the director of graduate studies for approval.

#### **Fisheries and Aquatic Biology - Required Courses**

In addition to course requirements for the conservation sciences major, PhD students in fisheries and aquatic biology track are required to take minimum of 8 semester credits from following list. Other advanced courses or colloquia on fisheries or aquatic biology that are not listed here may also satisfy needs of students in the track. Please check with FAB track coordinator to add other courses.

Take 8 or more credit(s) from the following:

- [EEB 5601](#) - Limnology (3.0 cr)
- [EEB 5605](#) - Limnology Laboratory (2.0 cr)
- [EEB 8601](#) - Introduction to Stream Restoration (3.0 cr)
- [EEB 8602](#) - Stream Restoration Practice (2.0 cr)
- [ENT 5361](#) - Aquatic Insects (4.0 cr)
- [FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)
- [FNRM 5153](#) - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)
- [FW 4401](#) - Fish Physiology and Behavior (3.0 cr)
- [FW 5003](#) - Human Dimensions of Biological Conservation (3.0 cr)
- [FW 5051](#) - Analysis of Populations (4.0 cr)
- [FW 5136](#) - Ichthyology (4.0 cr)
- [FW 5601](#) - Fisheries Population Analysis (3.0 cr)
- [FW 8459](#) - Stream and River Ecology (3.0 cr)
- [FW 8465](#) - Fish Habitats and Restoration (3.0 cr)

#### **Fisheries and Aquatic Biology - Electives**

PhD students should take a minimum of 6 semester credits either from the following list, or choose 5- or 8-xxxx courses from other departments in consultation with the advisor and/or SAC.

Take 6 or more credit(s) from the following:

- [APEC 5151](#) - Applied Microeconomics: Firm and Household (3.0 cr)
- [EEB 5042](#) - Quantitative Genetics (3.0 cr)
- [EEB 5409](#) - Evolution (3.0 cr)
- [EEB 5601](#) - Limnology (3.0 cr)
- [EEB 5609](#) - Ecosystem Ecology (3.0 cr)
- [ENT 5011](#) - Insect Structure and Function (4.0 cr)
- [ENT 5041](#) - Insect Ecology (3.0 cr)
- [EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)
- [EPSY 5243](#) - Principles and Methods of Evaluation (3.0 cr)
- [FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)
- [FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- [FNRM 5203](#) - Forest Fire and Disturbance Ecology (3.0 cr)
- [FNRM 5204](#) - Landscape Ecology and Management (3.0 cr)
- [FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- [FW 5003](#) - Human Dimensions of Biological Conservation (3.0 cr)
- [FW 5051](#) - Analysis of Populations (4.0 cr)
- [FW 5401](#) - Fish Physiology and Behavior (3.0 cr)
- [FW 5603W](#) - Habitats and Regulation of Wildlife [WI] (3.0 cr)
- [FW 5625](#) - Wildlife Handling and Immobilization for Research and Management (2.0 cr)
- [GEOG 8280](#) - Biogeography (3.0 cr)
- [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)
- [GRAD 8102](#) - Practicum for Future Faculty (3.0 cr)
- [HORT 5071](#) - Ecological Restoration (4.0 cr)
- [ISG 5010](#) - Risk Analysis for Introduced Species and Genotypes (3.0 cr)
- [ISG 5020](#) - Risk Analysis Modeling for Introduced Species and Genotypes (1.0 cr)
- [ISG 8001](#) - Discussions in Introduced Species and Genotypes (1.0 cr)
- [ISG 8021](#) - Problem Solving Practicum in Risk Analysis (3.0 cr)
- [ISG 8031](#) - Cooperative Learning Practicum (1.0 cr)
- [LA 5202](#) - Landscape Analysis Workshop (1.0 cr)
- [LA 5204](#) - Metropolitan Landscape Ecology (3.0 cr)
- [PA 5251](#) - Strategic Planning and Management (3.0 cr)
- [PA 5253](#) - Designing Planning and Participation Processes (3.0 cr)
- [PA 5501](#) - Theories and Policies of Development (3.0 cr)
- [PA 5511](#) - Community Economic Development (3.0 cr)
- [VMED 5181](#) - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)

#### **Wildlife Ecology and Management**

The Wildlife Ecology and Management track is available for students wishing to emphasize this concentration within the conservation sciences degree. The track provides structure and oversight for students interested in the interface of population, species, and



ecosystem biology with the disciplines of social sciences, education, and economics. The track name will be posted to the transcript, and may be useful to the graduate for obtaining jobs with many federal and state agencies where such expertise is specified in job announcements or hiring criteria. The track designation clearly indicates that the student has specialized coursework and research or project experience leading to expertise in wildlife ecology and management.

Students in the track must be advised or co-advised by a faculty member affiliated with the track. Requests for admission to the track may be made during the application process or at any time after the student is admitted to conservation sciences. Students in the track must meet all MS degree requirements. Students who designate this track will be expected to work closely with their Student Advisory Committee (SAC) to develop an appropriate course of study. The track coordinator will review each student's academic program to examine how track expectations are met and forward it with a recommendation to the director of graduate studies for approval.

#### **Wildlife Ecology & Management - Electives**

Doctoral students should take a minimum of 14 credits from the following list, or choose 5- or 8-xxx level courses from other departments in consultation with SAC to meet minimum credit requirements.

Take 14 or more credit(s) from the following:

- APEC 5151 - Applied Microeconomics: Firm and Household (3.0 cr)
- EEB 4129 - Mammalogy (4.0 cr)
- EEB 4134 - Introduction to Ornithology (4.0 cr)
- EEB 5042 - Quantitative Genetics (3.0 cr)
- EEB 5409 - Evolution (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- ENT 4021 - Honey Bees and Insect Societies (3.0 cr)
- ENT 5011 - Insect Structure and Function (4.0 cr)
- ENT 5041 - Insect Ecology (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
- FW 5051 - Analysis of Populations (4.0 cr)
- FW 5401 - Fish Physiology and Behavior (3.0 cr)
- FW 5603W - Habitats and Regulation of Wildlife [WI] (3.0 cr)
- FW 5625 - Wildlife Handling and Immobilization for Research and Management (2.0 cr)
- GEOG 8280 - Biogeography (3.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8102 - Practicum for Future Faculty (3.0 cr)
- HORT 5071 - Ecological Restoration (4.0 cr)
- ISG 5010 - Risk Analysis for Introduced Species and Genotypes (3.0 cr)
- ISG 5020 - Risk Analysis Modeling for Introduced Species and Genotypes (1.0 cr)
- ISG 8001 - Discussions in Introduced Species and Genotypes (1.0 cr)
- ISG 8021 - Problem Solving Practicum in Risk Analysis (3.0 cr)
- ISG 8031 - Cooperative Learning Practicum (1.0 cr)
- LA 5202 - Landscape Analysis Workshop (1.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- PA 5251 - Strategic Planning and Management (3.0 cr)
- PA 5253 - Designing Planning and Participation Processes (3.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5511 - Community Economic Development (3.0 cr)
- VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)



### *Twin Cities Campus*

## Entomology M.S.

Entomology

College of Food, Agricultural and Natural Resource Sciences

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Entomology, 1980 Folwell Avenue, 219 Hodson Hall, St. Paul, MN 55108 (612-624-3636; fax: 612-625-5299)

Email: [entodept@umn.edu](mailto:entodept@umn.edu)

Website: <http://www.entomology.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Entomology centers on the study of insects and includes specializations in ecology, behavior, molecular biology, microbiology, neurobiology, physiology, population dynamics, systematics, and taxonomy. Specialized or applied areas include apiculture, biological control, cell culture, insect conservation, insect-vector relations, integrated pest management, and modeling. Research programs are active in aquatic systems, forest systems, crop and animal agriculture, human health, and natural and urban environments.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Preferred GPA for prior graduate work is 3.50.

Other requirements to be completed before admission:

A bachelor's degree with a major in a biological science is a prerequisite. Preference is given to students with a broad background in the basic sciences. Admission depends primarily on applicant's undergraduate record, letters of recommendation, and the statement of interest from the applicant.

GRE scores in Verbal Reasoning, Quantitative Reasoning, Analytical Writing are required.

### **Special Application Requirements:**

Applicants must submit a complete set of official transcripts and a clearly written statement of career interests, goals, and objectives, and a diversity statement. Three letters of recommendation are required from persons well acquainted with the student's academic record.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL).





For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** 1-3 project reports as directed by the advisor and the advisory committee.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

Students must accumulate 2 written examination points.

### Required Coursework (11 credits)

Take the following courses:

[ENT 5011](#) - Insect Structure and Function (4.0 cr)

[ENT 5021](#) - Insect Biodiversity and Evolution (4.0 cr)

[ENT 5041](#) - Insect Ecology (3.0 cr)

### Electives (8 to 18 credits)

Plan A students select 8 credits, and Plan B students select 13 to 18 credits of ENT or non-ENT elective coursework in consultation with the advisor.

### Plan Options

#### Plan A

##### Graduate Seminar (1 credit)

Take at least 1 credit of ENT 8300.

[ENT 8300](#) - Graduate Seminar (1.0 - 2.0 cr)

##### Thesis Credits

Take at least 10 master's thesis credits.

[ENT 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

Take 1 to 6 credits, as needed to complete the 30-credit minimum, in consultation with the advisor.

[ENT 5910](#) - Special Problems in Entomology (1.0 - 6.0 cr)



### **Twin Cities Campus**

## **Entomology Minor**

Entomology

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Entomology, 1980 Folwell Ave, 219 Hodson Hall, St. Paul, MN 55108 (612-624-3636; fax: 612-625-5299)

Email: [entodept@umn.edu](mailto:entodept@umn.edu)

Website: <http://www.entomology.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Entomology centers on the study of insects and includes specializations in ecology, behavior, molecular biology, microbiology, neurobiology, physiology, population dynamics, systematics, and taxonomy. Specialized or applied areas include apiculture, biological control, cell culture, insect conservation, insect-vector relations, integrated pest management, and modeling. Research programs are active in aquatic systems, forest systems, crop and animal agriculture, human health, and natural and urban environments.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

Courses are chosen in consultation with the student's major advisor and the Entomology director of graduate studies.

#### **Master's Course List**

Take at least six credits from the following:

ENT 4xxx  
ENT 5xxx  
ENT 8xxx

#### **Doctoral**

Courses are chosen in consultation with the student's major advisor and the Entomology director of graduate studies.

#### **Doctoral Course List**

Take at least 12 credits from the following:



ENT 4xx  
ENT 5xx  
ENT 8xx



### **Twin Cities Campus**

## **Entomology Ph.D.**

Entomology

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Entomology, 1980 Folwell Avenue, 219 Hodson Hall, St. Paul, MN 55108 (612-624-3636; fax: 612-625-5299)

Email: [entodept@umn.edu](mailto:entodept@umn.edu)

Website: <http://www.entomology.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Entomology centers on the study of insects and includes specializations in ecology, behavior, molecular biology, microbiology, neurobiology, physiology, population dynamics, systematics, and taxonomy. Specialized or applied areas include apiculture, biological control, cell culture, insect conservation, insect-vector relations, integrated pest management, and modeling. Research programs are active in aquatic systems, forest systems, crop and animal agriculture, human health, and natural and urban environments.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A GPA of 3.00 on a 4.00 scale. Students should have a firm background in biology, with fundamentals of mathematics, physics, and chemistry.

Preferred GPA for prior graduate work is 3.50 on a 4.00 scale.

Other requirements to be completed before admission:

A bachelor's degree with a major in a biological science is a prerequisite. Preference is given to students with a broad background in the basic sciences. Admission depends primarily on applicant's undergraduate record, letters of recommendation, and the statement of interest from the applicant.

GRE scores for Verbal Reasoning, Quantitative Reasoning and Analytical Writing are required for admission.

#### **Special Application Requirements:**

Applicants must submit a complete set of official transcripts and a clearly written statement of career interests, goals, objectives and a diversity statement. Three letters of recommendation are required from persons well acquainted with the student's academic record.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

The preferred English language test is Test of English as Foreign Language



Key to [test abbreviations](#)(GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

24 thesis credits are required.

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** 1-3 project reports as directed by the advisor and the advisory committee.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Students must accumulate 3 written examination points.

### Core Courses (11 credits)

Take the following courses:

[ENT 5021](#) - Insect Biodiversity and Evolution (4.0 cr)

[ENT 5011](#) - Insect Structure and Function (4.0 cr)

[ENT 5041](#) - Insect Ecology (3.0 cr)

### Seminar (2 credits)

Take 2 credits of the following:

[ENT 8300](#) - Graduate Seminar (1.0 - 2.0 cr)

### Electives (11 credits)

Select 11 credits of ENT or non-ENT elective coursework in consultation with the advisor.

### Thesis Credits

Take 24 doctoral thesis credits.

[ENT 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### ***Twin Cities Campus***

## **Food Science M.S.**

*Food Science & Nutrition*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Food Science and Nutrition, 225 Food Science and Nutrition Building, 1334 Eckles Avenue, Saint Paul, MN 55108 (612-624-6753; fax: 612-625-5272)

Email: [fsgrad@umn.edu](mailto:fsgrad@umn.edu)

Website: [http://fscn.cfans.umn.edu/graduate\\_programs/foodsciencegraduate/index.htm](http://fscn.cfans.umn.edu/graduate_programs/foodsciencegraduate/index.htm)

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Food science applies scientific principles to the manufacture, distribution, marketing, and consumer aspects of food. Food scientists apply the basic principles and techniques of many disciplines, including chemistry, physics, microbiology, and nutrition, to food processing and preservation, new product development, and food marketing. Food scientists are concerned with the theoretical and practical aspects of the food chain, from the production of raw materials to the use of food products by consumers. Students may emphasize the chemistry, engineering, microbiology, nutrition, or technology of food products.

Students may spend a maximum of five (5) years in this degree program.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants to the program need a bachelor's degree, or its international equivalent, in any field.

Other requirements to be completed before admission:

The minimum requirements are general chemistry with laboratory, organic chemistry with laboratory, physics with laboratory, biology with laboratory, and calculus. If preparation appears inadequate, certain additional courses may be required after admission.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project is equivalent to 120 hours of work or three full weeks of research and writing. It should consist of one of the following options, which are intended to familiarize the candidate with the tools of research or scholarship in the field and serve to demonstrate the ability to work independently: 1) The candidate may prepare one paper equivalent to 120 hours of work in one advanced course, over and above the normal course requirement as approved by the instructor in consultation with the advisor. This course must be from the major field of interest. 2) The candidate may prepare one paper equivalent to the requirement of 120 hours in some related field or course as approved in consultation with the instructor and the adviser. 3) The student may do an equivalent amount of library or laboratory research and write a research report to satisfy the requirement as approved by the adviser. This may take the form of a research proposal.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

All students are expected to participate as teaching assistants during their graduate careers. Up to 9 credits of 4xxx-level courses are allowed.

### Required Courses

All students take the following required courses for 11 credits:

[FSCN 4112](#) - Food Chemistry and Functional Foods (3.0 cr)

[FSCN 4121](#) - Food Microbiology (3.0 cr)

[FSCN 4332](#) - Food Processing Operations (3.0 cr)

[FSCN 8318](#) - Current Issues in Food Science (2.0 cr)

Take one of the following courses for a total of 2 to 4 credits:

[FSCN 5131](#) - Food Quality for Graduate Credit (3.0 cr)

or [FSCN 5312](#) - Food Analysis (4.0 cr)

or If [FSCN 5122](#) is taken, [FSCN 5123](#) must also be taken

[FSCN 5122](#) - Food Fermentations and Biotechnology (2.0 cr)

[FSCN 5123](#) - Molecular Biology for Applied Scientists (1.0 cr)

### Food Science Elective

Take at least 3 additional FSCN credits, in consultation with the adviser.

[FSCN 5xxx](#)

or [FSCN 8xxx](#)

### General Elective

Choose remaining credits in consultation with the adviser to meet minimum credit requirements.

### Plan Options

#### Plan A

Take 10 master's thesis credits.

[FSCN 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

Plan B students do not have additional requirements.



### ***Twin Cities Campus***

## **Food Science Minor**

*Food Science & Nutrition*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Food Science and Nutrition, 225 Food Science and Nutrition Building, 1334 Eckles Avenue, Saint Paul, MN 55108 (612-624-6753; fax: 612-625-5272)

Email: [fsgrad@umn.edu](mailto:fsgrad@umn.edu)

Website: <http://fscn.cfans.umn.edu/education/foodsciencegraduate/index.htm>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Food science applies scientific principles to the manufacture, distribution, marketing, and consumer aspects of food. Food scientists apply the basic principles and techniques of many disciplines, including chemistry, physics, microbiology, and nutrition, to food processing and preservation, new product development, and food marketing. Food scientists are concerned with the theoretical and practical aspects of the food chain, from the production of raw materials to the use of food products by consumers. Students may emphasize the chemistry, engineering, microbiology, nutrition, or technology of food products.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Food Science director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

All courses graded both A/F and S/N must be taken on the A/F grade basis, with a minimum grade of B-, to be applied to the minor.

#### **Course Requirements (9 credits)**

All students take the following courses:

[FSCN 4112](#) - Food Chemistry and Functional Foods (3.0 cr)

[FSCN 4121](#) - Food Microbiology (3.0 cr)

[FSCN 4332](#) - Food Processing Operations (3.0 cr)

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.





Masters

Doctoral

**Additional Coursework (3 credits)**

Doctoral students select at least 3 additional credits, in consultation with the Food Science director of graduate studies, to complete the 12-credit minimum

FSCN 5xxx  
FSCN 8xxx



### **Twin Cities Campus**

## **Food Science Ph.D.**

*Food Science & Nutrition*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Food Science and Nutrition, 225 Food Science and Nutrition Building, 1334 Eckles Avenue, Saint Paul, MN 55108 (612-624-6753; fax: 612-625-5272)

Email: [fsgrad@umn.edu](mailto:fsgrad@umn.edu)

Website: [http://fscn.cfans.umn.edu/graduate\\_programs/foodsciencegraduate/index.htm](http://fscn.cfans.umn.edu/graduate_programs/foodsciencegraduate/index.htm)

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Food science applies scientific principles to the manufacture, distribution, marketing, and consumer aspects of food. Food scientists apply the basic principles and techniques of many disciplines, including chemistry, physics, microbiology, and nutrition, to food processing and preservation, new product development, and food marketing. Food scientists are concerned with the theoretical and practical aspects of the food chain, from the production of raw materials to the use of food products by consumers. Students may emphasize the chemistry, engineering, microbiology, nutrition, or technology of food products.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants to the program need a bachelor's degree in any field or its international equivalent along with demonstrated research ability such as a MS degree or publications.

Other requirements to be completed before admission:

The minimum requirements are general chemistry with laboratory, organic chemistry with laboratory, physics with laboratory, biology with laboratory, and calculus. If preparation appears inadequate, certain additional courses may be required after admission. Graduate Record Examination (GRE) General Test scores, and the TOEFL (for international students) are also required.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

All students must participate as teaching assistants during their graduate career.

### Required Courses

All students must take the following courses

[FSCN 4112](#) - Food Chemistry and Functional Foods (3.0 cr)

[FSCN 4121](#) - Food Microbiology (3.0 cr)

[FSCN 4332](#) - Food Processing Operations (3.0 cr)

[FSCN 8318](#) - Current Issues in Food Science (2.0 cr)

[FSCN 5131](#) - Food Quality for Graduate Credit (3.0 cr)

### Course Options

Students must choose one of the following courses.

[FSCN 5122](#) - Food Fermentations and Biotechnology (2.0 cr)

[FSCN 5312](#) - Food Analysis (4.0 cr)

### General Elective

Students must take at least three (3) credits at the 5xxx or 8xxx level in addition to the courses listed above.

### Elective Courses

Students complete additional 5xxx and 8xxx level FSCN courses, in consultation with their advisor, to total at least 24 credits.

FSCN 5xxx

FSCN 8xxx

### Thesis Credits

Food Science PhD students must take 24 thesis credits.

[FSCN 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Land and Atmospheric Science M.S.**

*Soil, Water, & Climate*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Soil, Water, and Climate, 439 Borlaug Hall, 1991 Upper Buford Circle, St. Paul, MN 55108 (612-625-5251; fax: 612-625-2208)

Email: [kjarcho@umn.edu](mailto:kjarcho@umn.edu)

Website: <http://www.laas.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Land and atmospheric science (LAAS) is a science-based interdisciplinary program focused on the fundamentals of Earth system processes related to land and atmosphere and their coupled interactions. Students have the option to develop a program based on one of the more traditional areas in atmospheric science or soil science or to design their own interdisciplinary course of study bridging the two disciplines. The land and atmospheric science graduate program has no formal tracks or emphasis areas, but instead allows students to design a curriculum that addresses their interests within the scope of the program. This multidisciplinary program encompasses aspects of chemistry, physics, biology, atmospheric sciences, and geology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

BS degree in a related field of science, or a graduate or professional degree.

### **Required prerequisites**

#### **Basic Sciences**

Students are expected to have taken a minimum of four of the following courses (or their equivalent).

**MATH 1271** - Calculus I [MATH] (4.0 cr)

or **MATH 1142** - Short Calculus [MATH] (4.0 cr)

or **MATH 2243** - Linear Algebra and Differential Equations (4.0 cr)

**PHYS 1101W** - Introductory College Physics I [PHYS, WI] (4.0 cr)

**PHYS 1102W** - Introductory College Physics II [PHYS, WI] (4.0 cr)

or **ESPM 3131** - Environmental Physics (3.0 cr)

or **BIOL 1009** - General Biology [BIOL] (4.0 cr)

or **CHEM 1061** - Chemical Principles I [PHYS] (3.0 cr)

**CHEM 1065** - Chemical Principles I Laboratory [PHYS] (1.0 cr)

**CHEM 1062** - Chemical Principles II [PHYS] (3.0 cr)

**CHEM 1066** - Chemical Principles II Laboratory [PHYS] (1.0 cr)

or **STAT 3011** - Introduction to Statistical Analysis [MATH] (4.0 cr)

#### **Environmental Sciences**

Students are expected to have taken a minimum of two of the following (or similar) courses:

Take 2 - 6 course(s) from the following:

• **ESPM 1011** - Issues in the Environment [ENV] (3.0 cr)

• **ESPM 1425** - Introduction to Weather and Climate [PHYS, ENV] (4.0 cr)

• **SOIL 2125** - Basic Soil Science [PHYS, ENV] (4.0 cr)

• **ESCI 1001** - Earth and Its Environments [PHYS, ENV] (4.0 cr)



- [ESPM 3612W](#) - Soil and Environmental Biology [WI] (4.0 cr)  
or [MICB 3301](#) - Biology of Microorganisms (5.0 cr)
- [EEB 3407](#) - Ecology (3.0 cr)

Other requirements to be completed before admission:

Student course admission prerequisites are as shown below. Students who are admitted with deficiencies would be provided with a list of courses they are required to take before the completion of their degree. This list would be developed by the directors of graduate studies in consultation with the student's faculty advisor.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 20 major credits and 10 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project typically consists of a technical paper of a topic and length acceptable to the student's advisory committee.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

Use of 4xxx-level courses requires advisor and director of graduate studies approval.

### Core Courses

Take the following courses:

- [LAAS 5050](#) - Integrated Topics in Land & Atmospheric Science (3.0 cr)
- [LAAS 8128](#) - Land and Atmospheric Science Seminar (1.5 cr)
- [SOIL 8123](#) - Research Ethics in the Plant and Environmental Sciences (0.5 cr)

### LAAS and Related Courses

Plan A students must select at least 15 credits (9 major credits and 6 related fields) from this list, and Plan B students must select at least 25 credits (15 major credits and 10 related fields). Courses are selected based on relevance to research interests and with the consent of the advisor.

Take 15 - 25 credit(s) from the following:

- [LAAS 5311](#) - Soil Chemistry and Mineralogy (3.0 cr)
- [LAAS 5416](#) - Precision Agriculture and Nutrient Management (3.0 cr)
- [LAAS 5425](#) - Atmospheric Processes I: Thermodynamics and Dynamics of the Atmosphere (3.0 cr)
- [LAAS 5426](#) - Atmospheric Processes II: Radiation, Composition, and Climate (3.0 cr)
- [LAAS 5480](#) - Special Topics in Land and Atmospheric Science (1.0 - 4.0 cr)
- [LAAS 5515](#) - Soil Formation: Earth Surface Processes and Biogeochemistry (3.0 cr)



- LAAS 5621 - Soil and Environmental Genomics (3.0 cr)
- LAAS 8195 - Research Problems in Soils (1.0 - 5.0 cr)
- AGRO 5121 - Applied Experimental Design (4.0 cr)
- AGRO 5321 - Ecology of Agricultural Systems (3.0 cr)
- BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)
- BBE 5608 - Environmental and Industrial Microbiology (3.0 cr)
- CEGE 4502 - Water and Wastewater Treatment (3.0 cr)
- CEGE 4562 - Environmental Remediation Technologies (3.0 cr)
- CEGE 5180 - Special Topics (1.0 - 4.0 cr)
- CEGE 5511 - Urban Hydrology and Water Quality (4.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)
- CEGE 5543 - Introductory Environmental Fluid Mechanics (4.0 cr)
- CEGE 5551 - Environmental Microbiology (3.0 cr)
- CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)
- CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)
- CEGE 8503 - Environmental Mass Transport (4.0 cr)
- CEGE 8506 - Stochastic Hydrology (4.0 cr)
- CEGE 8521 - The Atmospheric Boundary Layer (4.0 cr)
- CEGE 8541 - Aquatic Chemistry (3.0 cr)
- CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)
- CEGE 8551 - Environmental Microbiology: Molecular Theory and Methods (4.0 cr)
- CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)
- CEGE 8562 - Analysis and Modeling of Aquatic Environments II (3.0 cr)
- CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)
- EEB 4068 - Plant Physiological Ecology (3.0 cr)
- EEB 4611 - Biogeochemical Processes (3.0 cr)
- EEB 5053 - Ecology: Theory and Concepts (4.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5605 - Limnology Laboratory (2.0 cr)
- ESCI 5102 - Climate Change and Human History (3.0 cr)
- ESCI 5351 - Geochemical Modeling of Aqueous Systems (3.0 cr)
- ESCI 5402 - Science and Politics of Global Warming (3.0 cr)
- ESCI 8401 - Aqueous Environmental Geochemistry (3.0 cr)
- ESCI 8801 - Geomicrobiology (3.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5402 - Biometeorology (3.0 cr)
- ESPM 5601 - Principles of Waste Management (3.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5153 - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FW 8459 - Stream and River Ecology (3.0 cr)
- GEOG 5401 - Geography of Environmental Systems and Global Change (3.0 cr)
- GEOG 5426 - Climatic Variations (3.0 cr)
- GEOG 5531 - Numerical Spatial Analysis (4.0 cr)
- GEOG 5839 - Introduction to Dendrochronology (3.0 cr)
- GEOG 5562 - GIS Development Practicum (3.0 cr)
- GEOG 8270 - Seminar: Climatology (3.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- PMB 4111 - Microbial Physiology and Diversity (3.0 cr)
- PMB 5412 - Plant Physiology (3.0 cr)
- PLPA 8103 - Plant-Microbe Interactions (3.0 cr)
- PUBH 6100 - Topics: Environmental Health (1.0 - 4.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- SAGR 8010 - Colloquium in Sustainable Agriculture (2.0 cr)
- SOIL 5232 - Vadose Zone Hydrology (3.0 cr)
- SOIL 5555 - Wetland Soils (3.0 cr)
- SOIL 5611 - Soil Biology and Fertility (4.0 cr)
- SOIL 8252 - Advanced Soil Physics (2.0 cr)
- SOIL 8510 - Advanced Topics in Pedology (2.0 - 4.0 cr)
- SOIL 8541 - Aquatic and Soil Chemistry (3.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)



- [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- [STAT 5303](#) - Designing Experiments (4.0 cr)
- [WRS 5101](#) - Water Policy (3.0 cr)

**Plan Options**

**Plan A**

Take 10 master's thesis credits.

[LAAS 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Land and Atmospheric Science Minor**

*Soil, Water, & Climate*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Soil, Water, and Climate, 439 Borlaug Hall, 1991 Upper Buford Circle, St. Paul, MN 55108 (612-625-5251; fax: 612-625-2208)

Email: [kjarcho@umn.edu](mailto:kjarcho@umn.edu)

Website: <http://www.laas.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Land and atmospheric science (LAAS) is a science-based interdisciplinary program focused on the fundamentals of Earth system processes related to land and atmosphere and their coupled interactions. Students have the option to develop a program based on one of the more traditional areas in atmospheric science or soil science or to design their own interdisciplinary course of study bridging the two disciplines. The Land and Atmospheric Science graduate program has no formal tracks or emphasis areas, but instead allows students to design a curriculum that addresses their interests within the scope of the program. This multidisciplinary program encompasses aspects of chemistry, physics, biology, atmospheric sciences, and geology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

B.S. degree in a related science field.

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Land and Atmospheric Science director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

All minor courses must be taken A-F, unless approved by the Graduate Advisory Committee, or if they are offered on the S-N basis only. Courses for use in the minor must be selected with the consultation of the LAAS graduate faculty member serving as the minor advisor and approved by the LAAS director of graduate studies.

### **Required Course (3 credits)**

Take the following course:

[LAAS 5050](#) - Integrated Topics in Land & Atmospheric Science (3.0 cr)





### Electives (6 to 9 credits)

Masters students select 6 credits, and doctoral students select 9 credits to complete minimum credit requirements. Other courses can be applied to this requirement with approval of the LAAS advisor and LAAS director of graduate studies.

[LAAS 5051](#) - Thesis Proposal Writing for Land & Atmospheric Science (2.0 cr)

[LAAS 5311](#) - Soil Chemistry and Mineralogy (3.0 cr)

[LAAS 5416](#) - Precision Agriculture and Nutrient Management (3.0 cr)

[LAAS 5425](#) - Atmospheric Processes I: Thermodynamics and Dynamics of the Atmosphere (3.0 cr)

[LAAS 5426](#) - Atmospheric Processes II: Radiation, Composition, and Climate (3.0 cr)

[LAAS 5515](#) - Soil Formation: Earth Surface Processes and Biogeochemistry (3.0 cr)

[LAAS 5621](#) - Soil and Environmental Genomics (3.0 cr)

[LAAS 8128](#) - Land and Atmospheric Science Seminar (1.5 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Land and Atmospheric Science Ph.D.**

*Soil, Water, & Climate*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Soil, Water, and Climate, 439 Borlaug Hall, 1991 Upper Buford Circle, St. Paul, MN 55108 (612-625-5251; fax: 612-625-2208)

Email: [laas@umn.edu](mailto:laas@umn.edu)

Website: <http://www.laas.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 50
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Land and atmospheric science (LAAS) is a science-based interdisciplinary program focused on the fundamentals of Earth system processes related to land and atmosphere and their coupled interactions. Students have the option to develop a program based on one of the more traditional areas in atmospheric science or soil science or to design their own interdisciplinary course of study bridging the two disciplines. The Land and atmospheric science graduate program has no formal tracks or emphasis areas, but instead allows students to design a curriculum that addresses their interests within the scope of the program. This multidisciplinary program encompasses aspects of chemistry, physics, biology, atmospheric sciences, and geology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

Applicants to the LAAS PhD program are expected to have an MS degree or equivalent in a related field of science.

### **Required prerequisites**

#### **Basic Sciences**

Students are expected to have taken a minimum of four of the following courses (or their equivalent):

- [MATH 1271](#) - Calculus I [MATH] (4.0 cr)
- or [MATH 1142](#) - Short Calculus [MATH] (4.0 cr)
- or [MATH 2243](#) - Linear Algebra and Differential Equations (4.0 cr)
- [PHYS 1101W](#) - Introductory College Physics I [PHYS, WI] (4.0 cr)
- [PHYS 1102W](#) - Introductory College Physics II [PHYS, WI] (4.0 cr)
- or [ESPM 3131](#) - Environmental Physics (3.0 cr)
- or [BIOL 1009](#) - General Biology [BIOL] (4.0 cr)
- or [CHEM 1061](#) - Chemical Principles I [PHYS] (3.0 cr)
- [CHEM 1065](#) - Chemical Principles I Laboratory [PHYS] (1.0 cr)
- [CHEM 1062](#) - Chemical Principles II [PHYS] (3.0 cr)
- [CHEM 1066](#) - Chemical Principles II Laboratory [PHYS] (1.0 cr)
- or [STAT 3011](#) - Introduction to Statistical Analysis [MATH] (4.0 cr)

#### **Environmental Sciences**

Students are expected to have taken a minimum of two of the following (or similar) courses:

Take 2 - 6 course(s) from the following:

- [ESPM 1011](#) - Issues in the Environment [ENV] (3.0 cr)
- [ESPM 1425](#) - Introduction to Weather and Climate [PHYS, ENV] (4.0 cr)
- [SOIL 2125](#) - Basic Soil Science [PHYS, ENV] (4.0 cr)
- [ESCI 1001](#) - Earth and Its Environments [PHYS, ENV] (4.0 cr)



- [ESPM 3612W](#) - Soil and Environmental Biology [WI] (4.0 cr)  
or [MICB 3301](#) - Biology of Microorganisms (5.0 cr)
- [EEB 3407](#) - Ecology (3.0 cr)

Other requirements to be completed before admission:

Students with a BS degree and outstanding scholarship can request direct admission to the LAAS PhD program. Each request will be considered on a case-by-case basis by the Graduate Advisory Committee. Evidence of outstanding scholarship may include: peer-reviewed publications, a pre-doctoral fellowship, a National Science Foundation PhD Fellowship, high GPA/GRE scores, or strong previous research experience. Current MS candidates who exhibit outstanding scholarship may request transfer to a PhD degree program after completion of their first two semesters of coursework.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

16 credits are required in the major.

10 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

### Core Courses

All doctoral students must complete the 10-credit core curriculum.

Take exactly 5 course(s) totaling exactly 10 credit(s) from the following:

- [LAAS 5050](#) - Integrated Topics in Land & Atmospheric Science (3.0 cr)
- [LAAS 8128](#) - Land and Atmospheric Science Seminar (1.5 cr)
- [SOIL 8123](#) - Research Ethics in the Plant and Environmental Sciences (0.5 cr)
- [LAAS 5051](#) - Thesis Proposal Writing for Land & Atmospheric Science (2.0 cr)
- [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)

### LAAS and Related Courses

Choose courses relevant to particular area of research with consent of advisor. Take at least 6 credits from the following list to complete the 16-credit minimum for the major, and at least 10 credits for the supporting program minimum.

Take 16 or more credit(s) from the following:

- [LAAS 5311](#) - Soil Chemistry and Mineralogy (3.0 cr)
- [LAAS 5416](#) - Precision Agriculture and Nutrient Management (3.0 cr)
- [LAAS 5425](#) - Atmospheric Processes I: Thermodynamics and Dynamics of the Atmosphere (3.0 cr)
- [LAAS 5426](#) - Atmospheric Processes II: Radiation, Composition, and Climate (3.0 cr)
- [LAAS 5480](#) - Special Topics in Land and Atmospheric Science (1.0 - 4.0 cr)
- [LAAS 5515](#) - Soil Formation: Earth Surface Processes and Biogeochemistry (3.0 cr)
- [LAAS 5621](#) - Soil and Environmental Genomics (3.0 cr)



- LAAS 8195 - Research Problems in Soils (1.0 - 5.0 cr)
- AGRO 5121 - Applied Experimental Design (4.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)
- AGRO 5321 - Ecology of Agricultural Systems (3.0 cr)
- BBE 5608 - Environmental and Industrial Microbiology (3.0 cr)
- CEGE 4502 - Water and Wastewater Treatment (3.0 cr)
- CEGE 4562 - Environmental Remediation Technologies (3.0 cr)
- CEGE 5180 - Special Topics (1.0 - 4.0 cr)
- CEGE 5511 - Urban Hydrology and Water Quality (4.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)
- CEGE 5543 - Introductory Environmental Fluid Mechanics (4.0 cr)
- CEGE 5551 - Environmental Microbiology (3.0 cr)
- CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)
- CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)
- CEGE 8503 - Environmental Mass Transport (4.0 cr)
- CEGE 8506 - Stochastic Hydrology (4.0 cr)
- CEGE 8541 - Aquatic Chemistry (3.0 cr)
- CEGE 8521 - The Atmospheric Boundary Layer (4.0 cr)
- CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)
- CEGE 8551 - Environmental Microbiology: Molecular Theory and Methods (4.0 cr)
- CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)
- CEGE 8562 - Analysis and Modeling of Aquatic Environments II (3.0 cr)
- CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)
- EEB 4068 - Plant Physiological Ecology (3.0 cr)
- EEB 4611 - Biogeochemical Processes (3.0 cr)
- EEB 5053 - Ecology: Theory and Concepts (4.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5605 - Limnology Laboratory (2.0 cr)
- ESCI 5102 - Climate Change and Human History (3.0 cr)
- ESCI 5351 - Geochemical Modeling of Aqueous Systems (3.0 cr)
- ESCI 5402 - Science and Politics of Global Warming (3.0 cr)
- ESCI 8401 - Aqueous Environmental Geochemistry (3.0 cr)
- GEOG 5562 - GIS Development Practicum (3.0 cr)
- ESCI 8801 - Geomicrobiology (3.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5402 - Biometeorology (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5601 - Principles of Waste Management (3.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5153 - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FW 8459 - Stream and River Ecology (3.0 cr)
- GEOG 5401 - Geography of Environmental Systems and Global Change (3.0 cr)
- GEOG 5426 - Climatic Variations (3.0 cr)
- GEOG 5531 - Numerical Spatial Analysis (4.0 cr)
- GEOG 5839 - Introduction to Dendrochronology (3.0 cr)
- GEOG 8270 - Seminar: Climatology (3.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- PMB 4111 - Microbial Physiology and Diversity (3.0 cr)
- PMB 5412 - Plant Physiology (3.0 cr)
- PLPA 8103 - Plant-Microbe Interactions (3.0 cr)
- PUBH 6100 - Topics: Environmental Health (1.0 - 4.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- SAGR 8010 - Colloquium in Sustainable Agriculture (2.0 cr)
- SOIL 5232 - Vadose Zone Hydrology (3.0 cr)
- SOIL 5555 - Wetland Soils (3.0 cr)
- SOIL 5611 - Soil Biology and Fertility (4.0 cr)
- SOIL 8252 - Advanced Soil Physics (2.0 cr)
- SOIL 8510 - Advanced Topics in Pedology (2.0 - 4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)



- [WRS 5101](#) - Water Policy (3.0 cr)

**Thesis credits**

Take 24 or more credit(s) from the following:

- [LAAS 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Natural Resources Science and Management M.S.**

*Bioproducts and Biosystems Engineering, Fisheries, Wildlife, and Conservation Biology, Forest Resources*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Forest Resources, 116d Green Hall, 1530 Cleveland Avenue N, St. Paul MN 55108 (612-624-7683; fax: 612-625-5212)

Email: [nrsm@umn.edu](mailto:nrsm@umn.edu)

Website: <http://www.nrsm.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students in the natural resources science and management program may emphasize one of the following tracks, or develop an individualized plan of study: 1) forests: biology, ecology, conservation, and management; 2) economics, policy, management, and society; 3) assessment, monitoring, and geospatial analysis; 4) recreation resources, tourism, and environmental education; 5) forest hydrology and watershed management; 6) forest products; or 7) paper science and engineering.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Most admitted students have earned degrees in natural resource-related majors. Applicants with exceptional academic records but no related background are eligible; if admitted, they may complete the prerequisites for advanced courses during the early stages of their graduate program. These prerequisites will vary depending upon the student's track and major advisor.

Applicants will not be admitted unless a member of the program faculty agrees to advise them ahead of time. This decision depends on admissibility (the applicant's overall credentials), mutual research interests, and the faculty member's ability to take on a new student. Some faculty members will not advise students unless they have funding for the student. Applicants are encouraged to review faculty profiles on the program website and begin making contacts prior to and during the application process.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language



Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required.  
**Capstone Project:** Plan B project(s) is(are) designed in consultation with the student's advisor and committee. It(They) must develop and demonstrate competence in the student's track. Students must present a seminar on the Plan B project.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

The MS is offered under Plan A (with thesis) and Plan B (without thesis). Plan A students usually design a program to support their specific thesis project. In consultation with faculty members, Plan B students design a program that develops competence in at least one track. Students present a seminar on the thesis or the Plan B project. Specific requirements vary by track and research project; prospective students should contact the director of graduate studies or a prospective faculty advisor for specific information. Students must also receive training in the ethical conduct of research and present a formal seminar to faculty and peers. This presentation is separate from the final exam seminar.

### Required Orientation (1 credit)

[NR 8101](#) - Natural Resources Science and Management Orientation (1.0 cr)

### Required Seminar (1 credit)

[NR 8107](#) - Seminar: Natural Resources Science and Management (1.0 cr)

### Required Coursework Plan A (18 credits)

Students work with committee to develop a program of coursework that meets their needs. Specific tracks & suggested courses are listed below. Students may choose to develop an individualized plan of study from courses listed below.

Courses not on these lists require approval. All courses must be approved by the NRSM Graduate Studies Committee. Plan A students usually design a program to support their specific thesis project. Students present a seminar on their thesis.

#### Thesis for Plan A (10 credits)

[NR 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

### Required Coursework Plan B (28 credits)

Students work with committee to develop a program of coursework that meets their needs. Specific tracks & suggested courses are listed below. Students may choose to develop an individualized plan of study from courses listed below.

Courses not on these lists require approval. All courses must be approved by the NRSM Graduate Studies Committee. Plan B students design a program that develops competence in their chosen field of study.

**Joint- or Dual-degree Coursework:** Law, Science & Technology Student may take a total of 12 credits in common among the academic programs.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Assessment, Monitoring, and Geospatial Analysis

Addresses measurements and related technology applications and resource analysis. Graduate students in this track may choose to specialize in topics such as: geographic information systems (GIS); remote sensing; geospatial analysis; survey design (including forest inventory and monitoring), measurement, modeling; and biometrics. Studies typically focus on landscape, region, or global levels.

### Assessment, Monitoring, and Geospatial Analysis - Suggested Course List

NRSM students in the assessment, monitoring, and geospatial analysis track should refer to this list when enrolling in courses that are appropriate for their area of study. Plan A students must enroll in 19 coursework credits in addition to their seminar requirement and



thesis credits, and Plan B students must enroll in 29 credits in addition to their seminar requirement. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)
- CSCI 5707 - Principles of Database Systems (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- ECON 8201 - Econometric Analysis (2.0 cr)
- ECON 8203 - Econometric Analysis (2.0 cr)
- ECON 8204 - Econometric Analysis (2.0 cr)
- EEB 5068 - Plant Physiological Ecology (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- ENT 5051 - Scientific Illustration of Insects (3.0 cr)
- ENT 5126 - Spatial and Temporal Analysis of Ecological Data (3.0 cr)
- ENT 5920 - Special Lectures in Entomology (1.0 - 4.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESCI 5201 - Time-Series Analysis of Geological Phenomena (3.0 cr)
- ESPM 5014 - Tribal and Indigenous Natural Resource Management (3.0 cr)
- ESPM 5015 - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- ESPM 5071 - Ecological Restoration (4.0 cr)
- ESPM 5108 - Ecology of Managed Systems (4.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5202 - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- ESPM 5261 - Economics and Natural Resources Management (4.0 cr)
- ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)
- ESPM 5555 - Wetland Soils (3.0 cr)
- ESPM 5575 - Wetlands (3.0 cr)
- ESPM 5602 - Regulations and Corporate Environmental Management (3.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)
- ESPM 5604 - Environmental Management Systems and Strategy (3.0 cr)
- ESPM 5605 - Recycling: Extending Raw Materials Supplies (3.0 cr)
- ESPM 5607 - Industrial Biotechnology and the Environment (3.0 cr)
- ESPM 5811 - Environmental Interpretation (3.0 cr)
- FNRM 5101 - Park and Protected Area Tourism (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5216 - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- FNRM 5218 - Measuring and Modeling Forests (3.0 cr)
- FNRM 5228 - Advanced Topics in Assessment and Modeling of Forests (3.0 cr)
- FNRM 5259 - Visitor Behavior Analysis (3.0 cr)





- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FNRM 5264 - Advanced Forest Management Planning (3.0 cr)
- FNRM 5411 - Managing Forest Ecosystems: Silviculture (3.0 cr)
- FNRM 5413 - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)
- FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- FNRM 5471 - Forest Management Planning (3.0 cr)
- FNRM 8101 - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- FNRM 8102 - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- FNRM 8103 - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- FNRM 8104 - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- FNRM 8105 - Research Problems: Silviculture (1.0 - 5.0 cr)
- FNRM 8106 - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- FNRM 8108 - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- FNRM 8201 - Research Problems: Forest Economics (1.0 - 5.0 cr)
- FNRM 8202 - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- FNRM 8203 - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- FNRM 8204 - Research Problems: Forest Policy (1.0 - 5.0 cr)
- FNRM 8205 - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- FNRM 8206 - Research Problems: Forest Management (1.0 - 5.0 cr)
- FNRM 8207 - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- FNRM 8208 - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- FW 8051 - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)
- FW 8200 - Seminar (1.0 - 4.0 cr)
- GCC 5008 - Policy and Science of Global Environmental Change [ENV] (3.0 cr)
- GEOG 5531 - Numerical Spatial Analysis (4.0 cr)
- GEOG 5562 - GIS Development Practicum (3.0 cr)
- GEOG 8260 - Seminar: Physical Geography (2.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- GIS 5571 - ArcGIS I (3.0 cr)
- GIS 5572 - ArcGIS II (3.0 cr)
- GIS 5575 - Practical Surveying for GIS (2.0 cr)
- GIS 5577 - Spatial Database Design and Administration (3.0 cr)
- GIS 5578 - GIS Programming (3.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8102 - Practicum for Future Faculty (3.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- LA 5576 - Ecological Restoration Project Planning and Management (3.0 cr)
- LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)
- LAW 6062 - Energy Law (3.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5503 - Economics of Development (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- PLPA 5003 - Diseases of Forest and Shade Trees (3.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- PUBH 8472 - Spatial Biostatistics (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOIL 5555 - Wetland Soils (3.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5101 - Theory of Statistics I (4.0 cr)
- STAT 5102 - Theory of Statistics II (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)



- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5511 - Time Series Analysis (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)

### Economics, Policy, Management, and Society

For students interested in focusing on how society values and makes decisions about the use, management, and protection of natural and environmental resources. Graduate students in this track can specialize in areas such as: economics, policy, administration and management, planning, operations research, conflict resolution, human dimensions, and land use planning. Studies might consider choices, impacts, and tradeoffs in protecting, restoring, developing, and allocating natural and environmental resources. The research conducted by students in this track may address a wide range of issues and problems from local to international in scope.

### Economics, Policy, Management, and Society - Suggested Course List

NRSM students in the economics, policy, management, and society track should refer to this list when enrolling in courses that are appropriate for their area of study. Plan A students must enroll in 19 coursework credits in addition to their seminar requirement and thesis credits, and Plan B students must enroll in 29 credits in addition to their seminar requirement. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 5151 - Applied Microeconomics: Firm and Household (3.0 cr)
- APEC 5152 - Applied Macroeconomics: Income and Employment (3.0 cr)
- APEC 5321 - Regional Economic Analysis (3.0 cr)
- APEC 5721 - Economics of Science and Technology Policy (3.0 cr)
- APEC 8004 - Applied Microeconomic Analysis of Social Choice and Welfare (2.0 cr)
- APEC 8202 - Mathematical Optimization in Applied Economics (3.0 cr)
- APEC 8203 - Applied Welfare Economics and Public Policy (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- APEC 8601 - Natural Resource Economics (3.0 cr)
- APEC 8602 - Economics of the Environment (3.0 cr)
- BIOL 5407 - Ecology (3.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CEGE 5570 - Design for Sustainable Development - India (3.0 - 9.0 cr)
- CI 5537 - Principles of Environmental Education (3.0 cr)
- CI 5747 - Global and Environmental Education: Content and Practice (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- COMM 5250 - Environmental Communication (3.0 cr)
- COMM 5402 - Advanced Interpersonal Communication (3.0 cr)
- COMM 5441 - Communication in Human Organizations (3.0 cr)
- COMM 8452 - Seminar: Methods of Intercultural/Diversity Facilitation (3.0 cr)
- CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)
- CSCI 5707 - Principles of Database Systems (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- ECON 8105 - Macroeconomic Theory (2.0 cr)
- ECON 8106 - Macroeconomic Theory (2.0 cr)
- ECON 8201 - Econometric Analysis (2.0 cr)
- ECON 8203 - Econometric Analysis (2.0 cr)
- ECON 8204 - Econometric Analysis (2.0 cr)
- EEB 5068 - Plant Physiological Ecology (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- EEB 8200 - Sustainability Science Distributed Graduate Seminar (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)



- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESPM 5014 - Tribal and Indigenous Natural Resource Management (3.0 cr)
- ESPM 5015 - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- ESPM 5071 - Ecological Restoration (4.0 cr)
- ESPM 5108 - Ecology of Managed Systems (4.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5202 - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- ESPM 5256 - Natural Resource Law and the Management of Public Lands and Waters (3.0 cr)
- ESPM 5261 - Economics and Natural Resources Management (4.0 cr)
- ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)
- ESPM 5555 - Wetland Soils (3.0 cr)
- ESPM 5575 - Wetlands (3.0 cr)
- ESPM 5602 - Regulations and Corporate Environmental Management (3.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)
- ESPM 5604 - Environmental Management Systems and Strategy (3.0 cr)
- ESPM 5605 - Recycling: Extending Raw Materials Supplies (3.0 cr)
- ESPM 5607 - Industrial Biotechnology and the Environment (3.0 cr)
- ESPM 5811 - Environmental Interpretation (3.0 cr)
- FNRM 5101 - Park and Protected Area Tourism (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5216 - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- FNRM 5218 - Measuring and Modeling Forests (3.0 cr)
- FNRM 5228 - Advanced Topics in Assessment and Modeling of Forests (3.0 cr)
- FNRM 5259 - Visitor Behavior Analysis (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FNRM 5264 - Advanced Forest Management Planning (3.0 cr)
- FNRM 5411 - Managing Forest Ecosystems: Silviculture (3.0 cr)
- FNRM 5413 - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)
- FNRM 5431 - Timber Harvesting and Road Planning (2.0 cr)
- FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- FNRM 5471 - Forest Management Planning (3.0 cr)
- FNRM 5501 - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- FNRM 8101 - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- FNRM 8102 - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- FNRM 8103 - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- FNRM 8104 - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- FNRM 8105 - Research Problems: Silviculture (1.0 - 5.0 cr)
- FNRM 8106 - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- FNRM 8108 - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- FNRM 8201 - Research Problems: Forest Economics (1.0 - 5.0 cr)
- FNRM 8202 - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- FNRM 8203 - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- FNRM 8204 - Research Problems: Forest Policy (1.0 - 5.0 cr)
- FNRM 8205 - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- FNRM 8206 - Research Problems: Forest Management (1.0 - 5.0 cr)
- FNRM 8207 - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- FNRM 8208 - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- FW 4001 - Biometry (4.0 cr)
- FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
- FW 8051 - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)



- FW 8200 - Seminar (1.0 - 4.0 cr)
- FW 8494 - Research in Wildlife (1.0 - 4.0 cr)
- GCC 5008 - Policy and Science of Global Environmental Change [ENV] (3.0 cr)
- GEOG 5531 - Numerical Spatial Analysis (4.0 cr)
- GEOG 5561 - Principles of Geographic Information Science (4.0 cr)
- GEOG 5562 - GIS Development Practicum (3.0 cr)
- GEOG 8101 - Proseminar: Nature and Society (3.0 cr)
- GEOG 8260 - Seminar: Physical Geography (2.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- GIS 5571 - ArcGIS I (3.0 cr)
- GIS 5572 - ArcGIS II (3.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8102 - Practicum for Future Faculty (3.0 cr)
- LA 5004 - Regional Environmental Landscape Planning (4.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- LA 5576 - Ecological Restoration Project Planning and Management (3.0 cr)
- LAW 6062 - Energy Law (3.0 cr)
- MGMT 6033 - Managing the Strategy Process (2.0 cr)
- MGMT 6050 - Management of Innovation and Change (2.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)
- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 5611 - Facilitation and Meeting Skills (1.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5011 - Management of Organizations (3.0 cr)
- PA 5021 - Microeconomics for Policy Analysis (3.0 cr)
- PA 5022 - Applications of Economics for Policy Analysis (1.5 - 3.0 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5101 - Management and Governance of Nonprofit Organizations (3.0 cr)
- PA 5122 - Law and Public Affairs (3.0 cr)
- PA 5242 - Environmental Planning, Policy, and Decision Making (3.0 cr)
- PA 5251 - Strategic Planning and Management (3.0 cr)
- PA 5253 - Designing Planning and Participation Processes (3.0 cr)
- PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)
- PA 5311 - Program Evaluation (3.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5503 - Economics of Development (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5721 - Energy Systems and Policy (3.0 cr)
- PA 5722 - Economics of Natural Resource and Environmental Policy (3.0 cr)
- PA 5741 - Risk, Resilience and Decision Making (1.5 cr)
- PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- PA 5890 - Topics in Foreign Policy and International Affairs (1.0 - 5.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- PA 8790 - Advanced Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- PLPA 5003 - Diseases of Forest and Shade Trees (3.0 cr)
- POL 5315 - State Governments: Laboratories of Democracy (3.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5960 - Topics in Psychology (1.0 - 4.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- PUBH 8472 - Spatial Biostatistics (3.0 cr)
- SCO 8735 - Supply Chain Management (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8701 - Sociological Theory (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOIL 5555 - Wetland Soils (3.0 cr)
- SOIL 5611 - Soil Biology and Fertility (4.0 cr)



- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5101 - Theory of Statistics I (4.0 cr)
- STAT 5102 - Theory of Statistics II (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5511 - Time Series Analysis (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)
- WRS 5101 - Water Policy (3.0 cr)

### Forest Hydrology and Watershed Management

Brings together the integrally related areas of earth sciences, soils, and water resources management with an applied focus on wildland ecosystems, which may include the interface of forests with grasslands, wetlands, and agriculture. Graduate students in this track may specialize in areas such as: forest hydrology, water quality, and watershed management. Research would focus on forest, riparian, and wetland ecosystems.

### Forest Hydrology and Watershed Management - Suggested Course List

NRSM students in the forest hydrology and watershed management track should refer to this list when enrolling in courses that are appropriate for their area of study. Plan A students must enroll in 19 coursework credits in addition to their seminar requirement and thesis credits, and Plan B students must enroll in 29 credits in addition to their seminar requirement. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- BBE 5513 - Watershed Engineering (3.0 cr)
- BBE 5523 - Ecological Engineering Design (3.0 cr)
- BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)
- BBE 8013 - Parameter Estimation in Biosystems and Agricultural Engineering (3.0 cr)
- BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CEGE 4501 - Hydrologic Design (4.0 cr)
- CEGE 4512 - Open Channel Hydraulics (4.0 cr)
- CEGE 4522 - Review of Introductory Fluid Mechanics for Graduate Students (3.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 8506 - Stochastic Hydrology (4.0 cr)
- CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)
- CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)
- CEGE 8562 - Analysis and Modeling of Aquatic Environments II (3.0 cr)
- CEGE 8601 - Introduction to Stream Restoration (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- EEB 5053 - Ecology: Theory and Concepts (4.0 cr)
- EEB 5068 - Plant Physiological Ecology (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- EEB 8601 - Introduction to Stream Restoration (3.0 cr)
- EEB 8602 - Stream Restoration Practice (2.0 cr)
- ENT 5126 - Spatial and Temporal Analysis of Ecological Data (3.0 cr)
- ENT 5920 - Special Lectures in Entomology (1.0 - 4.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)



- [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- [ESCI 4401](#) - Aqueous Environmental Geochemistry (3.0 cr)
- [ESCI 4702](#) - General Hydrogeology (4.0 cr)
- [ESCI 4703](#) - Glacial Geology (4.0 cr)
- [ESCI 5201](#) - Time-Series Analysis of Geological Phenomena (3.0 cr)
- [ESPM 4216](#) - Contaminant Hydrology (3.0 cr)
- [ESPM 5015](#) - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- [ESPM 5031](#) - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- [ESPM 5061](#) - Water Quality and Natural Resources (3.0 cr)
- [ESPM 5071](#) - Ecological Restoration (4.0 cr)
- [ESPM 5108](#) - Ecology of Managed Systems (4.0 cr)
- [ESPM 5111](#) - Hydrology and Water Quality Field Methods (3.0 cr)
- [ESPM 5202](#) - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- [ESPM 5211](#) - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- [ESPM 5241](#) - Natural Resource and Environmental Policy (3.0 cr)
- [ESPM 5242](#) - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- [ESPM 5245](#) - Sustainable Land Use Planning and Policy (3.0 cr)
- [ESPM 5251](#) - Natural Resources in Sustainable International Development (3.0 cr)
- [ESPM 5261](#) - Economics and Natural Resources Management (4.0 cr)
- [ESPM 5295](#) - GIS in Environmental Science and Management (4.0 cr)
- [ESPM 5402](#) - Biometeorology (3.0 cr)
- [ESPM 5555](#) - Wetland Soils (3.0 cr)
- [ESPM 5575](#) - Wetlands (3.0 cr)
- [ESPM 5602](#) - Regulations and Corporate Environmental Management (3.0 cr)
- [ESPM 5603](#) - Environmental Life Cycle Analysis (3.0 cr)
- [ESPM 5604](#) - Environmental Management Systems and Strategy (3.0 cr)
- [ESPM 5605](#) - Recycling: Extending Raw Materials Supplies (3.0 cr)
- [ESPM 5811](#) - Environmental Interpretation (3.0 cr)
- [FNRM 5101](#) - Park and Protected Area Tourism (3.0 cr)
- [FNRM 5104](#) - Forest Ecology (4.0 cr)
- [FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)
- [FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- [FNRM 5153](#) - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)
- [FNRM 5203](#) - Forest Fire and Disturbance Ecology (3.0 cr)
- [FNRM 5204](#) - Landscape Ecology and Management (3.0 cr)
- [FNRM 5216](#) - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- [FNRM 5218](#) - Measuring and Modeling Forests (3.0 cr)
- [FNRM 5232](#) - Managing Recreational Lands (4.0 cr)
- [FNRM 5259](#) - Visitor Behavior Analysis (3.0 cr)
- [FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- [FNRM 5264](#) - Advanced Forest Management Planning (3.0 cr)
- [FNRM 5362](#) - Drones: Data, Analysis, and Operations (3.0 cr)
- [FNRM 5411](#) - Managing Forest Ecosystems: Silviculture (3.0 cr)
- [FNRM 5413](#) - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)
- [FNRM 5431](#) - Timber Harvesting and Road Planning (2.0 cr)
- [FNRM 5462](#) - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- [FNRM 5471](#) - Forest Management Planning (3.0 cr)
- [FNRM 5480](#) - Topics in Natural Resources (1.0 - 3.0 cr)
- [FNRM 8101](#) - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- [FNRM 8102](#) - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- [FNRM 8103](#) - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- [FNRM 8104](#) - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- [FNRM 8105](#) - Research Problems: Silviculture (1.0 - 5.0 cr)
- [FNRM 8106](#) - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- [FNRM 8201](#) - Research Problems: Forest Economics (1.0 - 5.0 cr)
- [FNRM 8202](#) - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- [FNRM 8203](#) - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- [FNRM 8204](#) - Research Problems: Forest Policy (1.0 - 5.0 cr)
- [FNRM 8205](#) - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- [FNRM 8206](#) - Research Problems: Forest Management (1.0 - 5.0 cr)
- [FNRM 8207](#) - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- [FNRM 8208](#) - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- [FW 8051](#) - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)
- [GCC 5008](#) - Policy and Science of Global Environmental Change [ENV] (3.0 cr)



- GEOG 8260 - Seminar: Physical Geography (2.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- GIS 5577 - Spatial Database Design and Administration (3.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)
- LAAS 5416 - Precision Agriculture and Nutrient Management (3.0 cr)
- LAAS 5426 - Atmospheric Processes II: Radiation, Composition, and Climate (3.0 cr)
- LAAS 5515 - Soil Formation: Earth Surface Processes and Biogeochemistry (3.0 cr)
- LAW 6062 - Energy Law (3.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5503 - Economics of Development (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- PLPA 5003 - Diseases of Forest and Shade Trees (3.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOIL 5232 - Vadose Zone Hydrology (3.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)
- WRS 5101 - Water Policy (3.0 cr)

### Forest Products

For students who wish to specialize in areas such as: wood and fiber as raw materials; deterioration of wood; wood mechanics and structural design; wood moisture interactions and drying; processing and performance of composites; economics of manufacturing systems; technology and processing of solid wood products; marketing, design, and production of housing components; and energy-efficient building construction.

### Forest Products - Suggested Course List

NRSM students in the forest products track should refer to this list when enrolling in courses that are appropriate for their area of study. Plan A students must enroll in 19 coursework credits in addition to their seminar requirement and thesis credits, and Plan B students must enroll in 29 credits in addition to their seminar requirement. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- BBE 5001 - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)



- BBE 5023 - Process Control and Instrumentation (3.0 cr)
- BBE 5301 - Applied Surface and Colloid Science (3.0 cr)
- BBE 5302 - Biodegradation of Bioproducts (3.0 cr)
- BBE 5303 - Introduction to Bio-based Materials Science (3.0 cr)
- BBE 5401 - Bioproducts Separation and Purification Processes (3.0 cr)
- BBE 5402 - Bio-based Products Engineering Lab II (2.0 cr)
- BBE 5403 - Bio-based Products Engineering Lab I (2.0 cr)
- BBE 5404 - Biopolymers and Biocomposites Engineering (3.0 cr)
- BBE 5608 - Environmental and Industrial Microbiology (3.0 cr)
- BBE 5713 - Biological Process Engineering (3.0 cr)
- BBE 5733 - Renewable Energy Technologies (3.0 cr)
- BBE 8001 - Seminar I (1.0 cr)
- BBE 8002 - Seminar II (1.0 cr)
- BBE 8013 - Parameter Estimation in Biosystems and Agricultural Engineering (3.0 cr)
- CHEM 4214 - Polymers (3.0 cr)
- CHEM 4221 - Introduction to Polymer Chemistry (3.0 cr)
- CHEM 5210 - Materials Characterization (4.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- ENTR 6041 - Initiating New Product Design and Business Development (2.0 - 4.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5202 - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5261 - Economics and Natural Resources Management (4.0 cr)
- ESPM 5575 - Wetlands (3.0 cr)
- ESPM 5602 - Regulations and Corporate Environmental Management (3.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)
- ESPM 5605 - Recycling: Extending Raw Materials Supplies (3.0 cr)
- FNRM 5101 - Park and Protected Area Tourism (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5216 - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- FNRM 5218 - Measuring and Modeling Forests (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FNRM 5264 - Advanced Forest Management Planning (3.0 cr)
- FNRM 5362 - Drones: Data, Analysis, and Operations (3.0 cr)
- FNRM 5411 - Managing Forest Ecosystems: Silviculture (3.0 cr)
- FNRM 5413 - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)
- FNRM 5431 - Timber Harvesting and Road Planning (2.0 cr)
- FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- FNRM 5471 - Forest Management Planning (3.0 cr)
- FNRM 5480 - Topics in Natural Resources (1.0 - 3.0 cr)
- FNRM 5501 - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- FNRM 8101 - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- FNRM 8102 - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- FNRM 8103 - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- FNRM 8104 - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- FNRM 8105 - Research Problems: Silviculture (1.0 - 5.0 cr)
- FNRM 8106 - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- FNRM 8108 - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- FNRM 8201 - Research Problems: Forest Economics (1.0 - 5.0 cr)
- FNRM 8202 - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- FNRM 8203 - Research Problems: Forest Recreation (1.0 - 5.0 cr)





- FNRM 8204 - Research Problems: Forest Policy (1.0 - 5.0 cr)
- FNRM 8205 - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- FNRM 8206 - Research Problems: Forest Management (1.0 - 5.0 cr)
- FNRM 8207 - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- FNRM 8208 - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SSM 5414 - Advanced Residential Building Science (4.0 cr)
- SSM 5416 - Building Testing & Diagnostics (2.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)

#### Forests: Biology, Ecology, Conservation, and Management

Focuses on forest resources and allows students to choose from specializations in the following areas: forest biology, ecology, ecophysiology; genetics and tree improvement; tree physiology; reproductive biology and forest regeneration; forest growth and vegetation dynamics; timber harvesting, silviculture, and sustainable forest management; landscape ecology, restoration, and management; conservation of biodiversity and wildlife habitat management; forest health; disturbance (including fire) ecology; urban and community forestry; and agroforestry. Research normally focuses on forest and related ecosystems.

#### Forests: Biology, Ecology, Conservation, and Management - Suggested Course List

NRSM students in the forests: biology, ecology, conservation, and management track should refer to this list when enrolling in courses that are appropriate for their area of study. Plan A students must enroll in 19 coursework credits in addition to their seminar requirement and thesis credits, and Plan B students must enroll in 29 credits in addition to their seminar requirement. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- BBE 5001 - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)
- BBE 5302 - Biodegradation of Bioproducts (3.0 cr)
- BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- EEB 4609W - Ecosystem Ecology [ENV, WI] (3.0 cr)
- EEB 5068 - Plant Physiological Ecology (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)



- [EEB 8200](#) - Sustainability Science Distributed Graduate Seminar (3.0 cr)
- [ENT 4251](#) - Forest and Shade Tree Entomology (3.0 cr)
- [ENT 5051](#) - Scientific Illustration of Insects (3.0 cr)
- [ENT 5126](#) - Spatial and Temporal Analysis of Ecological Data (3.0 cr)
- [ENT 5920](#) - Special Lectures in Entomology (1.0 - 4.0 cr)
- [EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)
- [EPSY 5244](#) - Survey Design, Sampling, and Implementation (3.0 cr)
- [EPSY 5247](#) - Qualitative Methods in Educational Psychology (3.0 cr)
- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- [EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)
- [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- [ESCI 5201](#) - Time-Series Analysis of Geological Phenomena (3.0 cr)
- [ESPM 5015](#) - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- [ESPM 5061](#) - Water Quality and Natural Resources (3.0 cr)
- [ESPM 5071](#) - Ecological Restoration (4.0 cr)
- [ESPM 5108](#) - Ecology of Managed Systems (4.0 cr)
- [ESPM 5202](#) - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- [ESPM 5211](#) - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- [ESPM 5242](#) - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- [ESPM 5245](#) - Sustainable Land Use Planning and Policy (3.0 cr)
- [ESPM 5251](#) - Natural Resources in Sustainable International Development (3.0 cr)
- [ESPM 5256](#) - Natural Resource Law and the Management of Public Lands and Waters (3.0 cr)
- [ESPM 5295](#) - GIS in Environmental Science and Management (4.0 cr)
- [ESPM 5555](#) - Wetland Soils (3.0 cr)
- [ESPM 5603](#) - Environmental Life Cycle Analysis (3.0 cr)
- [ESPM 5604](#) - Environmental Management Systems and Strategy (3.0 cr)
- [FNRM 5101](#) - Park and Protected Area Tourism (3.0 cr)
- [FNRM 5104](#) - Forest Ecology (4.0 cr)
- [FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)
- [FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- [FNRM 5153](#) - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)
- [FNRM 5203](#) - Forest Fire and Disturbance Ecology (3.0 cr)
- [FNRM 5204](#) - Landscape Ecology and Management (3.0 cr)
- [FNRM 5205](#) - Productivity and Ecology of Forest Soils (3.0 cr)
- [FNRM 5216](#) - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- [FNRM 5218](#) - Measuring and Modeling Forests (3.0 cr)
- [FNRM 5232](#) - Managing Recreational Lands (4.0 cr)
- [FNRM 5259](#) - Visitor Behavior Analysis (3.0 cr)
- [FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- [FNRM 5264](#) - Advanced Forest Management Planning (3.0 cr)
- [FNRM 5362](#) - Drones: Data, Analysis, and Operations (3.0 cr)
- [FNRM 5411](#) - Managing Forest Ecosystems: Silviculture (3.0 cr)
- [FNRM 5413](#) - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)
- [FNRM 5431](#) - Timber Harvesting and Road Planning (2.0 cr)
- [FNRM 5462](#) - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- [FNRM 5471](#) - Forest Management Planning (3.0 cr)
- [FNRM 5480](#) - Topics in Natural Resources (1.0 - 3.0 cr)
- [FNRM 5501](#) - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- [FNRM 8101](#) - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- [FNRM 8102](#) - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- [FNRM 8103](#) - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- [FNRM 8104](#) - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- [FNRM 8105](#) - Research Problems: Silviculture (1.0 - 5.0 cr)
- [FNRM 8106](#) - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- [FNRM 8108](#) - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- [FNRM 8201](#) - Research Problems: Forest Economics (1.0 - 5.0 cr)
- [FNRM 8202](#) - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- [FNRM 8203](#) - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- [FNRM 8204](#) - Research Problems: Forest Policy (1.0 - 5.0 cr)
- [FNRM 8205](#) - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- [FNRM 8206](#) - Research Problems: Forest Management (1.0 - 5.0 cr)
- [FNRM 8207](#) - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- [FNRM 8208](#) - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)



- FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
- FW 5603W - Habitats and Regulation of Wildlife [WI] (3.0 cr)
- FW 8051 - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)
- FW 8200 - Seminar (1.0 - 4.0 cr)
- FW 8452 - Conservation Biology (3.0 cr)
- GCC 5008 - Policy and Science of Global Environmental Change [ENV] (3.0 cr)
- GEOG 5426 - Climatic Variations (3.0 cr)
- GEOG 5839 - Introduction to Dendrochronology (3.0 cr)
- GEOG 8260 - Seminar: Physical Geography (2.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- HORT 5071 - Ecological Restoration (4.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- LA 5576 - Ecological Restoration Project Planning and Management (3.0 cr)
- LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)
- LAW 6062 - Energy Law (3.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5503 - Economics of Development (3.0 cr)
- PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- PLPA 5003 - Diseases of Forest and Shade Trees (3.0 cr)
- PLPA 5480 - Principles of Plant Pathology (3.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOIL 5611 - Soil Biology and Fertility (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)

### Paper Science and Engineering

Specializes in areas such as: the chemistry and biotechnology of lignocellulosic materials; material science of paper and fiber products; paper recycling; energy and manufacturing efficiency in the pulp and paper-making process; novel and environmentally friendly pulping and bleaching, transport processes through porous media, surface and colloid science of papermaking; chemical engineering applications in pulp and paper processes; and statistical process control.

### Paper Science and Engineering - Suggested Course List

NRSM students in the paper science and engineering track should refer to this list when enrolling in courses that are appropriate for their area of study. Plan A students must enroll in 19 coursework credits in addition to their seminar requirement and thesis credits, and Plan B students must enroll in 29 credits in addition to their seminar requirement. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)



- APEC 8212 - Econometric Analysis II (2.0 cr)
- BBE 5001 - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)
- BBE 5023 - Process Control and Instrumentation (3.0 cr)
- BBE 5301 - Applied Surface and Colloid Science (3.0 cr)
- BBE 5302 - Biodegradation of Bioproducts (3.0 cr)
- BBE 5303 - Introduction to Bio-based Materials Science (3.0 cr)
- BBE 5305 - Pulp and Paper Technology (3.0 cr)
- BBE 5401 - Bioproducts Separation and Purification Processes (3.0 cr)
- BBE 5402 - Bio-based Products Engineering Lab II (2.0 cr)
- BBE 5403 - Bio-based Products Engineering Lab I (2.0 cr)
- BBE 5404 - Biopolymers and Biocomposites Engineering (3.0 cr)
- BBE 5608 - Environmental and Industrial Microbiology (3.0 cr)
- BBE 5713 - Biological Process Engineering (3.0 cr)
- BBE 5733 - Renewable Energy Technologies (3.0 cr)
- BBE 8001 - Seminar I (1.0 cr)
- BBE 8002 - Seminar II (1.0 cr)
- BBE 8013 - Parameter Estimation in Biosystems and Agricultural Engineering (3.0 cr)
- BBE 8300 - Research Problems (1.0 - 10.0 cr)
- CHEM 5210 - Materials Characterization (4.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 8101 - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- FNRM 8102 - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- FNRM 8103 - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- FNRM 8104 - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- FNRM 8105 - Research Problems: Silviculture (1.0 - 5.0 cr)
- FNRM 8106 - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- FNRM 8201 - Research Problems: Forest Economics (1.0 - 5.0 cr)
- FNRM 8202 - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- FNRM 8203 - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- FNRM 8204 - Research Problems: Forest Policy (1.0 - 5.0 cr)
- FNRM 8205 - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- FNRM 8206 - Research Problems: Forest Management (1.0 - 5.0 cr)
- FNRM 8207 - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- FNRM 8208 - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)



- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)

### Recreation Resources, Tourism, and Environmental Education

Focuses on the use and management of natural resources for recreation and tourism. Graduate students in this track may specialize in areas such recreational land management, resource-based tourism, planning for recreation and tourism, and the human dimensions of natural resource uses. Additionally, students may focus on environmental education and leadership for effective communication with diverse publics about natural resources.

### Recreation Resources, Tourism, and Environmental Education - Suggested Course List

NRSM students in the recreation resources, tourism, and environmental education track should refer to this list when enrolling in courses that are appropriate for their area of study. Plan A students must enroll in 19 coursework credits in addition to their seminar requirement and thesis credits, and Plan B students must enroll in 29 credits in addition to their seminar requirement. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 4311 - Tourism Development: Principles, Processes, Policies (3.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CI 5537 - Principles of Environmental Education (3.0 cr)
- CI 5747 - Global and Environmental Education: Content and Practice (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- EEB 5053 - Ecology: Theory and Concepts (4.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- ENT 5920 - Special Lectures in Entomology (1.0 - 4.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESPM 5015 - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- ESPM 5071 - Ecological Restoration (4.0 cr)
- ESPM 5108 - Ecology of Managed Systems (4.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5202 - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- ESPM 5261 - Economics and Natural Resources Management (4.0 cr)
- ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)
- ESPM 5555 - Wetland Soils (3.0 cr)
- ESPM 5575 - Wetlands (3.0 cr)
- ESPM 5602 - Regulations and Corporate Environmental Management (3.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)
- ESPM 5604 - Environmental Management Systems and Strategy (3.0 cr)



- ESPM 5605 - Recycling: Extending Raw Materials Supplies (3.0 cr)
- ESPM 5811 - Environmental Interpretation (3.0 cr)
- FNRM 5101 - Park and Protected Area Tourism (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5216 - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- FNRM 5218 - Measuring and Modeling Forests (3.0 cr)
- FNRM 5232 - Managing Recreational Lands (4.0 cr)
- FNRM 5259 - Visitor Behavior Analysis (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FNRM 5264 - Advanced Forest Management Planning (3.0 cr)
- FNRM 5362 - Drones: Data, Analysis, and Operations (3.0 cr)
- FNRM 5411 - Managing Forest Ecosystems: Silviculture (3.0 cr)
- FNRM 5431 - Timber Harvesting and Road Planning (2.0 cr)
- FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- FNRM 5471 - Forest Management Planning (3.0 cr)
- FNRM 5480 - Topics in Natural Resources (1.0 - 3.0 cr)
- FNRM 5501 - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- FNRM 8101 - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- FNRM 8102 - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- FNRM 8103 - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- FNRM 8104 - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- FNRM 8105 - Research Problems: Silviculture (1.0 - 5.0 cr)
- FNRM 8106 - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- FNRM 8108 - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- FNRM 8201 - Research Problems: Forest Economics (1.0 - 5.0 cr)
- FNRM 8202 - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- FNRM 8203 - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- FNRM 8204 - Research Problems: Forest Policy (1.0 - 5.0 cr)
- FNRM 8205 - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- FNRM 8206 - Research Problems: Forest Management (1.0 - 5.0 cr)
- FNRM 8207 - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- FNRM 8208 - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- LA 5576 - Ecological Restoration Project Planning and Management (3.0 cr)
- LS 5950 - Special Topics (1.0 - 4.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)
- OLPD 5502 - Theory and Models of Evaluation (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 5611 - Facilitation and Meeting Skills (1.0 cr)
- PA 4101 - Nonprofit Management and Governance (3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5011 - Management of Organizations (3.0 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5111 - Financing Public and Nonprofit Organizations (3.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5503 - Economics of Development (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5960 - Topics in Psychology (1.0 - 4.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)



- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8701 - Sociological Theory (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)



### **Twin Cities Campus**

## **Natural Resources Science and Management Minor**

*Bioproducts and Biosystems Engineering, Fisheries, Wildlife, and Conservation Biology, Forest Resources*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Forest Resources, 116d Green Hall, 1530 Cleveland Avenue N., St. Paul MN 55108 (612-624-7683)

Email: [nrsm@umn.edu](mailto:nrsm@umn.edu)

Website: <http://www.nrsm.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students in the Natural Resources Science and Management Program normally emphasize one of the following tracks: 1) Forests: Biology, Ecology, Conservation, and Management; 2) Economics, Policy, Management, and Society; 3) Assessment, Monitoring, and Geospatial Analysis; 4) Recreation Resources, Tourism, and Environmental Education; 5) Forest Hydrology and Watershed Management; 6) Forest Products; or 7) Paper Science and Engineering.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Students majoring in other programs who wish to declare a minor in Natural Resources Science and Management must file a proposal with the NRSRM program office.

The NRSRM program does not require specific courses for completion of the minor. Rather, the student should work in consultation with their major advisor(s) and with the NRSRM faculty member who will serve on the student's examination committee as the representative of the program minor.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **Minor Requirements**

The NRSRM program does not require specific courses for completion of this minor. The minor requires at least 8 credits of graduate-level courses to be chosen in consultation with the student's major advisor and the NRSRM faculty member who will serve on the student's examination committee as the minor program representative.

The proposed coursework will be reviewed by NRSRM's Director of Graduate Studies and must be approved before the student can submit their Graduate Degree Plan.





Doctoral

**Requirements**

The NRSM program does not require specific courses for completion of this minor. The minor requires at least 12 credits of graduate-level courses to be chosen in consultation with the student's major advisor and the NRSM faculty member who will serve on the student's examination committee as the minor program representative.

The proposed coursework will be reviewed by NRSM's Director of Graduate Studies and must be approved before the student can submit their Graduate Degree Plan.



### *Twin Cities Campus*

## Natural Resources Science and Management Ph.D.

*Forest Resources*

### College of Food, Agricultural and Natural Resource Sciences

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Forest Resources, 116d Green Hall, 1530 Cleveland Avenue N, St. Paul MN 55108 (612-624-7683; fax: 612-625-5212)

Email: [nrsm@umn.edu](mailto:nrsm@umn.edu)

Website: <http://www.nrsm.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 59 to 72
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students in the natural resources science and management (NRSM) PhD program may emphasize one of the following tracks, or develop an individualized plan of study: 1) forests: biology, ecology, conservation, and management; 2) economics, policy, management, and society; 3) assessment, monitoring, and geospatial analysis; 4) recreation resources, tourism, and environmental education; 5) forest hydrology and watershed management; 6) forest products; or 7) paper science and engineering.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Most admitted students have earned degrees in natural resource-related majors. Applicants with exceptional academic records but no related background are eligible; if admitted, they may complete the prerequisites for advanced courses during the early stages of their graduate program. These prerequisites will vary depending upon the student's chosen track and major advisor.

Applicants will not be admitted unless a member of the program faculty agrees to advise the student ahead of time. This decision depends on admissibility (the applicant's overall credentials), mutual research interests, and the faculty member's ability to take on a new student. Some faculty members will not advise students unless they have funding for the student. Applicants are encouraged to review faculty profiles on the program website and begin making contacts prior to and during the application process.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

35 to 48 credits are required in the major.  
0 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

The NRSM graduate program will typically expect to see 40 to 48 course credits. If a student enters the program with a relevant master's degree, relevant credits from the prior degree can be transferred in to apply toward the doctoral degree pending advisor, committee, graduate program, and college approval. Normally, a student who enters the doctoral program with a master's degree will complete 30-40 additional credits in the major program. There are no minor courses required, but students have the option of formally declaring a minor.

Students must also receive training in the ethical conduct of research and present a formal seminar to faculty and peers. This presentation is separate from the final exam seminar.

### Required Orientation (1 credit)

[NR 8101](#) - Natural Resources Science and Management Orientation (1.0 cr)

### Required Seminar (1 credit)

[NR 8107](#) - Seminar: Natural Resources Science and Management (1.0 cr)

### Thesis Credits

Take 24 doctoral thesis credits.

[NR 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:** Law, Science & Technology Student may take a total of 12 credits in common among the academic programs.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Assessment, Monitoring, and Geospatial Analysis

Addresses measurements and related technology applications and resource analysis. Graduate students in this track may choose to specialize in topics such as: geographic information systems (GIS); remote sensing; geospatial analysis; survey design (including forest inventory and monitoring), measurement, modeling; and biometrics. Studies typically focus on landscape, region, or global levels.

### Assessment, Monitoring, and Geospatial Analysis - Suggested Course List

NRSM students in the assessment, monitoring, and geospatial analysis track should refer to this list when enrolling in courses that are appropriate for their area of study. Students must enroll in at least 34 credits in addition to their seminar and thesis credit (24 credits of NR 8888) requirements. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- [AGRO 5121](#) - Applied Experimental Design (4.0 cr)
- [APEC 5031](#) - Methods of Economic Data Analysis (3.0 cr)
- [APEC 5032](#) - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- [APEC 8211](#) - Econometric Analysis I (2.0 cr)
- [APEC 8212](#) - Econometric Analysis II (2.0 cr)
- [BIOL 8100](#) - Improvisation for Scientists (1.0 cr)
- [CEGE 5541](#) - Environmental Water Chemistry (3.0 cr)
- [CI 8149](#) - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- [CSCI 5302](#) - Analysis of Numerical Algorithms (3.0 cr)
- [CSCI 5707](#) - Principles of Database Systems (3.0 cr)
- [DES 8103](#) - Qualitative and Mixed Methods Research (3.0 cr)



- ECON 8201 - Econometric Analysis (2.0 cr)
- ECON 8203 - Econometric Analysis (2.0 cr)
- ECON 8204 - Econometric Analysis (2.0 cr)
- EEB 5068 - Plant Physiological Ecology (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- ENT 5920 - Special Lectures in Entomology (1.0 - 4.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESPM 5015 - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- ESPM 5071 - Ecological Restoration (4.0 cr)
- ESPM 5108 - Ecology of Managed Systems (4.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5202 - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- ESPM 5261 - Economics and Natural Resources Management (4.0 cr)
- ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)
- ESPM 5555 - Wetland Soils (3.0 cr)
- ESPM 5575 - Wetlands (3.0 cr)
- ESPM 5602 - Regulations and Corporate Environmental Management (3.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)
- ESPM 5604 - Environmental Management Systems and Strategy (3.0 cr)
- ESPM 5605 - Recycling: Extending Raw Materials Supplies (3.0 cr)
- ESPM 5811 - Environmental Interpretation (3.0 cr)
- FNRM 5101 - Park and Protected Area Tourism (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5216 - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- FNRM 5218 - Measuring and Modeling Forests (3.0 cr)
- FNRM 5228 - Advanced Topics in Assessment and Modeling of Forests (3.0 cr)
- FNRM 5232 - Managing Recreational Lands (4.0 cr)
- FNRM 5259 - Visitor Behavior Analysis (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FNRM 5264 - Advanced Forest Management Planning (3.0 cr)
- FNRM 5362 - Drones: Data, Analysis, and Operations (3.0 cr)
- FNRM 5411 - Managing Forest Ecosystems: Silviculture (3.0 cr)
- FNRM 5413 - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)
- FNRM 5431 - Timber Harvesting and Road Planning (2.0 cr)
- FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- FNRM 5471 - Forest Management Planning (3.0 cr)
- FNRM 5480 - Topics in Natural Resources (1.0 - 3.0 cr)
- FNRM 5501 - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- FNRM 8101 - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- FNRM 8102 - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- FNRM 8103 - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- FNRM 8104 - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- FNRM 8105 - Research Problems: Silviculture (1.0 - 5.0 cr)
- FNRM 8106 - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- FNRM 8108 - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- FNRM 8201 - Research Problems: Forest Economics (1.0 - 5.0 cr)



- [FNRM 8202](#) - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- [FNRM 8203](#) - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- [FNRM 8204](#) - Research Problems: Forest Policy (1.0 - 5.0 cr)
- [FNRM 8205](#) - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- [FNRM 8206](#) - Research Problems: Forest Management (1.0 - 5.0 cr)
- [FNRM 8207](#) - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- [FNRM 8208](#) - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- [FW 8200](#) - Seminar (1.0 - 4.0 cr)
- [GEOG 5531](#) - Numerical Spatial Analysis (4.0 cr)
- [GEOG 5562](#) - GIS Development Practicum (3.0 cr)
- [GEOG 8260](#) - Seminar: Physical Geography (2.0 cr)
- [GIS 5555](#) - Basic Spatial Analysis (3.0 cr)
- [GIS 5571](#) - ArcGIS I (3.0 cr)
- [GIS 5572](#) - ArcGIS II (3.0 cr)
- [GIS 5575](#) - Practical Surveying for GIS (2.0 cr)
- [GIS 5577](#) - Spatial Database Design and Administration (3.0 cr)
- [GIS 5578](#) - GIS Programming (3.0 cr)
- [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)
- [GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)
- [LA 5204](#) - Metropolitan Landscape Ecology (3.0 cr)
- [LA 5576](#) - Ecological Restoration Project Planning and Management (3.0 cr)
- [LAW 6062](#) - Energy Law (3.0 cr)
- [NR 5021](#) - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- [NR 8100](#) - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- [OLPD 5061](#) - Ethnographic Research Methods (3.0 cr)
- [OLPD 5528](#) - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- [PA 5002](#) - Introduction to Policy Analysis (1.5 cr)
- [PA 5031](#) - Statistics for Public Affairs (4.0 cr)
- [PA 5035](#) - Survey Research and Data Collection (1.5 cr)
- [PA 5041](#) - Qualitative Methods for Policy Analysts (4.0 cr)
- [PA 5501](#) - Theories and Policies of Development (3.0 cr)
- [PA 5711](#) - Science, Technology & Environmental Policy (3.0 cr)
- [PA 5920](#) - Skills Workshop (0.5 - 4.0 cr)
- [POL 8126](#) - Qualitative Methods (3.0 cr)
- [PUBH 7250](#) - Designing and Conducting Focus Group Interviews (1.0 cr)
- [PUBH 7407](#) - Analysis of Categorical Data (3.0 cr)
- [PUBH 8472](#) - Spatial Biostatistics (3.0 cr)
- [SOC 5811](#) - Social Statistics for Graduate Students [MATH] (4.0 cr)
- [SOC 8801](#) - Sociological Research Methods (4.0 cr)
- [SOC 8811](#) - Advanced Social Statistics (4.0 cr)
- [SOIL 5555](#) - Wetland Soils (3.0 cr)
- [STAT 5021](#) - Statistical Analysis (4.0 cr)
- [STAT 5101](#) - Theory of Statistics I (4.0 cr)
- [STAT 5102](#) - Theory of Statistics II (4.0 cr)
- [STAT 5201](#) - Sampling Methodology in Finite Populations (3.0 cr)
- [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- [STAT 5303](#) - Designing Experiments (4.0 cr)
- [STAT 5401](#) - Applied Multivariate Methods (3.0 cr)
- [STAT 5421](#) - Analysis of Categorical Data (3.0 cr)
- [STAT 5511](#) - Time Series Analysis (3.0 cr)
- [STAT 5601](#) - Nonparametric Methods (3.0 cr)
- [STAT 8051](#) - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- [STAT 8052](#) - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- [STAT 8053](#) - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- [STAT 8054](#) - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- [WRIT 5051](#) - Graduate Research Writing for International Students (3.0 cr)

### Economics, Policy, Management, and Society

For students interested in focusing on how society values and makes decisions about the use, management, and protection of natural and environmental resources. Graduate students in this track can specialize in areas such as: economics, policy, administration and management, planning, operations research, conflict resolution, human dimensions, and land use planning. Studies might consider choices, impacts, and tradeoffs in protecting, restoring, developing, and allocating natural and environmental resources. The research conducted by students in this track may address a wide range of issues and problems from local to international in scope.

### Economics, Policy, Management, and Society - Suggested Course List



NRSM students in the economics, policy, management, and society track should refer to this list when enrolling in courses that are appropriate for their area of study. Students must enroll in at least 34 credits in addition to their seminar and thesis credit (24 credits of NR 8888) requirements. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 5152 - Applied Macroeconomics: Income and Employment (3.0 cr)
- APEC 5321 - Regional Economic Analysis (3.0 cr)
- APEC 5721 - Economics of Science and Technology Policy (3.0 cr)
- APEC 8004 - Applied Microeconomic Analysis of Social Choice and Welfare (2.0 cr)
- APEC 8202 - Mathematical Optimization in Applied Economics (3.0 cr)
- APEC 8203 - Applied Welfare Economics and Public Policy (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- APEC 8601 - Natural Resource Economics (3.0 cr)
- APEC 8602 - Economics of the Environment (3.0 cr)
- BIOL 5407 - Ecology (3.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CEGE 5570 - Design for Sustainable Development - India (3.0 - 9.0 cr)
- CI 5537 - Principles of Environmental Education (3.0 cr)
- CI 5747 - Global and Environmental Education: Content and Practice (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- COMM 5250 - Environmental Communication (3.0 cr)
- COMM 5402 - Advanced Interpersonal Communication (3.0 cr)
- COMM 5441 - Communication in Human Organizations (3.0 cr)
- COMM 8452 - Seminar: Methods of Intercultural/Diversity Facilitation (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- ECON 8105 - Macroeconomic Theory (2.0 cr)
- ECON 8106 - Macroeconomic Theory (2.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- EEB 8200 - Sustainability Science Distributed Graduate Seminar (3.0 cr)
- ENT 5920 - Special Lectures in Entomology (1.0 - 4.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESPM 5015 - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- ESPM 5071 - Ecological Restoration (4.0 cr)
- ESPM 5108 - Ecology of Managed Systems (4.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5202 - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- ESPM 5256 - Natural Resource Law and the Management of Public Lands and Waters (3.0 cr)
- ESPM 5261 - Economics and Natural Resources Management (4.0 cr)
- ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)
- ESPM 5555 - Wetland Soils (3.0 cr)
- ESPM 5575 - Wetlands (3.0 cr)
- ESPM 5602 - Regulations and Corporate Environmental Management (3.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)
- ESPM 5604 - Environmental Management Systems and Strategy (3.0 cr)
- ESPM 5605 - Recycling: Extending Raw Materials Supplies (3.0 cr)
- ESPM 5811 - Environmental Interpretation (3.0 cr)



- FNRM 5101 - Park and Protected Area Tourism (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5218 - Measuring and Modeling Forests (3.0 cr)
- FNRM 5232 - Managing Recreational Lands (4.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FNRM 5264 - Advanced Forest Management Planning (3.0 cr)
- FNRM 5362 - Drones: Data, Analysis, and Operations (3.0 cr)
- FNRM 5411 - Managing Forest Ecosystems: Silviculture (3.0 cr)
- FNRM 5413 - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)
- FNRM 5431 - Timber Harvesting and Road Planning (2.0 cr)
- FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- FNRM 5471 - Forest Management Planning (3.0 cr)
- FNRM 5480 - Topics in Natural Resources (1.0 - 3.0 cr)
- FNRM 5501 - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- FNRM 8101 - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- FNRM 8102 - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- FNRM 8103 - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- FNRM 8104 - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- FNRM 8105 - Research Problems: Silviculture (1.0 - 5.0 cr)
- FNRM 8106 - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- FNRM 8108 - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- FNRM 8201 - Research Problems: Forest Economics (1.0 - 5.0 cr)
- FNRM 8202 - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- FNRM 8203 - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- FNRM 8204 - Research Problems: Forest Policy (1.0 - 5.0 cr)
- FNRM 8205 - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- FNRM 8206 - Research Problems: Forest Management (1.0 - 5.0 cr)
- FNRM 8207 - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- FNRM 8208 - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- FW 4001 - Biometry (4.0 cr)
- FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
- FW 8200 - Seminar (1.0 - 4.0 cr)
- FW 8494 - Research in Wildlife (1.0 - 4.0 cr)
- GEOG 5561 - Principles of Geographic Information Science (4.0 cr)
- GEOG 8101 - Proseminar: Nature and Society (3.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- GIS 5571 - ArcGIS I (3.0 cr)
- GIS 5572 - ArcGIS II (3.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)
- LA 5004 - Regional Environmental Landscape Planning (4.0 cr)
- LAW 6062 - Energy Law (3.0 cr)
- MGMT 6033 - Managing the Strategy Process (2.0 cr)
- MGMT 6050 - Management of Innovation and Change (2.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)
- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 5611 - Facilitation and Meeting Skills (1.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5011 - Management of Organizations (3.0 cr)
- PA 5021 - Microeconomics for Policy Analysis (3.0 cr)
- PA 5022 - Applications of Economics for Policy Analysis (1.5 - 3.0 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5101 - Management and Governance of Nonprofit Organizations (3.0 cr)
- PA 5122 - Law and Public Affairs (3.0 cr)
- PA 5242 - Environmental Planning, Policy, and Decision Making (3.0 cr)



- PA 5251 - Strategic Planning and Management (3.0 cr)
- PA 5253 - Designing Planning and Participation Processes (3.0 cr)
- PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)
- PA 5311 - Program Evaluation (3.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5503 - Economics of Development (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5721 - Energy Systems and Policy (3.0 cr)
- PA 5722 - Economics of Natural Resource and Environmental Policy (3.0 cr)
- PA 5741 - Risk, Resilience and Decision Making (1.5 cr)
- PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- PA 5890 - Topics in Foreign Policy and International Affairs (1.0 - 5.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- PA 8790 - Advanced Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- POL 5315 - State Governments: Laboratories of Democracy (3.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5960 - Topics in Psychology (1.0 - 4.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- SCO 8735 - Supply Chain Management (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8701 - Sociological Theory (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOIL 5611 - Soil Biology and Fertility (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)
- WRS 5101 - Water Policy (3.0 cr)

### Forest Hydrology and Watershed Management

Brings together the integrally related areas of earth sciences, soils, and water resources management with an applied focus on wildland ecosystems, which may include the interface of forests with grasslands, wetlands, and agriculture. Graduate students in this track may specialize in areas such as: forest hydrology, water quality, and watershed management. Research would focus on forest, riparian, and wetland ecosystems.

### Forest Hydrology and Watershed Management - Suggested Course List

NRSM students in the forest hydrology and watershed management track should refer to this list when enrolling in courses that are appropriate for their area of study. Students must enroll in at least 34 credits in addition to their seminar and thesis credit (24 credits of NR 8888) requirements. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- BBE 5513 - Watershed Engineering (3.0 cr)
- BBE 5523 - Ecological Engineering Design (3.0 cr)
- BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)
- BBE 8013 - Parameter Estimation in Biosystems and Agricultural Engineering (3.0 cr)
- BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CEGE 4501 - Hydrologic Design (4.0 cr)
- CEGE 4512 - Open Channel Hydraulics (4.0 cr)
- CEGE 4522 - Review of Introductory Fluid Mechanics for Graduate Students (3.0 cr)





- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 8506 - Stochastic Hydrology (4.0 cr)
- CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)
- CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)
- CEGE 8562 - Analysis and Modeling of Aquatic Environments II (3.0 cr)
- CEGE 8601 - Introduction to Stream Restoration (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- EEB 5053 - Ecology: Theory and Concepts (4.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- EEB 8601 - Introduction to Stream Restoration (3.0 cr)
- EEB 8602 - Stream Restoration Practice (2.0 cr)
- ENT 5920 - Special Lectures in Entomology (1.0 - 4.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)
- ESCI 4702 - General Hydrogeology (4.0 cr)
- ESCI 4703 - Glacial Geology (4.0 cr)
- ESCI 5201 - Time-Series Analysis of Geological Phenomena (3.0 cr)
- ESPM 4216 - Contaminant Hydrology (3.0 cr)
- ESPM 5015 - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- ESPM 5071 - Ecological Restoration (4.0 cr)
- ESPM 5108 - Ecology of Managed Systems (4.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5202 - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- ESPM 5261 - Economics and Natural Resources Management (4.0 cr)
- ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)
- ESPM 5402 - Biometeorology (3.0 cr)
- ESPM 5555 - Wetland Soils (3.0 cr)
- ESPM 5575 - Wetlands (3.0 cr)
- ESPM 5602 - Regulations and Corporate Environmental Management (3.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)
- ESPM 5604 - Environmental Management Systems and Strategy (3.0 cr)
- ESPM 5605 - Recycling: Extending Raw Materials Supplies (3.0 cr)
- ESPM 5811 - Environmental Interpretation (3.0 cr)
- FNRM 5101 - Park and Protected Area Tourism (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5153 - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5216 - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- FNRM 5218 - Measuring and Modeling Forests (3.0 cr)
- FNRM 5232 - Managing Recreational Lands (4.0 cr)
- FNRM 5259 - Visitor Behavior Analysis (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FNRM 5264 - Advanced Forest Management Planning (3.0 cr)
- FNRM 5362 - Drones: Data, Analysis, and Operations (3.0 cr)
- FNRM 5411 - Managing Forest Ecosystems: Silviculture (3.0 cr)
- FNRM 5413 - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)



- FNRM 5431 - Timber Harvesting and Road Planning (2.0 cr)
- FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- FNRM 5471 - Forest Management Planning (3.0 cr)
- FNRM 5480 - Topics in Natural Resources (1.0 - 3.0 cr)
- FNRM 5501 - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- FNRM 8101 - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- FNRM 8102 - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- FNRM 8103 - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- FNRM 8104 - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- FNRM 8105 - Research Problems: Silviculture (1.0 - 5.0 cr)
- FNRM 8106 - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- FNRM 8108 - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- FNRM 8201 - Research Problems: Forest Economics (1.0 - 5.0 cr)
- FNRM 8202 - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- FNRM 8203 - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- FNRM 8204 - Research Problems: Forest Policy (1.0 - 5.0 cr)
- FNRM 8205 - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- FNRM 8206 - Research Problems: Forest Management (1.0 - 5.0 cr)
- FNRM 8207 - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- FNRM 8208 - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- FW 8051 - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)
- GEOG 8260 - Seminar: Physical Geography (2.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- GIS 5577 - Spatial Database Design and Administration (3.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)
- LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)
- LAAS 5425 - Atmospheric Processes I: Thermodynamics and Dynamics of the Atmosphere (3.0 cr)
- LAAS 5426 - Atmospheric Processes II: Radiation, Composition, and Climate (3.0 cr)
- LAAS 5515 - Soil Formation: Earth Surface Processes and Biogeochemistry (3.0 cr)
- LAW 6062 - Energy Law (3.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5503 - Economics of Development (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOIL 5232 - Vadose Zone Hydrology (3.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)
- WRS 5101 - Water Policy (3.0 cr)



### Forest Products

For students who wish to specialize in areas such as: wood and fiber as raw materials; deterioration of wood; wood mechanics and structural design; wood moisture interactions and drying; processing and performance of composites; economics of manufacturing systems; technology and processing of solid wood products; marketing, design and production of housing components; and energy-efficient building construction.

### Forest Products - Suggested Course List

NRSM students in the forest products track should refer to this list when enrolling in courses that are appropriate for their area of study. Students must enroll in at least 34 credits in addition to their seminar and thesis credit (24 credits of NR 8888) requirements. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- BBE 5001 - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)
- BBE 5023 - Process Control and Instrumentation (3.0 cr)
- BBE 5301 - Applied Surface and Colloid Science (3.0 cr)
- BBE 5302 - Biodegradation of Bioproducts (3.0 cr)
- BBE 5303 - Introduction to Bio-based Materials Science (3.0 cr)
- BBE 5401 - Bioproducts Separation and Purification Processes (3.0 cr)
- BBE 5402 - Bio-based Products Engineering Lab II (2.0 cr)
- BBE 5403 - Bio-based Products Engineering Lab I (2.0 cr)
- BBE 5404 - Biopolymers and Biocomposites Engineering (3.0 cr)
- BBE 5608 - Environmental and Industrial Microbiology (3.0 cr)
- BBE 5713 - Biological Process Engineering (3.0 cr)
- BBE 5733 - Renewable Energy Technologies (3.0 cr)
- BBE 8001 - Seminar I (1.0 cr)
- BBE 8002 - Seminar II (1.0 cr)
- BBE 8013 - Parameter Estimation in Biosystems and Agricultural Engineering (3.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CHEM 4214 - Polymers (3.0 cr)
- CHEM 4221 - Introduction to Polymer Chemistry (3.0 cr)
- CHEM 5210 - Materials Characterization (4.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- ENT 5920 - Special Lectures in Entomology (1.0 - 4.0 cr)
- ENTR 6041 - Initiating New Product Design and Business Development (2.0 - 4.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESPM 5015 - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- ESPM 5071 - Ecological Restoration (4.0 cr)
- ESPM 5108 - Ecology of Managed Systems (4.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5202 - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- ESPM 5261 - Economics and Natural Resources Management (4.0 cr)
- ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)
- ESPM 5555 - Wetland Soils (3.0 cr)
- ESPM 5575 - Wetlands (3.0 cr)
- ESPM 5602 - Regulations and Corporate Environmental Management (3.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)
- ESPM 5604 - Environmental Management Systems and Strategy (3.0 cr)



- [ESPM 5605](#) - Recycling: Extending Raw Materials Supplies (3.0 cr)
- [FNRM 5104](#) - Forest Ecology (4.0 cr)
- [FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)
- [FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- [FNRM 5203](#) - Forest Fire and Disturbance Ecology (3.0 cr)
- [FNRM 5204](#) - Landscape Ecology and Management (3.0 cr)
- [FNRM 5216](#) - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- [FNRM 5218](#) - Measuring and Modeling Forests (3.0 cr)
- [FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- [FNRM 5264](#) - Advanced Forest Management Planning (3.0 cr)
- [FNRM 5362](#) - Drones: Data, Analysis, and Operations (3.0 cr)
- [FNRM 5411](#) - Managing Forest Ecosystems: Silviculture (3.0 cr)
- [FNRM 5413](#) - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)
- [FNRM 5431](#) - Timber Harvesting and Road Planning (2.0 cr)
- [FNRM 5462](#) - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- [FNRM 5471](#) - Forest Management Planning (3.0 cr)
- [FNRM 5480](#) - Topics in Natural Resources (1.0 - 3.0 cr)
- [FNRM 5501](#) - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- [FNRM 8101](#) - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- [FNRM 8102](#) - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- [FNRM 8103](#) - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- [FNRM 8104](#) - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- [FNRM 8105](#) - Research Problems: Silviculture (1.0 - 5.0 cr)
- [FNRM 8106](#) - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- [FNRM 8108](#) - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- [FNRM 8201](#) - Research Problems: Forest Economics (1.0 - 5.0 cr)
- [FNRM 8202](#) - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- [FNRM 8203](#) - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- [FNRM 8204](#) - Research Problems: Forest Policy (1.0 - 5.0 cr)
- [FNRM 8205](#) - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- [FNRM 8206](#) - Research Problems: Forest Management (1.0 - 5.0 cr)
- [FNRM 8207](#) - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- [FNRM 8208](#) - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- [GIS 5555](#) - Basic Spatial Analysis (3.0 cr)
- [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)
- [GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)
- [LAW 6062](#) - Energy Law (3.0 cr)
- [ME 5228](#) - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)
- [NR 5021](#) - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- [NR 8100](#) - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- [OLPD 5061](#) - Ethnographic Research Methods (3.0 cr)
- [OLPD 5528](#) - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- [PA 5002](#) - Introduction to Policy Analysis (1.5 cr)
- [PA 5031](#) - Statistics for Public Affairs (4.0 cr)
- [PA 5035](#) - Survey Research and Data Collection (1.5 cr)
- [PA 5041](#) - Qualitative Methods for Policy Analysts (4.0 cr)
- [PA 5711](#) - Science, Technology & Environmental Policy (3.0 cr)
- [PA 5920](#) - Skills Workshop (0.5 - 4.0 cr)
- [POL 8126](#) - Qualitative Methods (3.0 cr)
- [PUBH 7250](#) - Designing and Conducting Focus Group Interviews (1.0 cr)
- [PUBH 7407](#) - Analysis of Categorical Data (3.0 cr)
- [SOC 5811](#) - Social Statistics for Graduate Students [MATH] (4.0 cr)
- [SOC 8801](#) - Sociological Research Methods (4.0 cr)
- [SOC 8811](#) - Advanced Social Statistics (4.0 cr)
- [SSM 5414](#) - Advanced Residential Building Science (4.0 cr)
- [SSM 5416](#) - Building Testing & Diagnostics (2.0 cr)
- [STAT 5021](#) - Statistical Analysis (4.0 cr)
- [STAT 5201](#) - Sampling Methodology in Finite Populations (3.0 cr)
- [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- [STAT 5303](#) - Designing Experiments (4.0 cr)
- [STAT 5401](#) - Applied Multivariate Methods (3.0 cr)
- [STAT 5421](#) - Analysis of Categorical Data (3.0 cr)
- [STAT 5601](#) - Nonparametric Methods (3.0 cr)
- [STAT 8051](#) - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- [STAT 8052](#) - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)



- [STAT 8053](#) - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- [STAT 8054](#) - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- [WRIT 5051](#) - Graduate Research Writing for International Students (3.0 cr)

#### Forests: Biology, Ecology, Conservation, and Management

Focuses on forest resources and allows students to choose from specializations in the following areas: forest biology, ecology, ecophysiology; genetics and tree improvement; tree physiology; reproductive biology and forest regeneration; forest growth and vegetation dynamics; timber harvesting, silviculture, and sustainable forest management; landscape ecology, restoration, and management; conservation of biodiversity and wildlife habitat management; forest health; disturbance (including fire) ecology; urban and community forestry; and agroforestry. Research normally focuses on forest and related ecosystems.

#### Forests: Biology, Ecology, Conservation, and Management - Suggested Course List

NRSM students in the forests: biology, ecology, conservation, and management track should refer to this list when enrolling in courses that are appropriate for their area of study. Students must enroll in at least 34 credits in addition to their seminar and thesis credit (24 credits of NR 8888) requirements. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- [AGRO 5121](#) - Applied Experimental Design (4.0 cr)
- [APEC 5031](#) - Methods of Economic Data Analysis (3.0 cr)
- [APEC 5032](#) - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- [APEC 8211](#) - Econometric Analysis I (2.0 cr)
- [APEC 8212](#) - Econometric Analysis II (2.0 cr)
- [BBE 5001](#) - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)
- [BBE 5302](#) - Biodegradation of Bioproducts (3.0 cr)
- [BBE 5535](#) - Assessment and Diagnosis of Impaired Waters (3.0 cr)
- [BIOL 8100](#) - Improvisation for Scientists (1.0 cr)
- [CI 8149](#) - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- [DES 8103](#) - Qualitative and Mixed Methods Research (3.0 cr)
- [EEB 4609W](#) - Ecosystem Ecology [ENV, WI] (3.0 cr)
- [EEB 5068](#) - Plant Physiological Ecology (3.0 cr)
- [EEB 5601](#) - Limnology (3.0 cr)
- [EEB 5609](#) - Ecosystem Ecology (3.0 cr)
- [EEB 8200](#) - Sustainability Science Distributed Graduate Seminar (3.0 cr)
- [ENT 4251](#) - Forest and Shade Tree Entomology (3.0 cr)
- [ENT 5920](#) - Special Lectures in Entomology (1.0 - 4.0 cr)
- [EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)
- [EPSY 5244](#) - Survey Design, Sampling, and Implementation (3.0 cr)
- [EPSY 5247](#) - Qualitative Methods in Educational Psychology (3.0 cr)
- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- [EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)
- [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)
- [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- [ESPM 5015](#) - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- [ESPM 5031](#) - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- [ESPM 5061](#) - Water Quality and Natural Resources (3.0 cr)
- [ESPM 5071](#) - Ecological Restoration (4.0 cr)
- [ESPM 5108](#) - Ecology of Managed Systems (4.0 cr)
- [ESPM 5111](#) - Hydrology and Water Quality Field Methods (3.0 cr)
- [ESPM 5202](#) - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- [ESPM 5211](#) - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- [ESPM 5241](#) - Natural Resource and Environmental Policy (3.0 cr)
- [ESPM 5242](#) - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- [ESPM 5245](#) - Sustainable Land Use Planning and Policy (3.0 cr)
- [ESPM 5251](#) - Natural Resources in Sustainable International Development (3.0 cr)
- [ESPM 5256](#) - Natural Resource Law and the Management of Public Lands and Waters (3.0 cr)
- [ESPM 5261](#) - Economics and Natural Resources Management (4.0 cr)
- [ESPM 5295](#) - GIS in Environmental Science and Management (4.0 cr)
- [ESPM 5555](#) - Wetland Soils (3.0 cr)
- [ESPM 5575](#) - Wetlands (3.0 cr)
- [ESPM 5602](#) - Regulations and Corporate Environmental Management (3.0 cr)
- [ESPM 5603](#) - Environmental Life Cycle Analysis (3.0 cr)
- [ESPM 5604](#) - Environmental Management Systems and Strategy (3.0 cr)
- [ESPM 5605](#) - Recycling: Extending Raw Materials Supplies (3.0 cr)
- [ESPM 5811](#) - Environmental Interpretation (3.0 cr)



- FNRM 5101 - Park and Protected Area Tourism (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5153 - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5205 - Productivity and Ecology of Forest Soils (3.0 cr)
- FNRM 5216 - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- FNRM 5218 - Measuring and Modeling Forests (3.0 cr)
- FNRM 5232 - Managing Recreational Lands (4.0 cr)
- FNRM 5259 - Visitor Behavior Analysis (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FNRM 5264 - Advanced Forest Management Planning (3.0 cr)
- FNRM 5362 - Drones: Data, Analysis, and Operations (3.0 cr)
- FNRM 5411 - Managing Forest Ecosystems: Silviculture (3.0 cr)
- FNRM 5413 - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)
- FNRM 5431 - Timber Harvesting and Road Planning (2.0 cr)
- FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- FNRM 5471 - Forest Management Planning (3.0 cr)
- FNRM 5480 - Topics in Natural Resources (1.0 - 3.0 cr)
- FNRM 5501 - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- FNRM 8101 - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- FNRM 8102 - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- FNRM 8103 - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- FNRM 8104 - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- FNRM 8105 - Research Problems: Silviculture (1.0 - 5.0 cr)
- FNRM 8106 - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- FNRM 8108 - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- FNRM 8201 - Research Problems: Forest Economics (1.0 - 5.0 cr)
- FNRM 8202 - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- FNRM 8203 - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- FNRM 8204 - Research Problems: Forest Policy (1.0 - 5.0 cr)
- FNRM 8205 - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- FNRM 8206 - Research Problems: Forest Management (1.0 - 5.0 cr)
- FNRM 8207 - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- FNRM 8208 - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
- FW 5603W - Habitats and Regulation of Wildlife [WI] (3.0 cr)
- FW 8051 - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)
- FW 8200 - Seminar (1.0 - 4.0 cr)
- FW 8452 - Conservation Biology (3.0 cr)
- GEOG 5426 - Climatic Variations (3.0 cr)
- GEOG 5839 - Introduction to Dendrochronology (3.0 cr)
- GEOG 8260 - Seminar: Physical Geography (2.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)
- HORT 5071 - Ecological Restoration (4.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- LA 5576 - Ecological Restoration Project Planning and Management (3.0 cr)
- LAW 6062 - Energy Law (3.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5503 - Economics of Development (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)



- PLPA 5003 - Diseases of Forest and Shade Trees (3.0 cr)
- PLPA 5480 - Principles of Plant Pathology (3.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOIL 5611 - Soil Biology and Fertility (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)

### Paper Science and Engineering

Specializes in areas such as: the chemistry and biotechnology of lignocellulosic materials; material science of paper and fiber products; paper recycling; energy and manufacturing efficiency in the pulp and paper-making process; novel and environmentally friendly pulping and bleaching, transport processes through porous media, surface and colloid science of papermaking; chemical engineering applications in pulp and paper processes; and statistical process control.

### Paper Science and Engineering - Suggested Course List

NRSM students in the paper science and engineering track should refer to this list when enrolling in courses that are appropriate for their area of study. Students must enroll in at least 34 credits in addition to their seminar and thesis credit (24 credits of NR 8888) requirements. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- BBE 5001 - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)
- BBE 5023 - Process Control and Instrumentation (3.0 cr)
- BBE 5301 - Applied Surface and Colloid Science (3.0 cr)
- BBE 5302 - Biodegradation of Bioproducts (3.0 cr)
- BBE 5303 - Introduction to Bio-based Materials Science (3.0 cr)
- BBE 5305 - Pulp and Paper Technology (3.0 cr)
- BBE 5401 - Bioproducts Separation and Purification Processes (3.0 cr)
- BBE 5402 - Bio-based Products Engineering Lab II (2.0 cr)
- BBE 5403 - Bio-based Products Engineering Lab I (2.0 cr)
- BBE 5404 - Biopolymers and Biocomposites Engineering (3.0 cr)
- BBE 5608 - Environmental and Industrial Microbiology (3.0 cr)
- BBE 5713 - Biological Process Engineering (3.0 cr)
- BBE 5733 - Renewable Energy Technologies (3.0 cr)
- BBE 8001 - Seminar I (1.0 cr)
- BBE 8002 - Seminar II (1.0 cr)
- BBE 8013 - Parameter Estimation in Biosystems and Agricultural Engineering (3.0 cr)
- BBE 8300 - Research Problems (1.0 - 10.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CHEM 5210 - Materials Characterization (4.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- ENT 5920 - Special Lectures in Entomology (1.0 - 4.0 cr)
- ENTR 6041 - Initiating New Product Design and Business Development (2.0 - 4.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)



- [EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)
- [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- [ESPM 5015](#) - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- [ESPM 5031](#) - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- [ESPM 5061](#) - Water Quality and Natural Resources (3.0 cr)
- [ESPM 5071](#) - Ecological Restoration (4.0 cr)
- [ESPM 5108](#) - Ecology of Managed Systems (4.0 cr)
- [ESPM 5111](#) - Hydrology and Water Quality Field Methods (3.0 cr)
- [ESPM 5202](#) - Environmental Conflict Management, Leadership, and Planning (3.0 cr)
- [ESPM 5211](#) - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- [ESPM 5241](#) - Natural Resource and Environmental Policy (3.0 cr)
- [ESPM 5242](#) - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- [ESPM 5245](#) - Sustainable Land Use Planning and Policy (3.0 cr)
- [ESPM 5251](#) - Natural Resources in Sustainable International Development (3.0 cr)
- [ESPM 5261](#) - Economics and Natural Resources Management (4.0 cr)
- [ESPM 5295](#) - GIS in Environmental Science and Management (4.0 cr)
- [ESPM 5555](#) - Wetland Soils (3.0 cr)
- [ESPM 5575](#) - Wetlands (3.0 cr)
- [ESPM 5602](#) - Regulations and Corporate Environmental Management (3.0 cr)
- [ESPM 5603](#) - Environmental Life Cycle Analysis (3.0 cr)
- [ESPM 5604](#) - Environmental Management Systems and Strategy (3.0 cr)
- [ESPM 5605](#) - Recycling: Extending Raw Materials Supplies (3.0 cr)
- [FNRM 5104](#) - Forest Ecology (4.0 cr)
- [FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)
- [FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- [FNRM 5203](#) - Forest Fire and Disturbance Ecology (3.0 cr)
- [FNRM 5204](#) - Landscape Ecology and Management (3.0 cr)
- [FNRM 5216](#) - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)
- [FNRM 5218](#) - Measuring and Modeling Forests (3.0 cr)
- [FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- [FNRM 5264](#) - Advanced Forest Management Planning (3.0 cr)
- [FNRM 5362](#) - Drones: Data, Analysis, and Operations (3.0 cr)
- [FNRM 5411](#) - Managing Forest Ecosystems: Silviculture (3.0 cr)
- [FNRM 5413](#) - Managing Forest Ecosystems: Silviculture Lab (1.0 cr)
- [FNRM 5431](#) - Timber Harvesting and Road Planning (2.0 cr)
- [FNRM 5462](#) - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- [FNRM 5471](#) - Forest Management Planning (3.0 cr)
- [FNRM 5480](#) - Topics in Natural Resources (1.0 - 3.0 cr)
- [FNRM 5501](#) - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- [FNRM 8101](#) - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- [FNRM 8102](#) - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- [FNRM 8103](#) - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- [FNRM 8104](#) - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- [FNRM 8105](#) - Research Problems: Silviculture (1.0 - 5.0 cr)
- [FNRM 8106](#) - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- [FNRM 8108](#) - Research Problems: Forest Ecosystem Health (1.0 - 5.0 cr)
- [FNRM 8201](#) - Research Problems: Forest Economics (1.0 - 5.0 cr)
- [FNRM 8202](#) - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- [FNRM 8203](#) - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- [FNRM 8204](#) - Research Problems: Forest Policy (1.0 - 5.0 cr)
- [FNRM 8205](#) - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- [FNRM 8206](#) - Research Problems: Forest Management (1.0 - 5.0 cr)
- [FNRM 8207](#) - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- [FNRM 8208](#) - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- [GIS 5555](#) - Basic Spatial Analysis (3.0 cr)
- [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)
- [GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)
- [LAW 6062](#) - Energy Law (3.0 cr)
- [ME 5228](#) - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)
- [NR 5021](#) - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- [NR 8100](#) - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- [OLPD 5061](#) - Ethnographic Research Methods (3.0 cr)
- [OLPD 5528](#) - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- [PA 5002](#) - Introduction to Policy Analysis (1.5 cr)
- [PA 5031](#) - Statistics for Public Affairs (4.0 cr)





- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)

### Recreation Resources, Tourism, and Environmental Education

Focuses on the use and management of natural resources for recreation and tourism. Graduate students in this track may specialize in areas such recreational land management, resource-based tourism, planning for recreation and tourism, and the human dimensions of natural resource uses. Additionally, students may focus on environmental education and leadership for effective communication with diverse publics about natural resources.

### Recreation Resources, Tourism, and Environmental Education - Suggested Course List

NRSM students in the recreation resources, tourism, and environmental education track should refer to this list when enrolling in courses that are appropriate for their area of study. Students must enroll in at least 34 credits in addition to their seminar and thesis credit (24 credits of NR 8888) requirements. Students may elect to take courses outside of this list if advised to do so by their advisor or committee.

Take 0 or more course(s) from the following:

- AGRO 5121 - Applied Experimental Design (4.0 cr)
- APEC 4311 - Tourism Development: Principles, Processes, Policies (3.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CI 5537 - Principles of Environmental Education (3.0 cr)
- CI 5747 - Global and Environmental Education: Content and Practice (3.0 cr)
- CI 8149 - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- DES 8103 - Qualitative and Mixed Methods Research (3.0 cr)
- EEB 5053 - Ecology: Theory and Concepts (4.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- ENT 5920 - Special Lectures in Entomology (1.0 - 4.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESPM 5015 - Invasive Plants and Animals: Ecology and Management (3.0 cr)
- ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- ESPM 5071 - Ecological Restoration (4.0 cr)
- ESPM 5108 - Ecology of Managed Systems (4.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5202 - Environmental Conflict Management, Leadership, and Planning (3.0 cr)



- ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)
- ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)
- ESPM 5242 - Methods for Environmental and Natural Resource Policy Analysis (3.0 cr)
- ESPM 5245 - Sustainable Land Use Planning and Policy (3.0 cr)
- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- ESPM 5261 - Economics and Natural Resources Management (4.0 cr)
- ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)
- ESPM 5555 - Wetland Soils (3.0 cr)
- ESPM 5575 - Wetlands (3.0 cr)
- ESPM 5602 - Regulations and Corporate Environmental Management (3.0 cr)
- ESPM 5603 - Environmental Life Cycle Analysis (3.0 cr)
- ESPM 5604 - Environmental Management Systems and Strategy (3.0 cr)
- ESPM 5605 - Recycling: Extending Raw Materials Supplies (3.0 cr)
- ESPM 5811 - Environmental Interpretation (3.0 cr)
- FNRM 5101 - Park and Protected Area Tourism (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5218 - Measuring and Modeling Forests (3.0 cr)
- FNRM 5232 - Managing Recreational Lands (4.0 cr)
- FNRM 5259 - Visitor Behavior Analysis (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FNRM 5362 - Drones: Data, Analysis, and Operations (3.0 cr)
- FNRM 5431 - Timber Harvesting and Road Planning (2.0 cr)
- FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)
- FNRM 5480 - Topics in Natural Resources (1.0 - 3.0 cr)
- FNRM 5501 - Urban Forest Management: Managing Greenspaces for People (3.0 cr)
- FNRM 8101 - Research Problems: Physiological Ecology (1.0 - 5.0 cr)
- FNRM 8102 - Research Problems: Forest-Tree Genetics (1.0 - 5.0 cr)
- FNRM 8103 - Research Problems: Forest Hydrology (1.0 - 5.0 cr)
- FNRM 8104 - Research Problems: Forest Ecology (1.0 - 5.0 cr)
- FNRM 8105 - Research Problems: Silviculture (1.0 - 5.0 cr)
- FNRM 8106 - Research Problems: Urban Forestry--Biology and Management (1.0 - 5.0 cr)
- FNRM 8201 - Research Problems: Forest Economics (1.0 - 5.0 cr)
- FNRM 8202 - Research Problems: Forest Biometry and Measurements (1.0 - 5.0 cr)
- FNRM 8203 - Research Problems: Forest Recreation (1.0 - 5.0 cr)
- FNRM 8204 - Research Problems: Forest Policy (1.0 - 5.0 cr)
- FNRM 8205 - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)
- FNRM 8206 - Research Problems: Forest Management (1.0 - 5.0 cr)
- FNRM 8207 - Economic Analysis of Natural Resource Projects (1.0 - 5.0 cr)
- FNRM 8208 - Research Problems: Environmental Learning and Leadership (1.0 - 5.0 cr)
- FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
- GIS 5555 - Basic Spatial Analysis (3.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- LA 5576 - Ecological Restoration Project Planning and Management (3.0 cr)
- LAW 6062 - Energy Law (3.0 cr)
- LS 5950 - Special Topics (1.0 - 4.0 cr)
- NR 5021 - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)
- NR 8100 - Topics in Natural Resources Science and Management (1.0 - 2.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)
- OLPD 5502 - Theory and Models of Evaluation (3.0 cr)
- OLPD 5528 - Focus Group Interviewing Research Methods (1.0 - 3.0 cr)
- OLPD 5611 - Facilitation and Meeting Skills (1.0 cr)
- PA 4101 - Nonprofit Management and Governance (3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5011 - Management of Organizations (3.0 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5035 - Survey Research and Data Collection (1.5 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5111 - Financing Public and Nonprofit Organizations (3.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)



- PA 5503 - Economics of Development (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5960 - Topics in Psychology (1.0 - 4.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8701 - Sociological Theory (4.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)



### ***Twin Cities Campus***

## **Nutrition M.S.**

*Food Science & Nutrition*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Food Science and Nutrition, 225 Food Science and Nutrition Building, 1334 Eckles Avenue, Saint Paul, MN 55108 (612-624-6753; fax: 612-625-5272)

Email: [fsgrad@umn.edu](mailto:fsgrad@umn.edu)

Website: <http://fscn.cfans.umn.edu/graduate-programs/nutrition>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Nutrition is the study of how nutrients, both essential and nonessential, affect health and all life processes. Consequently, nutrition is an extremely broad field that encompasses physiology, biochemistry, education, public health, and public policy. The nutrition graduate program is interdisciplinary. Advisors and financial support may come from any of the departments or schools in which nutrition graduate faculty reside, including the Department of Food Science and Nutrition (College of Food, Agricultural and Natural Resource Sciences); Division of Epidemiology (School of Public Health); Departments of Medicine, Surgery, Psychiatry, Lab Medicine and Pathology, and Family Medicine and Community Health (Medical School); Department of Kinesiology and Leisure Studies (College of Education and Human Development); Department of Biochemistry and Molecular Biology (University of Minnesota Duluth); University of Minnesota Extension; Hormel Institute (Austin, MN); and V.A. Medical Center and Park Nicollet Institute (Minneapolis, MN).

Three subspecialty areas are offered in the program: human nutrition, nutritional biochemistry, and public health nutrition. Thesis work can be conducted locally or internationally in the laboratory, clinic, or field.

Students are allowed a maximum of 5 years in the program.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants to the program need a bachelor's degree in any field or its international equivalent.

Other requirements to be completed before admission:

A strong foundation in the biological and physical sciences is required. This background includes college mathematics, the equivalent of one semester of general chemistry, organic chemistry, general biology, biochemistry, physiology, and statistics. For the doctoral program, additional prerequisite courses include calculus and physics. If there is evidence that the applicant has a good background in the sciences, some of the prerequisites can be met after admission. The M.S. program also requires the following nutrition courses, or equivalent, which may be completed after the student's admission to the program: Principles of Nutrition (FSCN 1112), Life Cycle Nutrition (FSCN 3612), and Human Nutrition (FSCN 4612).

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19



- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project is a combined total of approximately 120 hours (the equivalent of three full-time weeks) of work. The graduate faculty, including the student's advisor and director of Graduate Studies, specify both the nature and extent of the course and project work necessary to satisfy this requirement.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

All students are expected to obtain teaching experience, subject to the policies of the advisor's department or division.

### Required Coursework

All students must take the following courses for at least 20 credits:

#### Orientation Course

[NUTR 8621](#) - Presentation Skills (1.0 cr)

#### Core Coursework

[NUTR 5625](#) - Nutritional Biochemistry (3.0 cr)

[NUTR 5626](#) - Nutritional Physiology (3.0 cr)

[NUTR 5622](#) - Vitamin and Mineral Biochemistry (3.0 cr)

[NUTR 5624](#) - Nutrition and Genetics (2.0 cr)

#### Advanced Topics Course

Take at least one course from the following list after completing two semesters in the program:

[NUTR 8620](#) - Advances in Nutrition (2.0 cr)

#### Outside Coursework

All students must complete at least 6 credits outside the major, including at least one statistics course and at least one methods course.

#### Statistics Course

Take at least one statistics course from the following list. A different statistics course can be substituted with advisor approval.

[PUBH 6450](#) - Biostatistics I (4.0 cr)

or [PUBH 6451](#) - Biostatistics II (4.0 cr)

or [PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

or [STAT 5021](#) - Statistical Analysis (4.0 cr)

#### Research Methods Course

Take one or more courses for at least 2 credits of research methods coursework from this list, or graduate-level methods coursework from another field with advisor approval.

[ANSC 5091](#) - Research Proposals: From Ideas to Strategic Plans [WI] (3.0 cr)

or [NURS 8173](#) - Principles and Methods of Implementing Research (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

or [PUBH 6617](#) *{Inactive}*(3.0 cr)

or [PUBH 6803](#) - Conducting a Systematic Literature Review (3.0 cr)

or [PUBH 6806](#) - Principles of Public Health Research (2.0 cr)

#### Additional Outside Coursework

Other courses may be from any field, but must be at the 5000 or 8000 level. Exceptions: 6000 level courses from Public Health (PUBH) are allowed.



## Plan Options

### Plan A: Master's Thesis Credits

Plan A students take at least 10 credits of the following:

[NUTR 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

### Plan B: Additional Coursework

Plan B students must take at least 10 credits from the following, or other graduate-level coursework with advisor approval:

[NUTR 8695](#) - Independent Study: Nutrition (1.0 - 10.0 cr)

NUTR 8xxx

NUTR 5xxx

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Integrated BS/MS-Nutrition

This sub-plan is limited to students completing the program under Plan B.

The Department of Food Science and Nutrition offers an integrated bachelor of science (BS) and master of science (MS) in nutrition. The integrated BS/MS program offers students the opportunity to earn both degrees in five years by working toward a master's degree while simultaneously working toward their undergraduate degree.

Nutrition undergraduate students in the DPD or nutrition studies sub-plans are welcome to apply to this program during their 3rd year of undergraduate study. During the 4th year, students take undergraduate and graduate courses concurrently and are advised by an undergraduate and graduate program advisor.

Students in this program will complete the 120 undergraduate credits required for a BS degree in nutrition by the end of the 4th year and must be awarded an undergraduate degree at the 4th year mark. During the 4th and 5th years, students will complete 30 graduate credits and a Plan B research project with a final oral defense as required for the nutrition MS degree. Students who satisfy the Didactic Program in Dietetics (DPD) verification requirements can begin the Emily Program Dietetic Internship in August following their 5th year. Students cannot double-count credits to meet credit requirements for both the undergraduate and graduate degrees.

## Rochester



### ***Twin Cities Campus***

## **Nutrition Minor**

*Food Science & Nutrition*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Food Science and Nutrition, 225 Food Science and Nutrition Building, 1334 Eckles Avenue, Saint Paul, MN 55108 (612-624-6753; fax: 612-625-5272)

Email: [fsgrad@umn.edu](mailto:fsgrad@umn.edu)

Website: <http://fscn.cfans.umn.edu/graduate-programs/nutrition>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 13
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Nutrition is the study of how nutrients, both essential and nonessential, affect health and all life processes. Consequently, nutrition is an extremely broad field that encompasses physiology, biochemistry, education, public health, and public policy. The nutrition graduate program is interdisciplinary.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor, their director of graduate studies, and the Nutrition director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

#### **Required Coursework (6 credits)**

Take the following courses:

[NUTR 5625](#) - Nutritional Biochemistry (3.0 cr)

[NUTR 5626](#) - Nutritional Physiology (3.0 cr)

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Masters**

### **Doctoral**

#### **Additional Coursework (7 credits)**



Doctoral students take the following 7 credits to complete the 13-credit minimum.

[NUTR 5624](#) - Nutrition and Genetics (2.0 cr)

[NUTR 5622](#) - Vitamin and Mineral Biochemistry (3.0 cr)

[NUTR 8620](#) - Advances in Nutrition (2.0 cr)





### **Twin Cities Campus**

## **Nutrition Ph.D.**

*Food Science & Nutrition*

### **College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Food Science and Nutrition, 225 Food Science and Nutrition Building, 1334 Eckles Avenue, Saint Paul, MN 55108 (612-624-6753; fax: 612-625-5272)

Email: [fsgrad@umn.edu](mailto:fsgrad@umn.edu)

Website: <http://fscn.cfans.umn.edu/graduate-programs/nutrition/phd>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 50
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Nutrition is the study of how nutrients, both essential and nonessential, affect health and all life processes. Consequently, nutrition is an extremely broad field that encompasses physiology, biochemistry, education, public health, and public policy. The nutrition graduate program is interdisciplinary. Advisers and financial support may come from any of the departments or schools in which nutrition graduate faculty reside, including the Department of Food Science and Nutrition (College of Food, Agricultural and Natural Resource Sciences); Division of Epidemiology (School of Public Health); Departments of Medicine, Surgery, Psychiatry, Lab Medicine and Pathology, and Family Medicine and Community Health (Medical School); Department of Kinesiology and Leisure Studies (College of Education and Human Development); Department of Biochemistry and Molecular Biology (University of Minnesota Duluth); University of Minnesota Extension; Hormel Institute (Austin, MN.); V.A. Medical Center and Park Nicollet Institute (Minneapolis, MN.).

Three subspecialty areas are offered in the doctoral degree program: human nutrition, nutritional biochemistry, and public health nutrition. Thesis work may be conducted locally or internationally in the laboratory, clinic, or field.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants to the program need a bachelor's degree in any field or its international equivalent, along with demonstrated research ability such as a MS degree or publications.

Other requirements to be completed before admission:

A strong foundation in the biological and physical sciences is required. This background includes college mathematics, the equivalent of one semester of general chemistry, organic chemistry, general biology, biochemistry, physiology, and statistics. For the doctoral program, additional prerequisite courses include calculus and physics. If there is evidence that the applicant has a good background in the sciences, some of the prerequisites can be met after admission.

The following nutrition courses, or equivalents, are required; however they may be completed after admission to the program: Principles of Nutrition (FSCN 1112), Life Cycle Nutrition (FSCN 3612), and Human Nutrition (FSCN 4612).

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19



- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

14 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

PhD students are expected to obtain teaching experience through assisting with course instruction three times. Teaching experience is subject to the policies of the advisor's department or division.

Thesis work may be conducted in the laboratory, clinic, or field, either locally or internationally.

### Required Coursework

#### Orientation Course (1 credit)

Take the following course:

[NUTR 8621](#) - Presentation Skills (1.0 cr)

#### Core Courses (11 credits)

Take the following courses:

[NUTR 5625](#) - Nutritional Biochemistry (3.0 cr)

[NUTR 5626](#) - Nutritional Physiology (3.0 cr)

[NUTR 5622](#) - Vitamin and Mineral Biochemistry (3.0 cr)

[NUTR 5624](#) - Nutrition and Genetics (2.0 cr)

#### Advanced Topics Course (2 credits)

Take the following course:

[NUTR 8620](#) - Advances in Nutrition (2.0 cr)

#### Outside Coursework (12 credits)

##### Statistics Course (3 credits)

Select at least 3 credits from the following list, in consultation with the advisor. Other statistics coursework can be applied to this requirement with advisor approval.

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[PUBH 6451](#) - Biostatistics II (4.0 cr)

[PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

[STAT 5021](#) - Statistical Analysis (4.0 cr)

##### Research Methods Course (2 credits)

Select at least 2 credits from the following list, in consultation with the advisor. Other research methods coursework can be applied to this requirement with advisor approval.

[ANSC 5091](#) - Research Proposals: From Ideas to Strategic Plans [WI] (3.0 cr)

[NURS 8173](#) - Principles and Methods of Implementing Research (3.0 cr)

[PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

[PUBH 6803](#) - Conducting a Systematic Literature Review (3.0 cr)

[PUBH 6806](#) - Principles of Public Health Research (2.0 cr)

##### Additional Outside Coursework (7 credits)



Select at least 7 credits in consultation with the advisor.

[APEC 5751](#) - Global Trade and Policy (3.0 cr)

[APEC 5831](#) - Food and Agribusiness Marketplace (2.0 cr)

[BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)

[BIOC 8006](#) - Biochemistry: Metabolism and Control (2.0 cr)

[BIOC 8008](#) - Molecular Biology of RNA (2.0 cr)

[GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)

[KIN 5141](#) - Nutrition and Exercise for Health Promotion and Disease Prevention (3.0 cr)

[KIN 5142](#) - Applied Nutrition for Sport Performance and Optimal Health (3.0 cr)

[NR 5021](#) - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)

[PHSL 5115](#) - Clinical Physiology I (3.0 cr)

[PHSL 5116](#) - Clinical Physiology II (3.0 cr)

[PHSL 5197](#) - Stress Physiology (1.0 cr)

[PUBH 6101](#) - Environmental Health (2.0 cr)

[PUBH 6113](#) - Public Policy and Risk: Strategies for Effective Decisions and Discourse (3.0 cr)

[PUBH 6131](#) - Working in Global Health (2.0 cr)

[PUBH 6134](#) - Sustainable Development and Global Public Health (2.0 cr)

[PUBH 6154](#) - Climate Change and Global Health (3.0 cr)

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

[PUBH 6325](#) - Data Processing with PC-SAS (1.0 cr)

[PUBH 6348](#) - Writing Research Grants (2.0 cr)

[PUBH 6901](#) - Foundations of Public Health Nutrition Leadership (2.0 cr)

[PUBH 6904](#) - Nutrition and Aging (2.0 cr)

[PUBH 6906](#) - Global Nutrition (2.0 cr)

[PUBH 6933](#) - Nutrition and Chronic Diseases (2.0 cr)

[VMED 5440](#) - Using Risk Analysis Tools: Estimating Food Safety Risks on the Farm to Table Continuum (2.0 cr)

[VMED 5915](#) - Essential Statistics for Life Sciences (3.0 cr)

#### **Doctoral Thesis Credits**

Take 24 doctoral thesis credits.

[NUTR 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Nutritional Sciences M.P.S.**

*Food Science & Nutrition*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Dept. of Food Science and Nutrition

225 Food Science and Nutrition | 1334 Eckles Ave | St. Paul, MN 55108

(612) 624-1290 | Fax: (612) 625-5272

Undergraduate Services: [fscnug@umn.edu](mailto:fscnug@umn.edu) | Graduate Services: [fscngrad@umn.edu](mailto:fscngrad@umn.edu)

Email: [fscngrad@umn.edu](mailto:fscngrad@umn.edu)

Website: <https://fscn.cfans.umn.edu/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Professional Studies

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Nutritional Sciences MPS is a terminal, coursework-only degree that prepares students for a career as a Registered Dietitian. This one-year program focuses on coursework that combines advanced knowledge of nutritional sciences with awareness of the practical applications of research. Graduates will be positioned to interpret and communicate nutritional science concepts to educationally and culturally diverse audiences including content experts, educators, media, and the public.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants should be in the process of completing the Dietetics (DPD) track of the Nutrition major or hold an RD. Admission is for fall semester only.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

**Plan C:** Plan C requires 24 major credits and 6 credits outside the major. There is no final exam.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

### **Required Courses (24 credits)**

Take the following courses:

[FSCN 5601](#) - Management of Eating Disorders (3.0 cr)

[NUTR 5622](#) - Vitamin and Mineral Biochemistry (3.0 cr)

[NUTR 5624](#) - Nutrition and Genetics (2.0 cr)

[NUTR 5625](#) - Nutritional Biochemistry (3.0 cr)

[NUTR 5626](#) - Nutritional Physiology (3.0 cr)

[NUTR 5627](#) - Nutritional and Food Toxicology (3.0 cr)



[NUTR 8621](#) - Presentation Skills (1.0 cr)

**Advances in Nutrition**

Take each of the following 2-credit NUTR 8260 courses for a total of 6 credits:

[NUTR 8620](#): Advances in Nutrition (2.0 cr)

[NUTR 8620](#): Obesity from the Molecule to the Bedside (2.0 cr)

[NUTR 8620](#): Current Issues in the Dietetics Profession (2.0 cr)

**Outside Coursework (6 credits)**

Select at least 6 credits from the following in consultation with the advisor, director of graduate studies, and graduate program coordinator.

[PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[PUBH 6806](#) - Principles of Public Health Research (2.0 cr)

[STAT 5021](#) - Statistical Analysis (4.0 cr)



### ***Twin Cities Campus***

## **Plant Pathology M.S.**

*Plant Pathology*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Plant Pathology, 495 Borlaug Hall, 1991 Buford Circle, Saint Paul, MN 55108 (612-625-8200)

Email: [plpath@umn.edu](mailto:plpath@umn.edu)

Website: <http://plpa.cfans.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 31
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Plant pathology focuses on the biology of plant-microbe interactions, and incorporates research involving biochemical, molecular, genetic, physiological, whole organism, population, and community levels of biological organization. Plant pathology interfaces with all plant science disciplines, and with food sciences, veterinary medicine, biobased products, and ecology. The MS program offers a molecular plant pathology track, in which students can design and use molecular approaches to investigate plant disease, increase basic knowledge, and develop new strategies for disease control.

The following areas of concentration are also offered: plant disease management, biological control of plant disease, forest pathology and microbial degradation of wood, microbial ecology, population biology, plant-microbe interactions, disease resistance, host-parasite coevolution, plant microbe mutualisms, and virology. Students have opportunities for laboratory and field research locally as well as nationally and internationally.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Applicants must have a sound college background in the basic biological and physical sciences and mathematics.

Other requirements to be completed before admission:

Applicants must have completed 35 semester credits in biology with at least one course in each of the following areas: botany, zoology, genetics, plant physiology, and microbiology. Applicants must also have completed at least one course each in inorganic chemistry, organic chemistry, biochemistry, and physics. If deficiencies exist in the prerequisites, students must correct them during the first year of the graduate program. These courses cannot be counted as part of the degree program.

### **Special Application Requirements:**

GRE scores are required for all students and TOEFL or IELTS scores are required for international students. A clearly written statement of career interests as well as three letters of recommendation are required of all students. Students may apply at any time; however, submission of all application materials by December 1 will ensure priority consideration for fellowships and research assistantships for the next academic year. Students can be admitted any semester.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 153
  - General Test - Quantitative Reasoning: 148
  - General Test - Analytical Writing: 4.5

International applicants must submit score(s) from one of the following tests:

- TOEFL



- Internet Based - Total Score: 79
- Internet Based - Writing Score: 21
- Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 15 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 25 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The capstone project usually involves a smaller research project than the Plan A thesis, extension/teaching related product, or a comprehensive literature review of plant pathology related subject. The project subject, scope, and the specific format of the expected final product must be agreed upon by the student's committee.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Students must enroll in a credit or non-credit teaching methods seminar or workshop, chosen in consultation with the advisor and director of graduate studies.

Regular attendance at weekly plant pathology seminars is expected.

Internships are encouraged as part of the graduate experience. Financial support for international or domestic internships is available on a competitive basis.

Take PLPA 5480 (3 credits), if an introductory plant pathology course has not previously been taken.

### Required Coursework (10 credits)

Take the following courses. Take PLPA 8005 for 2 credits to fulfill the one-semester teaching experience. Consult with the advisor and director of graduate studies regarding the additional teaching methods seminar/workshop requirement.

- [PLPA 5480](#) - Principles of Plant Pathology (3.0 cr)
- [PLPA 8123](#) - Research Ethics in Plant and Environmental Sciences (0.5 cr)
- [PLPA 8200](#) - Seminar (1.0 cr)
- [PLPA 8005](#) - Supervised Classroom or Extension Teaching Experience (1.0 - 2.0 cr)
- [PLPA 8104](#) - Plant Virology (2.0 cr)
- [PLPA 8105](#) - Plant Bacteriology (2.0 cr)

### Plant Pathology Electives (5 to 12 credits)

Plan A students select 5 credits, and Plan B students select 5 to 12 credits from the following. All courses must be chosen in consultation with the advisor, graduate advisory committee, and director of graduate studies.

- [PLPA 5003](#) - Diseases of Forest and Shade Trees (3.0 cr)
- [PLPA 5202](#) - Field Plant Pathology (2.0 cr)
- [PLPA 5203](#) - Introduction to Fungal Biology (3.0 cr)
- [PLPA 5300](#) - Current Topics in Molecular Plant Pathology (1.0 cr)
- [PLPA 5301](#) - Large Scale Omic Data in Plant Biology (3.0 cr)
- [PLPA 5303](#) - Data Visualization in Plant and Microbial Biology (3.0 cr)
- [PLPA 5444](#) - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)
- [PLPA 5660](#) - Plant Disease Resistance and Applications (3.0 cr)
- [PLPA 8103](#) - Plant-Microbe Interactions (3.0 cr)

### Outside Coursework (6 credits)

Select 6 credits, from the following or other coursework, in consultation with the advisor, director of graduate studies, and advisory committee.

- [AGRO 8241](#) - Chromosomal and Molecular Genetics of Plant Improvement (3.0 cr)
- [EEB 5221](#) - Molecular Evolution (3.0 cr)
- [GCD 5036](#) - Molecular Cell Biology (3.0 cr)



[BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)

### Plan Options

#### Plan A

##### Thesis Credits

Take 10 master's thesis credits.

[PLPA 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

##### Capstone Project (3 to 10 credits)

Take 3 to 10 project credits, as needed to complete the 25-credit requirement for the major field, in consultation with the advisor and graduate advisory committee.

[PLPA 8300](#) - Plant Pathology Project (1.0 - 6.0 cr)

### Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

#### Molecular Plant Pathology

This sub-plan is limited to students completing the program under Plan A.

#### Molecular Plant Pathology (10 credits)

##### Required Coursework (4 credits)

Take the following courses. Take PLPA 8005 for 2 credits to fulfill the one-semester teaching experience. Consult with the advisor and director of graduate studies regarding the additional teaching methods seminar/workshop requirement.

[PLPA 5300](#) - Current Topics in Molecular Plant Pathology (1.0 cr)

[PLPA 5480](#) - Principles of Plant Pathology (3.0 cr)

[PLPA 8005](#) - Supervised Classroom or Extension Teaching Experience (1.0 - 2.0 cr)

[PLPA 8103](#) - Plant-Microbe Interactions (3.0 cr)

[PLPA 8123](#) - Research Ethics in Plant and Environmental Sciences (0.5 cr)

[PLPA 8200](#) - Seminar (1.0 cr)

##### Outside Coursework (6 credits)

Select at least 6 course credits outside the major in consultation with advisor, director of graduate studies, and advisory committee.

##### Plant Pathology Electives

Select courses from the following, or other electives as needed to complete minimum credit requirements. All courses must be chosen in consultation with the director of graduate studies, advisor, and graduate advisory committee.

[PLPA 5003](#) - Diseases of Forest and Shade Trees (3.0 cr)

[PLPA 5202](#) - Field Plant Pathology (2.0 cr)

[PLPA 5203](#) - Introduction to Fungal Biology (3.0 cr)

[PLPA 5301](#) - Large Scale Omic Data in Plant Biology (3.0 cr)

[PLPA 5303](#) - Data Visualization in Plant and Microbial Biology (3.0 cr)

[PLPA 5444](#) - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)

[PLPA 5660](#) - Plant Disease Resistance and Applications (3.0 cr)

[PLPA 8104](#) - Plant Virology (2.0 cr)

[PLPA 8105](#) - Plant Bacteriology (2.0 cr)





### *Twin Cities Campus*

## Plant Pathology Minor

*Plant Pathology*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Plant Pathology Graduate Program, 495 Borlaug Hall, 1991 Buford Circle, Saint Paul, MN 55108 (612-625-8200)

Email: [plpath@umn.edu](mailto:plpath@umn.edu)

Website: <http://plpa.cfans.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Plant pathology focuses on the biology of plant-microbe interactions, and incorporates research involving biochemical, molecular, genetic, physiological, whole organism, population, and community levels of biological organization. Plant pathology interfaces with all plant science disciplines, and with many other fields including food sciences, veterinary medicine, biobased products, and ecology. Areas of concentration include molecular plant pathology, plant disease management, biological control of plant disease, forest pathology and microbial degradation of wood, microbial ecology, population biology, plant-microbe interactions, disease resistance, host-parasite coevolution, plant microbe mutualisms, and virology.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Plant Pathology director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

#### **Required Coursework (6 to 12 credits)**

Masters students select 6 credits, and doctoral students select 12 credits from the following in consultation with the Plant Pathology director of graduate studies:

- [PLPA 5103](#) - Plant-Microbe Interactions (3.0 cr)
- [PLPA 5300](#) - Current Topics in Molecular Plant Pathology (1.0 cr)
- [PLPA 5301](#) - Large Scale Omic Data in Plant Biology (3.0 cr)
- [PLPA 5444](#) - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)
- [PLPA 5480](#) - Principles of Plant Pathology (3.0 cr)
- [PLPA 8103](#) - Plant-Microbe Interactions (3.0 cr)
- [PLPA 8104](#) - Plant Virology (2.0 cr)
- [PLPA 8105](#) - Plant Bacteriology (2.0 cr)
- [PLPA 8123](#) - Research Ethics in Plant and Environmental Sciences (0.5 cr)



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Plant Pathology Ph.D.**

*Plant Pathology*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Plant Pathology Graduate Program, 495 Borlaug Hall, 1991 Buford Circle, Saint Paul, MN 55108 (612-625-8200)

Email: [plpath@umn.edu](mailto:plpath@umn.edu)

Website: <http://plpa.cfans.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 56
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Plant pathology focuses on the biology of plant-microbe interactions, and incorporates research involving biochemical, molecular, genetic, physiological, whole organism, population, and community levels of biological organization. Plant pathology interfaces with all plant science disciplines, and with food sciences, veterinary medicine, biobased products, and ecology. The PhD program offers a molecular plant pathology track, in which students can design and use molecular approaches to investigate plant disease, increase basic knowledge, and develop new strategies for disease control.

The following areas of concentration are also offered: plant disease management, biological control of plant disease, forest pathology and microbial degradation of wood, microbial ecology, population biology, plant-microbe interactions, disease resistance, host-parasite co-evolution, plant microbe mutualisms, and virology. Students have opportunities for laboratory and field research locally as well as nationally and internationally.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Applicants must have a sound college background in the basic biological and physical sciences and mathematics.

Applicants must satisfy all the prerequisites for the master's degree program in plant pathology, or have a master's degree in either plant pathology or a field of natural science.

Other requirements to be completed before admission:

Applicants must have completed 35 semester credits in biology with at least one course in each of the following areas: botany, zoology, genetics, plant physiology, and microbiology. Applicants must also have completed at least one course each in inorganic chemistry, organic chemistry, biochemistry, and physics. If deficiencies exist in the prerequisites, they must be corrected during the first year of the graduate program. Applicants should note that these courses cannot be counted as part of the degree program. All students accepted into the department with only a BS degree are admitted into the MS degree program. After a minimum of two semesters, students who qualify may elect to change their degree status to the PhD program. Criteria for the change include scholastic standing, potential for success in completing a PhD, and writing competency.

### **Special Application Requirements:**

GRE scores are required for all students and TOEFL or IELTS scores are required for international students. A clearly written statement of career interests as well as three letters of recommendation are required of all students. Students may apply at any time; however, submission of all application materials by December 10 will ensure priority consideration for fellowships and research assistantships for the next academic year. Students can be admitted any semester.

Applicants must submit their test score(s) from the following:

- GRE



- General Test - Verbal Reasoning: 153
- General Test - Quantitative Reasoning: 148
- General Test - Analytical Writing: 4.5

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#) (GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

20 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Students must enroll in a supervised teaching or extension teaching experience, chosen in consultation with the advisor and director of graduate studies.

Degree plans are determined by the advisory committee, with approval of the director of graduate studies.

Regular attendance at weekly plant pathology seminars is expected.

Internships are encouraged as part of the graduate experience. Financial support for international or domestic internships is available on a competitive basis.

### Required Coursework (13 credits)

Take the following courses. Take PLPA 8200 twice for a total of 2 credits. Take PLPA 8005 for 2 credits to fulfill the one-semester teaching experience requirement. Take GRAD 8101 concurrently with or after completing PLPA 8005.

- [PLPA 5480](#) - Principles of Plant Pathology (3.0 cr)
- [PLPA 8103](#) - Plant-Microbe Interactions (3.0 cr)
- [PLPA 8123](#) - Research Ethics in Plant and Environmental Sciences (0.5 cr)
- [PLPA 8200](#) - Seminar (1.0 cr)
- [PLPA 8005](#) - Supervised Classroom or Extension Teaching Experience (1.0 - 2.0 cr)
- [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)

### Electives (12 credits)

Take at least 12 credits, in consultation with the advisor, to complete the outside credit requirement.

- [AGRO 8241](#) - Chromosomal and Molecular Genetics of Plant Improvement (3.0 cr)
- [ANSC 5200](#) - Statistical Genetics and Genomics (4.0 cr)
- [BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)
- [CSCI 5481](#) - Computational Techniques for Genomics (3.0 cr)
- [EEB 5221](#) - Molecular Evolution (3.0 cr)
- [AGRO 5021](#) - Plant Breeding Principles (3.0 cr)
- [GCD 5036](#) - Molecular Cell Biology (3.0 cr)
- [GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)
- [MICA 8002](#) - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
- [AGRO 5431](#) - Applied Plant Genomics and Bioinformatics (3.0 cr)
- [BBE 5302](#) - Biodegradation of Bioproducts (3.0 cr)



[PMB 5412](#) - Plant Physiology (3.0 cr)

[CSCI 5461](#) - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)

#### **Thesis Credits**

Take at least 24 doctoral thesis credits.

[PLPA 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

#### **Standard Program**

##### **Standard Program Courses (7 credits)**

Take the following courses:

[PLPA 8104](#) - Plant Virology (2.0 cr)

[PLPA 8105](#) - Plant Bacteriology (2.0 cr)

[PLPA 5444](#) - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)

#### **Program Sub-plans**

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

#### **Molecular Plant Pathology**

##### **Molecular Plant Pathology Courses (7 credits)**

Take the following courses. Take PLPA 5300 twice for a total of 2 credits.

[PLPA 5301](#) - Large Scale Omic Data in Plant Biology (3.0 cr)

[PLPA 5300](#) - Current Topics in Molecular Plant Pathology (1.0 cr)

##### **Virology or Bacteriology Course**

Take one of the following courses:

[PLPA 8104](#) - Plant Virology (2.0 cr)

or [PLPA 8105](#) - Plant Bacteriology (2.0 cr)



### **Twin Cities Campus**

## **Risk Analysis for Introduced Species and Genotypes Minor**

*Fisheries, Wildlife, and Conservation Biology*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Entomology, Room 219 Hodson Hall, 6125B, 1980 Folwell Ave., St. Paul, MN 55108

Email: [isgigert@umn.edu](mailto:isgigert@umn.edu)

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 13
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The minor in risk analysis for introduced species and genotypes is available to master's (M.A. and M.S.) and doctoral students. The minor provides an interdisciplinary curriculum that addresses all phases of risk analysis pertaining to the introduction of exotic species and novel genotypes. The curriculum is based on collaborative learning and includes a survey course, discussions, a problem solving practicum, and a cooperative learning practicum. The minor complements major programs in applied economics; applied plant sciences; conservation biology; ecology, evolution, and behavior; entomology; natural resources science and management; plant biological sciences; and water resources science.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **ISG Core Courses**

The master's minor requires 6 graduate credits from the core curriculum; ISG 8001 must be taken two times for 1 credit each time.

[ISG 5010](#) - Risk Analysis for Introduced Species and Genotypes (3.0 cr)

[ISG 5020](#) - Risk Analysis Modeling for Introduced Species and Genotypes (1.0 cr)

[ISG 8001](#) - Discussions in Introduced Species and Genotypes (1.0 cr)

#### **Doctoral**

##### **ISG Doctoral Minor**

In addition to the 10-credit core listed, a 3-credit decision analysis or quantitative modeling course from another program is required.

ISG 8001 must be taken twice for one credit.

[ISG 5010](#) - Risk Analysis for Introduced Species and Genotypes (3.0 cr)



[ISG 5020](#) - Risk Analysis Modeling for Introduced Species and Genotypes (1.0 cr)

[ISG 8001](#) - Discussions in Introduced Species and Genotypes (1.0 cr)

[ISG 8021](#) - Problem Solving Practicum in Risk Analysis (3.0 cr)

[ISG 8031](#) - Cooperative Learning Practicum (1.0 cr)



### *Twin Cities Campus*

## Sustainable Agriculture Systems Minor

*Agronomy & Plant Genetics*

**College of Food, Agricultural and Natural Resource Sciences**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Director of Graduate Studies, Sustainable Agriculture Systems Minor, 411 Borlaug Hall, 1991 Buford Circle, St. Paul, MN 55108 (612-625-3754; fax:612-625-1268)

Email: [sheaf001@umn.edu](mailto:sheaf001@umn.edu)

Website: <http://www.misa.umn.edu/StudentPrograms/GraduateMinor/index.htm>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The minor in sustainable agriculture systems offers master's (MA and MS) and doctoral students an interdisciplinary curriculum that considers the biological, sociological, and economic aspects of agriculture. The minor emphasizes a holistic perspective to designing farming and food systems and solving problems in agriculture. The importance of yield and profitability are balanced by considerations of the environment and the health and social well-being of producers, consumers, and communities. A unique component of the minor is an on-site internship with growers, grassroots organizations, or public agencies working in sustainable agriculture. The minor complements major programs in ecology, conservation biology, forestry, sociology, geography, political science, and public affairs, as well as majors in the College of Food, Agricultural and Natural Resource Sciences.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Admission is contingent upon prior admission to a master's or doctoral degree-granting program.

### Special Application Requirements:

Contact the director of graduate studies in sustainable agriculture systems for an Intent to Enroll Form. Students are admitted each semester.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

#### **Required Coursework (6 Credits)**

All students pursuing the Sustainable Agriculture Systems minor must complete the following courses for a total of 6 credits. Take SAGR 8020 for 1 credit.

[SAGR 8010](#) - Colloquium in Sustainable Agriculture (2.0 cr)

[SAGR 8020](#) - Field Experience in Sustainable Agriculture (1.0 - 4.0 cr)

[AGRO 5321](#) - Ecology of Agricultural Systems (3.0 cr)





## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Masters

#### **Master's-level Minor**

The master's-level Sustainable Agriculture minor comprises the 6 required course credits noted above.

### Doctoral

#### **Doctoral-level Minor Electives (6 Credits)**

In addition to the 6 required credits, select at least 6 credits in consultation with the Sustainable Agriculture Systems director of graduate studies to complete the 12-credit minimum.



### **Twin Cities Campus**

## **Advanced Dental Therapy Postbaccalaureate Certificate**

*Dentistry Primary Care Administration*

### **School of Dentistry**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

University of MN, School of Dentistry

515 Delaware St SE

9-436 Moos Health Sci

Minneapolis, MN 55455

612-626-5138

Email: [heit0058@umn.edu](mailto:heit0058@umn.edu)

Website: <http://dentistry.umn.edu/programs-admissions/dental-therapy/index.htm>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 15
- This program does not require summer semesters for timely completion.
- Degree: Advanced Dental Therapy PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Advanced Dental Therapy certificate is designed for dental therapists who have completed a baccalaureate or master degree in dental therapy from the University of Minnesota, School of Dentistry between the years 2011 and 2014. It focuses on acquiring the knowledge and skills mandated by the Minnesota Board of Dentistry to become eligible for advanced dental therapy certification.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

Bachelor Degree of Dental Therapy from the University of Minnesota.

Master Degree of Dental Therapy from the University of Minnesota.

Other requirements to be completed before admission:

Completion of a Bachelor of Science in Dental Therapy degree or Master of Dental Therapy degree at the University of Minnesota, School of Dentistry between 2011 thru 2014. Holds current credentials of Licensed Dental Therapist in the state of Minnesota.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Students are required to maintain a minimum GPA of 3.00 and to achieve no less than a C grade in each course. Students must enroll in the Advance Dental Therapy Post-baccalaureate Certificate within five years following the completion of their dental therapy degree and must complete the course and clinic requirements within five years of enrollment.

#### **Required Didactic Coursework (5 Credits)**

Take the following courses for a total of 5 credits:



[DT 5162](#) - Principles of Exodontia and Minor Oral Surgery (1.0 cr)

[DT 6321](#) - Treatment Planning (2.0 cr)

[DT 6341](#) - Advanced Dental Therapy Prep Lecture (2.0 cr)

**Required Clinical Coursework (10 Credits)**

Take the following for at least 10 credits:

[DT 6340](#) - Advanced Dental Therapy Prep Clinic (10.0 cr)



### **Twin Cities Campus**

## **Dental Hygiene M.S.D.H.**

*Dentistry Primary Care Administration*

### **School of Dentistry**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Division of Dental Hygiene, 9-372 Moos Tower, 515 Delaware Street SE, Minneapolis, MN 55455 (612-625-9121; fax: 612-625-1605)

Email: [jaliv003@umn.edu](mailto:jaliv003@umn.edu)

Website: <http://www.dentistry.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 33 to 38
- This program requires summer semesters for timely completion.
- Degree: Master of Science Dental Hygiene

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of science in dental hygiene program prepares leaders in the profession for practice, research, the healthcare industry, and academia.

The curriculum provides meaningful academic experiences for each graduate student based on their career goals and interest. Courses in the management track will provide students with knowledge and skills necessary for careers in the healthcare industry such as sales, marketing and professional relations management, management of large dental clinics, practice management consulting, and entrepreneurship.

Courses in the education track will provide students with the knowledge and skills to teach didactic, clinic, and laboratory courses in dental hygiene programs; conduct research; and assume administrative positions.

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Graduate of an accredited US institution dental hygiene program.

Other requirements to be completed before admission:

Baccalaureate degree; dental hygiene license; CPR certification; undergraduate statistics course.

#### **Special Application Requirements:**

Applicants must submit a typed essay including short and long term goals and an explanation of why an advanced degree is of interest, a current resume including evidence of leadership and dental hygiene clinic experience, and three letters of reference. Deadline May 1.

Applicants pursuing the management track must submit their GMAT score.

Applicants must submit their test score(s) from the following:

- GMAT
  - Total score: 500

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 94
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS



- Total Score: 6.5
- MELAB
  - Final score: 80
  - Speaking test score: 0

Key to [test abbreviations](#)(GMAT, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 23 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan C:** Plan C requires 38 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Plan C students complete a capstone project based on internship experiences.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

The MSDH degree requirements must be completed in five years for cohorts matriculating prior to 2020 and in four years beginning in 2020.

### Core Curriculum (11 Credits)

All MSDH students take the following courses for a total of 11 credits:

- [DH 5401](#) - Research Methods in Health Sciences (3.0 cr)
- [DH 5407](#) - Instructional Strategies for Effective Teaching (2.0 cr)
- [DH 5411](#) - Administrative Leadership and Professional Development (2.0 cr)
- [DH 5421](#) - Grant Writing for Health Professionals (1.0 cr)

### Statistics

- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Dental Hygiene Education

This sub-plan is limited to students completing the program under Plan A.

Courses in the dental hygiene education track provide students with the knowledge and skills to teach didactic, clinic, and laboratory courses in dental hygiene programs; conduct research; and assume administrative positions.

### Education Track Curriculum (12 Credits)

In addition to the 11 MSDH core credits, take the following 12 credits to complete the 23 course credits required:

- [DH 5403](#) - The Discipline of Dental Hygiene (2.0 cr)
- [DH 5405](#) - Curriculum and Course Development (2.0 cr)
- [DH 5409](#) - Dental Hygiene Clinic Administration (2.0 cr)
- [DH 5413](#) - Dental Hygiene Supervised Clinic Student Teaching (4.0 cr)
- [DH 5415](#) - Dental Hygiene Supervised Didactic Course Student Teaching (2.0 cr)

### Thesis Credits

Take 10 masters thesis credits.

- [DH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



## Management

This sub-plan is limited to students completing the program under Plan A or Plan C.

The Management Track coursework can be taken on-line or on campus. Courses in the management track provide students with the knowledge and skills necessary for healthcare industry careers such as sales, marketing and professional relations management, management of large dental clinics, practice management consulting, and entrepreneurship.

### Management Track Curriculum (27 credits)

In addition to the 11 MSDH core credits, Plan A students take 27 credits (17 course credits and 10 thesis credits), and Plan C students take 27 credits (19 course credits and 8 project credits) to complete the 38-credit minimum.

#### Management Track Core Courses (9 Credits)

All Management track students take the following courses for a total of 9 credits:

[MBA 6030](#) - Financial Accounting (3.0 cr)

[MBA 6210](#) - Marketing Management (3.0 cr)

[MBA 6220](#) - Supply Chain & Operations (3.0 cr)

#### MBA Electives (8 to 10 Credits)

Plan A students select at least 8 credits, and Plan C students select at least 10 credits, from the following list in consultation with the advisor. Alternative courses may be taken with advisor approval.

[ENTR 6020](#) - Business Formation (4.0 cr)

[HRIR 6301](#) - Staffing, Training, and Development (4.0 cr)

[MBA 6300](#) - Strategic Management (3.0 cr)

[MILI 6235](#) - Pharmaceutical Industry: Business and Policy (2.0 cr)

[MILI 6562](#) - Information Technology in Health Care (2.0 cr)

[MKTG 6051](#) - Marketing Research - Rapid Insights (2.0 cr)

#### Plan A Option (10 Credits)

Plan A students must take 10 masters thesis credits.

[DH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

#### Plan C Option (8 Credits)

Plan C students must take the following courses for a total of 8 credits:

[DH 5201](#) - Management Internship (5.0 cr)

[DH 5203](#) - Capstone Project (3.0 cr)



### **Twin Cities Campus**

## **Dental Therapy M.D.T.**

*Dentistry Primary Care Administration*

### **School of Dentistry**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Division of Dental Therapy, 9-436 Moos Tower, 515 Delaware Street, S.E., Minneapolis, MN 55455

(612-625-4310; fax: 612-626-6096)

Email: [atki0094@umn.edu](mailto:atki0094@umn.edu)

Website: [http://www.dentistry.umn.edu/programs\\_admissions/DentalTherapyPrograms/home.html](http://www.dentistry.umn.edu/programs_admissions/DentalTherapyPrograms/home.html)

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 91
- This program requires summer semesters for timely completion.
- Degree: Master of Dental Therapy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The M.D.T. program blends a strong dental therapy education with the study of the biological, behavioral, and social sciences. It provides the didactic, laboratory, and clinical experiences required for the assessment and treatment of specified dental procedures. Dental therapy students learn alongside the dental and dental hygiene students with whom they will work with after graduation.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must have a bachelor of science or bachelor of arts degree.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 92
  - Internet Based - Writing Score: 20
  - Internet Based - Reading Score: 20

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan C:** Plan C requires 91 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

#### **Required courses**

DT 5210 *{Inactive}*(1.0 - 3.0 cr)

DT 5330 *{Inactive}*(3.0 cr)

[DT 5429](#) - Introduction to Psychomotor Skill Development (1.0 cr)



- DT 5430 - Oral Anatomy (2.0 cr)
- DT 5431 - Oral Anatomy Laboratory (3.0 cr)
- DT 5521 *{Inactive}*(1.0 cr)
- DT 5212 *{Inactive}*(2.0 cr)
- DT 5230 *{Inactive}*(2.0 cr)
- DT 5250 *{Inactive}*(2.0 cr)
- DT 5331 *{Inactive}*(2.0 cr)
- DT 5332 *{Inactive}*(3.0 cr)
- DT 5410 - Biomaterials Science I (1.0 cr)
- DT 5110 *{Inactive}*(1.0 cr)
- DT 5135 - Preclinical Pediatric Dentistry (2.0 cr)
- DT 5211 *{Inactive}*(2.0 cr)
- DT 5232 *{Inactive}*(0.0 cr)
- DT 5251 *{Inactive}*(1.0 cr)
- DT 5432 - Operative Dentistry I (1.0 cr)
- DT 5433 - Operative Dentistry I Pre-Clinic Laboratory (2.0 cr)
- DT 5140 - Preventive Pediatric Dental Clinic (1.0 cr)
- DT 5231 *{Inactive}*(1.0 cr)
- DT 5333 *{Inactive}*(3.0 cr)
- DT 5334W *{Inactive}*[WI] (4.0 cr)
- DT 5336 *{Inactive}*(1.0 cr)
- DT 5434 - Operative Dentistry II Lecture (1.0 cr)
- DT 5471 - Prosthodontic Topics for Dental Therapy (2.0 cr)
- DT 5335 *{Inactive}*(2.0 cr)
- DT 5337 *{Inactive}*(2.0 cr)
- DT 5338W *{Inactive}*[WI] (3.0 cr)
- DT 5960 - Essentials of Clinical Care II for the Dental Therapist (5.0 - 10.0 cr)
- DT 5460 - Essentials of Clinical Care I For the Dental Therapist (10.0 cr)
- DT 5141 - Clinical Pediatric Dentistry III (2.0 cr)
- DT 5241 - Oral Radiology Clinic II (1.0 cr)
- DT 5320 - Comprehensive Care Clinic (4.0 cr)
- DT 5361 - Outreach Experiences II (2.0 cr)
- DT 5443 - Operative Clinic III (4.0 cr)
- DT 5435 - Operative Dentistry II for the Dental Therapist, Lab (1.0 cr)





### **Twin Cities Campus**

## **Dentistry M.S.**

School of Dentistry - Adm

### **School of Dentistry**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

M.S.-Dentistry Program, 15-136 Moos Tower, 515 Delaware Street, S.E., Minneapolis, MN 55455 (612-624-9900; fax: 612-624-0027)

Email: [msdentistry@umn.edu](mailto:msdentistry@umn.edu)

Website: <http://www.dentistry.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MS program in dentistry prepares dentists with clinical expertise for positions of leadership in education, research, and program administration in the oral health field. A multidisciplinary faculty of dental educators, researchers, and clinicians teach the program, which is housed in the School of Dentistry. All students complete core coursework in teaching and evaluation of dentistry, research methods, and health care administration. Additional advanced coursework is offered in these same focus areas, as well as in selected clinical and oral science topics with multidisciplinary impact, including conscious sedation, craniofacial pain, geriatrics, oral biology, oral medicine and radiology, oral pathology, practice administration, and psychology. Students have flexibility in planning individualized programs to accommodate their specific areas of interest, and courses from other disciplines may be included for credit in the major area.

Students enrolled in an advanced clinical dental training program may be admitted to the dentistry graduate program for concurrent study, but must carefully plan their curriculum with their faculty adviser and the director of graduate studies so that their residency and M.S. programs are appropriately integrated and satisfy University registration requirements. Programs in the School of Dentistry that may enroll students for the MS degree include: General Practice Residency, Endodontics, Geriatrics, Orthodontics, Pediatric dentistry, Periodontics, Prosthodontics and Orofacial Pain

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

DDS/DMD or equivalent from accredited US institution or recognized foreign school. Clinical residency enrollment and 3.0 GPA or rank in top quarter of graduating professional school class preferred.

Other requirements to be completed before admission:

Applicants must submit three letters of recommendation from individuals familiar with their academic capabilities. Also required is a brief essay (under 500 words) which relates the applicant's career goals to the goals of the program. Applications are received and reviewed throughout the year. Students may enter the program in any semester at the discretion of program faculty.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 80
  - Paper Based - Total Score: 600

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Students must complete training in the responsible conduct of research.

### Core Coursework (8-9 Credits)

All students must select at least 8 credits, in consultation with the advisor, from the following list:

#### Required Courses

Three core courses are required.

[GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)

[OBIO 5001](#) - Methods in Research and Writing (2.0 cr)

[PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

#### Health Care Administration Course

At least one course is required.

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

or [PUBH 6724](#) - The Health Care System and Public Health (3.0 cr)

### Plan A Thesis Credits

Plan A students must take at least 10 master's thesis credits.

[DENT 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

### Topics Areas

Students must complete one topic area.

### Periodontology (12 to 22 Credits)

Plan A students pursuing the periodontology topic area must select at least 12 credits, and Plan B students must take at least 22 credits from the following list, in consultation with the advisor:

[ANAT 7999](#) - Head and Neck Anatomy (3.0 cr)

[OSUR 5277](#) - Physical Diagnosis for Oral Surgery Residents (2.0 cr)

[DENT 7102](#) - Conscious Sedation (2.0 cr)

[DENT 8100](#) - Topics in Advanced Periodontology: Literature Review (2.0 cr)

[DENT 7051](#) - Advanced Study in the Theory and Principles of Oral Medicine (2.0 cr)

[OBIO 8012](#) - Basic Concepts in Skeletal Biology (2.0 cr)

[DENT 7061](#) - Special Oral Pathology I (1.0 cr)

[DENT 7062](#) - Special Oral Pathology II (1.0 cr)

[DENT 7052](#) - Oral and Maxillofacial Radiologic Interpretation (2.0 cr)

[DENT 7101](#) - Management Philosophy for Dental Practices (1.0 cr)

[DENT 8101](#) - Dental Implantology: A Multidisciplinary Approach (2.0 cr)

-OR-

### General Practice Residency (12 to 22 Credits)

Plan A students pursuing the general practice residency topic area must select at least 12 credits from the following, in consultation with the advisor. Plan B students must select at least 22 credits from the following and in consultation with the advisor:

[DENT 7051](#) - Advanced Study in the Theory and Principles of Oral Medicine (2.0 cr)

[DENT 7102](#) - Conscious Sedation (2.0 cr)

[DENT 7123](#) - Temporomandibular Disorders and Orofacial Pain (1.0 cr)

[DENT 7052](#) - Oral and Maxillofacial Radiologic Interpretation (2.0 cr)

[DENT 7061](#) - Special Oral Pathology I (1.0 cr)

[DENT 7062](#) - Special Oral Pathology II (1.0 cr)



DENT 7101 - Management Philosophy for Dental Practices (1.0 cr)  
DENT 8121 - Current Literature in TMD and Orofacial Pain (1.0 cr)  
OSUR 5277 - Physical Diagnosis for Oral Surgery Residents (2.0 cr)

-OR-

**TMD, Orofacial Pain & Dental Sleep Medicine (12 to 22 Credits)**

Plan A students pursuing the TMD, orofacial pain and dental sleep medicine topic area must select at least 12 credits, and Plan B students must take at least 22 credits from the following list, in consultation with the advisor:

OSUR 5277 - Physical Diagnosis for Oral Surgery Residents (2.0 cr)  
ANAT 7999 - Head and Neck Anatomy (3.0 cr)  
DENT 8121 - Current Literature in TMD and Orofacial Pain (1.0 cr)  
DENT 7121 - Psychological Issues in Medical and Dental Patient Management (1.0 cr)  
DENT 7052 - Oral and Maxillofacial Radiologic Interpretation (2.0 cr)  
DENT 8120 - Advanced Principles and Techniques of Orofacial Pain Disorders (2.0 cr)  
DENT 7051 - Advanced Study in the Theory and Principles of Oral Medicine (2.0 cr)  
DENT 8123 - Advanced Topics in Orofacial Pain (2.0 cr)

-OR-

**Endodontics (12 to 22 Credits)**

Plan A students pursuing the endodontics topic area must select at least 12 credits from the following, in consultation with the advisor. Plan B students must select at least 22 credits from the following and in consultation with the advisor:

DENT 7102 - Conscious Sedation (2.0 cr)  
DENT 7051 - Advanced Study in the Theory and Principles of Oral Medicine (2.0 cr)  
DENT 7052 - Oral and Maxillofacial Radiologic Interpretation (2.0 cr)  
DENT 7021 - Contemporary Diagnosis and Management of Orofacial Pain (1.0 cr)  
DENT 7062 - Special Oral Pathology II (1.0 cr)  
DENT 7061 - Special Oral Pathology I (1.0 cr)  
ANAT 7999 - Head and Neck Anatomy (3.0 cr)  
DENT 7101 - Management Philosophy for Dental Practices (1.0 cr)  
OSUR 5277 - Physical Diagnosis for Oral Surgery Residents (2.0 cr)

-OR-

**Prosthodontics (12 to 22 Credits)**

Plan A students pursuing the prosthodontics topic area must select at least 12 credits, and Plan B students must take at least 22 credits from the following list, in consultation with the advisor:

ANAT 7999 - Head and Neck Anatomy (3.0 cr)  
DENT 7220 - Prosthetically-Driven Implant Surgery and Treatment Planning (1.0 cr)  
DENT 7102 - Conscious Sedation (2.0 cr)  
DENT 7112 - Treatment Planning Seminar (2.0 cr)  
DENT 7111 - Current Literature Review in Dentistry (2.0 cr)  
DENT 7052 - Oral and Maxillofacial Radiologic Interpretation (2.0 cr)  
DENT 8101 - Dental Implantology: A Multidisciplinary Approach (2.0 cr)  
DENT 7411 - Dental Biomaterials in Prosthodontics (1.0 cr)  
DENT 7123 - Temporomandibular Disorders and Orofacial Pain (1.0 cr)  
DENT 7061 - Special Oral Pathology I (1.0 cr)  
DENT 7062 - Special Oral Pathology II (1.0 cr)  
PERO 7321 - Periodontics/Orthodontics Seminar (1.0 cr)  
PERO 7322 - Multidisciplinary Treatment Seminar in Dentistry Related to Periodontics (1.0 cr)  
DENT 7051 - Advanced Study in the Theory and Principles of Oral Medicine (2.0 cr)  
DENT 7101 - Management Philosophy for Dental Practices (1.0 cr)  
OSUR 5277 - Physical Diagnosis for Oral Surgery Residents (2.0 cr)

-OR-

**Orthodontics (12 to 22 Credits)**

Plan A students pursuing the orthodontics topic area must select at least 12 credits from the following, in consultation with the advisor. Plan B students must select at least 22 credits from the following and in consultation with the advisor:

ANAT 7999 - Head and Neck Anatomy (3.0 cr)  
DENT 8091 - Interdisciplinary Care of the Cleft Palate Patient (1.0 cr)  
DENT 7061 - Special Oral Pathology I (1.0 cr)  
PERO 7321 - Periodontics/Orthodontics Seminar (1.0 cr)  
DENT 7062 - Special Oral Pathology II (1.0 cr)  
DENT 8081 - Clinical Topics in TMD (2.0 cr)  
OBIO 8012 - Basic Concepts in Skeletal Biology (2.0 cr)  
DENT 7082 - Craniofacial Growth and Development (2.0 cr)



### **Twin Cities Campus**

## **Oral Biology M.S.**

School of Dentistry - Adm

### **School of Dentistry**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Dentistry, 17-164 Moos Tower, 515 Delaware Street, S.E., Minneapolis, MN 55455 (612-626-4483; fax: 612-626-2651)

Email: [oralbio@umn.edu](mailto:oralbio@umn.edu)

Website: <http://www.oralbiology.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The interdisciplinary Oral Biology Program is offered by the School of Dentistry with cooperating faculty in the Medical School, College of Pharmacy, and Veterinary Medicine. It gives students research skills and a broad understanding of the development, structure, function, and pathology of the orofacial region. Students are encouraged to focus in one of five areas of emphasis: biomaterials and biomechanics; epithelial biology and carcinogenesis; microbiology and immunology; sensory neuroscience; and bone biology, craniofacial development, and tissue engineering. An exceptional student can create his/her own area of emphasis or specialize in topics not listed here; students should discuss their interests with the director of graduate studies before applying. Curricula are designed to allow considerable flexibility in planning individual programs to accommodate specific areas of interest; courses from other disciplines may be included as part of the major.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants must submit 1) scores from the General Test of the GRE, 2) three letters of recommendation from persons who can comment authoritatively about the applicant's potential for a research and academic career, 3) a clearly written personal statement (one to two pages) describing career goals, 4) an essay describing research aspirations (one to two pages), and 5) a résumé highlighting research experience and accomplishments.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 153
  - General Test - Quantitative Reasoning: 148
  - General Test - Analytical Writing: 4

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 90
  - Internet Based - Writing Score: 25
  - Internet Based - Reading Score: 25
- IELTS
  - Total Score: 6.5

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

The MS in oral biology is intended for individuals who are currently involved in a research laboratory or program and are seeking to increase their scientific perspectives. This program generally requires a minimum of two years to complete.

Courses in the major may be taken from other disciplines with the approval of the advisor and the director of graduate studies.

Students must also complete a minor in an associated non-clinical discipline (minimum 6 credits).

### Program Requirements

#### Required Coursework (4 Credits)

Select at least 4 credits from the following list, in consultation with the advisor:

[OBIO 8012](#) - Basic Concepts in Skeletal Biology (2.0 cr)

[OBIO 8018](#) - Topics in Oral Pathobiology (2.0 cr)

[OBIO 8021](#) - Oral Microbiology (2.0 cr)

[OBIO 8022](#) - Oral Neuroscience (2.0 cr)

[OBIO 8023](#) - Physical Biology of the Oral Cavity (2.0 cr)

[OBIO 8024](#) - Genetics and Human Disease (1.0 cr)

[OBIO 8025](#) - Topics in Cariology (2.0 cr)

[OBIO 8026](#) - Salivary Glands and Secretions (2.0 cr)

[OBIO 8027](#) - Biomaterials in Regenerative Dentistry (2.0 cr)

[OBIO 8028](#) - Molecular Basis of Cellular and Microbial Adhesion (2.0 cr)

[OBIO 8371](#) - Mucosal Immunobiology (3.0 cr)

#### Oral Biology Seminar (4 Credits)

Registration and participation in the oral biology student seminar series each semester is required. Take OBIO 8030 four times for a total of 4 credits.

[OBIO 8030](#) - Oral Biology Seminar (1.0 cr)

#### Electives (6 Credits)

Select at least 6 credits, in consultation with director of graduate studies.

#### Required Minor (6 Credits)

Students must complete a graduate minor in a complementary, non-clinical discipline. At least 6 minor field credits are required.

Confer with the director of graduate studies for the minor field to determine additional requirements.

#### Thesis Credits (10 Credits)

Take at least 10 master's thesis credits.

[OBIO 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Oral Biology Minor**

School of Dentistry - Adm

### **School of Dentistry**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Dentistry, 17-164 Moos Tower, 515 Delaware Street, S.E., Minneapolis, MN 55455 (612-626-4483; fax 612-626-2651)

Email: [oralbio@umn.edu](mailto:oralbio@umn.edu)

Website: <http://www.oralbiology.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The interdisciplinary oral biology program is offered by the School of Dentistry with cooperating faculty in the Medical School, College of Pharmacy, and Veterinary Medicine. It gives students research skills and a broad understanding of the development, structure, function, and pathology of the orofacial region. Students are encouraged to focus in one of five areas of emphasis: biomaterials and biomechanics; epithelial biology and carcinogenesis; microbiology and immunology; sensory neuroscience; and bone biology, craniofacial development, and tissue engineering. An exceptional student can create their own area of emphasis or specialize in topics not listed here; students should discuss their interests with the director of graduate studies before applying. Curricula are designed to allow considerable flexibility in planning individual programs to accommodate specific areas of interest.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

#### **Required Coursework (4-8 Credits)**

Master's students must select at least 4 credits, and doctoral students must select at least 8 credits, from the following list in consultation with the oral biology director of graduate studies.

- [OBIO 8012](#) - Basic Concepts in Skeletal Biology (2.0 cr)
- [OBIO 8018](#) - Topics in Oral Pathobiology (2.0 cr)
- [OBIO 8021](#) - Oral Microbiology (2.0 cr)
- [OBIO 8022](#) - Oral Neuroscience (2.0 cr)
- [OBIO 8023](#) - Physical Biology of the Oral Cavity (2.0 cr)
- [OBIO 8024](#) - Genetics and Human Disease (1.0 cr)
- [OBIO 8025](#) - Topics in Cariology (2.0 cr)
- [OBIO 8026](#) - Salivary Glands and Secretions (2.0 cr)
- [OBIO 8027](#) - Biomaterials in Regenerative Dentistry (2.0 cr)
- [OBIO 8028](#) - Molecular Basis of Cellular and Microbial Adhesion (2.0 cr)
- [OBIO 8371](#) - Mucosal Immunobiology (3.0 cr)

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.



Students may not complete the program with more than one sub-plan.

**Masters**

**Electives (2 credits)**

Select at least 2 credits, in consultation with the oral biology director of graduate studies, to meet the 6-credit minimum for the master's minor.

**Doctoral**

**Electives (4 credits)**

Select at least 4 credits, in consultation with the oral biology director of graduate studies, to meet the 12-credit minimum for the doctoral minor.



### **Twin Cities Campus**

## **Oral Biology Ph.D.**

School of Dentistry - Adm

### **School of Dentistry**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Dentistry, 17-164 Moos Tower, 515 Delaware Street, S.E., Minneapolis, MN 55455 (612-626-4483; fax:612-626-2651)

Email: [oralbio@umn.edu](mailto:oralbio@umn.edu)

Website: <http://www.oralbiology.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 55 to 61
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The interdisciplinary graduate program in oral biology is offered by the School of Dentistry with cooperating faculty in the Medical School, College of Pharmacy, and Veterinary Medicine. It gives students research skills and a broad understanding of the development, structure, function, and pathology of the orofacial region. Students are encouraged to focus in one of five areas of emphasis: biomaterials and biomechanics; epithelial biology and carcinogenesis; microbiology and immunology; sensory neuroscience; and bone biology, craniofacial development, and tissue engineering. An exceptional student can create his/her own area of emphasis or specialize in topics not listed here; students should discuss their interests with the director of graduate studies before applying. Curricula are designed to allow considerable flexibility in planning individual programs to accommodate specific areas of interest; courses from other disciplines may be included as part of the major.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Applicants must submit 1) scores from the General Test of the GRE, 2) three letters of recommendation from persons who can comment authoritatively about the applicant's potential for a research and academic career, 3) a clearly written personal statement (one to two pages) describing career goals, 4) an essay describing research aspirations (one to two pages), and 5) a résumé highlighting research experience and accomplishments. For D.D.S./Ph.D. applicants who are U.S. citizens, resident aliens, or Canadian citizens, U.S. or Canadian Dental Admission Test (DAT) scores at or above the national average will be accepted in lieu of the GRE. Applicants who have graduated from U.S. or Canadian dental or medical schools within three years of their application to the Ph.D. program may request that previous U.S. or Canadian DAT or MCAT scores be considered in lieu of the GRE.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 153
  - General Test - Quantitative Reasoning: 148
  - General Test - Analytical Writing: 4

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 90
  - Internet Based - Writing Score: 25
  - Internet Based - Reading Score: 25
- IELTS
  - Total Score: 6.5

The preferred English language test is Test of English as Foreign Language





Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

19 to 25 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Completion of a minor in a complementary, non-clinical discipline is required.

### Program Requirements

Courses may be selected from departments and programs outside oral biology with approval of the advisor and director of graduate studies.

#### Oral Biology Topics Courses (8 Credits)

Select at least 8 credits from the following list:

[OBIO 8012](#) - Basic Concepts in Skeletal Biology (2.0 cr)

[OBIO 8018](#) - Topics in Oral Pathobiology (2.0 cr)

[OBIO 8021](#) - Oral Microbiology (2.0 cr)

[OBIO 8022](#) - Oral Neuroscience (2.0 cr)

[OBIO 8023](#) - Physical Biology of the Oral Cavity (2.0 cr)

[OBIO 8024](#) - Genetics and Human Disease (1.0 cr)

[OBIO 8025](#) - Topics in Cariology (2.0 cr)

[OBIO 8026](#) - Salivary Glands and Secretions (2.0 cr)

[OBIO 8027](#) - Biomaterials in Regenerative Dentistry (2.0 cr)

[OBIO 8028](#) - Molecular Basis of Cellular and Microbial Adhesion (2.0 cr)

[OBIO 8371](#) - Mucosal Immunobiology (3.0 cr)

#### Oral Biology Seminar (8 Credits)

Take the following seminar eight times for a total of 8 credits:

[OBIO 8030](#) - Oral Biology Seminar (1.0 cr)

#### Statistics Course (3 Credits)

Take at least one course from the following list:

[STAT 5021](#) - Statistical Analysis (4.0 cr)

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[PUBH 7445](#) - Statistics for Human Genetics and Molecular Biology (3.0 cr)

#### Required Minor (12 Credits)

Students must complete a non-clinical minor in the basic sciences or public health. At least 12 minor field credits are required. Confer with the director of graduate studies for the minor field to determine additional requirements.

#### Thesis Credits (24 Credits)

Take at least 24 doctoral thesis credits.

[OBIO 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:** Doctor of Dental Surgery DDS/Oral Biology PhD



### **Twin Cities Campus**

## **Biochemistry, Molecular Biology and Biophysics M.S.**

*Biochemistry, Molecular Biology, & Biophysics TCBS*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Biochemistry, Molecular Biology and Biophysics

6-155 Jackson Hall

321 Church St. SE

Minneapolis, MN 55455

612-625-6100

Email: [bmbbqp@umn.edu](mailto:bmbbqp@umn.edu)

Website: <http://cbs.umn.edu/academics/departments/bmbb/graduate-program/about-graduate-program>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The biochemistry, molecular biology and biophysics (BMBB) graduate program is an interdisciplinary program that is supported by the College of Biological Sciences (CBS) and the Medical School of the University of Minnesota. The program provides a broad research-based education involving faculty from BMBB, as well as many faculty members from several other departments in CBS, the Medical School, the College of Science and Engineering (CSE), the College of Food, Agricultural and Natural Resources Sciences (CFANS), and the College of Veterinary Medicine.

BMBB focuses on determining the molecular mechanisms that underlie basic biological functions using an integrated approach that encompasses biochemistry, chemistry, biophysics, genomics, molecular biology, proteomics, and structural biology. Special emphasis is placed on revealing how biological processes go awry in diseases including cancer, diabetes, heart disease, and AIDS. The program has four areas of emphasis: synthetic biology and biotechnology, molecular biology, metabolic and systems biology, and chemical and structural biology. All students are expected to demonstrate a minimum level of competence in these areas, but will emphasize the area most related to their thesis project.

While graduate training in a BMBB laboratory involves first-year coursework and associated preliminary examinations, the focal point for graduate education is thesis research. Laboratory-based exploration coupled with journal clubs, seminars, scientific meetings and retreats, career counseling, and scientific ethics constitutes the major components of the program. Support for graduate education comes from a variety of sources but is augmented by several NIH and NSF-based training grants. Most graduate students from the University of Minnesota obtain full-time employment immediately after graduation or pursue advanced training in academic or corporate positions.

Students pursuing a degree in BMBB are only admitted to the PhD program (see note below) under the auspices of Molecular, Cellular and Structural Biology (MCSB), a first-year program administered by BMBB and the Molecular, Cellular, Developmental Biology and Genetics (MCDB&G) graduate programs. After the first year, students select either BMBB or MCDB&G to complete their degree.

Note: One cannot apply for admission to the master's degree in BMBB. Students are only admitted to the BMBB PhD program. Alternative, related master's degree programs that admit students are the master's of biological Sciences (MBS) (<http://cce.umn.edu/master-of-biological-sciences>) and the master's in microbial engineering (<http://bti.umn.edu/MicE/>).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The program can accommodate for a variety of educational backgrounds. However, applications from students with an undergraduate degree in the biological, chemical, or physical sciences are encouraged.



The program can accommodate for a variety of educational backgrounds. However, applications from students with an advanced degree in the biological, chemical, or physical sciences are encouraged.

Other requirements to be completed before admission:

Recommended academic preparation includes one year each of calculus, organic chemistry, and basic biology, including biochemistry and genetics. For students of demonstrated ability, background deficiencies can be made up during the first year of graduate study.

Successful applicants must have previous research experience in an academic or industrial setting, in addition to any course-related laboratory experiences. It is important to demonstrate familiarity, with an aptitude for basic science research prior to embarking on a graduate career in this program.

\*\*\*Note: Students are admitted only to the PhD program for BMBB (see additional note below).

#### **Special Application Requirements:**

Additionally, applicants must submit three letters of recommendation from persons familiar with their academic and research capabilities. A statement of interests and goals, a complete set of transcripts, and official scores from the General Test of the GRE are required. The GRE Subject Test in biochemistry, cell and molecular biology, biology, or chemistry is strongly recommended, but not required.

The deadline to submit a completed application is December 1. Completed files are reviewed between January and February. Graduate studies begin fall semester only.

Note: One cannot apply for admission to the master's degree in BMBB. Students are only admitted to the BMBB PhD program. Alternative, related master's degree programs that admit students are the Master of Biological Sciences (MBS) (<http://cce.umn.edu/master-of-biological-sciences>) and the Master in Microbial Engineering (<http://bti.umn.edu/MicE/>).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

All students are expected to participate in seminars involving student reports on current literature and research.

#### **Biochemistry Core (1 Credit)**

Take the following core course for 1 credit:

[BIOC 8401](#) - Ethics, Public Policy, and Careers in Molecular and Cellular Biology (1.0 cr)

#### **Laboratory and Field Course (1 Credit)**

Take MCDG 8920 for at least 1 credit. In August of the first year, BMBB students must register for this hands-on, intensive lab course that takes place at the Itasca Biological Station and Laboratories, which provides first-year students with exposure to a range of modern methods and model systems.

[MCDG 8920](#) - Special Topics (1.0 - 4.0 cr)

#### **Module Options (6 Credits)**

Complete 6 credits in consultation with the director of graduate studies.

[BIOC 5535](#) - Introduction to Modern Structural Biology -- Diffraction (2.0 cr)

[BIOC 5536](#) - Introduction to Modern Structural Biology - Nuclear Magnetic Resonance (2.0 cr)

[BIOC 8005](#) - Biochemistry: Structure and Catalysis (2.0 cr)

[BIOC 8006](#) - Biochemistry: Metabolism and Control (2.0 cr)

[BIOC 8007](#) - Molecular Biology of DNA (2.0 cr)

[BIOC 8008](#) - Molecular Biology of RNA (2.0 cr)

#### **Electives (12 Credits)**

Take 12 credits of coursework in one of the four BMBB emphases: synthetic biology and biotechnology, molecular biology, metabolic and systems biology, or chemical and structural biology. Courses from disciplines other than BMBB, in consultation with the advisor, may be used to build an emphasis.



Take 12 or more credit(s) from the following:

- [BIOC 5213](#) - Selected Topics in Molecular Biology (3.0 cr)
- [BIOC 5216](#) - Current Topics in Signal Transduction (2.0 cr)
- [BIOC 5309](#) - Biocatalysis and Biodegradation (3.0 cr)
- [BIOC 5351](#) - Protein Engineering (3.0 cr)
- [BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)
- [BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)
- [BIOC 5444](#) - Muscle (3.0 cr)
- [BIOC 5527](#) - Introduction to Modern Structural Biology (4.0 cr)
- [BIOC 5528](#) - Spectroscopy and Kinetics (4.0 cr)
- [BIOC 8084](#) - Research and Literature Reports (1.0 cr)
- [BIOC 8184](#) - Graduate Seminar (1.0 cr)
- [BIOL 8100](#) - Improvisation for Scientists (1.0 cr)
- [CHEM 8011](#) - Mechanisms of Chemical Reactions (4.0 cr)
- [CHEM 8021](#) - Computational Chemistry (4.0 cr)
- [CHEM 8411](#) - Introduction to Chemical Biology (4.0 cr)
- [CHEM 8412](#) - Chemical Biology of Enzymes (4.0 cr)
- [CHEM 8735](#) - Bioinorganic Chemistry (4.0 cr)
- [CHEN 8754](#) - Systems Analysis of Biological Processes (3.0 cr)
- [CSCI 5461](#) - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- [GCD 5005](#) - Computer Programming for Biology (3.0 cr)
- [GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)
- [GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)
- [GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- [GRAD 5102](#) - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)
- [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)
- [GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)
- [MICA 8002](#) - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
- [MICA 8003](#) - Immunity and Immunopathology (4.0 cr)
- [MICA 8004](#) - Cellular and Cancer Biology (4.0 cr)
- [MICA 8010](#) - Microbial Pathogenesis (3.0 cr)
- [MICA 8013](#) - Translational Cancer Research (2.0 cr)
- [PHCL 5111](#) - Pharmacogenomics (3.0 cr)
- [PUBH 6450](#) - Biostatistics I (4.0 cr)
- [PUBH 7445](#) - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- [SCB 8181](#) - Stem Cell Biology (3.0 cr)
- [STAT 5021](#) - Statistical Analysis (4.0 cr)

#### Thesis Credits

Take at least 10 master's thesis credits.

- [BIOC 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Biochemistry, Molecular Biology and Biophysics Minor**

*Biochemistry, Molecular Biology, & Biophysics TCBS*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Biochemistry, Molecular Biology and Biophysics

6-155 Jackson Hall

321 Church St. SE

Minneapolis, MN 55455

612-625-6100

Email: [bmbbqp@umn.edu](mailto:bmbbqp@umn.edu)

Website: <http://cbs.umn.edu/academics/departments/bmbb/graduate-program/about-graduate-program>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The biochemistry, molecular biology and biophysics (BMBB) program is an interdisciplinary program that is supported by the College of Biological Sciences (CBS) and the Medical School of the University of Minnesota. The program provides a broad research-based education involving faculty from BMBB as well as many faculty members from several other departments in CBS, the Medical School, the College of Science and Engineering (CSE), the College of Food, Agricultural and Natural Resources Sciences (CFANS), and the College of Veterinary Medicine.

BMBB focuses on determining the molecular mechanisms that underlie basic biological functions using an integrated approach that encompasses biochemistry, chemistry, biophysics, genomics, molecular biology, proteomics, and structural biology. Special emphasis is placed on revealing how biological processes go awry in diseases including cancer, diabetes, heart disease, and AIDS. The program has four areas of emphasis: synthetic biology and biotechnology, molecular biology, metabolic and systems biology, and chemical and structural biology. All students are expected to demonstrate a minimum level of competence in these areas, but will emphasize the area most related to their thesis project.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **Required Courses (6 Credits)**

Select at least six credits of BMBB coursework, chosen in consultation with the BMBB director of graduate studies. In extenuating cases, an alternative course may be substituted with the approval of the director of graduate studies.



BIOC 5xxx  
BIOC 6xxx  
BIOC 7xxx  
BIOC 8xxx

**Doctoral**

**Module Options (6 Credits)**

Take at least 6 credits from the following, in consultation with the BMBB director of graduate studies.

- [BIOC 5535](#) - Introduction to Modern Structural Biology -- Diffraction (2.0 cr)
- [BIOC 5536](#) - Introduction to Modern Structural Biology - Nuclear Magnetic Resonance (2.0 cr)
- [BIOC 8005](#) - Biochemistry: Structure and Catalysis (2.0 cr)
- [BIOC 8006](#) - Biochemistry: Metabolism and Control (2.0 cr)
- [BIOC 8007](#) - Molecular Biology of DNA (2.0 cr)
- [BIOC 8008](#) - Molecular Biology of RNA (2.0 cr)

**Biochemistry Electives (6 Credits)**

Take at least six credits, chosen in consultation with the BMBB director of graduate studies, to complete the 12-credit requirement. In extenuating cases, an alternative course may be substituted with the approval of the director of graduate studies.

- BIOC 5xxx
- BIOC 6xxx
- BIOC 7xxx
- BIOC 8xxx
- [GCD 5036](#) - Molecular Cell Biology (3.0 cr)



### ***Twin Cities Campus***

## **Biochemistry, Molecular Biology and Biophysics Ph.D.**

*Biochemistry, Molecular Biology, & Biophysics TCBS*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Biochemistry, Molecular Biology and Biophysics

6-155 Jackson Hall

321 Church St. SE

Minneapolis, MN 55455

612-625-6100

Email: [bmbbqp@umn.edu](mailto:bmbbqp@umn.edu)

Website: <http://cbs.umn.edu/academics/departments/bmbb/graduate-program/about-graduate-program>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Biochemistry, Molecular Biology and Biophysics (BMBB) graduate program is an interdisciplinary program that is supported by the College of Biological Sciences (CBS) and the Medical School of the University of Minnesota. The program provides a broad research-based education involving faculty from BMBB as well as many faculty members from several other departments in CBS, the Medical School, the College of Science and Engineering (CSE), the College of Food, Agricultural and Natural Resources Sciences (CFANS), and the College of Veterinary Medicine.

BMBB focuses on determining the molecular mechanisms that underlie basic biological functions using an integrated approach that encompasses biochemistry, chemistry, biophysics, genomics, molecular biology, proteomics, and structural biology. Special emphasis is placed on revealing how biological processes go awry in diseases including cancer, diabetes, heart disease, and AIDS. The program has four areas of emphasis: synthetic biology and biotechnology, molecular biology, metabolic and systems biology, and chemical and structural biology. All students are expected to demonstrate a minimum level of competence in these areas but will emphasize the area most related to their thesis project.

While graduate training in a BMBB laboratory involves first-year coursework and associated preliminary examinations, the focal point for graduate education is thesis research. Laboratory-based exploration coupled with journal clubs, seminars, scientific meetings and retreats, career counseling and scientific ethics constitutes the major components of the program. Support for graduate education comes from a variety of sources but is augmented by several NIH and NSF-based training grants. PhD graduates from the University of Minnesota obtain full-time employment immediately after graduation or pursue advanced training in academic or corporate postdoctoral positions.

Students pursuing the PhD are admitted to BMBB under the auspices of Molecular, Cellular and Structural Biology (MCSB), a first year program administered by BMBB and the Molecular, Cellular, Developmental Biology and Genetics (MCDB&G) graduate programs. After the first year, students select either BMBB or MCDB&G to complete their degree.

Related PhD and MS programs in BMBB:

As a part of the BMBB program, graduate studies leading to a PhD degree may be pursued on the Duluth campus. A PhD in BMBB may also be obtained through the Combined MD-PhD program. Please visit the program website for more information (<http://www.med.umn.edu/mdphd/index.htm>).

Note: One cannot apply for admission to the master's degree in BMBB. Students are only admitted to the BMBB PhD program. Alternative, related master's degree programs that admit students are the master's of biological sciences (MBS) (<http://cce.umn.edu/master-of-biological-sciences>) and the master's in microbial engineering (<http://bti.umn.edu/MicE/>).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)



## Prerequisites for Admission

The program can accommodate a variety of educational backgrounds. However, applications from students with an undergraduate degree in the biological, chemical, or physical sciences are encouraged.

The program can accommodate a variety of educational backgrounds. However, applications from students with an advanced degree in the biological, chemical, or physical sciences are encouraged.

Other requirements to be completed before admission:

Recommended academic preparation includes one year each of calculus, organic chemistry, and basic biology, including biochemistry and genetics. For students of demonstrated ability, background deficiencies can be made up during the first year of graduate study. Successful applicants must have previous research experience in an academic or industrial setting in addition to any course-related laboratory experiences. It is important to demonstrate an aptitude for basic science research prior to embarking on a graduate career in this program.

### Special Application Requirements:

Additionally, applicants must submit three letters of recommendation from persons familiar with their academic and research capabilities. A statement of interests and goals, and a complete set of transcripts are required. The deadline to submit a completed application is December 1. Completed files are reviewed between January and February. Graduate studies begin fall semester only. Related Ph.D. and M.S. Programs in BMBB: As a part of the BMBB program, graduate studies leading to a PhD degree may be pursued on the Duluth Campus. A PhD in BMBB may also be obtained through the Combined MD-PhD Program. Please visit the program website for more information (<http://www.med.umn.edu/mdphd/index.htm>). Note: One cannot apply for admission to the master's degree in BMBB. Students are only admitted to the BMBB PhD program. Alternative, related master's degree programs that admit students are the Master of Biological Sciences (MBS) (<http://cce.umn.edu/master-of-biological-sciences>) and the Master in Microbial Engineering (<http://bti.umn.edu/MicE/>). For an online application or for more information about graduate education admissions, see the General Information section of this website.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Students must complete three seminar presentations and two teaching assignments between years 2 and 4.

Students must register for BIOC 8084 or BIOC 8184 each semester until the 24 course credits identified in the Biochemistry Required Coursework and the Emphasis Electives course lists below have been completed.

### Biochemistry Required Coursework (12 Credits)

Complete the following core courses. MCDG 8920 must be taken for two credits.

[BIOC 5002](#) - Critical Evaluation of Biochemistry Research (1.0 cr)

[BIOC 8401](#) - Ethics, Public Policy, and Careers in Molecular and Cellular Biology (1.0 cr)

[MCDG 8920](#) - Special Topics (1.0 - 4.0 cr)

[BIOC 8084](#) - Research and Literature Reports (1.0 cr)

[BIOC 8184](#) - Graduate Seminar (1.0 cr)

Complete six credits, in consultation with the director of graduate studies, from the following list:

[BIOC 5535](#) - Introduction to Modern Structural Biology -- Diffraction (2.0 cr)

[BIOC 5536](#) - Introduction to Modern Structural Biology - Nuclear Magnetic Resonance (2.0 cr)

[BIOC 8005](#) - Biochemistry: Structure and Catalysis (2.0 cr)

[BIOC 8006](#) - Biochemistry: Metabolism and Control (2.0 cr)

[BIOC 8007](#) - Molecular Biology of DNA (2.0 cr)

[BIOC 8008](#) - Molecular Biology of RNA (2.0 cr)





### Emphasis Electives (12 Credits)

Complete 12 credits of coursework, in consultation with the advisor, from one of the four BMBB emphases: synthetic biology and biotechnology, molecular biology, metabolic and systems biology, or chemical biology and structural biology. Non-BMBB courses may be used to build an emphasis with advisor and director of graduate studies approval.

- BIOC 5213 - Selected Topics in Molecular Biology (3.0 cr)
- BIOC 5216 - Current Topics in Signal Transduction (2.0 cr)
- BIOC 5309 - Biocatalysis and Biodegradation (3.0 cr)
- BIOC 5351 - Protein Engineering (3.0 cr)
- BIOC 5352 - Biotechnology and Bioengineering for Biochemists (3.0 cr)
- BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)
- BIOC 5444 - Muscle (3.0 cr)
- BIOC 5527 - Introduction to Modern Structural Biology (4.0 cr)
- BIOC 5528 - Spectroscopy and Kinetics (4.0 cr)
- BIOC 8084 - Research and Literature Reports (1.0 cr)
- BIOC 8184 - Graduate Seminar (1.0 cr)
- BIOL 8100 - Improvisation for Scientists (1.0 cr)
- CHEM 8011 - Mechanisms of Chemical Reactions (4.0 cr)
- CHEM 8021 - Computational Chemistry (4.0 cr)
- CHEM 8411 - Introduction to Chemical Biology (4.0 cr)
- CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)
- CHEM 8735 - Bioinorganic Chemistry (4.0 cr)
- CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)
- CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- GCD 5005 - Computer Programming for Biology (3.0 cr)
- GCD 8008 - Mammalian Gene Transfer and Genome Engineering (2.0 cr)
- GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)
- GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- GRAD 5102 - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)
- MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
- MICA 8003 - Immunity and Immunopathology (4.0 cr)
- MICA 8004 - Cellular and Cancer Biology (4.0 cr)
- MICA 8010 - Microbial Pathogenesis (3.0 cr)
- MICA 8013 - Translational Cancer Research (2.0 cr)
- PHCL 5111 - Pharmacogenomics (3.0 cr)
- PUBH 6450 - Biostatistics I (4.0 cr)
- PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- SCB 8181 - Stem Cell Biology (3.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)

### Thesis Credits

Take 24 doctoral thesis credits.

- BIOC 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:** MD/PhD-Biochemistry, Molecular Biology and Biophysics Student may take a total of 18 credits in common among the academic programs.



### *Twin Cities Campus*

## Bioethics M.A.

*Bioethics, Center for*

**Graduate School**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Center for Bioethics, University of Minnesota, Suite N504 Boynton, 410 Church Street SE, Minneapolis, MN 55455 (612-624-9440; fax: 612-624-9108)

Email: [bthxed@umn.edu](mailto:bthxed@umn.edu)

Website: <http://www.bioethics.umn.edu/education/master-arts-bioethics>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Admissions for the Bioethics MA Program are currently on hold. Please contact [bthxed@umn.edu](mailto:bthxed@umn.edu) for updates.

The Center for Bioethics offers two kinds of MA degrees: Plan A and Plan B with a major in bioethics. The curriculum for both Plan A and Plan B degrees includes a set of required core courses, bioethics electives, and a requirement for coursework in fields related to bioethics. The Plan A culminates in a substantial, 10-credit master's thesis. In lieu of a thesis, the Plan B culminates in a 4-credit practicum, a 3-credit capstone project and final exam. Electives comprise the additional 3 credits in the Plan B degree.

Graduates of the MA in bioethics greatly enhance their professional opportunities in the field when they combine their bioethics degree with a terminal graduate or professional degree in another field. Examples of degree combinations can include an MA degree in bioethics with a JD, PhD, MD, nursing, or others. This model of pairing the MA in bioethics with another degree prompts students to acquire a firm disciplinary grounding as well as interdisciplinary bioethics expertise, a practice which best prepares students for the interdisciplinary career options related to bioethics. Some examples of careers include work in the fields of genetics, social work, public health, veterinary science, religious studies, psychology, biology and philosophy.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree is required for admission.

### **Special Application Requirements:**

Transcripts of all postsecondary academic work, a personal statement, a writing sample (preferably on a topic in bioethics), a description of research or relevant work experience, a C.V. or résumé, and at least three letters of reference are required. Applicants may also submit a statement on "Extenuating Circumstances" and "Diversity." See program website for more details.

Students are admitted to the Bioethics M.A. program for fall semester only. Applications are accepted as early as the first day of fall semester prior to the proposed start of the student's M.A. program. Our primary deadline is March 1 with an extended deadline of May 1 if space in our program remains available.

Students are encouraged to link their degree in bioethics to a degree in a related field (either before entering the bioethics M.A. program or at the same time). Given the fundamentally interdisciplinary nature of bioethics, prospective students are advised against viewing the bioethics M.A. as a stand-alone degree that prepares them for career placement. This model prompts students to acquire a firm disciplinary grounding as well as interdisciplinary bioethics expertise--a practice that best prepares students for bioethics-related career placement. Thus, the admissions process will give preference to students who have already earned or are in the process of earning an advanced degree in a related field, although this will not strictly be required for admission.



Because our program recommends pairing the Bioethics degree with another graduate or professional degree, we recognize applicants may need to answer to another program prior to our deadline. If this is the case, please email [bthxed@umn.edu](mailto:bthxed@umn.edu) with your concern.

Applicants must submit their test score(s) from the following:

- GRE
- MCAT
- LSAT

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600

Key to [test abbreviations](#) (GRE, MCAT, LSAT, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 21 major credits and 9 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** Students will design and undertake a project and its corollary product relevant to their interests, experience, and intended use of the MA in bioethics. The experiential component is designed to be flexible, allowing the student to undertake an internship, shadow physicians or other health care personnel, or use their own work experience when relevant to cater a project to their intended goals. Rigor is maintained through committee oversight, nature of the experience, and number of hours undertaken.

Products are also designed to be flexible while retaining rigor, innovation, and written analysis. Original research is not required (as with a thesis), but a thorough literature review and accompanying overview or synthesis of the arena of which the project is a part is necessary, as is a thorough explanation of the final product. Full committee approval of the final product before the project is undertaken is required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

**Joint- or Dual-degree Coursework:** Joint Degree Program in Law, Health, and the Life Sciences Student may take a total of 11 credits in common among the academic programs.



### **Twin Cities Campus**

## **Bioethics Minor**

*Bioethics, Center for*

**Graduate School**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Center for Bioethics, University of Minnesota, N504 Boynton, 410 Church Street SE, Minneapolis, MN 55455 (612-624-9440; fax: 612-624-9108)

Email: [bthxed@umn.edu](mailto:bthxed@umn.edu)

Website: <http://www.bioethics.umn.edu/education/graduate-minor-bioethics>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 14
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Bioethics minor is designed to deepen students knowledge of the ethical issues surrounding health and the life sciences.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

### **Special Application Requirements:**

Students pursuing the JD, MD, PharmD, DVM, DDS, or LLM degree are not eligible for the minor.

Eligible students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Bioethics director of graduate studies regarding feasibility and requirements.

Acceptance into the Bioethics minor requires pre-approval by the Bioethics director of graduate studies.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be chosen in consultation with the bioethics director of graduate studies.

Philosophy students are expected to have successfully completed at least one course in ethical theory at the 5xxx or 8xxx level prior to undertaking coursework in the minor.

Students must complete the minor with a 3.00 GPA.

### **Coursework Requirements**

#### **Required Courses (2 credits)**

Select 1 of the following courses in consultation with the Bioethics director of graduate studies:

[BTHX 5010](#) - Bioethics Proseminar (2.0 cr)

or [BTHX 5325](#) - Biomedical Ethics (3.0 cr)

#### **Electives (6 to 12 credits)**

Masters students select at least 6 credits and doctoral students select at least 12 credits from the following, in consultation with the Bioethics director of graduate studies, to meet minimum credit requirements. Other elective courses may be chosen with approval of



the Bioethics director of graduate studies.

- BTHX 5000 - Topics in Bioethics (1.0 - 4.0 cr)
- BTHX 5100 - Introduction to Clinical Ethics (3.0 cr)
- BTHX 5110 - Ethical Issues in Pediatrics (2.0 cr)
- BTHX 5120 - Dying in Contemporary Medical Culture (2.0 cr)
- BTHX 5210 - Ethics of Human Subjects Research (3.0 cr)
- BTHX 5400 - Intro Ethics in Hlth Policy (3.0 cr)
- BTHX 5411 - Health Law and Policy (3.0 cr)
- BTHX 5453 - Law, Biomedicine, and Bioethics (3.0 cr)
- BTHX 5510 - Gender and the Politics of Health (3.0 cr)
- BTHX 5520 - Social Justice and Bioethics (3.0 cr)
- BTHX 5540 - Bioethics, Psychiatry & Psychology (3.0 cr)
- BTHX 5610 - Research & Publication Seminar (1.0 cr)
- BTHX 5620 - Social Context of Health and Illness (3.0 cr)
- BTHX 5630 - Bioethics Colloquium (1.0 cr)
- BTHX 5650 - Disability Ethics (3.0 cr)
- BTHX 5900 - Independent Study in Bioethics (1.0 - 4.0 cr)
- BTHX 8000 - Advanced Topics in Bioethics (1.0 - 4.0 cr)
- BTHX 8114 - Ethical and legal Issues in Genetic Counseling (3.0 cr)
- BTHX 8120 - Dying in Contemporary Medical Culture (2.0 cr)
- BTHX 8500 - Practicum in Bioethics (1.0 - 4.0 cr)
- BTHX 8510 - Gender and the Politics of Health (3.0 cr)
- BTHX 8520 - Social Justice and Bioethics (3.0 cr)
- BTHX 8610 - Medical Consumerism (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Biomedical Informatics and Computational Biology M.S.**

*R Bioscience/Biotechnology*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Biomedical Informatics and Computational Biology, 300 University Square, 111 South Broadway, Rochester, MN 55904 (507-258-8006; fax: 507-258-8066)

Email: [bicbgrad@umn.edu](mailto:bicbgrad@umn.edu)

Website: <http://www.r.umn.edu/academics-research/bicb>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- The Biomedical Informatics and Computational Biology Program is an all-University program delivered on the Rochester and Twin Cities campuses. The University of Minnesota Twin Cities is the degree-granting authority for delivery of the Biomedical Informatics and Computational Biology Program in Rochester.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in biomedical informatics and computational biology (BICB) offers course work in five core areas: 1) biochemistry, molecular and cell biology; 2) database, data mining, and computing; 3) informatics, analysis, and machine learning; 4) mathematics, biostatistics, and statistics; and 5) computational and systems biology. In addition, students select courses from a diverse set of fields, including chemistry, chemical engineering, physics, biophysics, structural biology, imaging, signal processing, and clinical and translational sciences. The curriculum is individualized to fit the student's interest and research direction. Prior coursework may be used to fill the requirements if appropriate. Students may pursue a minor in a different program.

All students receive training in ethics, leadership, and management, including legal and intellectual property issues and entrepreneurship. Those interested in academic careers have the opportunity to participate in development programs that focus on aspects of teaching and learning.

The M.S. is offered under two plans: Plan A (with thesis), and Plan B (with project). Plan A is considered suitable for students planning to pursue careers that require a limited research experience or those planning to continue their education in a Ph.D. program. It is also suitable for students with full-time employment whose thesis can be related to their work assignments. Plan B is suitable for students planning to work in settings where technical knowledge is more germane than research experience.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

The program expects incoming graduate students to have a strong background in the quantitative sciences and varied backgrounds in the life/health sciences. The expected competencies of incoming students may be demonstrated by coursework completed at the undergraduate level or by informal competency examinations.

In addition to completing the online application form, applicants must submit a personal statement, which describes past experiences and career aspirations, and reasons for pursuing graduate studies in biomedical informatics and computational biology. Applicants should also indicate the names of the BICB graduate faculty whose interests overlap their own. Although there is no page limit for the personal statement, 2-3 pages are recommended.

#### **Special Application Requirements:**

Applications for the M.S. program are accepted throughout the year for either fall or spring.

GRE scores may be waived for students with significant work or academic experience.



Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#) (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** Plan B students complete a project under the direction of a faculty member and present the work to their faculty committee in an oral exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

The M.S. is offered under two plans: Plan A (with thesis), and Plan B (with project).

Plan A is considered suitable for students planning to pursue careers that require a limited research experience or those planning to continue their education in a Ph.D. program. Plan A students defend their thesis in public and must pass an oral examination. Plan A is suitable for students with full-time employment whose thesis can be related to their work assignments.

Plan B is suitable for students planning to work in settings where technical knowledge is more germane than research experience.

The requirements include 20 course credits for Plan A and 30 course credits for Plan B.

Up to 6 credits outside the major may be taken but are not required.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

Rochester



### **Twin Cities Campus**

## **Biomedical Informatics and Computational Biology Minor**

*R Bioscience/Biotechnology*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Biomedical Informatics and Computational Biology, 300 University Square, 111 South Broadway, Rochester, MN 55904 (507-258-8006; fax: 507-258-8066)

Email: [bicbgrad@umn.edu](mailto:bicbgrad@umn.edu)

Website: <http://www.r.umn.edu/academics-research/bicb>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.
- The Biomedical Informatics and Computational Biology Program is an all-University program delivered on the Rochester and Twin Cities campuses. The University of Minnesota Twin Cities is the degree-granting authority for delivery of the Biomedical Informatics and Computational Biology Program in Rochester.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in biomedical informatics and computational biology (BICB) offers course work in five core areas: 1) biochemistry, molecular and cell biology; 2) database, data mining, and computing; 3) informatics, analysis, and machine learning; 4) mathematics, biostatistics, and statistics; and 5) computational and systems biology. In addition, students select courses from a diverse set of fields, including chemistry, chemical engineering, physics, biophysics, structural biology, imaging, signal processing, and clinical and translational sciences. The curriculum is individualized to fit the student's interest and research direction. Prior coursework may be used to fill the requirements if appropriate. Students may pursue a minor in a different program.

All students receive training in ethics, leadership, and management, including legal and intellectual property issues and entrepreneurship. Students interested in academic careers have the opportunity to participate in development programs that focus on aspects of teaching and learning.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Minor programs are arranged on an individual basis.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Master's Minor: A minimum of 9 credits must be completed in Core Area 1 and one of Core Areas 2-5.

Doctoral Minor: A minimum of 12 credits must be completed in Core Area 1 and two of Core Areas 2-5.

Graduate students choose from a list of courses that satisfy requirements in core areas and electives.

There are five core areas:

1. Biochemistry, molecular and cell biology
2. Database, data mining, and computing





3. Informatics, analysis, and machine learning
4. Mathematics, biostatistics, and statistics
5. Computational and systems biology

Students choose elective courses from the following eight areas:

1. Biochemistry, molecular and cell biology
2. Informatics, database, data mining, and computing
3. Mathematics, biostatistics, and statistics
4. Chemistry, chemical engineering, and physics
5. Biophysics and structural biology
6. Imaging, information theory, and signal processing
7. Computational chemistry, medicinal chemistry, and drug design
8. Clinical and translational sciences

Core/elective courses are listed on the courses page of the BICB Student Handbook (<http://r.umn.edu/academics-research/bicb/graduate-program/student-handbook/courses>). The adviser(s), together with the DGS, will ensure that the student selects appropriate courses.



### **Twin Cities Campus**

## **Biomedical Informatics and Computational Biology Ph.D.**

*R Bioscience/Biotechnology*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Biomedical Informatics and Computational Biology, 300 University Square, 111 South Broadway, Rochester, MN 55904 (507-258-8006; fax: 507-258-8066)

Email: [bicbgrad@umn.edu](mailto:bicbgrad@umn.edu)

Website: <http://www.r.umn.edu/academics-research/bicb>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program requires summer semesters for timely completion.
- The Biomedical Informatics and Computational Biology Program is an all-University program delivered on the Rochester and Twin Cities campuses. The University of Minnesota Twin Cities is the degree-granting authority for delivery of the Biomedical Informatics and Computational Biology Program in Rochester.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in biomedical informatics and computational biology (BICB) offers course work in five core areas: 1) biochemistry, molecular and cell biology; 2) database, data mining, and computing; 3) informatics, analysis, and machine learning; 4) mathematics, biostatistics, and statistics; and 5) computational and systems biology. In addition, students select courses from a diverse set of fields, including chemistry, chemical engineering, physics, biophysics, structural biology, imaging, signal processing, and clinical and translational sciences. The curriculum is individualized to fit the student's interest and research direction. Prior coursework may be used to fill the requirements if appropriate. Students may pursue a minor in a different program.

All students receive training in ethics, leadership, and management, including legal and intellectual property issues and entrepreneurship. The Ph.D. program includes an industrial or clinical internship. Students interested in academic careers have the opportunity to participate in development programs that focus on aspects of teaching and learning.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

The program expects incoming graduate students to have a strong background in the quantitative sciences and varied backgrounds in the life/health sciences. The expected competencies of incoming students may be demonstrated by coursework completed at the undergraduate level or by informal competency examinations.

In addition to completing the online application form, applicants must submit a personal statement, which describes past experiences and career aspirations, and reasons for pursuing graduate studies in biomedical informatics and computational biology. Prospective students should also indicate the names of the BICB graduate faculty whose interests overlap with their own. The department strongly encourages applicants to contact these faculty members before applying. Although there is no page limit for the personal statement, 2-3 pages are recommended.

#### **Special Application Requirements:**

Three letters of recommendation and scores from the General Test of the GRE are required. Applicants are admitted only for the fall semester.

GRE scores may be waived for students with significant work or academic experience.

Applicants must submit their test score(s) from the following:

- GRE



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

30 credits are required in the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Ph.D. students take preliminary written exams at the end of the second year of study, which focuses on the development of a research proposal. An oral preliminary exam focuses on the plan for thesis research and the student's coursework and is taken by the fall of the third year of full-time registration or its equivalent. At least 24 course credits are required to gain competency in both biology and quantitative areas related to biomedical informatics and computational biology. An internship is required, which may be waived for students with equivalent experience. Additionally, 24 thesis credits are required. Ph.D. students defend their thesis in public and must pass an oral examination.

An internship is required, which may be waived for students with equivalent experience.

Up to 9 credits outside the major may be taken but are not required.

## Program Sub-plans

A sub-plan is not required for this program.  
Students may not complete the program with more than one sub-plan.

Rochester



**Twin Cities Campus**

## Biophysical Sciences and Medical Physics Minor

Radiology

### Graduate School

Link to a [list of faculty](#) for this program.

#### Contact Information:

University of Minnesota School of Medicine, Department of Radiology, Box 292 UMHC, 420 Delaware Street S.E., Minneapolis, Minnesota 55455 (612-626-0131; fax: 612-626-1951)

Email: [riten001@tc.umn.edu](mailto:riten001@tc.umn.edu)

Website: <http://www.med.umn.edu/radiology/research/physics/home.html>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This interdisciplinary program includes faculty members who have primary appointments in fields such as radiobiology, physics, engineering, computer science, physiology, dentistry, genetics, and biochemistry. Students concentrate in research areas such as molecular biophysics, medical imaging, magnetic resonance imaging and spectroscopy, radiobiology, radiation therapy physics, and mathematical biophysics and computation. A limited number of students prepare for employment as hospital-based medical physicists through a program that includes opportunities for coursework, laboratory work, and directed study to provide experience in areas such as purchase specification, acceptance testing, quality assurance, and radiation safety.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Programs are arranged on an individual basis and must consist of courses that represent a subfield of the discipline, e.g., radiobiology or medical physics.



### **Twin Cities Campus**

## **Clinical Ethics Postbaccalaureate Certificate**

Bioethics, Center for  
Graduate School

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Center for Bioethics  
N504 Boynton  
410 Church St SE  
Minneapolis, MN 55455  
Email: [bthxed@umn.edu](mailto:bthxed@umn.edu)  
Website: <http://www.bioethics.umn.edu/education/clinical-ethics-certificate-program>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 13
- This program does not require summer semesters for timely completion.
- Degree: Clinical Ethics PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Admissions to the clinical ethics post-baccalaureate certificate are currently on hold. Please contact [bthxed@umn.edu](mailto:bthxed@umn.edu) for updates.

The clinical ethics post-baccalaureate certificate will offer a graduate level educational opportunity for practicing professionals including physicians, nurses, social workers, chaplains, and others. Students will engage in classwork and practical experience geared toward mastery of the knowledge and skills needed for work in clinical ethics, including participation on ethics committees, clinical ethics consultation services, institutional and regional clinical ethics policy bodies, such as organ allocation committees or brain death committees, support for institutional staff development programs in their professional fields, or simply being better prepared to meet the ethical challenges that arise in their work. The curriculum will fulfill the health care ethics core competencies promulgated by the American Society for Bioethics and Humanities.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A graduate or professional degree in a field related to clinical ethics is required for admission.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

### **Required Courses**



NB: BTHX 8500 will be taken twice, 2 cr each time, once fall once spring.

[BTHX 5100](#) - Introduction to Clinical Ethics (3.0 cr)

[BTHX 5110](#) Ethical Issues in Pediatrics (2.0 cr)

[BTHX 5120](#) Dying in Contemporary Medical Culture (2.0 cr)

[BTHX 8100](#) Advanced Theory and Practice of Clinical Ethics (2.0 cr)

[BTHX 8500](#) - Practicum in Bioethics (1.0 - 4.0 cr)



### ***Twin Cities Campus***

## **Health Care Design and Innovation Postbaccalaureate Certificate**

School of Nursing

Graduate School

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Densford International Center for Nursing Leadership, University of Minnesota School of Nursing, 4-185 Weaver-Densford Hall, 308 Harvard St SE, Minneapolis, MN 55455 (612-625-1187; fax: 612-624-0908)

Email: [gophernursing@umn.edu](mailto:gophernursing@umn.edu)

Website: <http://www.hcdi.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Health Care Design & Innovation PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The postbaccalaureate certificate in health care design and innovation prepares health care and design practitioners to create optimal healing environments. Students learn how to apply design thinking in creating new processes, systems, and care environments. The certificate emphasizes principles that promote healing and safe patient care while maximizing clinical and financial outcomes.

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Admittance to the certificate program requires a baccalaureate degree from an accredited institution in a health-related field, interior design, architecture, or other design-related area.

Other requirements to be completed before admission:

Applicants are required to submit transcripts from all institutions where postsecondary credit was earned, reference materials containing an Admission Reference Form and personal letter of reference from two separate individuals, one essay, a current curriculum vitae/resume, and English language proficiency scores (if applicable). This certificate has two application deadlines: November 1 for spring admission and July 1 for fall admission.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Paper Based - Total Score: 550

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.



**Required Courses**

[CSPH 5711](#) - Optimal Healing Environments (3.0 cr)

[NURS 7610](#) - System Leadership and Innovation (3.0 cr)

[HUMF 5874](#) - Service Design: Designing complex systems to improve service delivery (4.0 cr)

[NURS 6707](#) - Health Care Design and Innovation Practicum (2.0 cr)





### **Twin Cities Campus**

## **Health Informatics M.H.I.**

*Health Informatics, AHC Inst*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Physical Address: 8-100 PWB, 516 Delaware St. SE, Minneapolis, MN 55455

Mailing Address: MMC 912, 420 Delaware St. SE, Minneapolis, MN 55455

612-626-3348

Email: [jhi@umn.edu](mailto:jhi@umn.edu)

Website: <http://healthinformatics.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Health Informatics

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Health informatics (also known as biomedical informatics) is an interdisciplinary field of scholarship that applies computer, information, statistical, management, and related scientific methods to enable biomedical discovery and support the effective and efficient use and analysis of data, management of information, and application of knowledge across the spectrum from basic science to clinical care. The ultimate goal of the field is to improve the health, well-being, and economic functioning of society. Students take a sequence of core courses in health informatics and biostatistics and take electives in technical and health science areas.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants are expected to have at least a bachelor's degree or equivalent degree from a regionally accredited institution of higher education or an international equivalent.

#### **Required prerequisites**

##### **Health or Biological Sciences**

Applicants must have taken 6 semester-credits or 9 quarter-credits at the undergraduate or graduate level in medical, life, or biological sciences from a regionally accredited institution of higher learning or equivalent. This broadly defined requirement includes most courses with a health or biology emphasis, including biostatistics, health services research, and public health, as well as more traditional biology or life science courses.

##### **Programming Language**

Documented work or educational experience working with a programming language such as C, C++, Java, Python, R, Visual Basic, etc.

or [HINF 5502](#) - Python Programming Essentials for the Health Sciences (1.0 cr)

or Department Consent

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 151
  - General Test - Quantitative Reasoning: 153
  - General Test - Analytical Writing: 4



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#) (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 31 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.  
**Capstone Project:** The capstone project is a 3- or 4-credit course in which students apply their newly acquired knowledge and skills to a project involving a practical problem in health informatics. Students learn how to design these projects properly through review of past exemplary projects. With the help of their advisors and the capstone course director, students design and carry out their own projects, which can take a variety of forms, including developing design and evaluation specifications for software to address a specific healthcare need; working on, observing, analyzing, and reporting the actions of a team involved in implementing a new information system; or observing and measuring the impact of such a system in a healthcare setting. Students submit a written project report, graded by the capstone project instructor and the student's advisor, in lieu of a final examination.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

### HINF Courses (15 credits)

Take the following courses:

- [HINF 5430](#) - Foundations of Health Informatics I (3.0 cr)
- [HINF 5431](#) - Foundations of Health Informatics II (3.0 cr)
- [HINF 5436](#) - AHC Informatics Grand Rounds (1.0 cr)
- [HINF 5510](#) - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)
- [HINF 5520](#) - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)
- [HINF 5531](#) - Health Data Analytics and Data Science (3.0 cr)

### Other Required Courses (6 credits)

Take the following courses:

- [NURS 7108](#) - Population Health Informatics (2.0 cr)
- [PUBH 6450](#) - Biostatistics I (4.0 cr)

### Final Project (3 credits)

MHI students take HINF 5499 (3 credits). Students pursuing the joint MD/MHI take LAMP 7195 (4 credits).  
[HINF 5499](#) - Capstone Project for the Masters of Health Informatics (3.0 cr)  
or [LAMP 7195](#) - Medical Informatics (4.0 cr)

### Electives

Take electives as needed to meet the 31-credit minimum. If labs or practicums are selected as electives, they must be taken concurrently with the associated course (i.e. take HINF 8430 with HINF 5430). Electives must be approved by the advisor.

- [BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)
- [BIOC 8007](#) - Molecular Biology of DNA (2.0 cr)
- [BIOC 8008](#) - Molecular Biology of RNA (2.0 cr)



CGSC 8410 - Perspectives in Learning, Perception, and Cognition (2.0 cr)  
CSCI 5106 - Programming Languages (3.0 cr)  
CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)  
CSCI 5271 - Introduction to Computer Security (3.0 cr)  
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)  
CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)  
CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)  
CSCI 5707 - Principles of Database Systems (3.0 cr)  
CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 8725 - Databases for Bioinformatics (3.0 cr)  
DES 5185 - Human Factors in Design (3.0 cr)  
EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)  
EPSY 5262 - Intermediate Statistical Methods (3.0 cr)  
EPSY 5621 - Assessment and Instructional Design for Students with Developmental Disabilities (3.0 cr)  
GCD 8103 - Human Histology (5.0 cr)  
HINF 5440 - Foundations of Translational Bioinformatics (3.0 cr)  
HINF 5450 - Foundations of Precision Medicine Informatics (3.0 cr)  
HINF 5494 - Topics in Health Informatics (1.0 - 3.0 cr)  
HINF 5496 - Internship in Health Informatics (1.0 - 6.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
HINF 5610 - Foundations of Biomedical Natural Language Processing (3.0 cr)  
HINF 5620 - Data Visualization for the Health Sciences (3.0 cr)  
HINF 5630 - Clinical Data Mining (3.0 cr)  
HINF 5640 - Advanced Translational Bioinformatics Methods (3.0 cr)  
HINF 5650 - Integrative Genomics and Computational Methods (3.0 cr)  
HINF 8220 - Computational Causal Analytics (3.0 cr)  
HINF 8405 - Advanced Topics in Health Informatics I (1.0 - 4.0 cr)  
HINF 8406 - Advanced Topics in Health Informatics II (1.0 - 4.0 cr)  
HINF 8430 - Foundations of Health Informatics I Lab (2.0 cr)  
HINF 8431 - Foundations of Health Informatics II Lab (2.0 cr)  
HINF 8440 - Foundations of Translational Bioinformatics Lab (2.0 cr)  
HINF 8492 - Advanced Readings or Research in Health Informatics (1.0 - 6.0 cr)  
HINF 8525 - Health Informatics Teaching (2.0 cr)  
HINF 8535 - Advanced Health Informatics Research Methods (3.0 cr)  
IDSC 6040 - Information Technology Management (2.0 cr)  
IDSC 6050 - Information Technologies and Solutions (2.0 cr)  
IDSC 6471 - Knowledge Management (2.0 cr)  
IDSC 8721 - Behavioral Decision Theory (3.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
KIN 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)  
LING 5001 - Introduction to Linguistics (4.0 cr)  
LING 5205 - Semantics (3.0 cr)  
LING 5801 - Introduction to Computational Linguistics (3.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MEDC 5245 - Introduction to Drug Design (3.0 cr)  
MILI 6992 - Healthcare Delivery Innovations:Optimizing Cost and Quality (2.0 cr)  
MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)  
NURS 5115 - Interprofessional Health Care Informatics (3.0 cr)  
NURS 5117 - Consumer Health Informatics Practicum (1.0 cr)  
NURS 6105 - Systems Analysis and Design (3.0 cr)  
NURS 7106 - Knowledge Representation and Interoperability Practicum (2.0 cr)  
NURS 7109 - Population Health Informatics Practicum (2.0 cr)  
NURS 7113 - Clinical Decision Support: Theory (2.0 cr)  
NURS 7114 - Clinical Decision Support Practicum (2.0 cr)  
NURS 7118 - Human Factors and Human-Computer Interaction in Health Informatics (3.0 cr)  
NURS 7610 - System Leadership and Innovation (3.0 cr)



PHAR 6224 - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)  
PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)  
PUBH 6102 - Issues in Environmental Health (2.0 cr)  
PUBH 6131 - Working in Global Health (2.0 cr)  
PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)  
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 6555 - Topics in Health Economics (2.0 cr)  
PUBH 6556 - Health and Health Systems (3.0 cr)  
PUBH 6557 - Health Finance I (3.0 cr)  
PUBH 6558 - Health Finance II (3.0 cr)  
PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)  
PUBH 6562 - Information Technology in Health Care (2.0 cr)  
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)  
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 6717 - Decision Analysis for Health Care (2.0 cr)  
PUBH 6724 - The Health Care System and Public Health (3.0 cr)  
PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)  
PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)  
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
PUBH 6780 - Topics: Public Health Administration and Policy (1.0 - 3.0 cr)  
PUBH 6800 - Topics: Health Services Research and Policy (0.5 - 4.0 cr)  
PUBH 6802 - Managing Electronic Health Information (3.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)  
PUBH 6814 - Data and Information for Population Health Management (2.0 cr)  
PUBH 6832 - Economics of the Health Care System (3.0 cr)  
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)  
PUBH 6863 - Understanding Health Care Quality (2.0 cr)  
PUBH 7400 - Topics: Biostatistics (0.5 - 4.0 cr)  
PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)  
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)  
PUBH 7405 - Biostatistics: Regression (4.0 cr)  
PUBH 7407 - Analysis of Categorical Data (3.0 cr)  
PUBH 7415 - Introduction to Clinical Trials (3.0 cr)  
PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 7460 - Advanced Statistical Computing (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 7588 - Information Uses in Long-Term Care (2.0 cr)  
PUBH 8432 - Probability Models for Biostatistics (3.0 cr)  
PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)  
PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 8446 - Advanced Statistical Genetics and Genomics (3.0 cr)  
PUBH 8452 - Advanced Longitudinal Data Analysis (3.0 cr)  
PUBH 8462 - Advanced Survival Analysis (3.0 cr)  
PUBH 8472 - Spatial Biostatistics (3.0 cr)  
PUBH 8801 - Health Services Policy Analysis: Theory (1.0 cr)  
PUBH 8810 - Research Studies in Health Care (3.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)  
STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)  
STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)  
HINF 5436 - AHC Informatics Grand Rounds (1.0 cr)

**Joint- or Dual-degree Coursework:**MD/MHI program Student may take a total of 3 credits in common among the academic programs.



### **Twin Cities Campus**

## **Health Informatics M.S.**

*Health Informatics, AHC Inst*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Physical Address: 8-100 PWB, 516 Delaware St. SE, Minneapolis, MN 55455

Mailing Address: MMC 912, 420 Delaware St. SE, Minneapolis, MN 55455

Email: [ihi@umn.edu](mailto:ihi@umn.edu)

Website: <http://healthinformatics.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Health informatics (also known as biomedical informatics) is an interdisciplinary field of scholarship that applies computer, information, statistical, management, and related scientific methods to enable biomedical discovery and support the effective and efficient use and analysis of data, management of information, and application of knowledge across the spectrum from basic science to clinical care. The ultimate goal of the field is to improve the health, well-being, and economic functioning of society. Students take a sequence of core courses in health informatics, computing, and biostatistics, and electives in technical and health science areas. Possible areas of emphasis include health information systems, telehealth, bioinformatics, user interface design, system impact evaluation, database construction and analysis, clinical decision-making, evaluation of health programs, and physiological monitoring and control.

The health informatics MS is intended for students who are interested in research, but who do not have the background or are not ready to commit to the PhD program.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.30.

Applicants are expected to have at least a bachelor of science or equivalent degree from a regionally accredited institution of higher education.

#### **Required prerequisites**

##### **Health or Biological Sciences**

Applicants must have taken 6 semester-credits or 9 quarter-credits at the undergraduate or graduate level in medical, life, or biological sciences from a regionally accredited institution of higher learning or equivalent. This broadly defined requirement includes most courses with a health or biology emphasis, including biostatistics, health services research, and public health, as well as more traditional biology or life science courses.

##### **Programming Language**

Documented work or educational experience working with a programming language such as C, C++, Java, Python, R, Visual Basic, etc.

or [HINF 5502](#) - Python Programming Essentials for the Health Sciences (1.0 cr)

or Department Consent

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 151
  - General Test - Quantitative Reasoning: 160



- General Test - Analytical Writing: 4

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#) (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 26 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 36 major credits and up to null credits outside the major. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

### Required HINF Courses (16 credits)

Take the following courses. Take HINF 5436 twice for a total of 2 credits.

- [HINF 5430](#) - Foundations of Health Informatics I (3.0 cr)
- [HINF 5431](#) - Foundations of Health Informatics II (3.0 cr)
- [HINF 5436](#) - AHC Informatics Grand Rounds (1.0 cr)
- [HINF 5510](#) - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)
- [HINF 5520](#) - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)
- [HINF 5531](#) - Health Data Analytics and Data Science (3.0 cr)

### Other Required Courses (7 credits)

Take the following courses:

- [NURS 7108](#) - Population Health Informatics (2.0 cr)
- [PUBH 6450](#) - Biostatistics I (4.0 cr)

### Electives (3 to 9 credits)

Plan A students select 3 credits, and Plan B students select 9 credits from the following. If labs or practicums are selected, they must be taken concurrently with the associated course (e.g., HINF 8430 must be taken with HINF 5430). Advisor approval is required.

- [BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)
- [BIOC 8007](#) - Molecular Biology of DNA (2.0 cr)
- [BIOC 8008](#) - Molecular Biology of RNA (2.0 cr)
- [CGSC 8410](#) - Perspectives in Learning, Perception, and Cognition (2.0 cr)
- [CSCI 5106](#) - Programming Languages (3.0 cr)
- [CSCI 5115](#) - User Interface Design, Implementation and Evaluation (3.0 cr)
- [CSCI 5271](#) - Introduction to Computer Security (3.0 cr)
- [CSCI 5421](#) - Advanced Algorithms and Data Structures (3.0 cr)
- [CSCI 5461](#) - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- [CSCI 5481](#) - Computational Techniques for Genomics (3.0 cr)



CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)  
CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)  
CSCI 5707 - Principles of Database Systems (3.0 cr)  
CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 8725 - Databases for Bioinformatics (3.0 cr)  
DES 5185 - Human Factors in Design (3.0 cr)  
EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)  
EPSY 5262 - Intermediate Statistical Methods (3.0 cr)  
EPSY 5621 - Assessment and Instructional Design for Students with Developmental Disabilities (3.0 cr)  
GCD 8103 - Human Histology (5.0 cr)  
HINF 5440 - Foundations of Translational Bioinformatics (3.0 cr)  
HINF 5450 - Foundations of Precision Medicine Informatics (3.0 cr)  
HINF 5494 - Topics in Health Informatics (1.0 - 3.0 cr)  
HINF 5496 - Internship in Health Informatics (1.0 - 6.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
HINF 5610 - Foundations of Biomedical Natural Language Processing (3.0 cr)  
HINF 5620 - Data Visualization for the Health Sciences (3.0 cr)  
HINF 5630 - Clinical Data Mining (3.0 cr)  
HINF 5640 - Advanced Translational Bioinformatics Methods (3.0 cr)  
HINF 5650 - Integrative Genomics and Computational Methods (3.0 cr)  
HINF 8220 - Computational Causal Analytics (3.0 cr)  
HINF 8405 - Advanced Topics in Health Informatics I (1.0 - 4.0 cr)  
HINF 8406 - Advanced Topics in Health Informatics II (1.0 - 4.0 cr)  
HINF 8430 - Foundations of Health Informatics I Lab (2.0 cr)  
HINF 8431 - Foundations of Health Informatics II Lab (2.0 cr)  
HINF 8440 - Foundations of Translational Bioinformatics Lab (2.0 cr)  
HINF 8492 - Advanced Readings or Research in Health Informatics (1.0 - 6.0 cr)  
HINF 8525 - Health Informatics Teaching (2.0 cr)  
HINF 8535 - Advanced Health Informatics Research Methods (3.0 cr)  
IDSC 6040 - Information Technology Management (2.0 cr)  
IDSC 6050 - Information Technologies and Solutions (2.0 cr)  
IDSC 6471 - Knowledge Management (2.0 cr)  
IDSC 8721 - Behavioral Decision Theory (3.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
KIN 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)  
LING 5001 - Introduction to Linguistics (4.0 cr)  
LING 5205 - Semantics (3.0 cr)  
LING 5801 - Introduction to Computational Linguistics (3.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MEDC 5245 - Introduction to Drug Design (3.0 cr)  
MILI 6992 - Healthcare Delivery Innovations:Optimizing Cost and Quality (2.0 cr)  
MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)  
NURS 5115 - Interprofessional Health Care Informatics (3.0 cr)  
NURS 5117 - Consumer Health Informatics Practicum (1.0 cr)  
NURS 6105 - Systems Analysis and Design (3.0 cr)  
NURS 7106 - Knowledge Representation and Interoperability Practicum (2.0 cr)  
NURS 7109 - Population Health Informatics Practicum (2.0 cr)  
NURS 7113 - Clinical Decision Support: Theory (2.0 cr)  
NURS 7114 - Clinical Decision Support Practicum (2.0 cr)  
NURS 7118 - Human Factors and Human-Computer Interaction in Health Informatics (3.0 cr)  
NURS 7610 - System Leadership and Innovation (3.0 cr)  
PHAR 6224 - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)  
PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)  
PUBH 6102 - Issues in Environmental Health (2.0 cr)  
PUBH 6131 - Working in Global Health (2.0 cr)  
PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)  
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)



PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 6555 - Topics in Health Economics (2.0 cr)  
PUBH 6556 - Health and Health Systems (3.0 cr)  
PUBH 6557 - Health Finance I (3.0 cr)  
PUBH 6558 - Health Finance II (3.0 cr)  
PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)  
PUBH 6562 - Information Technology in Health Care (2.0 cr)  
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)  
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 6717 - Decision Analysis for Health Care (2.0 cr)  
PUBH 6724 - The Health Care System and Public Health (3.0 cr)  
PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)  
PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)  
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
PUBH 6780 - Topics: Public Health Administration and Policy (1.0 - 3.0 cr)  
PUBH 6800 - Topics: Health Services Research and Policy (0.5 - 4.0 cr)  
PUBH 6802 - Managing Electronic Health Information (3.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)  
PUBH 6814 - Data and Information for Population Health Management (2.0 cr)  
PUBH 6832 - Economics of the Health Care System (3.0 cr)  
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)  
PUBH 6863 - Understanding Health Care Quality (2.0 cr)  
PUBH 7400 - Topics: Biostatistics (0.5 - 4.0 cr)  
PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)  
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)  
PUBH 7405 - Biostatistics: Regression (4.0 cr)  
PUBH 7407 - Analysis of Categorical Data (3.0 cr)  
PUBH 7415 - Introduction to Clinical Trials (3.0 cr)  
PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 7460 - Advanced Statistical Computing (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 7588 - Information Uses in Long-Term Care (2.0 cr)  
PUBH 8432 - Probability Models for Biostatistics (3.0 cr)  
PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)  
PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 8446 - Advanced Statistical Genetics and Genomics (3.0 cr)  
PUBH 8452 - Advanced Longitudinal Data Analysis (3.0 cr)  
PUBH 8462 - Advanced Survival Analysis (3.0 cr)  
PUBH 8472 - Spatial Biostatistics (3.0 cr)  
PUBH 8801 - Health Services Policy Analysis: Theory (1.0 cr)  
PUBH 8810 - Research Studies in Health Care (3.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)  
STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)  
STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)

### Plan Options

#### Plan A

Take at least 10 master's thesis credits.

[HINF 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

Take the following course:





[HINF 8770](#) - Plan B Project (4.0 cr)

### Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.



### **Twin Cities Campus**

## **Health Informatics Minor**

*Health Informatics, AHC Inst*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Physical Address: 8-100 PWB, 516 Delaware St. SE, Minneapolis, MN 55455

Mailing Address: MMC 912, 420 Delaware St. SE, Minneapolis, MN 55455

Email: [ihi@umn.edu](mailto:ihi@umn.edu)

Website: <http://healthinformatics.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Health informatics (also known as biomedical informatics) is an interdisciplinary field of scholarship that applies computer, information, statistical, management, and related scientific methods to enable biomedical discovery and support the effective and efficient use and analysis of data, management of information, and application of knowledge across the spectrum from basic science to clinical care. The ultimate goal of the field is to improve the health, well-being, and economic functioning of society. The minor provides an opportunity for students to supplement their primary training with additional knowledge and skills in health informatics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Required prerequisites**

##### **Health or Biological Sciences**

Applicants must have taken 6 semester-credits or 9 quarter-credits at the undergraduate or graduate level in medical, life, or biological sciences from a regionally accredited institution of higher learning or equivalent. This broadly defined requirement includes most courses with a health or biology emphasis, including biostatistics, health services research, and public health, as well as more traditional biology or life science courses.

##### **Programming language**

Documented work or educational experience working with a programming language such as C, C++, Java, Python, R, Visual Basic, etc.

or [HINF 5502](#) - Python Programming Essentials for the Health Sciences (1.0 cr)

or Department Consent

#### **Special Application Requirements:**

Applicants must be earning a graduate-level degree from the University of Minnesota.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.



### Required Coursework

All students pursuing the Health Informatics minor must complete the following course:

[HINF 5430](#) - Foundations of Health Informatics I (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### Masters

##### Required Course

Take the following course to complete the 6-credit minimum for the master's minor:

[HINF 5431](#) - Foundations of Health Informatics II (3.0 cr)

#### Doctoral

##### Required courses

[HINF 5440](#) - Foundations of Translational Bioinformatics (3.0 cr)

##### Foundations Lab

Students must take at least one lab concurrently with the associated course (i.e. take 8430 concurrently with 5430 or 8440 concurrently with 5440).

Take 1 - 2 course(s) from the following:

- [HINF 8430](#) - Foundations of Health Informatics I Lab (2.0 cr)
- [HINF 8440](#) - Foundations of Translational Bioinformatics Lab (2.0 cr)

##### Electives

Take HINF electives to meet the 12-credit minimum for the doctoral minor.

[HINF 5431](#) - Foundations of Health Informatics II (3.0 cr)

[HINF 5436](#) - AHC Informatics Grand Rounds (1.0 cr)

[HINF 5450](#) - Foundations of Precision Medicine Informatics (3.0 cr)

[HINF 5494](#) - Topics in Health Informatics (1.0 - 3.0 cr)

[HINF 5510](#) - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)

[HINF 5520](#) - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)

[HINF 5531](#) - Health Data Analytics and Data Science (3.0 cr)

[HINF 5610](#) - Foundations of Biomedical Natural Language Processing (3.0 cr)

[HINF 5620](#) - Data Visualization for the Health Sciences (3.0 cr)

[HINF 5630](#) - Clinical Data Mining (3.0 cr)

[HINF 5640](#) - Advanced Translational Bioinformatics Methods (3.0 cr)

[HINF 5650](#) - Integrative Genomics and Computational Methods (3.0 cr)

[HINF 8220](#) - Computational Causal Analytics (3.0 cr)

[HINF 8405](#) - Advanced Topics in Health Informatics I (1.0 - 4.0 cr)

[HINF 8406](#) - Advanced Topics in Health Informatics II (1.0 - 4.0 cr)

[HINF 8492](#) - Advanced Readings or Research in Health Informatics (1.0 - 6.0 cr)



### **Twin Cities Campus**

## **Health Informatics Ph.D.**

*Health Informatics, AHC Inst*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Physical Address: 8-100 PWB, 516 Delaware St. SE, Minneapolis, MN 55455

Mailing Address: MMC 912, 420 Delaware St. SE, Minneapolis, MN 55455

Email: [ihi@umn.edu](mailto:ihi@umn.edu)

Website: <http://healthinformatics.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 70
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Health informatics (also known as biomedical informatics) is an interdisciplinary field of scholarship that applies computer, information, statistical, management, and related scientific methods to enable biomedical discovery and support the effective and efficient use and analysis of data, management of information, and application of knowledge across the spectrum from basic science to clinical care. The ultimate goal of the field is to improve the health, well-being, and economic functioning of society. Students take a sequence of core courses in health informatics, computing, and biostatistics, and electives in technical and health science areas, and pursue one of four tracks: data science and informatics for learning health systems; clinical informatics; translational bioinformatics; or precision and personalized medicine (PPM) informatics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Applicants must have a BS or equivalent in science, technology, engineering, computer science, math, or another pertinent field from a regionally accredited university or international equivalent.

#### **Required prerequisites**

##### **Health or Biological Sciences**

Applicants must have taken 6 semester-credits or 9 quarter-credits at the undergraduate or graduate level in medical, life, or biological sciences from a regionally accredited institution of higher learning or equivalent. This broadly defined requirement includes most courses with a health or biology emphasis, including biostatistics, health services research, and public health, as well as more traditional biology or life science courses.

6-9 credits

##### **Computer Science**

###### **Clinical Informatics Track**

Documented work or educational experience working with a general purpose programming language such as C, C++, Java, Visual Basic, PASCAL, etc.

or [HINF 5502](#) - Python Programming Essentials for the Health Sciences (1.0 cr)

###### **or Other Tracks**

Applicants to the data science for learning health systems, translational bioinformatics, and precision and personalized medicine informatics tracks must also have taken an introduction to data structures and algorithms, such as the course listed below.

[CSCI 1933](#) - Introduction to Algorithms and Data Structures (4.0 cr)

##### **Track-Specific Prerequisites**

Applicants to the data science for learning health systems, translational bioinformatics, and precision and personalized medicine informatics tracks must also have the following prerequisites or must take remedial courses at the discretion of the admissions



committee:

**Mathematics**

Applicants must have college-level calculus and linear algebra, such as the courses listed below.

[MATH 1271](#) - Calculus I [MATH] (4.0 cr)

[CSCI 2033](#) - Elementary Computational Linear Algebra (4.0 cr)

or [MATH 4242](#) - Applied Linear Algebra (4.0 cr)

**Statistics**

Applicants must have college-level statistics, such as the courses below.

[STAT 3011](#) - Introduction to Statistical Analysis [MATH] (4.0 cr)

or [STAT 3021](#) - Introduction to Probability and Statistics (3.0 cr)

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 151
  - General Test - Quantitative Reasoning: 160
  - General Test - Analytical Writing: 4

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

46 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

All courses taken, milestones met, and progress made in the program are subject to Academic Program Committee (APC) review. The inclusion of 4000-level coursework requires APC approval.

### Required Core Coursework (14 credits)

**Phase I (12 credits)**

Take the following courses. Take HINF 5436 twice for a total of 2 credits.

[HINF 5430](#) - Foundations of Health Informatics I (3.0 cr)

[HINF 8430](#) - Foundations of Health Informatics I Lab (2.0 cr)

[HINF 5436](#) - AHC Informatics Grand Rounds (1.0 cr)

[HINF 5440](#) - Foundations of Translational Bioinformatics (3.0 cr)

[HINF 8440](#) - Foundations of Translational Bioinformatics Lab (2.0 cr)

**Phase II (2 credits)**

Take the following course, with APC approval, after completing Phase I coursework.

[HINF 8525](#) - Health Informatics Teaching (2.0 cr)



### Thesis Credits

Take at least 24 doctoral thesis credits in consultation with the APC.

[HINF 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Clinical Informatics

The clinical informatics track provides instruction and training for students interested in clinical applications methods and applications. The curriculum includes instruction in health data and coding, systems analysis, human-computer interaction, current informatics research, and current applications such as decision support systems, natural language processing, and predictive modeling. Additionally, students learn biostatistical methods, relational database theory and practice, analytics and data science methodologies, consumer health informatics, and interprofessional practice. Electives supplement individual student interests in areas such as computer programming, health data management, health care finance, and public and population health (with scope to include person-empowered participation and inter-professional engagement). Courses use a mixture of theoretical and applied subject matter to provide a solid grounding in current informatics thinking and practice.

### Clinical Informatics Coursework (32 credits)

#### Core Coursework (16 credits)

Take the following core courses:

[HINF 5431](#) - Foundations of Health Informatics II (3.0 cr)

[HINF 8431](#) - Foundations of Health Informatics II Lab (2.0 cr)

[HINF 5510](#) - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)

[HINF 5520](#) - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)

[HINF 5531](#) - Health Data Analytics and Data Science (3.0 cr)

[NURS 5116](#) - Consumer Health Informatics (1.0 cr)

[NURS 7108](#) - Population Health Informatics (2.0 cr)

#### Required Biostatistics Coursework (8 credits)

Take the following two courses:

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[PUBH 6451](#) - Biostatistics II (4.0 cr)

### Electives

Select at least 8 elective credits, in consultation with the APC, to complete the 46 course credits required for the PhD degree.

[BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)

[BIOC 8007](#) - Molecular Biology of DNA (2.0 cr)

[BIOC 8008](#) - Molecular Biology of RNA (2.0 cr)

[CGSC 8410](#) - Perspectives in Learning, Perception, and Cognition (2.0 cr)

[CSCI 5106](#) - Programming Languages (3.0 cr)

[CSCI 5115](#) - User Interface Design, Implementation and Evaluation (3.0 cr)

[CSCI 5271](#) - Introduction to Computer Security (3.0 cr)

[CSCI 5421](#) - Advanced Algorithms and Data Structures (3.0 cr)

[CSCI 5461](#) - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)

[CSCI 5481](#) - Computational Techniques for Genomics (3.0 cr)

[CSCI 5511](#) - Artificial Intelligence I (3.0 cr)

[CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)

[CSCI 5525](#) - Machine Learning (3.0 cr)

[CSCI 5607](#) - Fundamentals of Computer Graphics 1 (3.0 cr)

[CSCI 5608](#) - Fundamentals of Computer Graphics II (3.0 cr)

[CSCI 5707](#) - Principles of Database Systems (3.0 cr)

[CSCI 5708](#) - Architecture and Implementation of Database Management Systems (3.0 cr)

[CSCI 5801](#) - Software Engineering I (3.0 cr)

[CSCI 8725](#) - Databases for Bioinformatics (3.0 cr)

[DES 5185](#) - Human Factors in Design (3.0 cr)

[EPSY 5244](#) - Survey Design, Sampling, and Implementation (3.0 cr)

[EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)

[EPSY 5621](#) - Assessment and Instructional Design for Students with Developmental Disabilities (3.0 cr)

[GCD 8103](#) - Human Histology (5.0 cr)

[HINF 5450](#) - Foundations of Precision Medicine Informatics (3.0 cr)

[HINF 5494](#) - Topics in Health Informatics (1.0 - 3.0 cr)

[HINF 5496](#) - Internship in Health Informatics (1.0 - 6.0 cr)

[HINF 5502](#) - Python Programming Essentials for the Health Sciences (1.0 cr)

[HINF 5610](#) - Foundations of Biomedical Natural Language Processing (3.0 cr)



HINF 5620 - Data Visualization for the Health Sciences (3.0 cr)  
HINF 5630 - Clinical Data Mining (3.0 cr)  
HINF 5640 - Advanced Translational Bioinformatics Methods (3.0 cr)  
HINF 5650 - Integrative Genomics and Computational Methods (3.0 cr)  
HINF 8220 - Computational Causal Analytics (3.0 cr)  
HINF 8405 - Advanced Topics in Health Informatics I (1.0 - 4.0 cr)  
HINF 8406 - Advanced Topics in Health Informatics II (1.0 - 4.0 cr)  
HINF 8492 - Advanced Readings or Research in Health Informatics (1.0 - 6.0 cr)  
HINF 8535 - Advanced Health Informatics Research Methods (3.0 cr)  
IDSC 6040 - Information Technology Management (2.0 cr)  
IDSC 6050 - Information Technologies and Solutions (2.0 cr)  
IDSC 6471 - Knowledge Management (2.0 cr)  
IDSC 8721 - Behavioral Decision Theory (3.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
KIN 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)  
LING 5001 - Introduction to Linguistics (4.0 cr)  
LING 5205 - Semantics (3.0 cr)  
LING 5801 - Introduction to Computational Linguistics (3.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MEDC 5245 - Introduction to Drug Design (3.0 cr)  
MILI 6992 - Healthcare Delivery Innovations:Optimizing Cost and Quality (2.0 cr)  
MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)  
NURS 5115 - Interprofessional Health Care Informatics (3.0 cr)  
NURS 5117 - Consumer Health Informatics Practicum (1.0 cr)  
NURS 6105 - Systems Analysis and Design (3.0 cr)  
NURS 7106 - Knowledge Representation and Interoperability Practicum (2.0 cr)  
NURS 7109 - Population Health Informatics Practicum (2.0 cr)  
NURS 7113 - Clinical Decision Support: Theory (2.0 cr)  
NURS 7114 - Clinical Decision Support Practicum (2.0 cr)  
NURS 7118 - Human Factors and Human-Computer Interaction in Health Informatics (3.0 cr)  
NURS 7610 - System Leadership and Innovation (3.0 cr)  
PHAR 6224 - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)  
PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)  
PUBH 6102 - Issues in Environmental Health (2.0 cr)  
PUBH 6131 - Working in Global Health (2.0 cr)  
PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)  
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 6555 - Topics in Health Economics (2.0 cr)  
PUBH 6556 - Health and Health Systems (3.0 cr)  
PUBH 6557 - Health Finance I (3.0 cr)  
PUBH 6558 - Health Finance II (3.0 cr)  
PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)  
PUBH 6562 - Information Technology in Health Care (2.0 cr)  
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)  
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 6717 - Decision Analysis for Health Care (2.0 cr)  
PUBH 6724 - The Health Care System and Public Health (3.0 cr)  
PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)  
PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)  
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
PUBH 6780 - Topics: Public Health Administration and Policy (1.0 - 3.0 cr)  
PUBH 6800 - Topics: Health Services Research and Policy (0.5 - 4.0 cr)  
PUBH 6802 - Managing Electronic Health Information (3.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)  
PUBH 6814 - Data and Information for Population Health Management (2.0 cr)  
PUBH 6832 - Economics of the Health Care System (3.0 cr)  
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)



PUBH 6863 - Understanding Health Care Quality (2.0 cr)  
PUBH 7400 - Topics: Biostatistics (0.5 - 4.0 cr)  
PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)  
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)  
PUBH 7405 - Biostatistics: Regression (4.0 cr)  
PUBH 7407 - Analysis of Categorical Data (3.0 cr)  
PUBH 7415 - Introduction to Clinical Trials (3.0 cr)  
PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 7460 - Advanced Statistical Computing (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 7588 - Information Uses in Long-Term Care (2.0 cr)  
PUBH 8432 - Probability Models for Biostatistics (3.0 cr)  
PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)  
PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 8446 - Advanced Statistical Genetics and Genomics (3.0 cr)  
PUBH 8452 - Advanced Longitudinal Data Analysis (3.0 cr)  
PUBH 8462 - Advanced Survival Analysis (3.0 cr)  
PUBH 8472 - Spatial Biostatistics (3.0 cr)  
PUBH 8801 - Health Services Policy Analysis: Theory (1.0 cr)  
PUBH 8810 - Research Studies in Health Care (3.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)  
STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)  
STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)

### Data Science and Informatics for Learning Health Systems

The data science and informatics for learning health systems track builds on the highly regarded data science program offered jointly by the School of Engineering, School of Public Health, and School of Statistics. It also takes advantage of the School of Nursing's breadth of nursing and health informatics courses.

Students who pursue the data science and informatics for learning health systems track are expected to earn the University's data science MS degree en route to completing the PhD.

Students must consult with the APC to coordinate completion of coursework and other requirements for the data science MS, the health informatics PhD, and the data science and informatics for learning health systems track. Credits earned in the University's data science MS program may be used to fulfill required courses or elective credits in the data science and informatics for learning health systems track, subject to APC approval. Students who have an MS in data science from a comparable program may be exempt from this requirement in whole or in part, subject to APC review and approval.

### Data Science and Informatics Coursework (32 credits)

#### Core Coursework (18 credits)

Take the following courses, in consultation with the APC, after completion of the data science MS degree. Take HINF 5496 and HINF 8492 for at least 3 credits each.

HINF 5496 - Internship in Health Informatics (1.0 - 6.0 cr)  
HINF 5510 - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)  
HINF 5630 - Clinical Data Mining (3.0 cr)  
HINF 8220 - Computational Causal Analytics (3.0 cr)  
HINF 8492 - Advanced Readings or Research in Health Informatics (1.0 - 6.0 cr)

#### Elective Coursework (14 credits)

Select at least 14 elective credits from the following list, in consultation with the APC, to complete the 46 course credits required for the PhD degree. Credits earned in pursuit of the data science MS may be used to fulfill elective course requirements for this track, subject to APC approval.

Take 14 or more course(s) from the following:

#### Informatics

Take 0 or more course(s) from the following:

- HINF 5431 - Foundations of Health Informatics II (3.0 cr)
- HINF 8431 - Foundations of Health Informatics II Lab (2.0 cr)
- HINF 5610 - Foundations of Biomedical Natural Language Processing (3.0 cr)





- HINF 5620 - Data Visualization for the Health Sciences (3.0 cr)
- MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)

•**Applications**

Take 0 or more course(s) from the following:

- NURS 7113 - Clinical Decision Support: Theory (2.0 cr)
- PUBH 6102 - Issues in Environmental Health (2.0 cr)
- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6814 - Data and Information for Population Health Management (2.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)

•**Advanced Methodology**

Take 0 or more course(s) from the following:

- PUBH 6341 - Epidemiologic Methods I (3.0 cr)
- PUBH 8452 - Advanced Longitudinal Data Analysis (3.0 cr)
- PUBH 8462 - Advanced Survival Analysis (3.0 cr)
- PUBH 8472 - Spatial Biostatistics (3.0 cr)

•**Data Science**

Take 0 or more course(s) from the following:

- STAT 5101 - Theory of Statistics I (4.0 cr)
- STAT 5102 - Theory of Statistics II (4.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5511 - Time Series Analysis (3.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)
- PUBH 8475 - Statistical Learning and Data Mining (3.0 cr)
- CSCI 5105 - Introduction to Distributed Systems (3.0 cr)
- CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
- CSCI 5707 - Principles of Database Systems (3.0 cr)

**Translational Bioinformatics**

The translational bioinformatics track bridges genomics and bioinformatics to precision medicine through its methods and techniques development and innovation that directly relate to the study of basic biological science and diseases. The computational methods related to genomics, epigenomics, transcriptomics, proteomics, metabolomics, and pharmacogenomics are included, which build the connection of molecular findings and phenotypes to characterize disease susceptibility or determine disease markers, and predict response to treatment and prognosis. The program offers three specialized areas: structural and functional genomics, microbiomics and metagenomics, and cancer genomics.

Students must consult with the APC to coordinate completion of coursework and other requirements.

**Translational Bioinformatics Coursework (32 credits)**

**Phase 1 (22 credits)**

Take the following courses for a total of 22 credits:

- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
- HINF 8220 - Computational Causal Analytics (3.0 cr)
- HINF 5650 - Integrative Genomics and Computational Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- BIOC 8007 - Molecular Biology of DNA (2.0 cr)
- BIOC 8008 - Molecular Biology of RNA (2.0 cr)

**Phase II (6 credits)**

Take the following courses after competing Phase I, and with the approval of the APC:

- HINF 5496 - Internship in Health Informatics (1.0 - 6.0 cr)
- HINF 8492 - Advanced Readings or Research in Health Informatics (1.0 - 6.0 cr)

**Elective Coursework (4 credits)**

Select at least 4 elective credits from the following list, in consultation with the APC, to complete the 46 course credits required for the PhD degree.

- HINF 5431 - Foundations of Health Informatics II (3.0 cr)



HINF 8431 - Foundations of Health Informatics II Lab (2.0 cr)  
HINF 5450 - Foundations of Precision Medicine Informatics (3.0 cr)  
HINF 5610 - Foundations of Biomedical Natural Language Processing (3.0 cr)  
MEDC 5245 - Introduction to Drug Design (3.0 cr)  
PHAR 6224 - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)  
PUBH 7415 - Introduction to Clinical Trials (3.0 cr)  
PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)  
PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)

### Precision and Personalized Medicine Informatics

The precision and personalized medicine informatics track provides a didactic program for students training in informatics who will develop specialized knowledge in precision informatics methods applied to personal and population health-focused problems. The scope of this track includes social determinants of health and inter-professional research and expertise. Students will develop skills in quantitative methods and biomedical sciences for their application to precision medicine. In addition, students will gain an understanding of medical and biological science to provide needed context on which to apply informatics methods.

Students must consult with the APC to coordinate completion of coursework and other requirements.

### Precision and Personalized Medicine Informatics Coursework (32 credits)

#### Phase I (19 credits)

Take the following courses:

HINF 5450 - Foundations of Precision Medicine Informatics (3.0 cr)  
HINF 5510 - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)  
HINF 5520 - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)  
PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)  
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)  
HINF 5531 - Health Data Analytics and Data Science (3.0 cr)  
or HINF 5630 - Clinical Data Mining (3.0 cr)

#### Phase II (8 credits)

Take the following courses after completing Phase I, and with the approval of the APC. Take HINF 5496 and HINF 8492 for at least 3 credits each.

HINF 5496 - Internship in Health Informatics (1.0 - 6.0 cr)  
HINF 8492 - Advanced Readings or Research in Health Informatics (1.0 - 6.0 cr)  
PHAR 6224 - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)

#### Elective Coursework (5 credits)

Select at least 5 elective credits, in consultation with the APC, to complete the 46 course credits required for the PhD degree.

HINF 5431 - Foundations of Health Informatics II (3.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 8432 - Probability Models for Biostatistics (3.0 cr)  
PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)  
PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 8446 - Advanced Statistical Genetics and Genomics (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)



### **Twin Cities Campus**

## **Health Journalism and Communication M.A.**

*School of Journalism & Mass Communication*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Health Journalism and Communication M.A. Program, School of Journalism and Mass Communication, 111 Murphy Hall, 206 Church Street S.E., Minneapolis MN 55455 (612-626-1851; fax 612-625-9525)

Email: [dans@umn.edu](mailto:dans@umn.edu)

Website: <http://sjmc.umn.edu/grad/hjComm.html#degree>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 33
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: This program has been temporarily suspended. Applications are not being accepted at this time. Please contact Graduate Student Services at [sjmcgrad@umn.edu](mailto:sjmcgrad@umn.edu) with questions.

A joint program of the School of Journalism and Mass Communication and the School of Public Health, the professional master's in health journalism and communication promotes improved public communication about health matters by combining knowledge, skills, and experience from both disciplines. The program is designed for journalists and health professionals, who earn a master's degree in health journalism. Journalists and communications professionals learn the fundamentals of medical research and public health. Health professionals learn basic journalistic principles and ethics, and how to develop meaningful health stories. Those pursuing other master's degrees, (e.g., master's in public health), earn the M.A. in health journalism and communication in addition to the other degree.

The Health Journalism and Communication program has two distinct, but overlapping, programs of study. Students in the health journalism emphasis will gain advanced knowledge about public health and the evaluation of claims from health, medical, and scientific sources, as well as advanced training on reporting health stories for different media. Students in the health communication emphasis will learn the fundamentals of writing about health topics for different audiences in different formats, as well as health campaign development and evaluation.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Applications to this master's program are not currently being accepted. Please contact [sjmcgrad@umn.edu](mailto:sjmcgrad@umn.edu) with questions.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

**Plan B:** Plan B requires 25 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** Contact the program for capstone project information.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

The M.A. in health journalism and communication requires a minimum of 33 semester credits, to be completed over a two-year schedule. The program has two distinct areas of emphasis: health journalism and health communication. Students in the health journalism emphasis area learn to evaluate claims from health, medical, and scientific sources and to tell health-oriented stories in broadcast or magazine journalism. Students in the health communication emphasis learn the fundamentals of writing about health topics for different audiences, as well as health campaign development and evaluation.



### **Twin Cities Campus**

## **Health Journalism and Communication Minor**

*School of Journalism & Mass Communication*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Health Journalism and Communication M.A. Program, School of Journalism and Mass Communication, 111 Murphy Hall, 206 Church Street S.E., Minneapolis MN 55455 (612-626-1851; fax 612-625-9525)

Email: [dans@umn.edu](mailto:dans@umn.edu)

Website: <http://sjmc.umn.edu/grad/hjComm.html#degree>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: This program has been temporarily suspended. Applications are not being accepted at this time. Please contact the School of Journalism's Graduate Student Services office at [sjmcgrad@umn.edu](mailto:sjmcgrad@umn.edu) with questions.

A joint program of the School of Journalism and Mass Communication and the School of Public Health, the professional master's in health journalism and communication promotes improved public communication about health matters by combining knowledge, skills, and experience from both disciplines. The program is designed for journalists and health professionals, who earn a master's degree in health journalism. Journalists and communications professionals learn the fundamentals of medical research and public health. Health professionals learn basic journalistic principles and ethics, and how to develop meaningful health stories. Those pursuing other master's degrees, (e.g., master's in public health), earn the M.A. in health journalism and communication in addition to the other degree.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

The master's minor requires 6 credits. The doctoral minor requires 12 credits.



### **Twin Cities Campus**

## **History of Science, Technology, and Medicine M.A.**

*History of Science & Technology*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Program in the History of Science, Technology, and Medicine, University of Minnesota, 154 Shepherd Labs, 100 Union Street S.E., Minneapolis, MN 55455 (612-624-7069; fax: 612-301-1442)

Email: [hstm@umn.edu](mailto:hstm@umn.edu)

Website: <http://cse.umn.edu/hstm>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The program offers opportunities for advanced research and study in the history of science and technology (with particular expertise in the history of the physical sciences, history of the biological sciences, history of technology, and history of American science and technology) and in the history of medicine.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Students must have a bachelor's degree with a preferred grade average of B or better and must be capable of interdisciplinary study. Depending on background and career objectives, additional preparatory studies may be necessary in either the science-technology area or in the humanities and social sciences.

Although it is not strictly required for admission, it's strongly recommended that applicants submit a GRE score.

#### **Special Application Requirements:**

All application materials are submitted online to the University. Applications are accepted for fall admission only. The application deadline is December 1.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 15 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is written.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Reading proficiency in one foreign language.

A minimum GPA of 3.30 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B earned for each course.

The MA is offered under Plan A and Plan B. Students select one of two tracks: the history of science and technology or the history of medicine. Coursework is subject to distribution requirements in terms of area and period.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### History of Medicine

#### Major Courses

##### Required (6 credits)

All students complete the following courses.

[HMED 8112](#) - Historiography of Science, Technology, and Medicine (3.0 cr)

[HMED 8113](#) - Research Methods in the History of Science, Technology, and Medicine (3.0 cr)

##### Additional Coursework (9-15 credits)

In consultation with adviser, Plan A students select a minimum of 9 credits from the following and Plan B students select a minimum of 15 credits.

[HMED 5075](#) - Technology and Medicine in Modern America (3.0 cr)

[HMED 5940](#) - Topics in the History of Medicine (3.0 cr)

[HMED 8001](#) - Foundations in the History of Early Medicine (3.0 cr)

[HMED 8002](#) - Foundations in the History of Modern Medicine, 1800-present (3.0 cr)

[HMED 8135](#) - Disease and Debility in History (3.0 cr)

[HMED 8220](#) - Seminar: Current Topics in the History of Medicine (3.0 cr)

[HMED 8631](#) - Directed Study (1.0 - 6.0 cr)

[HMED 8632](#) - Directed Study (1.0 - 6.0 cr)

[HMED 8830](#) - Topics in the History of Science, Technology, and Medicine (3.0 cr)

##### Outside Field Courses (6 credits)

In consultation with adviser, select a minimum of 6 credits from the following. Other courses may be approved by the director of graduate studies.

[EMS 8100](#) - Workshop in Early Modern Studies (1.0 - 3.0 cr)

[EMS 8250](#) - Seminar in Early Modern Studies (3.0 cr)

[HIST 5910](#) - Topics in U.S. History (1.0 - 4.0 cr)

[HIST 8940](#) - Topics in Asian History (1.0 - 4.0 cr)

[HIST 8960](#) - Topics in History (1.0 - 4.0 cr)

[HIST 8993](#) - Directed Study (1.0 - 16.0 cr)

[HSCI 5242](#) - Navigating a Darwinian World (3.0 cr)

[HSCI 5244](#) - Nature's History: Science, Humans, and the Environment (3.0 cr)

[HSCI 5246](#) - History of (Un)Natural Disasters (3.0 cr)

[HSCI 5331](#) - Technology and American Culture (3.0 cr)

[HSCI 5332](#) - Science in the Shaping of America (3.0 cr)

[HSCI 5401](#) - Ethics in Science and Technology (3.0 cr)

[HSCI 5421](#) - Engineering Ethics (3.0 cr)

[HSCI 5611](#) - Enlightenment, Revolution, and the Rise of Modern Science (3.0 cr)

[HSCI 5993](#) - Directed Studies (1.0 - 15.0 cr)

[HSCI 8124](#) - Foundations for Research in Ancient Science (3.0 cr)



HSCI 8125 - Foundations for Research in the Scientific Revolution (3.0 cr)  
HSCI 8131 - Industrial Revolutions (3.0 cr)  
HSCI 8421 - Social and Cultural Studies of Science (3.0 cr)  
HSCI 8441 - Women in Science: Historical Perspectives (3.0 cr)  
HSCI 8900 - Seminar: History of Early Physical Science (3.0 cr)  
HSCI 8910 - Seminar: History of Modern Physical Sciences (3.0 cr)  
HSCI 8920 - Seminar: History of Biological Sciences (3.0 cr)  
HSCI 8930 - Seminar: History of Technology (3.0 cr)  
HSCI 8940 - Seminar: History of Science and Technology in the Americas (3.0 cr)  
HSCI 8950 - Seminar: Science and Technology in Cultural Settings (3.0 cr)  
HSCI 8993 - Directed Studies (1.0 - 5.0 cr)  
HSCI 8994 - Directed Research (1.0 - 5.0 cr)  
MST 5011 - Museum History and Philosophy (3.0 cr)  
MST 5012 - Museum Practices (3.0 cr)  
MST 5020 - Internship (1.0 - 6.0 cr)

### Plan Options

#### Plan A (10 credits)

Complete 10 thesis credits.

HMED 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B (3 credits)

Complete 3 credits in a directed study course.

HMED 8631 - Directed Study (1.0 - 6.0 cr)

or HMED 8632 - Directed Study (1.0 - 6.0 cr)

### History of Science and Technology

#### Major Courses

##### Required (6 credits)

All students complete the following courses.

HSCI 8112 - Historiography of Science, Technology, and Medicine (3.0 cr)

HSCI 8113 - Research Methods in the History of Science, Technology, and Medicine (3.0 cr)

##### Additional Coursework (9-15 credits)

In consultation with adviser, Plan A students select a minimum of 9 credits from the following, and Plan B students select a minimum of 15 credits.

HSCI 5211 - Biology and Culture in the 19th and 20th Centuries [CIV] (3.0 cr)

HSCI 5242 - Navigating a Darwinian World (3.0 cr)

HSCI 5244 - Nature's History: Science, Humans, and the Environment (3.0 cr)

HSCI 5246 - History of (Un)Natural Disasters (3.0 cr)

HSCI 5331 - Technology and American Culture (3.0 cr)

HSCI 5332 - Science in the Shaping of America (3.0 cr)

HSCI 5401 - Ethics in Science and Technology (3.0 cr)

HSCI 5421 - Engineering Ethics (3.0 cr)

HSCI 5611 - Enlightenment, Revolution, and the Rise of Modern Science (3.0 cr)

HSCI 5993 - Directed Studies (1.0 - 15.0 cr)

HSCI 8124 - Foundations for Research in Ancient Science (3.0 cr)

HSCI 8125 - Foundations for Research in the Scientific Revolution (3.0 cr)

HSCI 8131 - Industrial Revolutions (3.0 cr)

HSCI 8421 - Social and Cultural Studies of Science (3.0 cr)

HSCI 8441 - Women in Science: Historical Perspectives (3.0 cr)

HSCI 8830 - Topics in the History of Science, Technology, and Medicine (3.0 cr)

HSCI 8900 - Seminar: History of Early Physical Science (3.0 cr)

HSCI 8910 - Seminar: History of Modern Physical Sciences (3.0 cr)

HSCI 8920 - Seminar: History of Biological Sciences (3.0 cr)

HSCI 8930 - Seminar: History of Technology (3.0 cr)

HSCI 8940 - Seminar: History of Science and Technology in the Americas (3.0 cr)

HSCI 8950 - Seminar: Science and Technology in Cultural Settings (3.0 cr)

HSCI 8993 - Directed Studies (1.0 - 5.0 cr)

HSCI 8994 - Directed Research (1.0 - 5.0 cr)

##### Outside Field Courses (6 credits)

In consultation with adviser, select a minimum of 6 credits from the following. Other courses may be approved by the director of graduate studies.

EMS 8100 - Workshop in Early Modern Studies (1.0 - 3.0 cr)





[EMS 8250](#) - Seminar in Early Modern Studies (3.0 cr)  
[HIST 5910](#) - Topics in U.S. History (1.0 - 4.0 cr)  
[HIST 8940](#) - Topics in Asian History (1.0 - 4.0 cr)  
[HIST 8960](#) - Topics in History (1.0 - 4.0 cr)  
[HIST 8993](#) - Directed Study (1.0 - 16.0 cr)  
[HMED 5075](#) - Technology and Medicine in Modern America (3.0 cr)  
[HMED 5940](#) - Topics in the History of Medicine (3.0 cr)  
[HMED 8002](#) - Foundations in the History of Modern Medicine, 1800-present (3.0 cr)  
[HMED 8135](#) - Disease and Debility in History (3.0 cr)  
[HMED 8220](#) - Seminar: Current Topics in the History of Medicine (3.0 cr)  
[HMED 8631](#) - Directed Study (1.0 - 6.0 cr)  
[HMED 8632](#) - Directed Study (1.0 - 6.0 cr)  
[MST 5011](#) - Museum History and Philosophy (3.0 cr)  
[MST 5012](#) - Museum Practices (3.0 cr)  
[MST 5020](#) - Internship (1.0 - 6.0 cr)

### Plan Options

#### Plan A (10 credits)

Complete 10 thesis credits.

[HSCI 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B (3 credits)

Complete 3 credits in a directed study course.

[HSCI 8993](#) - Directed Studies (1.0 - 5.0 cr)

or [HSCI 8994](#) - Directed Research (1.0 - 5.0 cr)



### **Twin Cities Campus**

## **History of Science, Technology, and Medicine Minor**

*History of Science & Technology*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Program in the History of Science, Technology, and Medicine, University of Minnesota, 154 Shepherd Labs, 100 Union Street SE, Minneapolis, MN 55455 (612-624-7069; fax: 612-301-1442)

Email: [hstm@umn.edu](mailto:hstm@umn.edu)

Website: <http://cse.umn.edu/hstm>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The program offers opportunities for advanced research and study in the history of science and technology (with particular expertise in the history of the physical sciences, history of the biological sciences, history of technology, and history of American science and technology) and in the history of medicine.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B earned for each course.

The minimum required GPA for the minor is 3.0

The historiography course (HSCI or HMED 8112) is strongly recommended, along with other courses that are selected to define a course of study that should have some identifiable focus but also a certain breadth. Students should not plan to take all courses in the minor from the same faculty member.

#### **Minor Courses (6-12 credits)**

Master's students select a minimum of 6 credits from the following and doctoral students select a minimum of 12 credits.

- [HMED 5075](#) - Technology and Medicine in Modern America (3.0 cr)
- [HMED 5940](#) - Topics in the History of Medicine (3.0 cr)
- [HMED 8001](#) - Foundations in the History of Early Medicine (3.0 cr)
- [HMED 8002](#) - Foundations in the History of Modern Medicine, 1800-present (3.0 cr)
- [HMED 8112](#) - Historiography of Science, Technology, and Medicine (3.0 cr)
- [HMED 8113](#) - Research Methods in the History of Science, Technology, and Medicine (3.0 cr)
- [HMED 8220](#) - Seminar: Current Topics in the History of Medicine (3.0 cr)
- [HMED 8830](#) - Topics in the History of Science, Technology, and Medicine (3.0 cr)
- [HSCI 5211](#) - Biology and Culture in the 19th and 20th Centuries [CIV] (3.0 cr)
- [HSCI 5242](#) - Navigating a Darwinian World (3.0 cr)
- [HSCI 5244](#) - Nature's History: Science, Humans, and the Environment (3.0 cr)
- [HSCI 5246](#) - History of (Un)Natural Disasters (3.0 cr)



- [HSCI 5331](#) - Technology and American Culture (3.0 cr)
- [HSCI 5332](#) - Science in the Shaping of America (3.0 cr)
- [HSCI 5401](#) - Ethics in Science and Technology (3.0 cr)
- [HSCI 5421](#) - Engineering Ethics (3.0 cr)
- [HSCI 8112](#) - Historiography of Science, Technology, and Medicine (3.0 cr)
- [HSCI 8113](#) - Research Methods in the History of Science, Technology, and Medicine (3.0 cr)
- [HSCI 8124](#) - Foundations for Research in Ancient Science (3.0 cr)
- [HSCI 8125](#) - Foundations for Research in the Scientific Revolution (3.0 cr)
- [HSCI 8131](#) - Industrial Revolutions (3.0 cr)
- [HSCI 8421](#) - Social and Cultural Studies of Science (3.0 cr)
- [HSCI 8441](#) - Women in Science: Historical Perspectives (3.0 cr)
- [HSCI 8830](#) - Topics in the History of Science, Technology, and Medicine (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **History of Science, Technology, and Medicine Ph.D.**

*History of Science & Technology*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Program in the History of Science, Technology, and Medicine, University of Minnesota, 154 Shepherd Labs, 100 Union Street S.E., Minneapolis, MN 55455 (612-624-7069; fax: 612-301-1442)

Email: [hstm@umn.edu](mailto:hstm@umn.edu)

Website: <https://cse.umn.edu/hstm>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 54
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The program offers opportunities for advanced research and study in the history of science and technology (with particular expertise in the history of the physical sciences, history of the biological sciences, history of technology, and history of American science and technology) and in the history of medicine.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Students must have a bachelor's degree with a preferred grade average of B or better and must be capable of interdisciplinary study. Depending on background and career objectives, additional preparatory studies may be necessary in either the science-technology area or in the humanities and social sciences.

Although it is not strictly required for admission, it's strongly recommended that applicants submit a GRE score.

#### **Special Application Requirements:**

All application materials are submitted online to the University. Applications are accepted for fall semester only. The application deadline is December 1.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

24 credits are required in the major.  
6 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Reading proficiency in two foreign languages.

A minimum GPA of 3.30 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B earned for each course.

Students select one of two tracks: the history of science and technology or the history of medicine. Coursework is subject to distribution requirements in terms of area and period.

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### History of Medicine

#### Major Courses

##### Required (6 credits)

Complete the following courses.

[HMED 8112](#) - Historiography of Science, Technology, and Medicine (3.0 cr)

[HMED 8113](#) - Research Methods in the History of Science, Technology, and Medicine (3.0 cr)

##### Additional Coursework (18 credits)

In consultation with adviser, select a minimum of 18 credits, including 3 credits in either [HMED 8631](#) or [8632](#).

[HMED 5075](#) - Technology and Medicine in Modern America (3.0 cr)

[HMED 5940](#) - Topics in the History of Medicine (3.0 cr)

[HMED 8001](#) - Foundations in the History of Early Medicine (3.0 cr)

[HMED 8002](#) - Foundations in the History of Modern Medicine, 1800-present (3.0 cr)

[HMED 8135](#) - Disease and Debility in History (3.0 cr)

[HMED 8220](#) - Seminar: Current Topics in the History of Medicine (3.0 cr)

[HMED 8631](#) - Directed Study (1.0 - 6.0 cr)

[HMED 8632](#) - Directed Study (1.0 - 6.0 cr)

[HMED 8830](#) - Topics in the History of Science, Technology, and Medicine (3.0 cr)

##### Outside Field Courses (6 credits)

In consultation with adviser, select a minimum of 6 credits from the following. Other courses may be approved by the director of graduate studies.

[EMS 8100](#) - Workshop in Early Modern Studies (1.0 - 3.0 cr)

[EMS 8250](#) - Seminar in Early Modern Studies (3.0 cr)

[HIST 5910](#) - Topics in U.S. History (1.0 - 4.0 cr)

[HIST 8940](#) - Topics in Asian History (1.0 - 4.0 cr)

[HIST 8960](#) - Topics in History (1.0 - 4.0 cr)

[HIST 8993](#) - Directed Study (1.0 - 16.0 cr)

[HSCI 5242](#) - Navigating a Darwinian World (3.0 cr)

[HSCI 5244](#) - Nature's History: Science, Humans, and the Environment (3.0 cr)

[HSCI 5246](#) - History of (Un)Natural Disasters (3.0 cr)

[HSCI 5331](#) - Technology and American Culture (3.0 cr)

[HSCI 5332](#) - Science in the Shaping of America (3.0 cr)

[HSCI 5401](#) - Ethics in Science and Technology (3.0 cr)

[HSCI 5421](#) - Engineering Ethics (3.0 cr)

[HSCI 5611](#) - Enlightenment, Revolution, and the Rise of Modern Science (3.0 cr)

[HSCI 5993](#) - Directed Studies (1.0 - 15.0 cr)

[HSCI 8124](#) - Foundations for Research in Ancient Science (3.0 cr)

[HSCI 8125](#) - Foundations for Research in the Scientific Revolution (3.0 cr)

[HSCI 8131](#) - Industrial Revolutions (3.0 cr)



HSCI 8421 - Social and Cultural Studies of Science (3.0 cr)  
HSCI 8441 - Women in Science: Historical Perspectives (3.0 cr)  
HSCI 8900 - Seminar: History of Early Physical Science (3.0 cr)  
HSCI 8910 - Seminar: History of Modern Physical Sciences (3.0 cr)  
HSCI 8920 - Seminar: History of Biological Sciences (3.0 cr)  
HSCI 8930 - Seminar: History of Technology (3.0 cr)  
HSCI 8940 - Seminar: History of Science and Technology in the Americas (3.0 cr)  
HSCI 8950 - Seminar: Science and Technology in Cultural Settings (3.0 cr)  
HSCI 8993 - Directed Studies (1.0 - 5.0 cr)  
HSCI 8994 - Directed Research (1.0 - 5.0 cr)  
MST 5011 - Museum History and Philosophy (3.0 cr)  
MST 5012 - Museum Practices (3.0 cr)  
MST 5020 - Internship (1.0 - 6.0 cr)

**Thesis Credits (24 credits)**

Complete 24 credits after passing preliminary oral exam.

HMED 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**History of Science and Technology**

**Major Courses**

**Required (6 credits)**

Complete the following courses.

HSCI 8112 - Historiography of Science, Technology, and Medicine (3.0 cr)

HSCI 8113 - Research Methods in the History of Science, Technology, and Medicine (3.0 cr)

**Additional Coursework (18 credits)**

In consultation with adviser, select a minimum of 18 credits, including 3 credits in either HSCI 8993 or 8994.

HSCI 5211 - Biology and Culture in the 19th and 20th Centuries [CIV] (3.0 cr)

HSCI 5242 - Navigating a Darwinian World (3.0 cr)

HSCI 5244 - Nature's History: Science, Humans, and the Environment (3.0 cr)

HSCI 5246 - History of (Un)Natural Disasters (3.0 cr)

HSCI 5331 - Technology and American Culture (3.0 cr)

HSCI 5332 - Science in the Shaping of America (3.0 cr)

HSCI 5401 - Ethics in Science and Technology (3.0 cr)

HSCI 5421 - Engineering Ethics (3.0 cr)

HSCI 5611 - Enlightenment, Revolution, and the Rise of Modern Science (3.0 cr)

HSCI 5993 - Directed Studies (1.0 - 15.0 cr)

HSCI 8124 - Foundations for Research in Ancient Science (3.0 cr)

HSCI 8125 - Foundations for Research in the Scientific Revolution (3.0 cr)

HSCI 8131 - Industrial Revolutions (3.0 cr)

HSCI 8421 - Social and Cultural Studies of Science (3.0 cr)

HSCI 8441 - Women in Science: Historical Perspectives (3.0 cr)

HSCI 8830 - Topics in the History of Science, Technology, and Medicine (3.0 cr)

HSCI 8900 - Seminar: History of Early Physical Science (3.0 cr)

HSCI 8910 - Seminar: History of Modern Physical Sciences (3.0 cr)

HSCI 8920 - Seminar: History of Biological Sciences (3.0 cr)

HSCI 8930 - Seminar: History of Technology (3.0 cr)

HSCI 8940 - Seminar: History of Science and Technology in the Americas (3.0 cr)

HSCI 8950 - Seminar: Science and Technology in Cultural Settings (3.0 cr)

HSCI 8993 - Directed Studies (1.0 - 5.0 cr)

HSCI 8994 - Directed Research (1.0 - 5.0 cr)

**Outside Field Courses (6 credits)**

In consultation with adviser, select a minimum of 6 credits from the following. Other courses may be approved by the director of graduate studies.

EMS 8100 - Workshop in Early Modern Studies (1.0 - 3.0 cr)

EMS 8250 - Seminar in Early Modern Studies (3.0 cr)

HIST 5910 - Topics in U.S. History (1.0 - 4.0 cr)

HIST 8940 - Topics in Asian History (1.0 - 4.0 cr)

HIST 8960 - Topics in History (1.0 - 4.0 cr)

HIST 8993 - Directed Study (1.0 - 16.0 cr)

HMED 5075 - Technology and Medicine in Modern America (3.0 cr)

HMED 5940 - Topics in the History of Medicine (3.0 cr)

HMED 8002 - Foundations in the History of Modern Medicine, 1800-present (3.0 cr)

HMED 8135 - Disease and Debility in History (3.0 cr)

HMED 8220 - Seminar: Current Topics in the History of Medicine (3.0 cr)

HMED 8631 - Directed Study (1.0 - 6.0 cr)

HMED 8632 - Directed Study (1.0 - 6.0 cr)



[MST 5011](#) - Museum History and Philosophy (3.0 cr)

[MST 5012](#) - Museum Practices (3.0 cr)

[MST 5020](#) - Internship (1.0 - 6.0 cr)

**Thesis Credits (24 credits)**

Complete 24 credits after completing preliminary oral exam.

[HSCI 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### *Twin Cities Campus*

## Human Rights M.H.R.

*Global Studies Department*

### Graduate School

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

Email: [hhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 45
- This program does not require summer semesters for timely completion.
- Degree: Master of Human Rights

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master's of human rights is a two-year interdisciplinary professional master's degree to prepare students to work in the field of human rights or to advance their knowledge and skills in the field. This degree equips graduate students with core professional and conceptual knowledge and analytical tools necessary to operate on the professional level in the field of human rights, along with the in-depth academic and professional training needed for the specific human rights area in which they practice or intend to practice. Students follow a core curriculum that includes the study of human rights norms and law, methodology, critical views of human rights, and human rights policy that will equip them with the skills needed to address the problems.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Complete application will include a University of Minnesota application, personal statement, resume or C.V., transcripts, GRE scores, TOEFL scores (if applicable), at least three letters of recommendation, and an optional diversity statement.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600

Key to [test abbreviations](#)(GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan C:** Plan C requires 45 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Students will participate in a three-credit capstone seminar rather than a thesis. The capstone seminar is one of the required core courses.

This program may be completed with a minor.





Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

A 400-hour, non-credit professional internship, supervised by the Human Rights program, is required. Completion of the internship during the summer after the first year is expected.

4xxx-level coursework is limited to language courses unless approved by the director of graduate studies.

Required courses offered on both the A/F and S/N grading basis must be taken A/F.

### Human Rights Core

PA 5886 - Master of Human Rights Cohort Seminar I (1.0 cr)

PA 5887 - Master of Human Rights Cohort Seminar II (1.0 cr)

Take 3 or more course(s) totaling 9 or more credit(s) from the following:

- GLOS 5403 - Human Rights Advocacy (3.0 cr)
- HIST 8245 - Human Rights: A Global History (3.0 cr)
- LAW 6886 - International Human Rights Law (3.0 cr)
- PA 5885 - Human Rights Policy: Issues and Actors (3.0 cr)
- SOC 8171 - Cross-Disciplinary Perspectives in Human Rights (3.0 cr)

### Professional Core

#### Quantitative

Higher-level options available for students with strong statistical background, with DGS approval.

Take 1 or more course(s) from the following:

- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5032 - Applied Regression (2.0 cr)
- PA 5033 - Multivariate Techniques (2.0 cr)
- PA 5044 - Applied Regression, Accelerated (2.0 cr)
- PA 5045 - Statistics for Public Affairs, Accelerated (4.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)

#### Qualitative

Take 1 or more course(s) from the following:

- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- OLPD 5061 - Ethnographic Research Methods (3.0 cr)
- SOC 8852 - Advanced Qualitative Research Methods: Ethnographic Practicum (3.0 cr)

#### Management

Take 1 or more course(s) from the following:

- PA 5011 - Management of Organizations (3.0 cr)
- PA 5101 - Management and Governance of Nonprofit Organizations (3.0 cr)
- PA 5151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)

#### Policy and Economic Analysis

Take 1 or more course(s) from the following:

- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5021 - Microeconomics for Policy Analysis (3.0 cr)
- PA 5012 - The Politics of Public Affairs (3.0 cr)
- PA 5801 - Global Public Policy (3.0 cr)

### Capstone or Professional Paper

Take 1 or more course(s) from the following:

- PA 8081 - Capstone Workshop (3.0 cr)
- PA 8082 - Professional Paper-Writing Seminar (3.0 cr)
- PA 8921 - Master's: Professional Paper (Individual Option) (1.0 - 3.0 cr)

### Concentration and Electives

Concentration (12 credits) plus electives to bring total credits to 45.

### Concentrations: Pre-Designed



Students complete 12 credits in a pre-designed or self-designed concentration. Pre-designed concentrations are listed below. Consult the program or adviser for courses which do not appear but which may be eligible with consent of adviser.

#### **Human Rights, Race, and Ethnicity**

Take 12 or more credit(s) from the following:

- [AFRO 5866](#) - The Civil Rights and Black Power Movement, 1954-1984 (3.0 cr)
- [AFRO 8202](#) - Seminar: Intellectual History of Race (3.0 cr)
- [AFRO 8554](#) - Seminar: Gender, Race, Nation, and Policy--Perspectives from Within the African Diaspora (3.0 cr)
- [PA 5002](#) - Introduction to Policy Analysis (1.5 cr)
- [PA 5311](#) - Program Evaluation (3.0 cr)
- [PA 5422](#) - Diversity and Public Policy (3.0 cr)
- [PA 5421](#) - Racial Inequality and Public Policy (3.0 cr)
- [PA 8302](#) - Applied Policy Analysis (4.0 cr)
- [PA 8312](#) - Analysis of Discrimination (4.0 cr)
- [PSY 8210](#) - Law, Race, and Social Psychology (3.0 cr)

-OR-

#### **Human Rights, Gender, and Sexuality**

Take 12 or more credit(s) from the following:

- [GWSS 5104](#) - Transnational Feminist Theory (3.0 cr)
- [GWSS 8101](#) - Intellectual History of Feminism (3.0 cr)
- [GWSS 8103](#) - Feminist Theories of Knowledge (3.0 cr)
- [LAW 6827](#) - Women's International Human Rights (2.0 cr)
- [PA 5601](#) - Global Survey of Gender and Public Policy (3.0 cr)
- [PA 5561](#) - Gender and International Development (3.0 cr)
- [PUBH 6675](#) - Women's Health (2.0 cr)

-OR-

#### **Human Rights in the Arts and Humanities**

Take 12 or more credit(s) from the following:

- [ARTS 5710](#) - Advanced Photography and Moving Image Projects (4.0 cr)
- [ARTS 5760](#) - Experimental Film and Video (4.0 cr)
- [ENGW 5102](#) - Graduate Fiction Writing (4.0 cr)
- [ENGW 5106](#) - Graduate Literary Nonfiction Writing (4.0 cr)

-OR-

#### **Human Rights, NGO Leadership, and Management Course**

Take 12 or more credit(s) from the following:

- [PA 5101](#) - Management and Governance of Nonprofit Organizations (3.0 cr)
- [PA 5104](#) - Strategic Human Resource Management (3.0 cr)
- [PA 5108](#) - Board leadership development (1.0 cr)
- [PA 5116](#) - Financing Public and Nonprofit Organizations (1.5 cr)
- [PA 5123](#) - Philanthropy in America: History, Practice, and Trends (1.5 - 3.0 cr)
- [PA 5137](#) - Project Management in the Public Arena (1.5 cr)
- [PA 5144](#) - Social Entrepreneurship (3.0 cr)
- [PA 5145](#) - Civic Participation in Public Affairs (3.0 cr)
- [PA 5151](#) - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- [PA 5251](#) - Strategic Planning and Management (3.0 cr)
- [PA 5311](#) - Program Evaluation (3.0 cr)
- [PA 5405](#) - Public Policy Implementation (3.0 cr)
- [PA 5501](#) - Theories and Policies of Development (3.0 cr)
- [PA 5801](#) - Global Public Policy (3.0 cr)
- [PA 5927](#) - Effective Grantwriting for Nonprofit Organizations (1.5 cr)

-OR-

#### **Human Rights and Project/Policy Evaluation**

Take 12 or more credit(s) from the following:

- [PA 5311](#) - Program Evaluation (3.0 cr)
- [PA 5103](#) - Leadership and Change (1.5 - 3.0 cr)
- [PA 5104](#) - Strategic Human Resource Management (3.0 cr)
- [PA 5105](#) - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- [PA 5145](#) - Civic Participation in Public Affairs (3.0 cr)
- [PA 5251](#) - Strategic Planning and Management (3.0 cr)
- [PA 5405](#) - Public Policy Implementation (3.0 cr)



- [PUBH 6852](#) - Program Evaluation in Health and Mental Health Settings (2.0 cr)

-OR-

#### Human Rights and Development

Take 12 or more credit(s) from the following:

- [ESPM 5251](#) - Natural Resources in Sustainable International Development (3.0 cr)
- [OLPD 5104](#) - Strategies for International Development of Education Systems (3.0 cr)
- [OLPD 5107](#) - Gender, Education, and International Development (3.0 cr)
- [OLPD 5121](#) - Educational Reform in International Context (3.0 cr)
- [PA 5151](#) - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- [PA 5405](#) - Public Policy Implementation (3.0 cr)
- [PA 5501](#) - Theories and Policies of Development (3.0 cr)
- [PA 5503](#) - Economics of Development (3.0 cr)
- [PA 5521](#) - Development Planning and Policy Analysis (4.0 cr)
- [PA 5522](#) - International Development Policy, Families, and Health (3.0 cr)
- [PA 5561](#) - Gender and International Development (3.0 cr)
- [PA 5601](#) - Global Survey of Gender and Public Policy (3.0 cr)

-OR-

#### Human Rights, Conflict and International Security

Take 12 or more credit(s) from the following:

- [GLOS 5315](#) - Never Again! Memory & Politics after Genocide [GP] (3.0 cr)
- [LAW 6027](#) - Law of the Sea (2.0 cr)
- [LAW 6889](#) - Laws of War (3.0 cr)
- [LAW 6918](#) - Rule of Law (2.0 cr)
- [PA 5801](#) - Global Public Policy (3.0 cr)
- [PA 5813](#) - US Foreign Policy: Issues and Institutions (3.0 cr)
- [PA 5823](#) - Managing Humanitarian and Refugee Crises: Challenges for Policymakers & Practitioners (1.0 cr)
- [PA 5826](#) - National Security Policy (3.0 cr)
- [POL 5465](#) - Democracy and Dictatorship in Southeast Asia [GP] (3.0 cr)
- [POL 5885](#) - International Conflict and Security (3.0 cr)
- [SOC 5315](#) - Never Again! Memory & Politics after Genocide [GP] (3.0 cr)
- [SOC 5411](#) - Terrorist Networks & Counterterror Organizations (3.0 cr)

-OR-

#### Human Rights and Migration

Take 12 or more credit(s) from the following:

- [CHIC 5374](#) - Migrant Farmworkers in the United States: Families, Work, and Advocacy [CIV] (4.0 cr)
- [LAW 6027](#) - Law of the Sea (2.0 cr)
- [LAW 6872](#) - Immigration Law (3.0 cr)
- [PA 5281](#) - Immigrants, Urban Planning and Policymaking in the U.S. (3.0 cr)
- [PA 5301](#) - Population Methods & Issues for the United States & Global South (3.0 cr)
- [PA 5451](#) - Immigration, Health and Public Policy (3.0 cr)
- [PA 5452](#) - Immigration and Public Policy (3.0 cr)
- [PA 5801](#) - Global Public Policy (3.0 cr)

-OR-

#### Human Rights: Crime, Law, and Justice

Take 12 or more credit(s) from the following:

- [LAW 6648](#) - International Criminal Law (3.0 cr)
- [LAW 6893](#) - Transitional Justice (2.0 cr)
- [LAW 6918](#) - Rule of Law (2.0 cr)
- [POL 5403](#) - Constitutions, Democracy, and Rights: Comparative Perspectives (3.0 cr)
- [POL 5492](#) - Law and (In)Justice in Latin America (3.0 cr)
- [SOC 5104](#) - Crime and Human Rights (3.0 cr)
- [SOC 5171](#) - Sociology of International Law: Human Rights & Trafficking [GP] (3.0 cr)
- [SOC 5411](#) - Terrorist Networks & Counterterror Organizations (3.0 cr)
- [SOC 5315](#) - Never Again! Memory & Politics after Genocide [GP] (3.0 cr)
- [GLOS 5315](#) - Never Again! Memory & Politics after Genocide [GP] (3.0 cr)

-OR-

#### Human Rights and Research Methods (Qualitative and/or Quantitative)

Take 12 or more credit(s) from the following:

- [OLPD 5061](#) - Ethnographic Research Methods (3.0 cr)



- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5032 - Applied Regression (2.0 cr)
- PA 5033 - Multivariate Techniques (2.0 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5044 - Applied Regression, Accelerated (2.0 cr)
- PA 5045 - Statistics for Public Affairs, Accelerated (4.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)

-OR-

#### **Human Rights and Area Studies (Latin America, Asia, Middle East, Africa, etc.)**

The potential area studies courses offered at the University are vast. Students will work with their advisor to select at least 12 credits for an area studies concentration.

Take 12 or more credit(s) from the following:

-OR-

#### **Human Rights and Public Health**

Take 12 or more credit(s) from the following:

- BTHX 5520 - Social Justice and Bioethics (3.0 cr)
- CSPH 5111 - Ways of Thinking about Health (2.0 cr)
- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)
- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)
- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
- PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)
- PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)
- PUBH 6801 - Health and Human Rights (3.0 cr)
- PUBH 6804 - Mental Health Policy (2.0 cr)

-OR-

#### **Human Rights and Environment**

Take 12 or more credit(s) from the following:

- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- LAW 6215 - Environmental Law (3.0 cr)
- LAW 6400 - International Environmental Law (2.0 cr)
- LAW 7012 - CL: Environmental and Energy Law (3.0 cr)
- PA 5242 - Environmental Planning, Policy, and Decision Making (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5722 - Economics of Natural Resource and Environmental Policy (3.0 cr)
- PA 5723 - Water Policy (3.0 cr)
- PA 5724 - Climate Change Policy (3.0 cr)
- PA 5752 - Material-Energy Flows & Sustainable Development (3.0 cr)
- PA 5721 - Energy Systems and Policy (3.0 cr)



### **Twin Cities Campus**

## **Integrated Biosciences M.S.**

Medical School - Adm

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

University of Minnesota, 251 Swenson Science Building, 1035 Kirby Drive, Duluth, MN 55812 (218- 726-6898; fax: 218-726-8152)

Email: [ibs@d.umn.edu](mailto:ibs@d.umn.edu)

Website: <http://www.d.umn.edu/ibs>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The all-University integrated biosciences graduate program offers study toward the master of science (M.S.) degree under Plan A (coursework and original thesis). The program has two areas of emphasis: cell, molecular, and physiological (CMP) biology; and ecology, organismal, and population (EOP) biology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree or equivalent from an accredited college/university in the biological or physical sciences or a related field. Background in a variety of subdisciplines is appropriate preparation.

Other requirements to be completed before admission:

Recommended undergraduate courses for applicants pursuing the M.S. degree include one year each of chemistry, biology, and physics. One semester of calculus is also recommended. Applicants are strongly encouraged to have taken other advanced courses in chemistry, biology, additional calculus, and introductory statistics.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

### Required Coursework



### ***Twin Cities Campus***

## **Integrated Biosciences Ph.D.**

*Medical School - Adm*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Integrated Biosciences Graduate Program, University of Minnesota, 251 Swenson Science Building, 1035 Kirby Drive, Duluth, MN 55812 (218-726-6898; fax: 218-726-8152)

Email: [ibs@d.umn.edu](mailto:ibs@d.umn.edu)

Website: <http://www.d.umn.edu/ibs>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 56
- This program does not require summer semesters for timely completion.
- The Integrated Biosciences Ph.D. is an All-University program delivered on the Twin Cities and Duluth Campuses. The University of Minnesota Twin Cities is the degree granting authority for the Integrated Biosciences Ph.D. program in Duluth.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The all-University integrated biosciences graduate program offers study toward the doctor of philosophy (Ph.D.) degree. The program has two areas of emphasis: cell, molecular, and physiological (CMP) biology; and ecology, organismal, and population (EOP) biology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree or equivalent from an accredited college or university in the biological or physical sciences or a related field.

Other requirements to be completed before admission:

Recommended undergraduate courses for applicants pursuing the Ph.D. degree include one year each of chemistry, biology, physics, calculus, and advanced chemistry. One semester (minimum) of statistics is also recommended.

Additional recommended courses for students in the ecology, organismal, and population (EOP) emphasis include one year of calculus, one semester each of ecology and evolutionary biology along with one course in two of the following subjects: genetics, cell biology, biochemistry.

Additional recommended courses for students in the cell, molecular, and physiological (CMP) emphasis include one year of organic chemistry plus one course in each of the following: genetics, cell biology, and biochemistry.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80



The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

20 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

**Ph.D. Written Preliminary Examination:** In addition to completing the curriculum for the major and internal related fields, students will be required to pass both a written and oral preliminary examination prior to completing the Ph.D. program. The preliminary written examination will be administered once the student has completed the majority of the required coursework. This will typically occur in the summer of the second year. The written examination will consist of a completed NIH or NSF grant application for the student's proposed research project. The project will be evaluated by the Thesis Examining Committee, which will also serve as the student's Final Oral Examining Committee to provide continuity of advice during the length of the student's research program.

**Ph.D. Oral Preliminary Examination:** The oral preliminary examination will be administered within two months of the successful completion of the preliminary written examination. The examination will be administered by the graduate faculty according to University regulations and all students will be required to pass the oral examination to continue in the Ph.D. program.

Most students will complete the requirements for the Ph.D. degree within five years. The final oral defense will be conducted by the graduate faculty according to University regulations. It will consist of a public seminar presented by the student.





### **Twin Cities Campus**

## **Integrated Food Systems Leadership Post-baccalaureate Certificate**

College of Veterinary Medicine - Adm

### **Graduate School**

Link to a [list of faculty](#) for this program.

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 13
- This program requires summer semesters for timely completion.
- Degree: Integrated Food Systems Leadership PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Integrated Food Systems Leadership Certificate is an interdisciplinary program targeted for early to mid-career working professionals seeking to improve their leadership skills in the context of the farm-to-fork food system. The certificate program is ideal for aspiring or new leaders seeking to increase their leadership, expand their food system perspective, take on additional responsibility, and improve effectiveness in their organization. The program focuses on developing leadership and critical thinking skills using a food systems approach while working across disciplines in industry, academia, government agencies, and intergovernmental organizations. This certificate also provides participants with knowledge and skills to enhance their current roles and career through development of a robust knowledge of production, policy, and business aspects of the global food supply chain.

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

all degrees acceptable

all degrees acceptable

Other requirements to be completed before admission:

Applicants must be early to mid-career working professionals

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.



A minimum GPA of 3.0 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

**Required Courses**

- IFSL 7000 - Keys to Effective Leadership (1.0 cr)
- IFSL 7011 - Food Production, Processing, and Supply Chains (2.0 cr)
- IFSL 7021 - Food Governance, Policy, and Regulation (2.0 cr)
- IFSL 7031 - Food Security, Safety, and Defense (2.0 cr)
- IFSL 7041 - Food Business, Marketing, and Product Development (2.0 cr)
- IFSL 7051 - Leading Across Integrated Food Systems (2.0 cr)
- IFSL 7061 - Teamwork: Food Systems in Action (1.0 cr)
- IFSL 7070 - Communications and Critical Thinking (1.0 cr)



### ***Twin Cities Campus***

## **Integrative Health & Wellbeing Coaching M.A.**

*Spirituality & Healing, Center for*  
**Graduate School**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Earl E. Bakken Center for Spirituality & Healing  
C591 Mayo Memorial Building  
420 Delaware St SE  
Minneapolis, MN 55455  
Email: [csch-academics@umn.edu](mailto:csch-academics@umn.edu)  
Website: <http://www.csh.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 38
- This program requires summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Health coaching is an emerging method of partnering with clients to help them achieve their overall goals. Integrative health coaches practice from a holistic perspective that views the client as intrinsically healthy, whole, wise, and the ultimate expert in their own healing journey. Although health coaches do not diagnose or treat illness, they assist those with health conditions to enhance their healing and change their lifestyle patterns. While an individual may make some changes alone, many changes happen more easily within the structure and support of a partnership, which can be uniquely provided by a health coach. This assistance includes necessary connection to resources, and the assembly of an optimal, interprofessional healthcare team. The ability to perform this role requires that health coaches have a comfortable working knowledge in both conventional and integrative healthcare.

The Earl E. Bakken Center for Spirituality & Healing is a pioneer in the health coaching field, working to advance education, research, and care model innovation. The Master of Arts in Integrative Health and Wellbeing Coaching was the first masters level health coaching degree to be offered through an accredited university in the United States. Graduates of the program work in a multitude of practice settings, including hospitals, clinics, health educational facilities, community centers, senior living centers, fitness venues, corporations, schools, and private practice.

All required coursework is offered in a blended format that combines online curriculum with in person intensives. Students are required to be on campus two extended weekends per semester. The program requires a set of core coaching classes, with additional coursework in integrative nutrition, mind-body science, physical exercise, lifestyle medicine, coaching for chronic conditions, and group health coaching. Six credits of elective courses round out the degree, which gives students the opportunity to take other CSPH courses or to satisfy requirements for a minor in another department. Students finish the program with a 2-credit capstone project.

The Bakken Center for Spirituality & Healing's integrative health coaching programs are accredited by the National Board for Health and Wellness Coaching (NBHWC) (<https://nbhwc.org>). The Bakken Center has been a national leader in defining the scope of practice, developing educational competencies and standard of practice, and helping to lead the creation of a national certification process and exam in Health and Wellness coaching. Students in the Master of Arts program are eligible to take the national board certification exam after the required core courses are completed (CSPH 5701-5702-5703-5705-5706). In addition, nurses may complete a certification exam as Health and Wellness Nurse Coaches (<http://www.ahncc.org/>).

Although the instruction is based on research in the field, this Plan B degree is not intended to provide intensive research training and is understood to be a terminal degree.

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.



Bachelor's degree in a health-related field or a bachelor's degree in a non-health-related field with specific coursework in psychology, physiology, and statistics from an accredited institution.

#### **Required prerequisites**

#### **Required Prerequisite Coursework**

Previous coursework in basic psychology, human physiology, and statistics must have been completed. Statistics must be completed within 7 years prior to application. All prerequisites must be completed at an accredited institution for a grade equal to B (3.0) or better.

Other requirements to be completed before admission:

In addition to the University's online application, applicants submit a personal statement describing their goals for the program and their professional qualifications. This three to five page statement should focus on what led to the applicant's interest in health coaching as a professional activity, including a description of interest in, and experience with, holistic integrative health and healing. Three letters of recommendation, transcripts, and a current CV or resume are also required. All items are uploaded into the University's online application. Selected applicants will be invited for admissions interviews.

#### **Special Application Requirements:**

The degree is designed for individuals with a bachelor's degree in a health-related field, or for professionals without healthcare backgrounds who have extensive interest in working with individuals and groups to optimize wellbeing, assuming completion of required prerequisites. All applicants must have completed the prerequisite courses in Physiology, Statistics (within past 7 years), and Psychology before beginning core health coaching coursework the Fall semester of entrance. All prerequisite courses must be completed at an accredited institution with a grade equal to B (3.0) or better.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan B:** Plan B requires 32 to 38 major credits and 0 to 6 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The capstone is the culminating course for the Master of Arts in Integrative Health and wellbeing Coaching program. Students use coaching data collected during the Advanced Health Coaching Practicum, Health Coaching Professional Internship, or Group Health Coaching course to write and orally present a research-informed concept analysis and retrospective narrative case report. Prerequisites: Integrative Health and Wellbeing Coaching Master of Arts student, CSPH 5701, 5702, 5703, 5704, 5705, 5706, 5707, 5709\* (\*may be taken concurrently).

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Up to 3 credits of CSPH courses at the 4xxx-level may be used for elective credits.

#### **Core Required Coursework**



Core courses require a grade of B (3.0) or higher, except CSPH 5705 and 8701, which require a grade of S. Final skills assessments for CSPH 5702, 5703, 5705, and 5709 must earn scores of at least 80%. If a core course or skills assessment is not successfully completed, students may be required at instructors' discretion to repeat the course and/or take CSPH 5712 for 1-2 credits for remediation within one calendar year. CSPH 5712 taken for remediation cannot be counted as an elective.

- CSPH 5701 - Fundamentals of Health Coaching I (4.0 cr)
- CSPH 5702 - Fundamentals of Health Coaching II (4.0 cr)
- CSPH 5703 - Advanced Health Coaching Practicum (3.0 cr)
- CSPH 5704 - Business of Health Coaching (2.0 cr)
- CSPH 5705 - Health Coaching Professional Internship (2.0 cr)
- CSPH 5706 - Lifestyle Medicine (2.0 cr)
- CSPH 5707 - Coaching People with Clinical Conditions (2.0 cr)
- CSPH 5709 - Health and Wellbeing Group Coaching (2.0 cr)
- CSPH 8701 - Integrative Health and Wellbeing Coaching MA Capstone Project (2.0 cr)

#### Additional Required Coursework

Each additional required course must be taken on an A-F grading basis and requires a grade of B- or higher. Failure to earn at least a B- may result in required remediation work at the discretion of the instructor, the program director, and the director of graduate studies. Remediation work may include repeating the course for an acceptable grade within one calendar year.

- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- CSPH 5431 - Functional Nutrition: An Expanded View of Nutrition, Chronic Disease, and Optimal Health (2.0 cr)
- CSPH 5708 - Mind-Body Science and the Art of Transformation (1.0 cr)
- KIN 5123 - Motivational Interventions in Physical Activity (3.0 cr)

#### Electives

Complete 6 CSPH credits. Up to 3 credits may be from 4xxx-level CSPH courses. Electives require a passing grade of C- or higher or S, provided an overall GPA of 3.0 is maintained.

Take 6 or more credit(s) from the following:

- CSPH 4311 - Foundations of Hatha Yoga: Alignment & Movement Principles (3.0 cr)
- CSPH 4312 - Hatha Yoga Philosophy, Lifestyle, & Ethics (3.0 cr)
- CSPH 4313 - Hatha Yoga Teaching Principles & Methodology (2.0 cr)
- CSPH 5000 - Explorations in Integrative Therapies and Healing Practices (1.0 - 4.0 cr)
- CSPH 5102 - Art of Healing: Self as Healer (1.0 cr)
- CSPH 5111 - Ways of Thinking about Health (2.0 cr)
- CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)
- CSPH 5118 - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)
- CSPH 5121 - Whole Systems Healing: Health and the Environment (2.0 cr)
- CSPH 5201 - Spirituality and Resilience (2.0 cr)
- CSPH 5212 - Peacebuilding Through Mindfulness: Transformative Dialogue in the Global Community (3.0 cr)
- CSPH 5215 - Forgiveness and Healing: A Journey Toward Wholeness (3.0 cr)
- CSPH 5225 - Meditation: Integrating Body and Mind (2.0 cr)
- CSPH 5226 - Advanced Meditation: Body, Brain, Mind, and Universe (1.0 cr)
- CSPH 5303 - Pain Management and Evidence Based Complementary Health Approaches (3.0 cr)
- CSPH 5305 - Introduction to Integrative Mental Health (2.0 cr)
- CSPH 5307 - Integrative Nursing: Application across Settings and Populations (1.0 cr)
- CSPH 5311 - Introduction to Traditional Chinese Medicine (2.0 cr)
- CSPH 5313 - Acupressure (1.0 cr)
- CSPH 5315 - Traditional Tibetan Medicine: Ethics, Spirituality, and Healing (2.0 cr)
- CSPH 5317 - Yoga: Ethics, Spirituality, and Healing (2.0 cr)
- CSPH 5318 - Tibetan Medicine, Ayurveda, and Yoga in India (4.0 cr)
- CSPH 5319 - Yoga and Ayurveda in India (4.0 cr)
- CSPH 5331 - Foundations of Shamanism and Shamanic Healing (2.0 cr)
- CSPH 5341 - Overview of Indigenous Hawaiian Healing (2.0 cr)
- CSPH 5343 - Ayurveda Medicine: The Science of Self-healing (2.0 cr)
- CSPH 5401 - People, Plants, and Drugs: Introduction to Ethnopharmacology (3.0 cr)
- CSPH 5421 - Botanical Medicines in Integrative Healthcare (3.0 cr)
- CSPH 5423 - Botanical Medicines: Foundations and Practical Applications (1.0 cr)
- CSPH 5431 - Functional Nutrition: An Expanded View of Nutrition, Chronic Disease, and Optimal Health (2.0 cr)
- CSPH 5503 - Aromatherapy Fundamentals (1.0 cr)
- CSPH 5513 - Living Well, Dying Well: Empowering Patient Communication at the End of Life (2.0 cr)
- CSPH 5521 - Therapeutic Landscapes (3.0 cr)
- CSPH 5522 - Therapeutic Horticulture (3.0 cr)
- CSPH 5523 - Applications in Therapeutic Horticulture (2.0 cr)
- CSPH 5535 - Reiki Healing (1.0 cr)
- CSPH 5536 - Advanced Reiki Healing: Level II (1.0 cr)
- CSPH 5541 - Emotional Healing and Happiness: Eastern and Western Approaches to Transforming the Mind (2.0 cr)



- CSPH 5555 - Introduction to Body and Movement-based Therapies (2.0 cr)
- CSPH 5561 - Overview of the Creative Arts in Health and Healing (2.0 cr)
- CSPH 5601 - Music, Health and Healing (2.0 cr)
- CSPH 5605 - Movement and Music for Well-being and Healing (2.0 cr)
- CSPH 5631 - Healing Imagery I (2.0 cr)
- CSPH 5641 - Animals in Health Care: The Healing Dimensions of Human/Animal Relationships (3.0 cr)
- CSPH 5642 - Nature Heals: An Introduction to Nature-Based Therapeutics (3.0 cr)
- CSPH 5643 - Horse as Teacher: Intro to Nature-Based Therapeutics Equine-Assisted Activities & Therapies (EAAT) (3.0 cr)
- CSPH 5711 - Optimal Healing Environments (3.0 cr)
- CSPH 5712 - Supervised Health Coaching Skills Advancement (1.0 - 2.0 cr)
- CSPH 5713 - Health Coaching for Health Professionals (2.0 cr)
- CSPH 5805 - Wellbeing in the Workplace (3.0 cr)
- CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)
- CSPH 5807 - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)
- CSPH 5905 - Food Matters: Cook Like Your Life Depends On It (1.0 cr)
- CSPH 6000 - Integrative Therapies and Healing Practices Topics (1.0 - 4.0 cr)
- CSPH 8101 - Critiquing and Synthesizing Complementary and Alternative Healing Practices (CAHP) Research (2.0 cr)
- CSPH 8191 - Independent Study in Integrative Therapies and Healing Practices (1.0 - 6.0 cr)



### **Twin Cities Campus**

## **Integrative Therapies and Healing Practices Minor**

*Spirituality & Healing, Center for*  
**Graduate School**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Earl E. Bakken Center for Spirituality & Healing, Mayo Memorial Building, Room C591, MMC 505, 420 Delaware Street SE, Minneapolis, MN 55455 (612-624-9459; fax: 612-626-5280)

Email: [csH-academics@umn.edu](mailto:csH-academics@umn.edu)

Website: <http://www.csh.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Minor in Integrative Therapies and Healing Practices is an innovative, interdisciplinary program designed to expose students to a global range of integrative, complementary, cross-cultural, and spiritual healing practices. The program enables students to acquire advanced knowledge and skills to enhance their academic and professional careers, their own lives, and the lives of their patients. Courses augment the preparation of students in health sciences and other disciplines, by developing knowledge and skills in the emerging field of integrative healthcare. Specifically, the minor provides students with a theoretical basis for applying integrative therapies and healing practices; prepares students to evaluate research in integrative therapies and healing practices; and prepares students to work collaboratively in a multicultural, pluralistic healthcare system.

The curriculum includes a core introductory course that provides the theoretical foundation for the minor. Students choose additional courses in clinical applications, spirituality, or cross-cultural health and healing. Students are encouraged to choose these elective credits from courses consistent with their academic training and professional goals. The program draws upon the rich expertise of University and community-based faculty who encourage and challenge students to discover new ways of caregiving, and to cultivate diverse skills that will transform their life's work, experiences, and relationships with others.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The minor is designed for graduate students pursuing healthcare or other majors who are seeking to deepen their understanding of integrative therapies and healing practices.

Graduate students come from wide-ranging backgrounds and careers, including nursing, pharmacy, medicine, nutrition, psychology, physical therapy, liberal studies, social work, and public health.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Integrative Therapies and Healing Practices director of graduate studies regarding feasibility and requirements.



Note that students may not use course credits to satisfy requirements for both a major and the minor.

### Required Course

All students complete the Introduction to Integrative Therapies and Healing Practices course.

**CSPH 5101** - Introduction to Integrative Healing Practices (3.0 cr)

### Elective Options

Master's students complete at least 5 credits and doctoral students complete at least 9 credits to complete the minor.

- CSPH 5000** - Explorations in Integrative Therapies and Healing Practices (1.0 - 4.0 cr)
- CSPH 5102** - Art of Healing: Self as Healer (1.0 cr)
- CSPH 5111** - Ways of Thinking about Health (2.0 cr)
- CSPH 5115** - Cultural Awareness, Knowledge and Health (3.0 cr)
- CSPH 5118** - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)
- CSPH 5121** - Whole Systems Healing: Health and the Environment (2.0 cr)
- CSPH 5201** - Spirituality and Resilience (2.0 cr)
- CSPH 5212** - Peacebuilding Through Mindfulness: Transformative Dialogue in the Global Community (3.0 cr)
- CSPH 5215** - Forgiveness and Healing: A Journey Toward Wholeness (3.0 cr)
- CSPH 5225** - Meditation: Integrating Body and Mind (2.0 cr)
- CSPH 5226** - Advanced Meditation: Body, Brain, Mind, and Universe (1.0 cr)
- CSPH 5303** - Pain Management and Evidence Based Complementary Health Approaches (3.0 cr)
- CSPH 5305** - Introduction to Integrative Mental Health (2.0 cr)
- CSPH 5307** - Integrative Nursing: Application across Settings and Populations (1.0 cr)
- CSPH 5311** - Introduction to Traditional Chinese Medicine (2.0 cr)
- CSPH 5313** - Acupressure (1.0 cr)
- CSPH 5315** - Traditional Tibetan Medicine: Ethics, Spirituality, and Healing (2.0 cr)
- CSPH 5317** - Yoga: Ethics, Spirituality, and Healing (2.0 cr)
- CSPH 5318** - Tibetan Medicine, Ayurveda, and Yoga in India (4.0 cr)
- CSPH 5319** - Yoga and Ayurveda in India (4.0 cr)
- CSPH 5331** - Foundations of Shamanism and Shamanic Healing (2.0 cr)
- CSPH 5341** - Overview of Indigenous Hawaiian Healing (2.0 cr)
- CSPH 5343** - Ayurveda Medicine: The Science of Self-healing (2.0 cr)
- CSPH 5401** - People, Plants, and Drugs: Introduction to Ethnopharmacology (3.0 cr)
- CSPH 5421** - Botanical Medicines in Integrative Healthcare (3.0 cr)
- CSPH 5423** - Botanical Medicines: Foundations and Practical Applications (1.0 cr)
- CSPH 5431** - Functional Nutrition: An Expanded View of Nutrition, Chronic Disease, and Optimal Health (2.0 cr)
- CSPH 5503** - Aromatherapy Fundamentals (1.0 cr)
- CSPH 5513** - Living Well, Dying Well: Empowering Patient Communication at the End of Life (2.0 cr)
- CSPH 5521** - Therapeutic Landscapes (3.0 cr)
- CSPH 5522** - Therapeutic Horticulture (3.0 cr)
- CSPH 5523** - Applications in Therapeutic Horticulture (2.0 cr)
- CSPH 5535** - Reiki Healing (1.0 cr)
- CSPH 5536** - Advanced Reiki Healing: Level II (1.0 cr)
- CSPH 5541** - Emotional Healing and Happiness: Eastern and Western Approaches to Transforming the Mind (2.0 cr)
- CSPH 5555** - Introduction to Body and Movement-based Therapies (2.0 cr)
- CSPH 5561** - Overview of the Creative Arts in Health and Healing (2.0 cr)
- CSPH 5601** - Music, Health and Healing (2.0 cr)
- CSPH 5605** - Movement and Music for Well-being and Healing (2.0 cr)
- CSPH 5631** - Healing Imagery I (2.0 cr)
- CSPH 5641** - Animals in Health Care: The Healing Dimensions of Human/Animal Relationships (3.0 cr)
- CSPH 5642** - Nature Heals: An Introduction to Nature-Based Therapeutics (3.0 cr)
- CSPH 5643** - Horse as Teacher: Intro to Nature-Based Therapeutics Equine-Assisted Activities & Therapies (EAAT) (3.0 cr)
- CSPH 5701** - Fundamentals of Health Coaching I (4.0 cr)
- CSPH 5706** - Lifestyle Medicine (2.0 cr)
- CSPH 5708** - Mind-Body Science and the Art of Transformation (1.0 cr)
- CSPH 5711** - Optimal Healing Environments (3.0 cr)
- CSPH 5712** - Supervised Health Coaching Skills Advancement (1.0 - 2.0 cr)
- CSPH 5713** - Health Coaching for Health Professionals (2.0 cr)
- CSPH 5805** - Wellbeing in the Workplace (3.0 cr)
- CSPH 5806** - Wellbeing and Resiliency for Health Professionals (1.0 cr)
- CSPH 5807** - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)
- CSPH 5905** - Food Matters: Cook Like Your Life Depends On It (1.0 cr)
- CSPH 6000** - Integrative Therapies and Healing Practices Topics (1.0 - 4.0 cr)
- CSPH 8101** - Critiquing and Synthesizing Complementary and Alternative Healing Practices (CAHP) Research (2.0 cr)





CSPH 8191 - Independent Study in Integrative Therapies and Healing Practices (1.0 - 6.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Integrative Therapies and Healing Practices Postbaccalaureate Certificate**

*Spirituality & Healing, Center for*  
**Graduate School**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Earl E. Bakken Center for Spirituality & Healing, Mayo Memorial Building, Room C591, MMC 505, 420 Delaware Street SE, Minneapolis, MN 55455 (612-624-9459; fax: 612-626-5280).

Email: [csH-academics@umn.edu](mailto:csH-academics@umn.edu)

Website: <http://www.csh.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12 to 20
- This program does not require summer semesters for timely completion.
- Degree: Integrative Therapies & Healing Practices PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Postbaccalaureate Certificate in Integrative Therapies and Healing Practices is an innovative, interdisciplinary program designed to expose students to a global range of integrative, complementary, cross-cultural, and spiritual healing practices. The program enables students to acquire advanced knowledge and skills to enhance their professional careers, their own lives, and the lives of their patients. Courses augment the preparation of students in health sciences and related disciplines, by developing knowledge and skills in the emerging field of integrative healthcare. Specifically, the certificate provides students with a theoretical basis for applying integrative therapies and healing practices; prepares students to evaluate research in integrative therapies and healing practices; and prepares students to work collaboratively with other health professionals and patients in a multicultural, pluralistic healthcare system.

The curriculum for the 12-credit certificate includes a core introductory course that provides the theoretical foundation for the program and a course in self-care. Students choose additional courses in clinical applications, spirituality, or cross-cultural health and healing. Students are encouraged to choose these elective credits from courses consistent with their academic training and professional goals. A faculty advisor will work with the student in designing a program plan that accommodates each student's unique learning objectives. The program draws upon the rich expertise of University and community-based faculty who encourage and challenge students to discover new ways of caregiving, and to cultivate diverse skills that will transform their life's work, experiences, and relationships with others.

The certificate may be completed concurrently with another graduate program or completed independently.

Students have the option to pursue a 20-credit Health Coaching track within the certificate. See the Program Sub-Plan section that follows for more information.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

The certificate requires applicants to have a bachelors or higher degree in a healthcare or related field; or board certified chaplains and other backgrounds with work experience in healthcare.

Eligible degrees include medicine, nursing, psychology, nutrition, Traditional Chinese Medicine, chiropractic medicine, naturopathic medicine, pharmacy, social work, and public health.

Other requirements to be completed before admission:

This field of study is designed for the healthcare professional, those currently enrolled in a graduate health professions program, board-certified chaplains with at least three years in a healthcare setting, and those with a non-healthcare bachelor's degree with direct work



experience in health related areas.

The certificate's Health Coaching track requires an applicant interview prior to admission.

**Special Application Requirements:**

In addition to the University's online application, applicants submit a personal statement describing their goals for obtaining the certificate and their professional qualifications. The statement should address your interest in integrative therapies and short- and long-term professional goals after completing the program. Two letters of recommendation are required, preferably one from an academic source and one from an employer/supervisor. A current C.V. or resume is also required. All items are uploaded directly into the University's online application.

Applicants to the Health Coaching track are required to provide three letters of recommendation and a three-to-five page personal statement focusing on what led to the applicant's interest in Health Coaching as a professional activity, including a description of interest in and experience with holistic integrative health and healing. A current C.V. or resume is also required. All items are uploaded directly into the University's online application. Selected Health Coaching track applicants will be chosen for admissions interviews.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

**Required Course**

Students pursuing either the general certificate or the certificate with health coaching track must complete this course.

[CSPH 5101](#) - Introduction to Integrative Healing Practices (3.0 cr)

**Certificate Options**

**General Certificate**

**Self Care Course Requirement**

General certificate students complete one of the two following courses for at least one credit:

[CSPH 5102](#) - Art of Healing: Self as Healer (1.0 cr)

or [CSPH 5806](#) - Wellbeing and Resiliency for Health Professionals (1.0 cr)

**Electives**

Students are encouraged to choose electives, in consultation with their faculty advisor, from CSPH courses consistent with their academic training and professional goals. Up to 3 credits of CSPH courses at the 4xxx-level may be applied to the certificate.

Take 3 or more course(s) totaling 8 or more credit(s) from the following:

- [CSPH 4311](#) - Foundations of Hatha Yoga: Alignment & Movement Principles (3.0 cr)
- [CSPH 4312](#) - Hatha Yoga Philosophy, Lifestyle, & Ethics (3.0 cr)
- [CSPH 4313](#) - Hatha Yoga Teaching Principles & Methodology (2.0 cr)
- [CSPH 5000](#) - Explorations in Integrative Therapies and Healing Practices (1.0 - 4.0 cr)
- [CSPH 5102](#) - Art of Healing: Self as Healer (1.0 cr)
- [CSPH 5111](#) - Ways of Thinking about Health (2.0 cr)



- CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)
- CSPH 5118 - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)
- CSPH 5121 - Whole Systems Healing: Health and the Environment (2.0 cr)
- CSPH 5201 - Spirituality and Resilience (2.0 cr)
- CSPH 5212 - Peacebuilding Through Mindfulness: Transformative Dialogue in the Global Community (3.0 cr)
- CSPH 5215 - Forgiveness and Healing: A Journey Toward Wholeness (3.0 cr)
- CSPH 5225 - Meditation: Integrating Body and Mind (2.0 cr)
- CSPH 5226 - Advanced Meditation: Body, Brain, Mind, and Universe (1.0 cr)
- CSPH 5303 - Pain Management and Evidence Based Complementary Health Approaches (3.0 cr)
- CSPH 5305 - Introduction to Integrative Mental Health (2.0 cr)
- CSPH 5307 - Integrative Nursing: Application across Settings and Populations (1.0 cr)
- CSPH 5311 - Introduction to Traditional Chinese Medicine (2.0 cr)
- CSPH 5313 - Acupressure (1.0 cr)
- CSPH 5315 - Traditional Tibetan Medicine: Ethics, Spirituality, and Healing (2.0 cr)
- CSPH 5317 - Yoga: Ethics, Spirituality, and Healing (2.0 cr)
- CSPH 5318 - Tibetan Medicine, Ayurveda, and Yoga in India (4.0 cr)
- CSPH 5319 - Yoga and Ayurveda in India (4.0 cr)
- CSPH 5331 - Foundations of Shamanism and Shamanic Healing (2.0 cr)
- CSPH 5341 - Overview of Indigenous Hawaiian Healing (2.0 cr)
- CSPH 5343 - Ayurveda Medicine: The Science of Self-healing (2.0 cr)
- CSPH 5401 - People, Plants, and Drugs: Introduction to Ethnopharmacology (3.0 cr)
- CSPH 5421 - Botanical Medicines in Integrative Healthcare (3.0 cr)
- CSPH 5423 - Botanical Medicines: Foundations and Practical Applications (1.0 cr)
- CSPH 5431 - Functional Nutrition: An Expanded View of Nutrition, Chronic Disease, and Optimal Health (2.0 cr)
- CSPH 5503 - Aromatherapy Fundamentals (1.0 cr)
- CSPH 5513 - Living Well, Dying Well: Empowering Patient Communication at the End of Life (2.0 cr)
- CSPH 5521 - Therapeutic Landscapes (3.0 cr)
- CSPH 5522 - Therapeutic Horticulture (3.0 cr)
- CSPH 5523 - Applications in Therapeutic Horticulture (2.0 cr)
- CSPH 5535 - Reiki Healing (1.0 cr)
- CSPH 5536 - Advanced Reiki Healing: Level II (1.0 cr)
- CSPH 5541 - Emotional Healing and Happiness: Eastern and Western Approaches to Transforming the Mind (2.0 cr)
- CSPH 5555 - Introduction to Body and Movement-based Therapies (2.0 cr)
- CSPH 5561 - Overview of the Creative Arts in Health and Healing (2.0 cr)
- CSPH 5601 - Music, Health and Healing (2.0 cr)
- CSPH 5605 - Movement and Music for Well-being and Healing (2.0 cr)
- CSPH 5631 - Healing Imagery I (2.0 cr)
- CSPH 5641 - Animals in Health Care: The Healing Dimensions of Human/Animal Relationships (3.0 cr)
- CSPH 5642 - Nature Heals: An Introduction to Nature-Based Therapeutics (3.0 cr)
- CSPH 5643 - Horse as Teacher: Intro to Nature-Based Therapeutics Equine-Assisted Activities & Therapies (EAAT) (3.0 cr)
- CSPH 5701 - Fundamentals of Health Coaching I (4.0 cr)
- CSPH 5706 - Lifestyle Medicine (2.0 cr)
- CSPH 5708 - Mind-Body Science and the Art of Transformation (1.0 cr)
- CSPH 5711 - Optimal Healing Environments (3.0 cr)
- CSPH 5712 - Supervised Health Coaching Skills Advancement (1.0 - 2.0 cr)
- CSPH 5713 - Health Coaching for Health Professionals (2.0 cr)
- CSPH 5805 - Wellbeing in the Workplace (3.0 cr)
- CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)
- CSPH 5807 - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)
- CSPH 5905 - Food Matters: Cook Like Your Life Depends On It (1.0 cr)
- CSPH 6000 - Integrative Therapies and Healing Practices Topics (1.0 - 4.0 cr)
- CSPH 8101 - Critiquing and Synthesizing Complementary and Alternative Healing Practices (CAHP) Research (2.0 cr)
- CSPH 8191 - Independent Study in Integrative Therapies and Healing Practices (1.0 - 6.0 cr)

-OR-

#### Health Coaching track

Coursework for the certificate with the health coaching track is detailed in sub-plan requirements.

### Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

#### Health Coaching



Health coaching is an emerging method of partnering with clients to help them achieve their overall goals. Integrative health coaches practice from a holistic perspective that views the client as intrinsically healthy, whole, wise, and the ultimate expert in their own healing journey. Although health coaches do not diagnose or treat illness, they assist those with health conditions to enhance their healing and change their lifestyle patterns. This assistance includes necessary connection to resources, and the assembly of an optimal, interprofessional healthcare team. The ability to perform this role requires a comfortable working knowledge in both conventional and integrative healthcare.

The Bakken Center for Spirituality & Healing is a pioneer in the health coaching field, working to advance education, research, and care model innovation. Their integrative health coaching programs are accredited by the National Board for Health and Wellness Coaching (NBHWC) (<https://nbhwc.org>). The Bakken Center has been a national leader in defining the scope of practice, developing educational competencies and standard of practice, and helping to lead the creation of a national certification process and exam in Health and Wellness coaching. Students in the Health Coaching track are eligible to take the national board certification exam after completing the required coursework. Nurses may also complete a certification as Health and Wellness Nurse Coaches (<http://www.ahncc.org/>).

In addition to the required CSPH 5101 introduction course, students complete the health coaching track course requirements for a minimum of 20 credits. Students are strongly encouraged to confer with their faculty advisor concerning the specific sequence in which the track coursework must be taken. A minimum GPA of 3.0 must be maintained for all required track coursework.

Coursework may be completed in a minimum of four semesters or may be spread over a variable amount of time up to a maximum of four years. The curriculum provides education in the coaching process, the therapeutic alliance, and successful interprofessional communication. Students finish the program with a professional internship experience.

#### **Health Coaching track requirements**

- [CSPH 5701](#) - Fundamentals of Health Coaching I (4.0 cr)
- [CSPH 5702](#) - Fundamentals of Health Coaching II (4.0 cr)
- [CSPH 5703](#) - Advanced Health Coaching Practicum (3.0 cr)
- [CSPH 5704](#) - Business of Health Coaching (2.0 cr)
- [CSPH 5705](#) - Health Coaching Professional Internship (2.0 cr)
- [CSPH 5706](#) - Lifestyle Medicine (2.0 cr)



### **Twin Cities Campus**

## **Molecular, Cellular, Developmental Biology and Genetics M.S.**

*Genetics, Cell Biology, and Development TCBS, Genetics, Cell Biology, and Development TMED*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

MCDB&G Graduate Program, 6-160 Jackson Hall, 321 Church Street SE, University of Minnesota, Minneapolis, MN, 55455 (612-624-7470, fax: 612-626-6140)

Email: [mcdbg@umn.edu](mailto:mcdbg@umn.edu) OR [gcgrad@umn.edu](mailto:gcgrad@umn.edu)

Website: <http://mcdbg.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 55
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MCDB&G MS degree offers genetic counseling track that integrates selected coursework with first-hand experience in diagnostic medical genetics laboratories and supervised work in clinical settings with patients and families. Students who pursue the track have the opportunity to participate in the Leadership Education in Neurodevelopmental and Related Disabilities (LEND) program.

The MCDB&G program also offers a joint JD/MS-MCDB&G degree with the University's Law School, as well as an MS for MCDB&G doctoral students who wish to pursue an alternative or additional masters credential.

Applications to a free-standing research MS degree are not accepted.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Genetic counseling track: <http://cbs.umn.edu/genetic-counseling/admissions>

Joint JD/MS: <http://cbs.umn.edu/academics/departments/gcd/graduate/prospective>

#### **Special Application Requirements:**

MS/genetic counseling track:

Previous interaction with a practicing genetic counselor, in a clinical setting or other capacity is preferred

Application deadline is December 15 for the following fall semester

Joint JD/MS:

Previous research experience in an academic or industrial setting is required

Course-related laboratory experience is required

Demonstrated aptitude for basic science research is preferred

Applications and admission to both the MSDB&G MS and the JD are required

Application deadline for the MSDB&G MS is December 1 for the following fall semester

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS



Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 30 to 55 major credits and 0 credits outside the major. The final exam is written and oral.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Coursework (20 to 30 credits)

#### Required Coursework (3 credits)

Select 1 of the following courses. If GCD 8920 is selected, take Computational Genomics for 3 credits.

[GCD 5005](#) - Computer Programming for Biology (3.0 cr)

or [GCD 8920](#) - Special Topics (1.0 - 4.0 cr)

#### Electives (17 to 27 credits)

Plan A students take 17 credits, and Plan B students not pursuing the genetics counseling track take 27 credits from the following. MCDG 8900 can be taken for 1 credit up to 4 semesters for a maximum of 4 credits. MCDG 8950 can be taken for 1 credit up to 2 semesters for a maximum of 2 credits. Students pursuing the genetics counseling track exempt from this requirement.

[GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)

[GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)

[GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)

[GCD 8171](#) - Literature Analysis (1.0 - 2.0 cr)

[GCD 8401](#) - Ethics, Public Policy & Careers in Molecular Cell Biology (1.0 cr)

[MCDG 8900](#) - Student Research Seminar (1.0 cr)

[MCDG 8950](#) - Teaching Practicum (1.0 cr)

### Plan Options

#### Plan A

##### Thesis Credits

Plan A students take at least 10 master's thesis credits.

[MCDG 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

**Joint- or Dual-degree Coursework:** JD/MS-MCDB&G (Joint Degree Program in Law, Science and Technology) Student may take a total of 12 credits in common among the academic programs.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Genetic Counseling

This sub-plan is limited to students completing the program under Plan B.

Students must earn a passing grade in the 5 clinical internship rotations.

Students must present a log of at least 50 clinical cases to be eligible for the final oral examination.

Students accepted into the Leadership Education in Neurodevelopmental and Related Disabilities (LEND) program must take OLPD 5356 (3 credits) in addition to the genetic counseling track curriculum.

### First Year (25 credits)



Students will observe in a clinical setting one day per week, and gain experience in the clinical laboratories one day per week.

Take 2 credits of GCD 8921 (2 semesters; 1 credit each).

Take GCD 8993 for 2 credits.

[GCD 8073](#) - Genetics & Genomics in Human Health (3.0 cr)

[GCD 8911](#) - Introduction to Genetic Counseling Skills and Practice (3.0 cr)

[GCD 8912](#) - Genetic Counseling in Practice (4.0 cr)

[GCD 8916](#) - Genetic Counseling Research Seminar (2.0 cr)

[GCD 8917](#) - Medical Genetics I (3.0 cr)

[GCD 8918](#) - Medical Genetics II (3.0 cr)

[GCD 8921](#) - Professional Development Seminar I (1.0 cr)

[GCD 8993](#) - Directed Studies (1.0 - 5.0 cr)

[PSY 5137](#) - Introduction to Behavioral Genetics (3.0 cr)

#### **Summer (3 credits)**

During the summer between the first and second year of the program, students will begin their first clinical internship rotation with patient responsibilities. This clinical rotation includes the expectation that students will spend between 2-3 days per week in the clinic.

[GCD 8001](#) - Genetic Counseling Clinical Internship I (3.0 cr)

#### **Second Year (24 credits)**

Students will complete internships in a clinical setting 2-3 days per week.

Take 2 credits of GCD 8922 (2 semesters; 1 credit each).

Take 4 credits of GCD 8994 (2 semesters; 2 credits each).

Students admitted Fall 2020 and later will complete GCD 8914 for 2 credits.

[GCD 8002](#) - Genetic Counseling Clinical Internship II (5.0 cr)

[GCD 8003](#) - Genetic Counseling Clinical Internship III (5.0 cr)

[GCD 8913](#) - Psychosocial Issues in Genetic Counseling I (3.0 cr)

[GCD 8914](#) - Ethical and Legal Issues in Genetic Counseling (3.0 cr)

[GCD 8915](#) - Psychosocial Issues in Genetic Counseling II (3.0 cr)

[GCD 8922](#) - Professional Development Seminar II (1.0 cr)

[GCD 8994](#) - Research (1.0 - 5.0 cr)

#### **LEND Program Participants**

Students participating in the Leadership Education in Neurodevelopmental and Related Disabilities (LEND) program complete an additional 3-credit required course. LEND program participants may be advised to complete all 4 credits of GCD 8994 in one semester.

#### **Second Year Required Course (3 Credits)**

Take the following course. A Policy & Advocacy module and policy project may be substituted for OLPD 5356 with approval of the director of graduate studies.

[OLPD 5356](#) - Disability Policy and Services (3.0 cr)





### **Twin Cities Campus**

## **Molecular, Cellular, Developmental Biology and Genetics Minor**

*Genetics, Cell Biology, and Development TCBS, Genetics, Cell Biology, and Development TMED*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

MCDB&G Graduate Program, 6-160 Jackson Hall, 321 Church Street SE, University of Minnesota, Minneapolis, MN 55455 (612-624-7470, fax: 612-626-6140).

Email: [mcdbg@umn.edu](mailto:mcdbg@umn.edu)

Website: <http://mcdbg.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 12
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This program provides scientific training in the basic life sciences, with emphasis on the molecular basis of genetics, development, and cell biology. Areas of specialization include membranes, receptors, membrane transport, cell interactions, macromolecular structure, extracellular matrix, cytoskeleton, cell motility, regulation of gene expression, neuroscience, developmental mechanisms, human genetics, plant cell and molecular biology, genetic mechanisms, and genomics.

The program is interdisciplinary and involves faculty from several departments in the College of Biological Sciences, the Medical School, and the College of Food, Agricultural and Natural Resource Sciences. Institutes for human genetics, plant molecular genetics, biological process technology, Genome Engineering, Stem Cell research and a center for developmental biology provide opportunities for graduate study.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and must meet with the MCDB&G director of graduate studies regarding feasibility, requirements and approval.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses taken for the minor must be graded A-F. A minimum GPA of 3.0 for these courses is required.

#### **Required Coursework (9 credits)**

Take the following courses for 9 credits. Other courses may be selected with approval of the MCDB&G director of graduate studies.

[GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)

[GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)

[GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)

#### **Electives (3 credits)**

Select at least one of the following courses in consultation with the MCDB&G director of graduate studies. GCD 8920 Special Topics: Computational Genomics, if selected, must be taken for 3 credits.



[GCD 8920](#) - Special Topics (1.0 - 4.0 cr)

or [GCD 5005](#) - Computer Programming for Biology (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Molecular, Cellular, Developmental Biology and Genetics Ph.D.**

*Genetics, Cell Biology, and Development TCBS, Genetics, Cell Biology, and Development TMED*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

MCDB&G Graduate Program, 6-160 Jackson Hall, 321 Church Street SE, University of Minnesota, Minneapolis, MN 55455 (612-624-7470, fax: 612-626-6140)

Email: [mcdbg@umn.edu](mailto:mcdbg@umn.edu)

Website: <http://mcdbg.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48 to 63
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This program provides scientific training in the basic life sciences, with emphasis on the molecular basis of genetics, development, and cell biology. Areas of specialization include membranes, receptors, membrane transport, cell interactions, macromolecular structure, extracellular matrix, cytoskeleton, cell motility, regulation of gene expression, neuroscience, developmental mechanisms, human genetics, plant cell and molecular biology, genetic mechanisms, and genomics.

The program is interdisciplinary and involves faculty from several departments in the College of Biological Sciences, the Medical School, and the College of Food, Agricultural and Natural Resource Sciences. Institutes for human genetics, plant molecular genetics, biological process technology, genome engineering, stem cell research, and a center for developmental biology provide opportunities for graduate study.

PhD students are admitted to MCDB&G under the auspices of Molecular, Cellular and Structural Biology (MCSB), a first-year program administered by the MCDB&G and the Biochemistry, Molecular Biology and Biophysics (BMBB) graduate programs. After the first year, students select either MCDB&G or BMBB to complete their degree. MCDB&G does NOT have a freestanding master's program.

The MCDB&G PhD is also part of two joint degree programs: The Joint Degree Program in Law, Health, and Life Sciences; and the MD/PhD program.

The Joint Degree Program in Law, Health, and Life Sciences is unique in the nation and enables students to combine a JD degree with a PhD or MS degree. Students entering this program must be admitted to both the MCDB&G program and the Law School. Admission qualifications for MS and PhD students are identical; only the student's career objectives distinguish the degree that they pursue.

The MD/PhD program emphasizes the integration of the two major components of training--medicine and research--to ensure excellence in both. The program features a special curriculum that facilitates the transition from Medical School to the first year of formal graduate training and the transition from graduate training back to Medical School.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Applications from students with an undergraduate or master's degree in the biological, chemical, or physical sciences are preferred.

Other requirements to be completed before admission:

Recommended academic preparation includes coursework in molecular biology, genetics, biology, and biochemistry. Successful applicants must have previous research experience in an academic or industrial setting in addition to any course-related laboratory experiences. It is important to demonstrate familiarity with and aptitude for basic science research prior to embarking on a graduate career in this program.



### Special Application Requirements:

Applicants must submit three letters of recommendation from persons familiar with their academic and research capabilities. A statement of interests and goals, and a complete set of transcripts (copies are accepted) are required. GRE General and Subject scores are NOT required. The deadline for receipt of completed applications is December 1st. Graduate studies begin fall semester only.

Entry into the J.D./Ph.D. program requires separate admittance to both the Law School and the MCDB&G Graduate Program. Entry into the M.D./Ph.D. program requires separate admittance to both the Medical School and the MCDB&G Graduate Program.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 107
  - Internet Based - Writing Score: 25
  - Internet Based - Reading Score: 25

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 to 39 credits are required in the major.  
0 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Additional requirements include:

Weekly attendance at MCDB&G student seminars.

Weekly attendance at GCD departmental seminars.

Presentation at an MCDB&G student seminar in the 2nd, 3rd, and 4th year of study for a total of 3 times.

Completion of a TA assignment in the 2nd and 3rd years of study for a total of 2 times.

### Required Coursework (24 credits)

Take the following courses. MCDG 8900 can be taken for one credit four times (over four semesters). MCDG 8950 can be taken for one credit twice (over two semesters). MCDG 8920 must be taken with the Itasca Research Workshop topic for two credits.

[GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)

[GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)

[GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)

[GCD 8171](#) - Literature Analysis (1.0 - 2.0 cr)

[GCD 8401](#) - Ethics, Public Policy & Careers in Molecular Cell Biology (1.0 cr)

[MCDG 8920](#) - Special Topics (1.0 - 4.0 cr)

[MCDG 8900](#) - Student Research Seminar (1.0 cr)

[MCDG 8950](#) - Teaching Practicum (1.0 cr)

Take at least one of the following courses for 3 credits to complete the 24-credit course requirement. The Special Topics for GCD 8920 is Computational Genomics.

[GCD 5005](#) - Computer Programming for Biology (3.0 cr)

or [GCD 8920](#) - Special Topics (1.0 - 4.0 cr)

### Electives

Students may take additional elective credits if necessary. Select courses from the following list, or in consultation with the advisor and director of graduate studies.

Take 0 or more credit(s) from the following:

- [BIOC 5309](#) - Biocatalysis and Biodegradation (3.0 cr)



- [BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)
- [BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)
- [BIOC 5444](#) - Muscle (3.0 cr)
- [BIOC 5527](#) - Introduction to Modern Structural Biology (4.0 cr)
- [BIOC 5528](#) - Spectroscopy and Kinetics (4.0 cr)
- [BIOC 5535](#) - Introduction to Modern Structural Biology -- Diffraction (2.0 cr)
- [BIOC 5536](#) - Introduction to Modern Structural Biology - Nuclear Magnetic Resonance (2.0 cr)
- [BIOC 8001](#) - Biochemistry: Structure, Catalysis, and Metabolism (3.0 cr)
- [BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)
- [CSCI 5461](#) - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- [CSCI 5980](#) - Special Topics in Computer Science (1.0 - 3.0 cr)
- [CSCI 8980](#) - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)
- [GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)
- [GCD 8073](#) - Genetics & Genomics in Human Health (3.0 cr)
- [GCD 8111](#) - Quantitative Fluorescence Microscopy (3.0 cr)
- [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)
- [GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)
- [MATH 8540](#) - Topics in Mathematical Biology (1.0 - 3.0 cr)
- [MICA 8002](#) - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
- [MICA 8003](#) - Immunity and Immunopathology (4.0 cr)
- [MICA 8004](#) - Cellular and Cancer Biology (4.0 cr)
- [NSC 8211](#) - Developmental Neurobiology (4.0 cr)
- [OBIO 8012](#) - Basic Concepts in Skeletal Biology (2.0 cr)
- [PHCL 5111](#) - Pharmacogenomics (3.0 cr)
- [PUBH 6450](#) - Biostatistics I (4.0 cr)
- [SCB 8181](#) - Stem Cell Biology (3.0 cr)
- [STAT 5021](#) - Statistical Analysis (4.0 cr)

#### Thesis Credits

Take at least 24 doctoral thesis credits.

[MCDG 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:** Joint Degree Program in Law, Science and Technology (JD/PhD). Medical Scientist Training Program (MD/PhD) Student may take a total of 12 credits in common among the academic programs.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Biology Education

In addition to the required MCDB&G PhD coursework, students pursuing the Biology Education track must take Biology Education core and elective courses.

#### Biology Education Core (12 credits)

Students pursuing the Biology Education track must take the following core courses:

[CI 8134](#) - Foundations of Research in Curriculum and Instruction I (3.0 cr)

[CI 8135](#) - Foundations of Research in Curriculum and Instruction II (3.0 cr)

[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

#### Curriculum Instruction

Take at least one of the following:

[CI 8145](#) - Using Mixed Methods in Educational Research (3.0 cr)

or [CI 8147](#) - Critical Discourse Analysis in Educational Research (3.0 cr)

or [CI 8149](#) - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)

or [CI 8571](#) - Equity, Policy, and Social Justice in Science Education (3.0 cr)

or [CI 8572](#) - Learning Theory and Classical Research in STEM Education (3.0 cr)

#### Biology Education Electives (3 credits)

Take at least one biology elective course, selected in consultation with the advisor and director of graduate studies.

[EPSY 8226](#) - Item Response Models: Theory and Applications (3.0 cr)

or [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)

or [EPSY 8265](#) - Factor Analysis (3.0 cr)

or [EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)

or [EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)

or [EPSY 8268](#) - Hierarchical Linear Modeling in Educational Research (3.0 cr)

or [EPSY 8282](#) - Statistical Analysis of Longitudinal Data (3.0 cr)



- or [CI 8145](#) - Using Mixed Methods in Educational Research (3.0 cr)
- or [CI 8147](#) - Critical Discourse Analysis in Educational Research (3.0 cr)
- or [CI 8149](#) - Qualitative Research: Coding, Analysis, Interpretation, and Writing (3.0 cr)
- or [CI 8571](#) - Equity, Policy, and Social Justice in Science Education (3.0 cr)
- or [CI 8572](#) - Learning Theory and Classical Research in STEM Education (3.0 cr)



### *Twin Cities Campus*

## Water Resources Science M.S.

*Water Resources Center*

### Graduate School

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Water Resources Science, University of Minnesota, 193 McNeal Hall, 1985 Buford Avenue, St. Paul MN 55108 (612-624-7456)

Email: [wrs@umn.edu](mailto:wrs@umn.edu)

Website: <http://wrs.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 32
- This program does not require summer semesters for timely completion.
- University of Minnesota, Duluth
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This cross-campus interdisciplinary program provides comprehensive training in water resources science, with integration across scientific disciplines. A structured interdisciplinary graduate curriculum is offered. The program includes a set of core courses plus electives in the following areas of interest: aquatic biology, environmental chemistry, hydrologic science, limnology, water management technology, water policy, water quality, and watershed science and management. A Limnology and Oceanography track is also offered. Approximately 80 courses offered within 15 other graduate programs are available to students majoring in water resources science.

The goal of the program is to produce scientists with strong technical skills in disciplines relevant to water resources and a broad understanding of 1) the hydrologic cycle and associated ecosystems, 2) the interconnectedness of the sciences involved in managing aquatic resources, and 3) the interplay between the biophysical sciences and social sciences in developing and implementing public policies related to water.

Students in the program develop the breadth of scientific knowledge appropriate to understand the complicated aquatic ecosystems and watersheds on which they will work, as well as social dimensions of the topic, including the public policy and legal frameworks in which water resources are protected and managed.

The program involves faculty from the following departments on the Twin Cities campus: Applied Economics; Bioproducts and Biosystems Engineering; Civil Engineering; Earth Sciences; Ecology, Evolution, and Behavior; Entomology; Environmental and Occupational Health; Fisheries, Wildlife, and Conservation Biology; Forest Resources; Geography; Horticultural Science; Plant Biology; and Soil, Water, and Climate. It also involves faculty from the following departments on the Duluth campus: Biology; Chemical Engineering; Chemistry; Civil Engineering; Geography; Geological Sciences; and Physics; as well as the Large Lakes Observatory and the Natural Resources Research Institute in Duluth.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

The program is flexible enough to accommodate students from a variety of backgrounds. Normally students have a bachelor's degree in physical, biological, or environmental science or engineering.

Other requirements to be completed before admission:

Recommended academic preparation includes one year (or two semesters) each of calculus, physics, and chemistry, and one biology course.

Availability of funding and willingness of a member of the graduate faculty to serve as an advisor are important criteria for admission to the program.



### Special Application Requirements:

Applicants must submit three letters of recommendation via the University of Minnesota's online application system. These letters should be from professors qualified to estimate applicant's class rank and evaluate their ability to complete a program of graduate study, or from persons who can assess their professional or research potential.

Applicants must also submit a résumé of their academic history and professional experience and a statement of purpose, including the proposed area of emphasis. Applicants should submit results of the GRE General Test. Students may be admitted any semester but are strongly encouraged to submit their application by December 1 for fall semester admission. More specific application instructions can be found on the program website: <https://wrs.umn.edu/prospective-students/admissions-info>.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 22 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project is defined by the faculty advisor. The Plan B option is well suited to students who have little undergraduate course work in water resources science and thus need more coursework to gain the combination of depth and breadth needed in this field. Plan B projects involve field, laboratory, or computer work and the analysis, synthesis, or interpretation of data.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Students with WRS-equivalent core courses taken as undergraduates may substitute other classes to meet program requirements, with advisor approval.

### Water Resources Seminar

[WRS 8100](#) - Interdisciplinary Seminar in Water Resources (0.5 cr)

### Water Resources Ethics

[WRS 8581](#) - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

### Hydrology Core

Take at least 3 credits from the following:

- [BBE 8513](#) - Hydrologic Modeling of Small Watersheds (3.0 cr)
- or [CEGE 4501](#) - Hydrologic Design (4.0 cr)
- or [ESCI 4702](#) - General Hydrogeology (4.0 cr)
- or [FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)
- or [FNRM 5153](#) - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)

### Environmental/Water Chemistry Core

Take at least 3 credits from the following:

- [CEGE 5541](#) - Environmental Water Chemistry (3.0 cr)





or ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)  
or LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)  
or PUBH 6190 - Environmental Chemistry (3.0 cr)

#### Limnology Core

EEB 5601 - Limnology (3.0 cr)

#### Water Resources Policy Core

WRS 5101 - Water Policy (3.0 cr)

#### WRS Electives

Plan A students select at least 9 credits, and Plan B students select at least 17 credits from the following list:

AGRO 5121 - Applied Experimental Design (4.0 cr)  
BBE 5513 - Watershed Engineering (3.0 cr)  
BBE 5523 - Ecological Engineering Design (3.0 cr)  
BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)  
BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)  
CEGE 4351 - Groundwater Mechanics (3.0 cr)  
CEGE 4352 - Groundwater Modeling (3.0 cr)  
CEGE 4501 - Hydrologic Design (4.0 cr)  
CEGE 4502 - Water and Wastewater Treatment (3.0 cr)  
CEGE 4511 - Hydraulic Structures (3.0 cr)  
CEGE 4512 - Open Channel Hydraulics (4.0 cr)  
CEGE 4562 - Environmental Remediation Technologies (3.0 cr)  
CEGE 5541 - Environmental Water Chemistry (3.0 cr)  
CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)  
CEGE 5551 - Environmental Microbiology (3.0 cr)  
CEGE 8504 - Theory of Unit Operations (4.0 cr)  
CEGE 8505 - Biological Processes (3.0 cr)  
CEGE 8506 - Stochastic Hydrology (4.0 cr)  
CEGE 8507 - Advanced Methods in Hydrology (4.0 cr)  
CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)  
CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)  
CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)  
CEGE 8601 - Introduction to Stream Restoration (3.0 cr)  
CEGE 8602 - Stream Restoration Practice (2.0 cr)  
CONS 8004 - Economic and Social Aspects of Conservation Biology (3.0 cr)  
EEB 4611 - Biogeochemical Processes (3.0 cr)  
EEB 5601 - Limnology (3.0 cr)  
EEB 8601 - Introduction to Stream Restoration (3.0 cr)  
EEB 8602 - Stream Restoration Practice (2.0 cr)  
ENT 5081 - Insects, Aquatic Habitats, and Pollution (3.0 cr)  
ENT 5121 - Applied Experimental Design (4.0 cr)  
ENT 5361 - Aquatic Insects (4.0 cr)  
ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)  
ESCI 4402 - Biogeochemical Cycles in the Ocean (3.0 cr)  
ESCI 4702 - General Hydrogeology (4.0 cr)  
ESCI 5204 - Geostatistics and Inverse Theory (3.0 cr)  
ESCI 5705 - Limnogeology and Paleoenvironment (3.0 cr)  
ESCI 5971 - Field Hydrogeology (2.0 cr)  
ESCI 8511 - Mechanics of Sediment Transport (3.0 cr)  
ESCI 8601 - Introduction to Stream Restoration (3.0 cr)  
ESCI 8602 - Stream Restoration Practice (2.0 cr)  
ESPM 4216 - Contaminant Hydrology (3.0 cr)  
ESPM 5015 - Invasive Plants and Animals: Ecology and Management (3.0 cr)  
ESPM 5061 - Water Quality and Natural Resources (3.0 cr)  
ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)  
ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)  
ESPM 5256 - Natural Resource Law and the Management of Public Lands and Waters (3.0 cr)  
ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)  
ESPM 5402 - Biometeorology (3.0 cr)  
ESPM 5555 - Wetland Soils (3.0 cr)  
ESPM 5575 - Wetlands (3.0 cr)  
ESPM 5601 - Principles of Waste Management (3.0 cr)  
FNRM 5114 - Hydrology and Watershed Management (3.0 cr)



[FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
[FNRM 5153](#) - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)  
[FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)  
[FW 4136](#) - Ichthyology (4.0 cr)  
[FW 5459](#) - Stream and River Ecology (3.0 cr)  
[FW 8459](#) - Stream and River Ecology (3.0 cr)  
[FW 8465](#) - Fish Habitats and Restoration (3.0 cr)  
[GEOG 5426](#) - Climatic Variations (3.0 cr)  
[HORT 5071](#) - Ecological Restoration (4.0 cr)  
[LAAS 5311](#) - Soil Chemistry and Mineralogy (3.0 cr)  
[PMB 4121](#) - Microbial Ecology and Applied Microbiology (3.0 cr)  
[PUBH 6190](#) - Environmental Chemistry (3.0 cr)  
[PUBH 6450](#) - Biostatistics I (4.0 cr)  
[PUBH 6451](#) - Biostatistics II (4.0 cr)  
[SOIL 5232](#) - Vadose Zone Hydrology (3.0 cr)  
[SOIL 5555](#) - Wetland Soils (3.0 cr)  
[STAT 5021](#) - Statistical Analysis (4.0 cr)  
[STAT 5302](#) - Applied Regression Analysis (4.0 cr)  
[STAT 5303](#) - Designing Experiments (4.0 cr)  
[STAT 5401](#) - Applied Multivariate Methods (3.0 cr)  
[WRS 5150](#) - Watershed Specialist Training (2.0 cr)

**Plan A Option:**

Take 10 or more credit(s) from the following:

•[WRS 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

•**Plan B Option**

Select additional courses in consultation with your advisor to complete the Plan B option.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Limnology and Oceanography

The science of inland waters, or "limnology," includes the study of streams, lakes, ponds, and wetlands. While Lake Superior falls into this category, the style of research, particularly the nature of sampling and the scale of the processes investigated, makes the study of Lake Superior and other Great Lakes more akin to oceanography than to classical limnology.

A program that focuses on the study of both limnology and oceanography strengthens understanding of both systems, through comparative studies and by fostering interaction between groups that focus more strongly on one or the other system. Limnology and oceanography are by necessity interdisciplinary fields, with major components contributed by biological, geological, physical and chemical sciences. Such interdisciplinary fields in the modern research university require mechanisms to ensure cross-fertilization of ideas, approaches, methods, techniques, and knowledge. The limnology and oceanography track in WRS provides just such a much-needed mechanism. The goal of the program is to produce scientists with strong technical skills in aquatic science and a broad understanding of limnology and oceanography.

Students with WRS-equivalent coursework taken as undergraduates may substitute other classes to meet minimum credit requirements.

The faculty advisor must be a member of the limnology and oceanography track faculty.

### Water Resources Seminar

[WRS 8100](#) - Interdisciplinary Seminar in Water Resources (0.5 cr)

### Water Resources Ethics

[WRS 8581](#) - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

### Hydrology Core for Limnology/Oceanography Students

Take at least 3 credits from the following:

[BBE 8513](#) - Hydrologic Modeling of Small Watersheds (3.0 cr)

or [FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)

### Environmental/Water Chemistry Core for Limnology/Oceanography Students

Take at least 3 credits from the following:

[CEGE 5541](#) - Environmental Water Chemistry (3.0 cr)

or [ESCI 4401](#) - Aqueous Environmental Geochemistry (3.0 cr)

or [LAAS 5311](#) - Soil Chemistry and Mineralogy (3.0 cr)



or PUBH 6190 - Environmental Chemistry (3.0 cr)

or EEB 4611 - Biogeochemical Processes (3.0 cr)

#### Limnology Core

EEB 5601 - Limnology (3.0 cr)

#### Water Resources Policy Core

WRS 5101 - Water Policy (3.0 cr)

#### WRS Electives

Plan A students select at least 9 credits, and Plan B students select at least 17 credits from the following list and in consultation with the L&O committee.

AGRO 5121 - Applied Experimental Design (4.0 cr)

BBE 5513 - Watershed Engineering (3.0 cr)

BBE 5523 - Ecological Engineering Design (3.0 cr)

BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)

BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)

CEGE 4351 - Groundwater Mechanics (3.0 cr)

CEGE 4352 - Groundwater Modeling (3.0 cr)

CEGE 4501 - Hydrologic Design (4.0 cr)

CEGE 4502 - Water and Wastewater Treatment (3.0 cr)

CEGE 4511 - Hydraulic Structures (3.0 cr)

CEGE 4512 - Open Channel Hydraulics (4.0 cr)

CEGE 4562 - Environmental Remediation Technologies (3.0 cr)

CEGE 5541 - Environmental Water Chemistry (3.0 cr)

CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)

CEGE 5551 - Environmental Microbiology (3.0 cr)

CEGE 8504 - Theory of Unit Operations (4.0 cr)

CEGE 8505 - Biological Processes (3.0 cr)

CEGE 8506 - Stochastic Hydrology (4.0 cr)

CEGE 8507 - Advanced Methods in Hydrology (4.0 cr)

CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)

CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)

CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)

CEGE 8601 - Introduction to Stream Restoration (3.0 cr)

CEGE 8602 - Stream Restoration Practice (2.0 cr)

CONS 8004 - Economic and Social Aspects of Conservation Biology (3.0 cr)

EEB 4611 - Biogeochemical Processes (3.0 cr)

EEB 5601 - Limnology (3.0 cr)

EEB 8601 - Introduction to Stream Restoration (3.0 cr)

EEB 8602 - Stream Restoration Practice (2.0 cr)

ENT 5081 - Insects, Aquatic Habitats, and Pollution (3.0 cr)

ENT 5121 - Applied Experimental Design (4.0 cr)

ENT 5361 - Aquatic Insects (4.0 cr)

ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)

ESCI 4402 - Biogeochemical Cycles in the Ocean (3.0 cr)

ESCI 4702 - General Hydrogeology (4.0 cr)

ESCI 5204 - Geostatistics and Inverse Theory (3.0 cr)

ESCI 5705 - Limnogeology and Paleoenvironment (3.0 cr)

ESCI 5971 - Field Hydrogeology (2.0 cr)

ESCI 8511 - Mechanics of Sediment Transport (3.0 cr)

ESCI 8601 - Introduction to Stream Restoration (3.0 cr)

ESCI 8602 - Stream Restoration Practice (2.0 cr)

ESPM 4216 - Contaminant Hydrology (3.0 cr)

ESPM 5015 - Invasive Plants and Animals: Ecology and Management (3.0 cr)

ESPM 5061 - Water Quality and Natural Resources (3.0 cr)

ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)

ESPM 5211 - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)

ESPM 5256 - Natural Resource Law and the Management of Public Lands and Waters (3.0 cr)

ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)

ESPM 5402 - Biometeorology (3.0 cr)

ESPM 5555 - Wetland Soils (3.0 cr)

ESPM 5575 - Wetlands (3.0 cr)

ESPM 5601 - Principles of Waste Management (3.0 cr)

FNRM 5114 - Hydrology and Watershed Management (3.0 cr)

FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)

FNRM 5153 - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)

FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)



FW 4136 - Ichthyology (4.0 cr)  
FW 5459 - Stream and River Ecology (3.0 cr)  
FW 8459 - Stream and River Ecology (3.0 cr)  
FW 8465 - Fish Habitats and Restoration (3.0 cr)  
GEOG 5426 - Climatic Variations (3.0 cr)  
HORT 5071 - Ecological Restoration (4.0 cr)  
LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)  
PMB 4121 - Microbial Ecology and Applied Microbiology (3.0 cr)  
PUBH 6190 - Environmental Chemistry (3.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)  
SOIL 5232 - Vadose Zone Hydrology (3.0 cr)  
SOIL 5555 - Wetland Soils (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
WRS 5150 - Watershed Specialist Training (2.0 cr)

**Plan A Option:**

Take 10 or more credit(s) from the following:

•WRS 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

•**Plan B Option**

Select additional courses in consultation with your advisor to compete the Plan B option.



### **Twin Cities Campus**

## **Water Resources Science Minor**

*Water Resources Center*

### **Graduate School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Water Resources Science, 193 McNeal Hall, 1985 Buford Avenue, St. Paul MN 55108 (612-624-7456; fax: 612-625-1263)

Email: [wrs@umn.edu](mailto:wrs@umn.edu)

Website: <http://wrs.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.
- University of Minnesota Duluth

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This cross-campus interdisciplinary program provides comprehensive training in water resources science, with integration across scientific disciplines. A structured interdisciplinary graduate curriculum is offered. The program includes a set of core courses plus electives in the following areas of interest: aquatic biology, environmental chemistry, hydrologic science, limnology, water management technology, water policy, water quality, and watershed science and management. A Limnology and Oceanography track is also offered. Approximately 80 courses offered within 15 other graduate programs are available to students majoring in water resources science.

The goal of the program is to produce scientists with strong technical skills in disciplines relevant to water resources and a broad understanding of 1) the hydrologic cycle and associated ecosystems, 2) the interconnectedness of the sciences involved in managing aquatic resources, and 3) the interplay between the biophysical sciences and social sciences in developing and implementing public policies related to water.

Students in the program develop the breadth of scientific knowledge appropriate to understand the complicated aquatic ecosystems and watersheds on which they will work, as well as social dimensions of the topic, including the public policy and legal frameworks in which water resources are protected and managed.

The program involves faculty from the following departments on the Twin Cities campus: Applied Economics; Bioproducts and Biosystems Engineering; Civil Engineering; Earth Sciences; Ecology, Evolution, and Behavior; Entomology; Environmental and Occupational Health; Fisheries, Wildlife, and Conservation Biology; Forest Resources; Geography; Horticultural Science; Plant Biology; and Soil, Water, and Climate. It also involves faculty from the following departments on the Duluth campus: Biology; Chemical Engineering; Chemistry; Civil Engineering; Geography; Geological Sciences; and Physics; as well as the Large Lakes Observatory and the Natural Resources Research Institute in Duluth.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

#### **Required Course**

[WRS 5101](#) - Water Policy (3.0 cr)



### Electives

Master's students must take at least 6 credits, and doctoral students must take at least 9 credits from the following list of electives.

Take 6 - 9 credit(s) from the following:

- BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)
- CEGE 4501 - Hydrologic Design (4.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)
- ESCI 4702 - General Hydrogeology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5153 - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)
- LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Master's

Doctoral



### *Twin Cities Campus*

## Water Resources Science PhD

*Water Resources Center*

### Graduate School

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Water Resources Science, 193 McNeal Hall, 1985 Buford Avenue, St. Paul MN 55108 (612-624-7456)

Email: [wrs@umn.edu](mailto:wrs@umn.edu)

Website: <http://wrs.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- The Water Resources Science PhD is an All-University program delivered on the Twin Cities and Duluth Campuses. The University of Minnesota Twin Cities is the degree granting authority for the Water Resources Science PhD program in Duluth.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This cross-campus interdisciplinary program provides comprehensive training in water resources science, with integration across scientific disciplines. A structured interdisciplinary graduate curriculum is offered. The program includes a set of core courses plus electives in the following areas: aquatic biology, environmental chemistry, hydrologic science, limnology, water management technology, water policy, water quality, and watershed science and management. A limnology and oceanography track is also available. Approximately 80 courses offered within 15 other graduate programs are available to students majoring in water resources science.

The goal of the program is to produce scientists with strong technical skills in disciplines relevant to water resources and a broad understanding of 1) the hydrologic cycle and associated ecosystems, 2) the interconnectedness of the sciences involved in managing aquatic resources, and 3) the interplay between the biophysical sciences and social sciences in developing and implementing public policies related to water.

Students in the program develop the breadth of scientific knowledge appropriate to understand the complicated aquatic ecosystems and watersheds on which they will work, as well as social dimensions of the topic, including the public policy and legal frameworks in which water resources are protected and managed.

The program involves faculty from the following departments on the Twin Cities campus: Applied Economics; Bioproducts and Biosystems Engineering; Civil Engineering; Earth Sciences; Ecology, Evolution, and Behavior; Entomology; Environmental and Occupational Health; Fisheries, Wildlife, and Conservation Biology; Forest Resources; Geography; Horticultural Science; Plant Biology; and Soil, Water, and Climate. It also involves faculty from the following departments on the Duluth campus: Biology; Chemical Engineering; Chemistry; Civil Engineering; Geography; Geological Sciences; Physics; as well as the Large Lakes Observatory and the Natural Resources Research Institute in Duluth.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

The program is flexible enough to accommodate students from a variety of backgrounds. Normally students have a master's degree in physical, biological, or environmental science or engineering.

Other requirements to be completed before admission:

Recommended academic preparation includes one year (or two semesters) each of calculus, physics, and chemistry, and one biology course at the undergraduate level.

Availability of funding and willingness of a member of the graduate faculty to serve as an advisor are important criteria for admission to



the PhD program.

**Special Application Requirements:**

Applicants must submit three letters of recommendation via the University of Minnesota's online application system. These letters should be from professors qualified to estimate applicant's class rank and evaluate their ability to complete a program of graduate study, or from persons who can assess their professional or research potential.

Applicants must also submit a résumé of their academic history and professional experience and a statement of purpose, including the proposed area of emphasis. Applicants should submit results of the GRE General Test. Students may be admitted any semester but are strongly encouraged to submit their application by December 1 for fall semester admission. More specific application instructions can be found on the program website: <https://wrs.umn.edu/prospective-students/admissions-info>.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

### Water Resources Seminar

Students must take WRS 8100 for 0.5 credits.

[WRS 8100](#) - Interdisciplinary Seminar in Water Resources (0.5 cr)

### Water Resources Ethics

[WRS 8581](#) - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

### Hydrology Core

Take at least 3 credits from the following:

[BBE 8513](#) - Hydrologic Modeling of Small Watersheds (3.0 cr)

or [CEGE 4501](#) - Hydrologic Design (4.0 cr)

or [ESCI 4702](#) - General Hydrogeology (4.0 cr)

or [FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)

or [FNRM 5153](#) - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)

### Environmental/Water Chemistry Core

Take at least 3 credits from the following:

[CEGE 5541](#) - Environmental Water Chemistry (3.0 cr)

or [ESCI 4401](#) - Aqueous Environmental Geochemistry (3.0 cr)

or [LAAS 5311](#) - Soil Chemistry and Mineralogy (3.0 cr)

or [PUBH 6190](#) - Environmental Chemistry (3.0 cr)

### Limnology Core





EEB 5601 - Limnology (3.0 cr)

**Water Resources Policy Core**

WRS 5101 - Water Policy (3.0 cr)

**WRS Electives**

Select electives from the following list to complete the 24 course credits required:

BBE 5523 - Ecological Engineering Design (3.0 cr)  
BBE 5513 - Watershed Engineering (3.0 cr)  
BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)  
BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)  
PMB 4121 - Microbial Ecology and Applied Microbiology (3.0 cr)  
CEGE 4351 - Groundwater Mechanics (3.0 cr)  
CEGE 4352 - Groundwater Modeling (3.0 cr)  
CEGE 4501 - Hydrologic Design (4.0 cr)  
CEGE 4502 - Water and Wastewater Treatment (3.0 cr)  
CEGE 4511 - Hydraulic Structures (3.0 cr)  
CEGE 4512 - Open Channel Hydraulics (4.0 cr)  
CEGE 4562 - Environmental Remediation Technologies (3.0 cr)  
CEGE 5541 - Environmental Water Chemistry (3.0 cr)  
CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)  
CEGE 5551 - Environmental Microbiology (3.0 cr)  
CEGE 8504 - Theory of Unit Operations (4.0 cr)  
CEGE 8505 - Biological Processes (3.0 cr)  
CEGE 8506 - Stochastic Hydrology (4.0 cr)  
CEGE 8507 - Advanced Methods in Hydrology (4.0 cr)  
CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)  
ESCI 8511 - Mechanics of Sediment Transport (3.0 cr)  
CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)  
CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)  
CEGE 8601 - Introduction to Stream Restoration (3.0 cr)  
EEB 8601 - Introduction to Stream Restoration (3.0 cr)  
ESCI 8601 - Introduction to Stream Restoration (3.0 cr)  
CEGE 8602 - Stream Restoration Practice (2.0 cr)  
EEB 8602 - Stream Restoration Practice (2.0 cr)  
ESCI 8602 - Stream Restoration Practice (2.0 cr)  
CONS 8004 - Economic and Social Aspects of Conservation Biology (3.0 cr)  
EEB 4611 - Biogeochemical Processes (3.0 cr)  
EEB 5601 - Limnology (3.0 cr)  
ENT 5081 - Insects, Aquatic Habitats, and Pollution (3.0 cr)  
ENT 5361 - Aquatic Insects (4.0 cr)  
ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)  
ESCI 4402 - Biogeochemical Cycles in the Ocean (3.0 cr)  
ESCI 4702 - General Hydrogeology (4.0 cr)  
ESCI 5705 - Limnogeology and Paleoenvironment (3.0 cr)  
ESCI 5971 - Field Hydrogeology (2.0 cr)  
ESPM 4216 - Contaminant Hydrology (3.0 cr)  
ESPM 5061 - Water Quality and Natural Resources (3.0 cr)  
ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)  
ESPM 5256 - Natural Resource Law and the Management of Public Lands and Waters (3.0 cr)  
ESPM 5402 - Biometeorology (3.0 cr)  
ESPM 5555 - Wetland Soils (3.0 cr)  
SOIL 5555 - Wetland Soils (3.0 cr)  
ESPM 5575 - Wetlands (3.0 cr)  
ESPM 5601 - Principles of Waste Management (3.0 cr)  
FNRM 5114 - Hydrology and Watershed Management (3.0 cr)  
FNRM 5153 - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)  
FW 4136 - Ichthyology (4.0 cr)  
FW 8459 - Stream and River Ecology (3.0 cr)  
FW 8465 - Fish Habitats and Restoration (3.0 cr)  
GEOG 5426 - Climatic Variations (3.0 cr)  
HORT 5071 - Ecological Restoration (4.0 cr)  
LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)  
PUBH 6190 - Environmental Chemistry (3.0 cr)  
SOIL 5232 - Vadose Zone Hydrology (3.0 cr)



[ESPM 5295](#) - GIS in Environmental Science and Management (4.0 cr)  
[FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
[FW 5459](#) - Stream and River Ecology (3.0 cr)  
[FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)  
[STAT 5021](#) - Statistical Analysis (4.0 cr)  
[WRS 5150](#) - Watershed Specialist Training (2.0 cr)  
[AGRO 5121](#) - Applied Experimental Design (4.0 cr)  
[ENT 5121](#) - Applied Experimental Design (4.0 cr)  
[ESCI 5204](#) - Geostatistics and Inverse Theory (3.0 cr)  
[ESPM 5015](#) - Invasive Plants and Animals: Ecology and Management (3.0 cr)  
[ESPM 5211](#) - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)  
[PUBH 6450](#) - Biostatistics I (4.0 cr)  
[PUBH 6451](#) - Biostatistics II (4.0 cr)  
[STAT 5302](#) - Applied Regression Analysis (4.0 cr)  
[STAT 5303](#) - Designing Experiments (4.0 cr)  
[STAT 5401](#) - Applied Multivariate Methods (3.0 cr)

#### Thesis Credits

Take at least 24 doctoral thesis credits.

[WRS 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Limnology and Oceanography

The science of inland waters, or "limnology," includes the study of streams, lakes, ponds, and wetlands. While Lake Superior falls into this category, the style of research, particularly the nature of sampling and the scale of the processes investigated, makes study of Lake Superior and other Great Lakes more akin to oceanography than to classical limnology. A program that focuses on the study of both limnology and oceanography strengthens understanding of both systems, through comparative studies and by fostering interaction between groups that focus more strongly on one or the other system. Limnology and oceanography are by necessity interdisciplinary fields, with major components contributed by biological, geological, physical, and chemical sciences.

This track within the cross-campus interdisciplinary WRS program provides comprehensive training in limnology and oceanography. As is the case for the WRS graduate program as a whole, the L&O program includes a set of core courses plus electives in the subfield of limnology and oceanography.

The goal of the program is to produce scientists with strong technical skills in aquatic science and a broad understanding of limnology and oceanography. Faculty on both Twin Cities and Duluth campuses participate in the limnology and oceanography track.

PhD students pursuing the limnology and oceanography track must have at least two members of the limnology and oceanography faculty on their committee, including the advisor.

### Water Resources Seminar

Students must take WRS 8100 for 0.5 credits.

[WRS 8100](#) - Interdisciplinary Seminar in Water Resources (0.5 cr)

### Water Resources Ethics

[WRS 8581](#) - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

### Hydrology Core for Limnology/Oceanography Students

Take 3 or more credit(s) from the following:

- [BBE 8513](#) - Hydrologic Modeling of Small Watersheds (3.0 cr)
- [FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)

### Environmental/Water Chemistry Core for Limnology/Oceanography Students

Take at least 3 credits from the following:

- [CEGE 5541](#) - Environmental Water Chemistry (3.0 cr)
- or [ESCI 4401](#) - Aqueous Environmental Geochemistry (3.0 cr)
- or [LAAS 5311](#) - Soil Chemistry and Mineralogy (3.0 cr)
- or [PUBH 6190](#) - Environmental Chemistry (3.0 cr)
- or [EEB 4611](#) - Biogeochemical Processes (3.0 cr)

### Limnology Core

[EEB 5601](#) - Limnology (3.0 cr)

### Water Resources Policy Core

[WRS 5101](#) - Water Policy (3.0 cr)



### WRS Electives

Select electives from the following list, in consultation with the L&O committee, to complete the 24 course credits required:

- BBE 5523 - Ecological Engineering Design (3.0 cr)
- BBE 5513 - Watershed Engineering (3.0 cr)
- BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)
- BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)
- PMB 4121 - Microbial Ecology and Applied Microbiology (3.0 cr)
- CEGE 4351 - Groundwater Mechanics (3.0 cr)
- CEGE 4352 - Groundwater Modeling (3.0 cr)
- CEGE 4501 - Hydrologic Design (4.0 cr)
- CEGE 4502 - Water and Wastewater Treatment (3.0 cr)
- CEGE 4511 - Hydraulic Structures (3.0 cr)
- CEGE 4512 - Open Channel Hydraulics (4.0 cr)
- CEGE 4562 - Environmental Remediation Technologies (3.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)
- CEGE 5551 - Environmental Microbiology (3.0 cr)
- CEGE 8504 - Theory of Unit Operations (4.0 cr)
- CEGE 8505 - Biological Processes (3.0 cr)
- CEGE 8506 - Stochastic Hydrology (4.0 cr)
- CEGE 8507 - Advanced Methods in Hydrology (4.0 cr)
- CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)
- ESCI 8511 - Mechanics of Sediment Transport (3.0 cr)
- CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)
- CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)
- CEGE 8601 - Introduction to Stream Restoration (3.0 cr)
- EEB 8601 - Introduction to Stream Restoration (3.0 cr)
- ESCI 8601 - Introduction to Stream Restoration (3.0 cr)
- CEGE 8602 - Stream Restoration Practice (2.0 cr)
- EEB 8602 - Stream Restoration Practice (2.0 cr)
- ESCI 8602 - Stream Restoration Practice (2.0 cr)
- CONS 8004 - Economic and Social Aspects of Conservation Biology (3.0 cr)
- EEB 4611 - Biogeochemical Processes (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- ENT 5081 - Insects, Aquatic Habitats, and Pollution (3.0 cr)
- ENT 5361 - Aquatic Insects (4.0 cr)
- ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)
- ESCI 4402 - Biogeochemical Cycles in the Ocean (3.0 cr)
- ESCI 4702 - General Hydrogeology (4.0 cr)
- ESCI 5705 - Limnogeology and Paleoenvironment (3.0 cr)
- ESCI 5971 - Field Hydrogeology (2.0 cr)
- ESPM 4216 - Contaminant Hydrology (3.0 cr)
- ESPM 5061 - Water Quality and Natural Resources (3.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- ESPM 5256 - Natural Resource Law and the Management of Public Lands and Waters (3.0 cr)
- ESPM 5402 - Biometeorology (3.0 cr)
- ESPM 5555 - Wetland Soils (3.0 cr)
- SOIL 5555 - Wetland Soils (3.0 cr)
- ESPM 5575 - Wetlands (3.0 cr)
- ESPM 5601 - Principles of Waste Management (3.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5153 - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)
- FW 4136 - Ichthyology (4.0 cr)
- FW 8459 - Stream and River Ecology (3.0 cr)
- FW 8465 - Fish Habitats and Restoration (3.0 cr)
- GEOG 5426 - Climatic Variations (3.0 cr)
- HORT 5071 - Ecological Restoration (4.0 cr)
- LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- SOIL 5232 - Vadose Zone Hydrology (3.0 cr)
- WRS 5150 - Watershed Specialist Training (2.0 cr)
- ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FW 5459 - Stream and River Ecology (3.0 cr)



[STAT 5021](#) - Statistical Analysis (4.0 cr)  
[AGRO 5121](#) - Applied Experimental Design (4.0 cr)  
[ENT 5121](#) - Applied Experimental Design (4.0 cr)  
[ESCI 5204](#) - Geostatistics and Inverse Theory (3.0 cr)  
[ESPM 5015](#) - Invasive Plants and Animals: Ecology and Management (3.0 cr)  
[ESPM 5211](#) - Survey, Measurement, and Modeling for Environmental Analysis (3.0 cr)  
[PUBH 6450](#) - Biostatistics I (4.0 cr)  
[PUBH 6451](#) - Biostatistics II (4.0 cr)  
[STAT 5302](#) - Applied Regression Analysis (4.0 cr)  
[STAT 5303](#) - Designing Experiments (4.0 cr)  
[STAT 5401](#) - Applied Multivariate Methods (3.0 cr)

**Thesis Credits**

Take at least 24 doctoral thesis credits.

[WRS 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### ***Twin Cities Campus***

## **Development Practice M.D.P.**

*HHH Administration*

### **Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002).

Email: [hhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 50
- This program requires summer semesters for timely completion.
- Degree: Master of Development Practice

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of development practice (MDP) prepares students for careers in sustainable development. The degree provides a rigorous, interdisciplinary education and equips students with the competencies, skills, and knowledge needed to work toward poverty alleviation and sustainable development in developing regions of the world.

The MDP program is jointly administered by the Humphrey School of Public Affairs and the Interdisciplinary Center for the Study of Global Change (ICGC) and spans several academic units across the University of Minnesota. The degree provides training in policy analysis and management, health and education, natural sciences, social sciences, and interdisciplinary research methods. An international field experience and capstone workshop in development practice also are required.

The Minnesota MDP program and degree are part of a global association of MDP programs.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A four-year bachelor's degree from an accredited US university or foreign equivalent at time of enrollment.

Other requirements to be completed before admission:

While no specific experience or academic pathway is required, students with a strong liberal education background and sound quantitative and analytical skills will be best prepared for academic success at the Humphrey School of Public Affairs.

Previous coursework in mathematics, statistics, and economics is recommended. Past applicants needing to strengthen this part of their skill set have found courses in introductory microeconomics, college algebra, and introductory statistics to be helpful preparation. Prior to admission students may find such courses available online; many are also available at the University of Minnesota.

International professional experience and foreign language competency are strongly preferred.

#### **Special Application Requirements:**

A complete application will include a University of Minnesota graduate application, personal statement, resume or C.V., transcripts, GRE scores, TOEFL scores, at least three letters of recommendation, and an optional diversity statement.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL



- Internet Based - Total Score: 100
- Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 50 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The required capstone project is an opportunity for second-year MDP students to apply their competencies, skills, and knowledge through a client-based team project. Each student team and the workshop advisor will work with a NGO or public sector client engaged in some dimension of sustainable development to identify a project, typically situated in a developing country. While the specifics of each project vary, all will include some degree of project design, in-depth research, analysis, and the creation of a final, professional report. Student teams will be expected to develop and deliver appropriate client and public presentations. Projects will be done by small groups and can have multiple dimensions. Students will have the opportunity to integrate various aspects of development such as economic development, public health, environmental sustainability, education development, and community engagement.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

The required field experience is an opportunity at the end of the first academic year for MDP students to develop and apply new competencies, skills, and knowledge through a client-based team project in the field. Each student team will be matched with a NGO or public sector client engaged in some dimension of sustainable development, typically situated in a developing country. While the specifics of each project vary, all will include some degree of project design, in-depth research, analysis, and the creation of a final, professional report. Student teams will be expected to develop and deliver appropriate client presentations. Projects will be done by small groups and can have multiple dimensions. Students will have the opportunity to integrate various aspects of development such as economic development, public health, environmental sustainability, education development, and community engagement. The field placement entails an additional program cost that is the responsibility of students.

Required coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C-.

### Core Courses (28 credits)

Take the following courses:

- [AGRO 5321](#) - Ecology of Agricultural Systems (3.0 cr)
- [MDP 5001](#) - Ways of Knowing for Sustainable Development (2.0 cr)
- [MDP 5002](#) - Program Development Workshop (3.0 cr)
- [MDP 5004](#) - International Field Experience (3.0 cr)
- [MDP 5005](#) - Qualitative Methods for Development Practice (3.0 cr)
- [MDP 5100](#) - Post-Field / Pre-Capstone Seminar (1.0 cr)
- [MDP 5200](#) - Capstone Workshop in Development Practice (3.0 cr)
- [PA 5501](#) - Theories and Policies of Development (3.0 cr)
- [PA 5503](#) - Economics of Development (3.0 cr)
- [PA 5521](#) - Development Planning and Policy Analysis (4.0 cr)

### Statistics Course (4 credits)

Select 1 of the following courses:

- [PA 5031](#) - Statistics for Public Affairs (4.0 cr)
- [PA 5045](#) - Statistics for Public Affairs, Accelerated (4.0 cr)

### Additional Methods Course (4 credits)

Select 1 of the following courses:

- [PA 5003](#) - Introduction to Financial Analysis and Management (1.5 cr)
- [PA 5032](#) - Applied Regression (2.0 cr)
- [PA 5044](#) - Applied Regression, Accelerated (2.0 cr)
- [PA 5311](#) - Program Evaluation (3.0 cr)



[EPSY 5243](#) - Principles and Methods of Evaluation (3.0 cr)

[OLPD 5501](#) - Principles and Methods of Evaluation (3.0 cr)

**International Education Course (3 credits)**

Select 1 of the following courses:

[OLPD 5104](#) - Strategies for International Development of Education Systems (3.0 cr)

[OLPD 5107](#) - Gender, Education, and International Development (3.0 cr)

**Environmental Science Course (3 credits)**

Select 1 of the following courses:

[GEOG 5401](#) - Geography of Environmental Systems and Global Change (3.0 cr)

[GCC 5008](#) - Policy and Science of Global Environmental Change [ENV] (3.0 cr)

**Leadership and Management Course (3 credits)**

Take the following course:

[PA 5151](#) - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)

**Public Health (2 credits)**

Select 1 of the following courses:

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

[PUBH 6134](#) - Sustainable Development and Global Public Health (2.0 cr)

**Electives**

Select elective credits, in consultation with the advisor, to meet the 50-credit minimum. Other courses may be applied with advisor approval.

[ESPM 5061](#) - Water Quality and Natural Resources (3.0 cr)

[ESPM 5108](#) - Ecology of Managed Systems (4.0 cr)

[ESPM 5202](#) - Environmental Conflict Management, Leadership, and Planning (3.0 cr)

[ESPM 5251](#) - Natural Resources in Sustainable International Development (3.0 cr)

[ESPM 5604](#) - Environmental Management Systems and Strategy (3.0 cr)

[HORT 5071](#) - Ecological Restoration (4.0 cr)

[PA 5721](#) - Energy Systems and Policy (3.0 cr)

[OLPD 5104](#) - Strategies for International Development of Education Systems (3.0 cr)

[OLPD 8101](#) - International Education and Development (3.0 cr)

[PA 5414](#) - Child Human Rights: Work and Education (3.0 cr)

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

[PUBH 6845](#) - Using Demographic Data for Policy Analysis (3.0 cr)

[PUBH 6933](#) - Nutrition and Chronic Diseases (2.0 cr)

[PA 5101](#) - Management and Governance of Nonprofit Organizations (3.0 cr)

[PA 5111](#) - Financing Public and Nonprofit Organizations (3.0 cr)

[PA 5271](#) - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)

[PA 5301](#) - Population Methods & Issues for the United States & Global South (3.0 cr)

[PA 5522](#) - International Development Policy, Families, and Health (3.0 cr)

[OLPD 5011](#) - Leading Organizational Change: Theory and Practice (3.0 cr)

[OLPD 5048](#) - Cross-Cultural Perspectives on Leadership (3.0 cr)

[ANTH 5041](#) - Ecological Anthropology (3.0 cr)

[ANTH 8120](#) - Problems in Culture Change and Applied Anthropology (3.0 - 6.0 cr)

[APEC 5152](#) - Applied Macroeconomics: Income and Employment (3.0 cr)

[GEOG 5385](#) - Globalization and Development: Political Economy (4.0 cr)

[GEOG 5561](#) - Principles of Geographic Information Science (4.0 cr)

[PA 5801](#) - Global Public Policy (3.0 cr)



### **Twin Cities Campus**

## **Early Childhood Policy Postbaccalaureate Certificate**

*HHH Social Policy Academic Program*

**Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Humphrey School of Public Affairs, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax 612-626-0002)

Email: [hhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Early Childhood Policy PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The early childhood policy post-baccalaureate certificate gives students expertise in applying research-based knowledge to public policies affecting young children and the adults who care for them. In addition to completing coursework, students in the certificate program complete a capstone workshop or independent study focused on early childhood policy. These certificate components provide a vehicle for students to gain fundamental early childhood policy skills and knowledge and to foster connection between the University of Minnesota and the early childhood policy community. Students may have opportunities to participate in the work of the Institute of Child Development's Human Capital Research Collaborative.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Admission to the certificate will be allowed in fall and spring semesters. Admission decisions will be made by a subcommittee of the faculty advisory group. A complete application will include a Graduate School application, personal statement, resume or C.V., and transcripts.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

Required coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C-. A minimum of 2/3 of the course credits must be taken A/F.





### Early Childhood and Public Policy Course (3 credits)

Take the following course:

[PA 5413](#) - Early Childhood and Public Policy (1.5 - 3.0 cr)

### Electives (6 credits)

Select 3 credits from the Policy Electives list, and 3 credits from the Open Electives list. Other courses allowed with advisor approval.

#### Policy Electives (3 credits)

Select 3 credits from the following. Topics courses (such as PA 5490) are eligible if they cover early childhood.

[PA 5415](#) - Economics of Early Childhood Development (1.5 - 3.0 cr)

[PA 5442](#) - Education Law and Policy (3.0 cr)

[FSOS 8104](#) - Family Policy Seminar (3.0 cr)

[PREV 8001](#) - Prevention Science: Principles and Practices (3.0 cr)

[SW 5101](#) - Historical Origins and Contemporary Policies in Social Welfare (3.0 cr)

[SW 8804](#) - Child Welfare Policy (3.0 cr)

#### Open Electives (3 credits)

Select 3 credits from the following. Topics courses (such as PA 5490) are eligible if they cover early childhood.

[PA 5311](#) - Program Evaluation (3.0 cr)

[PA 5480](#) - Topics in Race, Ethnicity, and Public Policy (1.0 - 3.0 cr)

[CI 8900](#) - Family, Youth, and Community Colloquium (1.0 - 4.0 cr)

[CPSY 5251W](#) - Social and Philosophical Foundations of Early Childhood Education [WI] (3.0 cr)

[CPSY 5252](#) - Facilitating Social and Emotional Learning in Early Childhood Education (3.0 cr)

[CPSY 5253](#) - Facilitating Cognitive and Language Learning in Early Childhood Education (3.0 cr)

[CPSY 5254](#) - Facilitating Creative and Motor Learning in Early Childhood Education (2.0 cr)

[EPSY 5221](#) - Principles of Educational and Psychological Measurement (3.0 cr)

[EPSY 5243](#) - Principles and Methods of Evaluation (3.0 cr)

[EPSY 5625](#) - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)

[EPSY 5849](#) - Multi-tiered Systems of Support in Early Childhood Education (3.0 cr)

[FSOS 5032](#) - Family Systems Theories and Interventions (3.0 cr)

[FSOS 8106](#) - Seminar: Families From an Economic Perspective (3.0 cr)

[NURS 5032](#) - Human Response to Health and Illness: Children and Childbearing Families (5.0 cr)

[OLPD 5346](#) - Politics of Education (3.0 cr)

[OLPD 5356](#) - Disability Policy and Services (3.0 cr)

[OLPD 5501](#) - Principles and Methods of Evaluation (3.0 cr)

[OLPD 8015](#) - Inquiry strategies in educational and organizational research (3.0 cr)

[OLPD 8016](#) - Research Design and Educational Policy (3.0 cr)

[OLPD 8087](#) - Seminar: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)

[OLPD 8095](#) - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)

[OLPD 8302](#) - Educational Policy Perspectives (3.0 cr)

[POL 8602](#) - Families, Children, and the State (3.0 cr)

[PUBH 6606](#) - Children's Health: Life Course and Equity Perspectives (2.0 cr)

[PUBH 6607](#) - Adolescent Health: Issues, Programs, and Policies (2.0 cr)

[PUBH 6613](#) - Children and Youth With Special Health Care Needs (2.0 cr)

[PUBH 6630](#) - Foundations of Maternal and Child Health Leadership (3.0 cr)

[PUBH 6634](#) - Children and Families: Public Health Policy and Advocacy (2.0 cr)

[PUBH 6655](#) - Principles and Programs in Maternal and Child Health (2.0 cr)

[SW 5905](#) - Permanency in Child Welfare (2.0 cr)

[SW 8363](#) - Social Work in Child Welfare (3.0 cr)

### Final Paper (3 Credits)

The final paper can be completed by taking PA 8081, 8082, 8921, or 8991. The paper must have a focus on early childhood policy.

Papers may be completed under other designators by permission.

[PA 8081](#) - Capstone Workshop (3.0 cr)

or [PA 8082](#) - Professional Paper-Writing Seminar (3.0 cr)

or [PA 8921](#) - Master's: Professional Paper (Individual Option) (1.0 - 3.0 cr)

or [PA 8991](#) - Independent Study (0.5 - 4.0 cr)



### **Twin Cities Campus**

## **Election Administration Postbaccalaureate Certificate**

*HHH Politics and Governance Academic Program*

**Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Humphrey School of Public Affairs, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax 612-626-0002)

Email: [hhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Election Administration PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The election administration post-baccalaureate certificate prepares professional election officials across the country for advancement in the field as well as students interested in entering the field of election administration. Students will acquire and develop the skills and knowledge of election operations and procedures. All courses are offered in an online format and include topics such as election law, election security, data analysis, and voter participation.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Admission to the certificate will be allowed in fall and spring semesters. Admission decisions will be made by a subcommittee of the faculty advisory group. The application must include a personal statement, resume or C.V., and transcripts.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

Required coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C-. A minimum of 2/3 of the course credits must be taken A/F.

### **Core**

[PA 5971](#) - Survey of Election Administration (3.0 cr)

[PA 5972](#) - Elections and the Law (2.0 cr)

[PA 5973](#) - Strategic Management of Election Administration (2.0 cr)



**Electives**

Take 5 or more credit(s) from the following:

- PA 5975 - Election Design (2.0 cr)
- PA 5976 - Voter Participation (1.0 cr)
- PA 5982 - Data Analysis for Election Administration (2.0 cr)
- PA 5983 - Introduction to Election Security (1.0 cr)
- PA 5984 - Elections Security: How to Protect America's Elections (2.0 cr)



### **Twin Cities Campus**

## **Human Services Leadership Postbaccalaureate Certificate**

*HHH Leadership and Management Academic Program*

**Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

Email: [hhhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- N/A

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Human service professionals face extraordinary challenges that require innovative thinking and an interdisciplinary approach. The certificate in human services leadership provides mid-career professionals knowledge and skills in leadership, public policy, and public service redesign for greater success plus increased potential for advancement to serve in mid- to senior-level leadership positions in county, state, and nonprofit agencies. Designed with input from industry leaders, the program is intended for working professionals involved in human service program development and delivery. The program allows students to complete a professional 12-credit graduate-level certificate that can serve as a stepping stone to the mid-career master of public affairs degree.

### **Accreditation**

This program is accredited by N/A

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A four-year bachelor's degree from an accredited US university or foreign equivalent at time of enrollment.

### **Special Application Requirements:**

At least 8 years of post-baccalaureate professional work experience. Pre-baccalaureate experience may be considered for applicants with a significant gap between completion of high school and the bachelor's degree. Sufficient prior academic preparation as demonstrated in a four-year bachelor's degree. A complete application will include a University of Minnesota application, personal statement, resume or C.V., transcripts, TOEFL scores (if applicable), at least two letters of recommendation, and a diversity statement.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Internet Based - Listening Score: 25
  - Internet Based - Writing Score: 25
  - Internet Based - Reading Score: 25
  - Internet Based - Speaking Score: 25
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MN Batt

Key to [test abbreviations](#)(TOEFL, IELTS, MN Batt).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Required coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C-. A minimum of 2/3 of the course credits must be taken A/F.

### Required Coursework (6 credits)

The courses below are offered in hybrid format with virtual lectures and analytical posts, as well as face-to-face meetings.

[PA 5161](#) - Redesigning Human Services (3.0 cr)

[PA 5162](#) - Public Service Redesign Workshop (3.0 cr)

### Elective Courses (6 credits)

PA 5190 is limited to "Leading Across Boundaries" or "Collaborative Governance."

[PA 5011](#) - Management of Organizations (3.0 cr)

[PA 5103](#) - Leadership and Change (1.5 - 3.0 cr)

[PA 5105](#) - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)

[PA 5137](#) - Project Management in the Public Arena (1.5 cr)

[PA 5145](#) - Civic Participation in Public Affairs (3.0 cr)

[PA 5190](#) - Topics in Public and Nonprofit Leadership and Management (1.0 - 3.0 cr)

[PA 5311](#) - Program Evaluation (3.0 cr)

[PA 5405](#) - Public Policy Implementation (3.0 cr)

[PA 5421](#) - Racial Inequality and Public Policy (3.0 cr)

[PA 5927](#) - Effective Grantwriting for Nonprofit Organizations (1.5 cr)

[OLPD 5011](#) - Leading Organizational Change: Theory and Practice (3.0 cr)



### *Twin Cities Campus*

## Nonprofit Management Postbaccalaureate Certificate

HHH Administration

Hubert H. Humphrey School of Public Affairs

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Graduate Student Services, Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002).

Email: [hhhadmit@umn.edu](mailto:hhhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 13
- This program does not require summer semesters for timely completion.
- Degree: Nonprofit Management PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The nonprofit management certificate program is designed for both current students and professionals who are employed in nonprofit organizations, especially persons who do not have a formal educational background in managing and leading a nonprofit organization. Students acquire knowledge and skills in effective leadership and management, organizational development, nonprofit governance, strategic planning, policy analysis, human resource development, finance, and fundraising. This program offers a wide array of elective courses appropriate to a broad range of nonprofit settings.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree from an accredited institution.

Other requirements to be completed before admission:

2 or more years experience as paid or volunteer staff member with nonprofit organizations.

### **Special Application Requirements:**

A complete application will include a University of Minnesota application, personal statement, resume or C.V., and transcripts.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.



13 credits of coursework are required, including 7.5 credits of required courses. In consultation with the faculty advisor, remaining elective credits are chosen to meet the student's individual goals and interests. Required coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C-. A minimum of 2/3 of the course credits must be taken A/F.

#### Required Core Courses (7.5 credits)

- PA 5003 - Introduction to Financial Analysis and Management (1.5 cr)
- PA 5251 - Strategic Planning and Management (3.0 cr)
- PA 5101 - Management and Governance of Nonprofit Organizations (3.0 cr)

#### Electives

Students should take at least 5.5 credits from Electives. Below are suggested courses; other courses allowed with advisor approval.

Take 2 or more course(s) from the following:

- PA 5103 - Leadership and Change (1.5 - 3.0 cr)
- PA 5104 - Strategic Human Resource Management (3.0 cr)
- PA 5108 - Board leadership development (1.0 cr)
- PA 5114 - Budget Analysis in Public and Nonprofit Orgs (1.5 cr)
- PA 5116 - Financing Public and Nonprofit Organizations (1.5 cr)
- PA 5123 - Philanthropy in America: History, Practice, and Trends (1.5 - 3.0 cr)
- PA 5135 - Managing Conflict: Negotiation (3.0 cr)
- PA 5144 - Social Entrepreneurship (3.0 cr)
- PA 5145 - Civic Participation in Public Affairs (3.0 cr)
- PA 5151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- PA 5190 - Topics in Public and Nonprofit Leadership and Management (1.0 - 3.0 cr)
- PA 5311 - Program Evaluation (3.0 cr)
- PA 5405 - Public Policy Implementation (3.0 cr)
- PA 5920 - Skills Workshop (0.5 - 4.0 cr)
- PA 5927 - Effective Grantwriting for Nonprofit Organizations (1.5 cr)
- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)
- OLPD 5607 - Organization Development (3.0 cr)
- OLPD 8703 - Public Policy in Higher Education (3.0 cr)
- PUBH 6557 - Health Finance I (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)
- SW 5562 - Global Social Work and Social Development (3.0 cr)
- SW 5904 - Facilitation and Conflict Management: Humanistic Approach (2.0 cr)
- SW 8551 - Advanced Community Practice: Assessment, Organizing, and Advocacy (3.0 cr)
- SW 8552 - Advanced Community Practice: Leadership, Planning, and Program Development (3.0 cr)
- SW 8561 - Human Resources Management in Human Services Agencies (3.0 cr)
- SW 8563 - Advanced Policy Advocacy (3.0 cr)
- SW 8804 - Child Welfare Policy (3.0 cr)
- SW 8805 - Aging and Disability Policy (3.0 cr)
- SW 8806 - Health and Mental Health Policy (3.0 cr)
- SW 8807 - International and Comparative Social Welfare Policy (3.0 cr)



### *Twin Cities Campus*

## Policy Issues on Work and Pay Postbaccalaureate Certificate

HHH Administration

### Hubert H. Humphrey School of Public Affairs

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Graduate Student Services, Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Ave S, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

Email: [hhhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 15
- This program does not require summer semesters for timely completion.
- Degree: Policy Issues on Work and Pay PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Policy Issues in Work and Pay certificate provides an understanding of, and the ability to evaluate and develop, federal, state, and local policies that affect the employment relationship. Students learn about the role of government in the employment relationship, including statutes, and how employers, unions, and the government interpret and utilize policies. Core courses are drawn from the Humphrey School of Public Affairs as well as the Center for Human Resources and Labor Studies in the Carlson School of Management, with auxiliary courses in law, history, sociology, and applied economics.

The certificate consists of at least 15 credits. Students complete 10 elective credits that allow them to focus on the area of public policy that is most relevant to their professional and educational goals and needs. Some elective courses require prerequisites, which do not count toward the certificate.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Mathematics courses at least through algebra; a one-semester course in microeconomics.

#### **Special Application Requirements:**

A complete application will include a Graduate School application, personal statement, resume or C.V., transcripts, and a diversity statement.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.





## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Required coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C-. A minimum of 2/3 of the course credits must be taken A/F.

### Required Courses (6 credits)

#### Public Policies on Work and Pay

[PA 5431](#) - Public Policies on Work and Pay (3.0 cr)  
or [HRIR 5655](#) - Public Policies on Work and Pay (3.0 cr)

#### Social Safety Nets/Social Insurance Programs

Must take [PA 5022](#): Economics of Social Insurance Programs (3 cr) to satisfy this requirement.  
[PA 5022](#) - Applications of Economics for Policy Analysis (1.5 - 3.0 cr)

### Elective Courses (9 credits)

Take at least 9 credits from the following list, or select other elective coursework with the approval of the director of graduate studies.

[HRIR 5222](#) - Creating and Managing Diversity and Inclusion (2.0 cr)  
[HRIR 5252](#) - Employment and Labor Law for the HRIR Professional (2.0 cr)  
[HRIR 5662](#) - Personnel Economics (2.0 cr)  
[HRIR 6503](#) - Employer-Sponsored Employee Benefit Programs (2.0 cr)  
[HRIR 6701](#) - Labor Relations and Collective Bargaining (4.0 cr)  
[PA 5401](#) - Poverty, Inequality, and Public Policy (3.0 cr)  
[PA 8386](#) - Research Methods in Public Policy (2.0 cr)  
[APEC 5511](#) - Labor Economics (3.0 cr)  
[LAW 6203](#) - Labor Law (2.0 cr)  
[LAW 6631](#) - Employment Discrimination (3.0 cr)  
[LAW 6632](#) - Employment Law (3.0 cr)  
[LAW 6833](#) - Alternative Dispute Resolution (2.0 cr)



### *Twin Cities Campus*

## Public Affairs Leadership Postbaccalaureate Certificate

HHH Administration

### Hubert H. Humphrey School of Public Affairs

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

Email: [hhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Public Affairs Leadership PBac Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Certificate in Public Affairs Leadership offers mid-career professionals specific knowledge and skills in leadership, public policy, and program analysis, as well as qualitative and quantitative research methods to succeed in today's public affairs environment. Intended for working professionals, the program allows students to complete a professional certificate in an integrative cohort format in nine months. The certificate stands on its own or can be a stepping stone to the mid-career Master of Public Affairs degree. The Certificate in Public Affairs Leadership is offered in a unique combination of on-campus and online sessions, making it convenient for students from outside of the Twin Cities area to participate. The program starts with a one-day orientation in July, a 4-day intensive foundations week in August, followed by monthly Friday-Saturday meetings from September to May. Designed for working professionals, this cohort approach combines the intensity and depth of in-person instruction paired with the convenience of online coursework.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A four-year bachelor's degree from an accredited U.S. university or foreign equivalent at time of enrollment is required.

Other requirements to be completed before admission:

At least 10 years of post-baccalaureate professional work experience is preferred and highly recommended. Pre-baccalaureate experience may be considered for applicants with a significant gap between completion of high school and the bachelor's degree. Sufficient prior academic preparation as demonstrated in a four-year bachelor's degree.

A complete application will include a University of Minnesota application, personal statement, resume or C.V., transcripts, TOEFL scores (when applicable), at least three letters of recommendation, and a diversity statement.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

Required coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C-. A minimum of 2/3 of the course credits must be taken A/F.

### Required Courses

- [PA 5051](#) - Public Affairs Leadership (2.0 cr)
- [PA 5052](#) - Public Affairs Leadership in a Diverse World (2.0 cr)
- [PA 5053](#) - Policy Analysis in Public Affairs (2.0 cr)
- [PA 5054](#) - Program Design and Implementation Analysis (2.0 cr)
- [PA 5055](#) - Qualitative Research Methods and Analysis (2.0 cr)
- [PA 5056](#) - Quantitative Research Methods and Analysis (2.0 cr)



### ***Twin Cities Campus***

## **Public Affairs M.P.A.**

*HHH Administration*

### **Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue S, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

Email: [hhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Public Affairs

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of public affairs (MPA) is intended for mid-career professionals, and prepares them for public leadership and policy and program analysis. To accommodate working professionals, the program is typically completed in two to three years of part-time enrollment. The program can be completed in one calendar year (fall, spring, summer semesters) by attending full-time. Courses in a self-designed concentration provide a knowledge base and skills to achieve career goals. Concentration courses can be from Public Affairs and from the 150+ graduate programs across the University of Minnesota. Required courses in this degree are taken in a cohort format. The program starts with a one-day orientation in July, a 4-day intensive foundations week in August, followed by monthly Friday-Saturday meetings from September to May. Designed for working professionals, this cohort approach combines the intensity and depth of in-person instruction paired with the convenience of online coursework.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A four-year bachelor's degree from an accredited US university or foreign equivalent at time of enrollment.

#### **Special Application Requirements:**

At least 10 years of post-baccalaureate professional work experience is preferred and highly recommended. Pre-baccalaureate experience may be considered for applicants with a significant gap between completion of high school and the bachelor's degree. Applicants must demonstrate sufficient prior academic preparation as demonstrated in a four-year bachelor's degree. A complete application will include a University of Minnesota application, personal statement, resume or C.V., transcripts, TOEFL scores (if applicable), at least three letters of recommendation, and an optional diversity statement.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The capstone project is designed to provide a learning opportunity for students to apply their knowledge through a client-based team project. The workshop includes a written report for the client and an oral presentation to the client that summarizes the major findings of the semester-long study.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

Coursework offered on both the A/F and S/N grade basis must be taken A/F. Up to 6 of the 14 credits required for self-designed concentration may be taken S/N.

### Required Core Courses (12 credits)

Take the following courses:

- PA 5051 - Public Affairs Leadership (2.0 cr)
- PA 5052 - Public Affairs Leadership in a Diverse World (2.0 cr)
- PA 5053 - Policy Analysis in Public Affairs (2.0 cr)
- PA 5054 - Program Design and Implementation Analysis (2.0 cr)
- PA 5055 - Qualitative Research Methods and Analysis (2.0 cr)
- PA 5056 - Quantitative Research Methods and Analysis (2.0 cr)

### Capstone Project (4 credits)

Take the following courses:

- PA 5080 - Capstone Preparation Workshop (1.0 cr)
- PA 8081 - Capstone Workshop (3.0 cr)

### Self-Designed Concentration (14 credits)

MPA students self-design a concentration, choosing from a wide variety of classes, including courses in nonprofit management, human services leadership, program evaluation, and planning; or from Humphrey School research in the areas of social policy, global policy; economic and community development; science, technology, and environmental policy; and urban and regional policy and planning. Students may also choose courses from more than 150 graduate programs at the University of Minnesota.



### **Twin Cities Campus**

## **Public Affairs, Ph.D.**

*HHH Administration*

### **Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue S, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

Email: [hhphd@umn.edu](mailto:hhphd@umn.edu)

Website: <http://www.hhh.umn.edu/degrees/phd/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 66
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The doctor of philosophy (PhD) in public affairs offers students opportunities for rigorous, advanced study in the areas of public affairs, policy analysis, and planning. The goal of the PhD program is to train researchers who will enter academia or join highly respected public or nonprofit institutions involved in cutting edge research in public affairs, policy, planning, and management. Successful applicants to the program will be clear about the research they wish to undertake and why they think the Humphrey School is the best place to do that research. Students are expected to make original theoretical, methodological, or substantive contributions in the area of their specialization (sub-plans). Sub-plans are offered in public policy; urban planning; management and governance; and science, technology, and environmental policy. Students will be expected to complete the degree program within five years.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

The general requirement is the capability to pursue PhD-level work. Typically, an applicant should have an academic record from a recognized college that includes undergraduate coursework in microeconomics and mathematics (either calculus, statistics, or algebra).

#### **Special Application Requirements:**

A complete application will include a U of MN graduate application, a personal statement that includes motivation for pursuing doctoral studies, a resume or C.V., transcripts, GRE scores, a writing sample, TOEFL scores (if applicable), and at least three letters of recommendation.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

42 credits are required in the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

**Practical teaching experience:** Each candidate must complete training in pedagogy and a teaching experience as a course instructor or teaching assistant (TA) with instructional responsibilities. The pedagogical training may take place prior to or concurrent with the teaching experience. Evidence of English-speaking proficiency is required prior to the teaching experience.

**Dissertation requirement:** Each candidate must complete original academic research and fulfill a dissertation requirement by completing either an academic thesis or three related academic papers that are judged by the student's committee to be of publishable quality.

### Core Courses (12 credits)

Take the following courses. Take PA 8006 twice for a total of 3 credits.

- PA 8003 - Integrative Doctoral Seminar in Public Affairs I (3.0 cr)
- PA 8004 - Integrative Doctoral Seminar in Public Affairs II (3.0 cr)
- PA 8005 - Doctoral Research Seminar in Public Affairs (3.0 cr)
- PA 8006 - Current Research in Public Affairs: Topics, Approaches, and Cultures (1.5 cr)

### Research Methods (12 credits)

Take 4 or more courses totaling 12 or more credits, including at least one course each in quantitative methods and qualitative methods. Courses are chosen in consultation with advisor based on student's background and research interests. Students may use previous graduate-level coursework for up to three of the four methods courses (up to 9 credits) with approval of PhD program director.

### Thesis Credits

- Take 24 doctoral thesis credits.
- PA 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Management and Governance

#### Required Courses (6 credits)

- Take the following courses:
- PA 8106 - Research Seminar in Management, Leadership & Governance (3.0 cr)
- PA 5012 - The Politics of Public Affairs (3.0 cr)

#### Electives (12 credits)

Select 12 credits in the area of public and nonprofit leadership and management. Courses are chosen in consultation with advisor based on student's background and research interests.

### Public Policy

The public policy sub-plan is a self-designed set of topic-based courses (minimum 18 credits) determined by the student and advisor with the consent of the other faculty in the sub-plan area.

### Science, Technology, and Environmental Policy

The science, technology, and environmental policy sub-plan is a self-designed set of topic-based courses (minimum 18 credits) determined by the student and advisor with the consent of the other faculty in the sub-plan area.



### Urban Planning

Students must demonstrate proficiency in GIS.

#### **Required Courses (6 credits)**

Take the following courses:

[PA 8206](#) - Planning Theory (3.0 cr)

[PA 5204](#) - Urban Spatial and Social Dynamics (3.0 cr)

#### **Electives (12 credits)**

Select 12 credits in consultation with the advisor.





### **Twin Cities Campus**

## **Public Policy M.P.P.**

*HHH Administration*

### **Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

Email: [hhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 45
- This program does not require summer semesters for timely completion.
- Degree: Master of Public Policy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of public policy (MPP) curriculum is built upon a core of required theoretical and methodological courses. In remaining courses, students choose either to emphasize more advanced study of analysis or management, or to focus on a particular substantive area of public policy. Structured concentrations include advanced policy analysis methods; economic and community development; gender and public policy; global public policy; human rights; politics and governance; public and nonprofit leadership and management; science, technology, and environmental policy; and social policy. Students have multiple opportunities to apply the concepts learned in their coursework to real-life policy problems, including cases presented in courses, their internships, and workshops.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A four-year bachelor's degree from an accredited US university or foreign equivalent at time of enrollment.

Other requirements to be completed before admission:

Recommended: Strong liberal education background; quantitative and analytical skills; previous college-level coursework in mathematics, statistics, and economics.

#### **Special Application Requirements:**

A complete application will include a University of Minnesota application, personal statement, resume or C.V., transcripts, GRE scores, TOEFL scores (if applicable), at least three letters of recommendation, and an optional diversity statement.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan C:** Plan C requires 45 major credits and 0 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

Coursework offered on both the A/F and S/N grade basis must be taken A/F.

### Core (12 credits)

Take the following courses:

- PA 5011 - Management of Organizations (3.0 cr)
- PA 5012 - The Politics of Public Affairs (3.0 cr)
- PA 5021 - Microeconomics for Policy Analysis (3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5003 - Introduction to Financial Analysis and Management (1.5 cr)

### Economics (3 credits)

Take 3 or more credit(s) from the following:

- PA 5022 - Applications of Economics for Policy Analysis (1.5 - 3.0 cr)
- PA 5431 - Public Policies on Work and Pay (3.0 cr)
- PA 5503 - Economics of Development (3.0 cr)
- PA 5521 - Development Planning and Policy Analysis (4.0 cr)
- PA 5722 - Economics of Natural Resource and Environmental Policy (3.0 cr)
- PA 5805 - Global Economics (3.0 cr)

### Foundational Methods (10 credits)

#### Statistics (4 credits)

Select one of the following courses in consultation with the advisor:

- PA 5031 - Statistics for Public Affairs (4.0 cr)
- or PA 5045 - Statistics for Public Affairs, Accelerated (4.0 cr)

#### Methods (6 credits)

Select from the following to complete the 10-credit Foundational Methods requirement:

- PA 5032 - Applied Regression (2.0 cr)
- PA 5044 - Applied Regression, Accelerated (2.0 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)

#### Additional Methods (0-4 credits)

Select courses if needed, in consultation with the advisor, to complete the 6-credit Methods requirement.

- PA 5033 - Multivariate Techniques (2.0 cr)
- PA 5043 - Economic and Demographic Data Analysis (2.0 cr)
- PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)
- PA 5311 - Program Evaluation (3.0 cr)
- PA 5521 - Development Planning and Policy Analysis (4.0 cr)
- PA 5928 - Data Management and Visualization with R (1.0 cr)
- PA 5929 - Data Visualization: Telling Stories with Numbers (2.0 cr)
- PA 5932 - Working with Data: Finding, Managing, and Using Data (1.5 cr)
- PA 5933 - Survey Methods: Designing Effective Questionnaires (2.0 cr)

### Concentration: 9 credits

Select courses in consultation with the advisor to complete chosen concentration.

### Professional Paper (1-3 credits)

Select one of the following in consultation with the advisor. PA 8921, if selected, can be taken for 1-3 credits with approval of the advisor.

- PA 8081 - Capstone Workshop (3.0 cr)
- or PA 8082 - Professional Paper-Writing Seminar (3.0 cr)
- or PA 8921 - Master's: Professional Paper (Individual Option) (1.0 - 3.0 cr)

### Electives

Select electives in consultation with the advisor to complete the 45-credit minimum.



**Joint- or Dual-degree Coursework:** MPP/MBA: 24 credits in common allowed; MPP/JD: 29 credits in common allowed; MPP/MPH - Public Health Practice: 26 credits in common allowed; MPP/MSW: 21 credits in common allowed for full program, 15 for advanced standing, 11 for direct practice.



### *Twin Cities Campus*

## Public Policy Minor

*HHH Administration*

### Hubert H. Humphrey School of Public Affairs

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Student Services, Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

Email: [hhhadmit@umn.edu](mailto:hhhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The public policy curriculum is built upon a core of required theoretical and methodological courses. In coursework, students study policy analysis or management or focus on a substantive area of public policy. Substantive areas include advanced policy analysis methods; economic and community development; global public policy; human rights; politics and governance; public and nonprofit leadership and management; public finance and budgeting; science, technology, and environmental policy; social policy; and gender and public policy. Students have multiple opportunities to apply the concepts learned to real-life policy problems.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Public Policy director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

Specific coursework for the minor is chosen in consultation with the student's minor advisor or the public policy director of graduate studies.

A minimum grade of B must be earned for courses taken on the A/F grading basis. Up to 3 credits may be taken S/N.

#### **Required Coursework (9 to 12 credits)**

Masters students select 9 credits, and doctoral students take the 12 credits from the following. Approval of the Public Policy director of graduate studies is required. Other courses can be selected with approval of the Public Policy director of graduate studies.

- [PA 5002](#) - Introduction to Policy Analysis (1.5 cr)
- [PA 5003](#) - Introduction to Financial Analysis and Management (1.5 cr)
- [PA 5011](#) - Management of Organizations (3.0 cr)
- [PA 5012](#) - The Politics of Public Affairs (3.0 cr)
- [PA 5021](#) - Microeconomics for Policy Analysis (3.0 cr)
- [PA 5405](#) - Public Policy Implementation (3.0 cr)
- [PA 5413](#) - Early Childhood and Public Policy (1.5 - 3.0 cr)
- [PA 5601](#) - Global Survey of Gender and Public Policy (3.0 cr)



- [PA 5801](#) - Global Public Policy (3.0 cr)
- [PA 5813](#) - US Foreign Policy: Issues and Institutions (3.0 cr)
- [PA 5826](#) - National Security Policy (3.0 cr)
- [PA 8302](#) - Applied Policy Analysis (4.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### ***Twin Cities Campus***

## **Science, Technology, and Environmental Policy M.S.**

*HHH Administration*

### **Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

Email: [hhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36 to 39
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MS in science, technology, and environmental policy (STEP) provides students with an understanding of the role of science and technology in society, including food and agriculture, the economy, energy and the environment, security, health, and education; the impact of science and technology on the political and economic relationships within and among nations; and the analysis and design of policies for appropriate promotion and regulation of science and technology regionally, nationally, and internationally. The program educates students with natural and social science backgrounds to assume roles in public policy development.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A four-year bachelor's degree from an accredited US university or foreign equivalent at time of enrollment.

Other requirements to be completed before admission:

While no specific experience or academic pathway is required, students with a strong liberal education background and sound quantitative and analytical skills will be best prepared for academic success at the Humphrey School of Public Affairs.

Previous coursework in mathematics, statistics, and economics is recommended. Past applicants needing to strengthen this part of their skill set have found courses in introductory microeconomics, college algebra, and introductory statistics to be helpful preparation.

Applicants applying to the MS-STEP program should have completed a degree or taken advanced level coursework in the natural or engineering sciences prior to the date of their planned enrollment.

#### **Special Application Requirements:**

A complete application will include a University of Minnesota application, personal statement, resume or C.V., transcripts, GRE scores, TOEFL scores (if applicable), at least three letters of recommendation, and an optional diversity statement.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7



Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 29 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan C:** Plan C requires 36 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

Required coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C-.

### Science, Technology, and Environmental Policy Overview (4.5 credits)

Take the following courses:

[PA 5711](#) - Science, Technology & Environmental Policy (3.0 cr)

[PA 5715](#) - Survey of Current Issues in Science, Technology, and Environmental Policy (1.5 cr)

### Sustainability Systems Science (7.5 credits)

Take the following courses:

[PA 5722](#) - Economics of Natural Resource and Environmental Policy (3.0 cr)

[PA 5741](#) - Risk, Resilience and Decision Making (1.5 cr)

**PA 5752 or PA 5761**

[PA 5752](#) - Material-Energy Flows & Sustainable Development (3.0 cr)

or [PA 5761](#) - Environmental Systems Analysis at the Food-Energy-Water Nexus (3.0 cr)

### Social and Policy Processes (4.5 credits)

Take the following courses:

[PA 5002](#) - Introduction to Policy Analysis (1.5 cr)

[PA 5012](#) - The Politics of Public Affairs (3.0 cr)

### Foundational Methods

#### Statistics Course (4 credits)

Select one of the following courses in consultation with the advisor:

[PA 5031](#) - Statistics for Public Affairs (4.0 cr)

or [PA 5045](#) - Statistics for Public Affairs, Accelerated (4.0 cr)

#### Methods Courses (6 credits)

Select at least one of the following courses in consultation with the advisor. PA 5041 can be taken with PA 5032 or PA 5041 with advisor approval.

[PA 5032](#) - Applied Regression (2.0 cr)

[PA 5044](#) - Applied Regression, Accelerated (2.0 cr)

[PA 5041](#) - Qualitative Methods for Policy Analysts (4.0 cr)

Select credits in consultation with the advisor to complete the 6-credit methods requirement:

[PA 5033](#) - Multivariate Techniques (2.0 cr)

[PA 5043](#) - Economic and Demographic Data Analysis (2.0 cr)

[PA 5271](#) - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)

[PA 5311](#) - Program Evaluation (3.0 cr)

[PA 5521](#) - Development Planning and Policy Analysis (4.0 cr)

[PA 5928](#) - Data Management and Visualization with R (1.0 cr)

[PA 5929](#) - Data Visualization: Telling Stories with Numbers (2.0 cr)

[PA 5932](#) - Working with Data: Finding, Managing, and Using Data (1.5 cr)

[PA 5933](#) - Survey Methods: Designing Effective Questionnaires (2.0 cr)

### Focus Area (3 credits)

Select one of the following courses in consultation with the advisor. PA 5790, if selected, must be for 3 credits and must be one of the



following topics: Env Mgmt of Food, Water, and Energy Systems or Urban Agriculture and Food Systems Policy.

[PA 5721](#) - Energy Systems and Policy (3.0 cr)

[PA 5723](#) - Water Policy (3.0 cr)

[PA 5724](#) - Climate Change Policy (3.0 cr)

[PA 5731](#) - Emerging Sciences and Technologies: Policy, Ethics and Law (3.0 cr)

[PA 5751](#) - Urban Infrastructure Systems for Sustainable and Healthy Cities (3.0 cr)

[PA 5790](#) - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)

#### **Electives**

Select electives in consultation with the advisor to meet the minimum credit requirement.

#### **Plan Options**

##### **Plan A Requirements**

Plan A master's students take at least 10 thesis credits.

[PA 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### **Plan C Requirements (3 credits)**

Plan C master's students select one of the following in consultation with the advisor. PA 8921, if selected, must be for 3 credits.

[PA 8081](#) - Capstone Workshop (3.0 cr)

[PA 8082](#) - Professional Paper-Writing Seminar (3.0 cr)

[PA 8921](#) - Master's: Professional Paper (Individual Option) (1.0 - 3.0 cr)

**Joint- or Dual-degree Coursework:**MS-STEP/JD (Joint Degree Program in Law, Health, and the Life Sciences) Student may take a total of 24 credits in common among the academic programs.





### ***Twin Cities Campus***

## **Science, Technology, and Environmental Policy Minor**

*HHH Administration*

### **Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Student Services, Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate minor in Science, Technology, and Environmental Policy (STEP) provides students with the skills and knowledge to study public issues arising at the intersection of science, technology, environment and society that shape economic development, environmental sustainability, human health, and well-being. The STEP graduate minor is designed to facilitate a cohort experience through the required survey course, PA 5711, additional coursework offered by STEP and STEP-affiliated faculty, and opportunities outside of the classroom through the Center for Science, Technology, and Environmental Policy (CSTEP). Students pursuing the STEP minor are strongly encouraged to participate in the activities of CSTEP, particularly the regular STEP Feedback and Research (STEP-FAR) seminar.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the STEP director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Required courses must be taken on the A/F grade basis. Up to 3 credits may be taken S/N. All other courses must be completed with grades of B or better. Specific coursework is chosen in consultation with the STEP advisor/director of graduate studies.

#### **Required Course (3 credits)**

Take the following course:

[PA 5711](#) - Science, Technology & Environmental Policy (3.0 cr)

#### **Environmental Systems Thinking (3 credits)**

Select at least 3 credits from the following:

[PA 5712](#) - Science to Action: All Paths (1.5 cr)

[PA 5715](#) - Survey of Current Issues in Science, Technology, and Environmental Policy (1.5 cr)

[PA 5722](#) - Economics of Natural Resource and Environmental Policy (3.0 cr)



PA 5741 - Risk, Resilience and Decision Making (1.5 cr)  
PA 5742 - Interdisciplinary Environmental Study: Practice and Design (1.5 cr)  
PA 5743 - Social Innovation Design Lab: Making Your Idea a Reality (1.5 cr)  
APEC 5721 - Economics of Science and Technology Policy (3.0 cr)  
**PA 5752 or PA 5761**  
PA 5752 - Material-Energy Flows & Sustainable Development (3.0 cr)  
or PA 5761 - Environmental Systems Analysis at the Food-Energy-Water Nexus (3.0 cr)

**Focus Area (3 credits)**

Select at least 3 credits from the following:

PA 5721 - Energy Systems and Policy (3.0 cr)  
PA 5723 - Water Policy (3.0 cr)  
PA 5724 - Climate Change Policy (3.0 cr)  
PA 5731 - Emerging Sciences and Technologies: Policy, Ethics and Law (3.0 cr)  
PA 5751 - Urban Infrastructure Systems for Sustainable and Healthy Cities (3.0 cr)

**Program Sub-plans**

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Urban and Regional Planning M.U.R.P.**

HHH Administration

### **Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Student Services, Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax 612-626-0002)

Email: [hhhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Master of Urban and Regional Planning

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of urban and regional planning (MURP) degree is an interdisciplinary program that prepares students to analyze, forecast, design, and implement plans for regions, communities, and neighborhoods. Students develop a comprehensive understanding of the built environment (land use, transportation, housing, regional economies) and the ability to mediate among competing interests. They are prepared for jobs in public, nonprofit, and private sectors. Students can generally complete the MURP degree in two years of full-time study.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A four-year bachelor's degree from an accredited US university or foreign equivalent at time of enrollment.

Other requirements to be completed before admission:

While no specific experience or academic pathway is required, students with a strong liberal education background and sound quantitative and analytical skills will be best prepared for academic success at the Humphrey School of Public Affairs.

Previous coursework in mathematics, statistics, and economics is recommended. Past applicants needing to strengthen this part of their skill set have found courses in introductory microeconomics, college algebra, and introductory statistics to be helpful preparation.

#### **Special Application Requirements:**

A complete application will include a University of Minnesota graduate application, personal statement, resume or C.V., transcripts, GRE scores, TOEFL scores (if applicable), at least three letters of recommendation, and an optional diversity statement.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 38 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan C:** Plan C requires 48 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

A 400-hour professional internship is required. MURP students must demonstrate competence with GIS through coursework or work experience. (Students not competent in GIS must take a graduate-level GIS course as part of their 48 credits.) Required coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C-.

### Required Core Courses

- PA 5004 - Introduction to Planning (3.0 cr)
- PA 5013 - Law and Urban Land Use (1.5 cr)
- PA 5205 - Statistics for Planning (4.0 cr)
- PA 5042 - Urban and Regional Economics (2.0 cr)
- PA 5043 - Economic and Demographic Data Analysis (2.0 cr)
- PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)
- PA 5211 - Land Use Planning (3.0 cr)
- PA 5145 - Civic Participation in Public Affairs (3.0 cr)
- PA 8081 - Capstone Workshop (3.0 cr)

### Plan Options

#### Plan A Requirements

Plan A students must complete at least 38 course credits, which will include the core courses, at least 6 credits from one of four concentration areas, and electives. Plan A students also must take at least 10 master's thesis credits.

##### Concentration Requirement

Take at least 6 credits from one of the following concentration areas: Environmental Planning; Housing and Community Development; Land Use and Urban Design; or Transportation Planning.

##### Electives

Take elective courses as needed to meet the 38-credit requirement for coursework.

##### Thesis Credits

Take 10 master's thesis credits.

PA 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan C Requirements

Plan C students must complete at least 48 course credits, which will include the core courses, at least 12 credits from one of four concentration areas, and electives.

##### Concentration Requirement

Take at least 12 credits from one of the following concentration areas: environmental planning; housing and community development; land use and urban design; or transportation planning.

##### Electives

Take elective courses as needed to meet the 48-credit requirement.

**Joint- or Dual-degree Coursework:** MURP/JD: 29 credits in common allowed. MURP/MLA: 37 credits in common allowed.

MURP/MPH: 26 credits in common allowed. MURP/MSCE: 18 credits in common allowed. MURP/MSW: 21 credits in common allowed for the full program; 15 for the advanced standing program; and 11 for MSW Direct Practice.



### ***Twin Cities Campus***

## **Urban and Regional Planning Minor**

*HHH Administration*

### **Hubert H. Humphrey School of Public Affairs**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Student Services, Hubert H. Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455 (612-624-3800; fax: 612-626-0002)

Email: [hhhadmit@umn.edu](mailto:hhadmit@umn.edu)

Website: <http://www.hhh.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Planners bring together knowledge and expertise from many diverse disciplines to shape neighborhoods, cities, and regions. The urban and regional planning minor helps students to think across those fields of expertise and act upon links among environmental systems, infrastructure development, and housing and community development. The program teaches technical and analytical skills needed to think strategically about developing and implementing plans at the neighborhood, city, and regional level.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

No more than 3 credits may be taken S/N. All other courses must be completed with grades of B or higher. Students must complete the minor with at least a 3.0 GPA.

#### **PA 5004**

[PA 5004](#) - Introduction to Planning (3.0 cr)

#### **Additional Coursework**

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- [PA 5211](#) - Land Use Planning (3.0 cr)
- [PA 5231](#) - Transit Planning and Management (3.0 cr)
- [PA 5234](#) - Urban Transportation Planning and Policy (3.0 cr)
- [PA 5242](#) - Environmental Planning, Policy, and Decision Making (3.0 cr)
- [PA 5261](#) - Housing Policy (3.0 cr)
- [PA 5262](#) - Neighborhood Revitalization Theories and Strategies (3.0 cr)

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.



**Masters**

**Required Coursework**

Take additional courses as needed, in consultation with the Urban and Regional Planning director of graduate studies, to meet the 9-credit requirement.

PA 5xxx

PA 8xxx

**Doctoral**

**Required Coursework**

Take additional courses as needed, in consultation with the Urban and Regional Planning director of graduate studies, to meet the 12-credit requirement.

PA 5xxx

PA 8xxx



### *Twin Cities Campus*

## American Indian and Indigenous Studies Minor

*American Indian Studies*

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### Contact Information:

Department of American Indian Studies, 19 Scott Hall, 72 Pleasant Street SE, Minneapolis MN 55455, phone 612-624-1338

Email: [obrie002@umn.edu](mailto:obrie002@umn.edu)

Website: <https://cla.umn.edu/ais>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Grounded by a strong commitment to the worlds, histories, representations, and political struggles of Indigenous peoples locally and globally, the intellectual project of American Indian and Indigenous Studies (AIIS) uses interdisciplinary methods of critical inquiry as a means through which doctoral students engage research and scholarship in their major fields of study. An AIIS minor is composed of graduate course work with core and affiliated Indigenous studies faculty in the Department of American Indian Studies and other departments.

The AIIS graduate minor strengthens doctoral students' work in their major field of study, as they will learn how to best integrate American Indian and Indigenous Studies into their existing work as well as how to complement their research to include indigenous methodologies.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### Special Application Requirements:

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the AIIS director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

All minor coursework must be taken on the A/F grade basis unless the course is only offered on the S/N grade basis, and the minimum cumulative GPA for that coursework is 3.00.

#### Required Core Course (3 credits)

Select one of the following core courses in consultation with the AIIS director of graduate studies.

[AMIN 5890](#) - Readings in American Indian and Indigenous History (3.0 cr)

[AMIN 8301](#) - Critical Indigenous Theory (3.0 cr)

[HIST 5890](#) - Readings in American Indian and Indigenous History (3.0 cr)

#### Electives (9 credits)

Select at least 9 credits from the following to complete the 12-credit minimum. Coursework from the Required Core list not applied to that requirement can be used as electives. All courses must be selected in consultation with the AIIS director of graduate studies.

Topics coursework must be preapproved by the AIIS director of graduate studies and must be taken for 3 credits. If chosen, AMIN 4994 or AMIN 4996 must be taken for 3 credits.



- AAS 4231 - Color of Public Policy: African Americans, American Indians, Asian Americans & Chicanos in the U.S. (3.0 cr)  
or AMIN 4231 - Color of Public Policy: African Americans, American Indians, Asian Americans, & Chicanos in the U.S. (3.0 cr)
- AMIN 4501 - Law, Sovereignty, and Treaty Rights (3.0 cr)
- AMIN 4511 - Indigenous Political Economies (3.0 cr)
- AMIN 4525W - Federal Indian Policy [WI] (3.0 cr)
- AMIN 4532 - Vine Deloria, Jr.: A Renaissance Indigenous Figure (3.0 cr)
- AMIN 4990 - Topics in American Indian Studies (1.0 - 4.0 cr)
- AMIN 4994 - Directed Research (1.0 - 12.0 cr)
- AMIN 4996 - Field Study (1.0 - 12.0 cr)
- AMIN 5107 - The Structure of Anishinaabemowin, the Ojibwe Language (3.0 cr)
- AMIN 5141 - American Indian Language Planning (3.0 cr)
- AMIN 5202 - Indigenous Peoples and Issues Before the United States Supreme Court (3.0 cr)
- AMIN 5402 - American Indians and the Cinema [AH, DSJ] (3.0 cr)
- AMIN 5409 - American Indian Women: Ethnographic and Ethnohistorical Perspectives [HIS, DSJ] (3.0 cr)
- AMIN 5412 - Comparative Indigenous Feminisms [GP] (3.0 cr)
- AMIN 5920 - Topics in American Indian Studies (3.0 cr)
- AMIN 8910 - Topics in American Indian and Indigenous Studies (1.0 - 3.0 cr)
- AMST 8920 - Topics in American Studies (3.0 cr)
- ANTH 8510 - Topics in Archaeology (3.0 cr)
- CI 8645 - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- ESCI 4602 - Sedimentology and Stratigraphy (3.0 cr)
- HIST 5910 - Topics in U.S. History (1.0 - 4.0 cr)
- AMIN 5602 - Archaeology and Native Americans [DSJ] (3.0 cr)  
or ANTH 5601 - Archaeology and Native Americans [DSJ] (3.0 cr)
- AMIN 5891 - American Indian and Indigenous Studies Workshop (1.5 cr)  
or HIST 5891 - American Indian and Indigenous Studies Workshop (1.5 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Doctoral





### *Twin Cities Campus*

## American Studies M.A.

*American Studies*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of American Studies, 104 Scott Hall, 72 Pleasant Street SE, Minneapolis, MN 55455 (612-624-4190; fax: 612-624-3858)

Email: [amstdy@umn.edu](mailto:amstdy@umn.edu)

Website: <http://americanstudies.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The American Studies graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the American Studies PhD program.

The American Studies graduate program is an interdisciplinary, interdepartmental program. The graduate faculty consists of core American Studies faculty members and graduate faculty members drawn from a wide number of departments. Students develop subfields (understood as a more specific focus of research and teaching) and also pursue broad training in analyzing the development of cultural and historical processes that shaped the nation and its diverse cultures, as well as analyzing contemporary practices.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

An undergraduate major in a field related to American Studies or other preparation acceptable to the American Studies admissions committee.

#### **Special Application Requirements:**

Note: The American Studies graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the American Studies PhD program.

The application deadline is December 1 of the year prior to intended entry.

Refer to the program website for application procedures and additional information.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 21 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The Plan B project requires 3 papers completed in consultation with the advisor.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Reading knowledge of one foreign language

A minimum GPA of 3.50 is required for students to remain in good standing.

All courses are selected in consultation with the student's advisor and the director of graduate studies. "Major" courses are defined as any courses that American Studies deems appropriate to the student's area of study, due to the interdisciplinary nature of the program.

### Required Courses (6 credits)

Take the following courses:

[AMST 8201](#) - Historical Foundations of American Studies (3.0 cr)

[AMST 8202](#) - Theoretical Foundations and Current Practice in American Studies (3.0 cr)

### Core Areas (9 credits)

#### Research Seminars (6 credits)

Take 6 AMST research seminar credits related to the selected concentration. Other research seminar credits can be substituted for this requirement. All courses must be approved by the advisor and director of graduate studies.

#### Comparative Culture (3 credits)

Select 3 credits for this requirement. Coursework must be approved by the advisor and director of graduate studies.

### Concentration Area Courses (3 to 12 credits)

Plan A students select 3 credits, and Plan B students select 12 credits of concentration area coursework with advisor and director of graduate studies approval.

### Cultural Pluralism Course (3 credits)

Select 3 credits for this requirement. Coursework must be approved by the advisor and director of graduate studies.

## Plan Options

### Plan A

#### Thesis Credits

Take 10 master's thesis credits.

[AMST 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

### Plan B



### *Twin Cities Campus*

## American Studies Minor

*American Studies*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of American Studies, 104 Scott Hall, 72 Pleasant Street S.E., Minneapolis, MN 55455 (612-624-4190; fax: 612-624-3858)

Email: [amstdy@umn.edu](mailto:amstdy@umn.edu)

Website: <http://americanstudies.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The American Studies graduate program is an interdisciplinary, interdepartmental program. The graduate faculty consists of core American Studies faculty members and graduate faculty members drawn from a wide number of departments. Students develop sub-fields (understood as a more specific focus of research and teaching) and also pursue broad training in analyzing the development of cultural and historical processes that shaped the nation and its diverse cultures, as well as analyzing contemporary practices.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the American Studies director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

The minimum cumulative GPA for minor field coursework is 3.50.

#### **Required Course (3 credits)**

Select at least 1 of the following courses in consultation with the American Studies director of graduate studies:

[AMST 8201](#) - Historical Foundations of American Studies (3.0 cr)

[AMST 8202](#) - Theoretical Foundations and Current Practice in American Studies (3.0 cr)

#### **Electives (6 to 9 credits)**

Masters students select 6 credits, and doctoral students select 9 credits from the following in consultation with the American Studies director of graduate studies:

[AMST 8231](#) - Cultural Fallout: The Cold War and Its Legacy, Readings (3.0 cr)

[AMST 8232](#) - Cultural Fallout: The Cold War and Its Legacy, Research (3.0 cr)

[AMST 8239](#) - Gender, Race, Class, Ethnicity, and Sexuality in the United States: Readings (3.0 cr)

[AMST 8240](#) - Gender, Race, Class, Ethnicity, and Sexuality in the United States: Topical Development (3.0 cr)

[AMST 8249](#) - Popular Culture and Politics in the 20th Century: Readings (3.0 cr)



- [AMST 8250](#) - Popular Culture and Politics in the 20th Century: Research Strategies (3.0 cr)
- [AMST 8259](#) - Literature, History, and Culture: Research Strategies (3.0 cr)
- [AMST 8260](#) - Literature, History, and Culture: Topical Development (3.0 cr)
- [AMST 8288](#) - Working in the Global Economy: Readings (3.0 cr)
- [AMST 8289](#) - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- [AMST 8920](#) - Topics in American Studies (3.0 cr)
- [AMST 8970](#) - Independent Study in American Studies (1.0 - 9.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### *Twin Cities Campus*

## American Studies Ph.D.

*American Studies*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of American Studies, 104 Scott Hall, 72 Pleasant Street SE, Minneapolis, MN 55455 (612-624-4190; fax: 612-624-3858).

Email: [amstyd@umn.edu](mailto:amstyd@umn.edu)

Website: <http://americanstudies.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 57 to 69
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The American Studies PhD is an interdisciplinary, interdepartmental program. The graduate faculty consists of core American Studies faculty members and graduate faculty members drawn from a wide number of departments. Students develop subfields (understood as a more specific focus of research and teaching) and also pursue broad training in analyzing the development of cultural and historical processes that shaped the nation and its diverse cultures, as well as analyzing contemporary practices.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

An undergraduate major in a field related to American Studies or other preparation acceptable to the American Studies admissions committee.

#### **Special Application Requirements:**

The application deadline is December 1 of the year prior to intended entry. Refer to the program website for application procedures and additional information.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

33 to 45 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.



This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Reading knowledge of one foreign language.

A minimum GPA of 3.50 is required for students to remain in good standing.

At least 3 credits of coursework other than the core must focus on American cultural diversity.

#### **Core Required Courses (12 credits)**

Take the following courses:

- [AMST 8201](#) - Historical Foundations of American Studies (3.0 cr)
- [AMST 8202](#) - Theoretical Foundations and Current Practice in American Studies (3.0 cr)
- [AMST 8401](#) - Practicum in American Studies (3.0 cr)
- [AMST 8801](#) - Dissertation Seminar (3.0 cr)

#### **Research Seminars (9 credits)**

Nine research seminar credits related to the research area are required. Selected credits, whether from the following list or others, require advisor and director of graduate studies approval.

- [AFRO 5101](#) - Seminar: Introduction to Africa and the African Diaspora (3.0 cr)
- [AMIN 5920](#) - Topics in American Indian Studies (3.0 cr)
- [AMST 5920](#) - Topics in American Studies (1.0 - 4.0 cr)
- [AMST 8920](#) - Topics in American Studies (3.0 cr)
- [AMST 8970](#) - Independent Study in American Studies (1.0 - 9.0 cr)
- [CHIC 5920](#) - Topics in Chicana(o) Studies (3.0 cr)
- [GLOS 5993](#) - Directed Studies (1.0 - 4.0 cr)
- [GWSS 8260](#) - Seminar: Race, Representation and Resistance (3.0 cr)
- [HIST 5980](#) - Topics in Comparative Women's History (3.0 - 4.0 cr)
- [HIST 8021](#) - History Research Seminar (3.0 cr)
- [HIST 8910](#) - Topics in U.S. History (1.0 - 4.0 cr)
- [HIST 8994](#) - Directed Research (1.0 - 16.0 cr)

#### **Comparative Culture (3 credits)**

Select 3 credits from the following in consultation with the advisor. Other courses may be applied with advisor and director of graduate studies approval.

- [AMIN 5409](#) - American Indian Women: Ethnographic and Ethnohistorical Perspectives [HIS, DSJ] (3.0 cr)
- [AMIN 5891](#) - American Indian and Indigenous Studies Workshop (1.5 cr)
- [AMST 8920](#) - Topics in American Studies (3.0 cr)
- [ANTH 8810](#) - Topics in Sociocultural Anthropology (3.0 cr)
- [CSCL 5910](#) - Topics in Cultural Studies and Comparative Literature (3.0 - 4.0 cr)
- [GWSS 5104](#) - Transnational Feminist Theory (3.0 cr)
- [GWSS 8260](#) - Seminar: Race, Representation and Resistance (3.0 cr)
- [HIST 5802](#) - Readings in American History, 1848-Present (3.0 cr)
- [HIST 5891](#) - American Indian and Indigenous Studies Workshop (1.5 cr)
- [HIST 5910](#) - Topics in U.S. History (1.0 - 4.0 cr)
- [HIST 5980](#) - Topics in Comparative Women's History (3.0 - 4.0 cr)
- [HIST 8802](#) - Readings in American History, 1848-Present (3.0 cr)
- [HIST 8910](#) - Topics in U.S. History (1.0 - 4.0 cr)
- [HSEX 6001](#) - Foundations of Human Sexuality (3.0 cr)
- [HSEX 6011](#) - Policy in Human Sexuality: Cutting Edge Analyses (3.0 cr)
- [HSPH 8003](#) - Race and Indigeneity in Heritage Representation (3.0 cr)
- [POL 8301](#) - American Politics (3.0 cr)

#### **Electives**

Select credits as needed, with advisor approval, to complete minimum credit requirements. Up to 12 credits from the above lists can also be applied as electives.

#### **Thesis Credits**

Take 24 doctoral thesis credits.

- [AMST 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### *Twin Cities Campus*

## Anthropology M.A.

Anthropology

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Anthropology, 395 Hubert H. Humphrey Center, 301 19th Ave S, Minneapolis, MN 55455 (612-625-3400; fax: 612-625-3095).

Email: [dgsanth@umn.edu](mailto:dgsanth@umn.edu)

Website: <https://cla.umn.edu/anthropology/graduate>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 33
- This program requires summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Anthropology graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Anthropology PhD program. Please refer to the Anthropology website at <https://cla.umn.edu/anthropology/graduate> for more information.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

### **Special Application Requirements:**

Note: The Anthropology graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Anthropology PhD program. Please refer to the Anthropology website at <https://cla.umn.edu/anthropology/graduate> for more information.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 27 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project comprises one to three projects, often related to seminar(s) or coursework related to the student's area of emphasis, completed in consultation with the advisor.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of B earned for each.

### **Master's Project (3 credits)**

Take the following in consultation with the advisor:

[ANTH 8555](#) - Master's Project Credits (3.0 cr)

### **Electives (12 to 15 credits)**

Students pursuing the Archaeology concentration select at least 12 credits, and students pursuing the Biological Anthropology or the



Sociocultural Anthropology concentration select at least 15 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with approval by the advisor and director of graduate studies.

- ANTH 5008 - Advanced Flintknapping (3.0 cr)
- ANTH 5009 - Human Behavioral Biology (3.0 cr)
- ANTH 5015W - Biology, Evolution, and Cultural Development of Language & Music [SOCS, WI] (3.0 cr)
- ANTH 5021W - Anthropology of the Middle East [SOCS, GP, WI] (3.0 cr)
- ANTH 5027W - Archaeology of Prehistoric Europe [HIS, WI] (3.0 cr)
- ANTH 5028 - Introduction to Historical Archaeology (3.0 cr)
- ANTH 5041 - Ecological Anthropology (3.0 cr)
- ANTH 5045W - Urban Anthropology [WI] (3.0 cr)
- ANTH 5112 - Reconstructing Hominin Behavior (3.0 cr)
- ANTH 5113 - Primate Evolution (3.0 cr)
- ANTH 5121 - Business Anthropology (2.0 cr)
- ANTH 5128 - Anthropology of Education (3.0 cr)
- ANTH 5221 - Anthropology of Material Culture (3.0 cr)
- ANTH 5244 - Interpreting Ancient Bone (4.0 cr)
- ANTH 5255 - Archaeology of Ritual and Religion (3.0 cr)
- ANTH 5269 - Analysis of Stone Tool Technology (4.0 cr)
- ANTH 5327W - Inca, Aztec & Maya Civilizations [HIS, WI] (3.0 cr)
- ANTH 5401 - The Human Fossil Record (3.0 cr)
- ANTH 5402 - Zooarchaeology Laboratory (3.0 cr)
- ANTH 5403 - Quantitative Methods in Biological Anthropology (4.0 cr)
- ANTH 5405 - Human Skeletal Analysis (4.0 cr)
- ANTH 5412 - Comparative Indigenous Feminisms [GP] (3.0 cr)
- ANTH 5442 - Archaeology of the British Isles (3.0 cr)
- ANTH 5448 - Applied Heritage Management (3.0 cr)
- ANTH 5450 - Spatial Analysis in Anthropology: Research Design and Field Applications (3.0 cr)
- ANTH 5501 - Managing Museum Collections (3.0 cr)
- ANTH 5601 - Archaeology and Native Americans [DSJ] (3.0 cr)
- ANTH 5980 - Topics in Anthropology (3.0 cr)
- ANTH 8001 - Ethnography, Theory, History (3.0 cr)
- ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)
- ANTH 8004 - Foundations of Anthropological Archaeology (3.0 cr)
- ANTH 8005 - Linguistic Anthropology (3.0 cr)
- ANTH 8009 - Prehistoric Pathways to World Civilizations (3.0 cr)
- ANTH 8111 - Evolutionary Morphology (3.0 cr)
- ANTH 8112 - Reconstructing Hominin Behavior (3.0 cr)
- ANTH 8113 - Primate Evolution (3.0 cr)
- ANTH 8114 - Biological Anthropology Graduate Program Seminar: Behavioral Ecology of Primates (3.0 cr)
- ANTH 8120 - Problems in Culture Change and Applied Anthropology (3.0 - 6.0 cr)
- ANTH 8201 - Humans and Nonhumans: Hybrids and Collectives (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- ANTH 8205 - Economic Anthropology (3.0 cr)
- ANTH 8207 - Political and Social Anthropology (3.0 cr)
- ANTH 8213 - Ecological Anthropology (3.0 cr)
- ANTH 8215 - Anthropology of Gender (3.0 cr)
- ANTH 8219 - Grant Writing (2.0 cr)
- ANTH 8220 - Field School (6.0 cr)
- ANTH 8223 - Anthropology of Place & Space (3.0 cr)
- ANTH 8230 - Anthropological Research Design (3.0 cr)
- ANTH 8244 - Interpreting Ancient Bone (4.0 cr)
- ANTH 8510 - Topics in Archaeology (3.0 cr)
- ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)
- ANTH 8980 - Anthropology Graduate Workshop (1.0 cr)
- ANTH 8991 - Independent Study (1.0 - 18.0 cr)
- ANTH 8992 - Directed Reading (1.0 - 18.0 cr)
- ANTH 8993 - Directed Study (1.0 - 18.0 cr)
- ANTH 8994 - Directed Research (1.0 - 18.0 cr)

#### Outside Coursework (6 credits)

Select 6 credits in consultation with the advisor. Course options are not limited to this list. Other courses can be applied to this requirement with approval by the advisor and director of graduate studies.

- AMIN 5890 - Readings in American Indian and Indigenous History (3.0 cr)
- AMST 8920 - Topics in American Studies (3.0 cr)
- ANAT 5095 - Advanced Problems in Anatomy (1.0 - 6.0 cr)





ANAT 5150 - Human Gross Anatomy (5.0 cr)  
ARCH 5671 - Historic Preservation (3.0 cr)  
ARCH 5673 - Historic Property Research and Documentation (3.0 cr)  
ARTS 5760 - Experimental Film and Video (4.0 cr)  
BTHX 5210 - Ethics of Human Subjects Research (3.0 cr)  
CGSC 8041 - Cognitive Neuroscience (4.0 cr)  
CL 8910 - Advanced Topics in Comparative Literature (3.0 cr)  
CLA 8000 - Topics in Graduate Studies (1.0 - 3.0 cr)  
CNES 5993 - Directed Studies (1.0 - 4.0 cr)  
COMM 5211 - Critical Media Studies: Theory and Methods (3.0 cr)  
CVM 6908 - Anatomy II (3.0 cr)  
EEB 5371 - Principles of Systematics (3.0 cr)  
EEB 5407 - Ecology (3.0 cr)  
EEB 8201 - Graduate Foundations in Ecology, Evolution and Behavior Semester 1 (4.0 cr)  
EEB 8202 - Graduate Foundations in Ecology, Evolution and Behavior - Semester 2 (4.0 cr)  
EEB 8990 - Graduate Seminar (1.0 - 3.0 cr)  
EEB 8991 - Independent Study: Ecology, Evolution, and Behavior (1.0 - 10.0 cr)  
ENGL 5300 - Readings in American Minority Literature (3.0 cr)  
ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
ESCI 5302 - Isotope Geology (3.0 cr)  
ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)  
FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)  
FREN 8240 - Critical Issues: French and Francophone Cinema (3.0 - 9.0 cr)  
GEOG 5511 - Principles of Cartography (4.0 cr)  
GEOG 5561 - Principles of Geographic Information Science (4.0 cr)  
GEOG 8230 - Theoretical Geography (3.0 cr)  
GEOG 8260 - Seminar: Physical Geography (2.0 cr)  
GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)  
GIS 5571 - ArcGIS I (3.0 cr)  
GIS 5577 - Spatial Database Design and Administration (3.0 cr)  
GIS 5590 - Special Topics in GIS (3.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)  
GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)  
GSD 8001 - Approaches to Textual Analysis (3.0 cr)  
GWSS 8109 - Feminist Knowledge Production (3.0 cr)  
GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)  
GWSS 8250 - Seminar: Nation, State, and Citizenship (1.0 - 3.0 cr)  
HIST 5547 - Empire and Nations in the Middle East (3.0 cr)  
HIST 5890 - Readings in American Indian and Indigenous History (3.0 cr)  
HIST 5910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 8015 - Scope and Methods of Historical Studies (3.0 cr)  
HIST 8910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 8920 - Topics in African History (1.0 - 4.0 cr)  
HIST 8950 - Topics in Latin American History (1.0 - 4.0 cr)  
HIST 8960 - Topics in History (1.0 - 4.0 cr)  
HMED 8113 - Research Methods in the History of Science, Technology, and Medicine (3.0 cr)  
HSPH 8001 - Who Owns the Past? Common Concerns and Big Questions in Heritage and Public History (3.0 cr)  
HSPH 8003 - Race and Indigeneity in Heritage Representation (3.0 cr)  
HSPH 8006 - Digital Methods for Heritage Studies & Public History (3.0 cr)  
LAW 6063 - Law and Neuroscience (2.0 cr)  
MST 5011 - Museum History and Philosophy (3.0 cr)  
OBIO 8012 - Basic Concepts in Skeletal Biology (2.0 cr)  
PHIL 8602 - Scientific Representation and Explanation (3.0 cr)  
POL 8260 - Topics in Political Theory (3.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
TH 8120 - Seminar (3.0 cr)

## Concentrations

### Archaeology

#### Required Core Courses (9 credits)

Take the following courses:



[ANTH 8004](#) - Foundations of Anthropological Archaeology (3.0 cr)

[ANTH 8009](#) - Prehistoric Pathways to World Civilizations (3.0 cr)

[ANTH 8230](#) - Anthropological Research Design (3.0 cr)

**Methods Course (3 credits)**

Select 3 credits from the following in consultation with the advisor. Additional courses taken from this list can be applied towards the Electives requirement.

[ANTH 4101](#) - Decolonizing Archives (3.0 cr)

[ANTH 5269](#) - Analysis of Stone Tool Technology (4.0 cr)

[ANTH 5402](#) - Zooarchaeology Laboratory (3.0 cr)

[ANTH 5403](#) - Quantitative Methods in Biological Anthropology (4.0 cr)

[ANTH 5450](#) - Spatial Analysis in Anthropology: Research Design and Field Applications (3.0 cr)

-OR-

**Biological Anthropology**

**Required Core Courses (9 credits)**

Take the following courses:

[ANTH 8111](#) - Evolutionary Morphology (3.0 cr)

[ANTH 8112](#) - Reconstructing Hominin Behavior (3.0 cr)

[ANTH 8114](#) - Biological Anthropology Graduate Program Seminar: Behavioral Ecology of Primates (3.0 cr)

-OR-

**Sociocultural Anthropology**

**Required Core Courses (9 credits)**

Take the following courses:

[ANTH 8001](#) - Ethnography, Theory, History (3.0 cr)

[ANTH 8002](#) - Ethnography: Contemporary Theory and Practice (3.0 cr)

[ANTH 8203](#) - Research Methods in Social and Cultural Anthropology (3.0 cr)



### *Twin Cities Campus*

## Anthropology Minor

*Anthropology*

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Anthropology, 395 Hubert H. Humphrey Center, 301 19th Avenue South, Minneapolis, MN 55455 (612-625-3400; fax: 612-625-3095)

Email: [dgsanth@umn.edu](mailto:dgsanth@umn.edu)

Website: <https://cla.umn.edu/anthropology/graduate>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The minor program in anthropology is individually designed by each student in consultation with a faculty advisor and the Anthropology director of graduate studies.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

### **Special Application Requirements:**

Students interested in the Anthropology minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Anthropology director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

The minor is designed, through consultation among the student, Anthropology director of graduate studies, and other relevant faculty members, to meet the student's academic and professional goals.

Students pursuing the minor must complete at least one ANTH 8xxx-level course.

Coursework applied to the minor must be taken on the A/F grade basis, with a minimum grade of B earned for each course. The minimum cumulative GPA for minor field coursework is 3.00. Exceptions require approval of the Anthropology director of graduate studies.

### **Coursework (6 to 12 credits)**

Master's students select 6 credits, and doctoral students select 12 credits from the following. Selected coursework must be approved by the Anthropology director of graduate studies.

[ANTH 5008](#) - Advanced Flintknapping (3.0 cr)

[ANTH 5009](#) - Human Behavioral Biology (3.0 cr)

[ANTH 5015W](#) - Biology, Evolution, and Cultural Development of Language & Music [SOCS, WI] (3.0 cr)

[ANTH 5021W](#) - Anthropology of the Middle East [SOCS, GP, WI] (3.0 cr)

[ANTH 5027W](#) - Archaeology of Prehistoric Europe [HIS, WI] (3.0 cr)



ANTH 5028 - Introduction to Historical Archaeology (3.0 cr)  
ANTH 5041 - Ecological Anthropology (3.0 cr)  
ANTH 5045W - Urban Anthropology [WI] (3.0 cr)  
ANTH 5112 - Reconstructing Hominin Behavior (3.0 cr)  
ANTH 5113 - Primate Evolution (3.0 cr)  
ANTH 5121 - Business Anthropology (2.0 cr)  
ANTH 5128 - Anthropology of Education (3.0 cr)  
ANTH 5221 - Anthropology of Material Culture (3.0 cr)  
ANTH 5244 - Interpreting Ancient Bone (4.0 cr)  
ANTH 5255 - Archaeology of Ritual and Religion (3.0 cr)  
ANTH 5269 - Analysis of Stone Tool Technology (4.0 cr)  
ANTH 5327W - Inca, Aztec & Maya Civilizations [HIS, WI] (3.0 cr)  
ANTH 5401 - The Human Fossil Record (3.0 cr)  
ANTH 5402 - Zooarchaeology Laboratory (3.0 cr)  
ANTH 5403 - Quantitative Methods in Biological Anthropology (4.0 cr)  
ANTH 5405 - Human Skeletal Analysis (4.0 cr)  
ANTH 5412 - Comparative Indigenous Feminisms [GP] (3.0 cr)  
ANTH 5442 - Archaeology of the British Isles (3.0 cr)  
ANTH 5448 - Applied Heritage Management (3.0 cr)  
ANTH 5450 - Spatial Analysis in Anthropology: Research Design and Field Applications (3.0 cr)  
ANTH 5501 - Managing Museum Collections (3.0 cr)  
ANTH 5601 - Archaeology and Native Americans [DSJ] (3.0 cr)  
ANTH 5980 - Topics in Anthropology (3.0 cr)  
ANTH 8001 - Ethnography, Theory, History (3.0 cr)  
ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)  
ANTH 8004 - Foundations of Anthropological Archaeology (3.0 cr)  
ANTH 8005 - Linguistic Anthropology (3.0 cr)  
ANTH 8009 - Prehistoric Pathways to World Civilizations (3.0 cr)  
ANTH 8111 - Evolutionary Morphology (3.0 cr)  
ANTH 8112 - Reconstructing Hominin Behavior (3.0 cr)  
ANTH 8113 - Primate Evolution (3.0 cr)  
ANTH 8114 - Biological Anthropology Graduate Program Seminar: Behavioral Ecology of Primates (3.0 cr)  
ANTH 8120 - Problems in Culture Change and Applied Anthropology (3.0 - 6.0 cr)  
ANTH 8201 - Humans and Nonhumans: Hybrids and Collectives (3.0 cr)  
ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)  
ANTH 8205 - Economic Anthropology (3.0 cr)  
ANTH 8207 - Political and Social Anthropology (3.0 cr)  
ANTH 8213 - Ecological Anthropology (3.0 cr)  
ANTH 8215 - Anthropology of Gender (3.0 cr)  
ANTH 8219 - Grant Writing (2.0 cr)  
ANTH 8220 - Field School (6.0 cr)  
ANTH 8223 - Anthropology of Place & Space (3.0 cr)  
ANTH 8230 - Anthropological Research Design (3.0 cr)  
ANTH 8244 - Interpreting Ancient Bone (4.0 cr)  
ANTH 8510 - Topics in Archaeology (3.0 cr)  
ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)  
ANTH 8980 - Anthropology Graduate Workshop (1.0 cr)  
ANTH 8991 - Independent Study (1.0 - 18.0 cr)  
ANTH 8992 - Directed Reading (1.0 - 18.0 cr)  
ANTH 8993 - Directed Study (1.0 - 18.0 cr)  
ANTH 8994 - Directed Research (1.0 - 18.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### *Twin Cities Campus*

## Anthropology Ph.D.

*Anthropology*

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Anthropology, 395 Hubert H. Humphrey Center, 301 19th Ave S, Minneapolis, MN 55455 (612-625-3400; fax: 612-625-3095)

Email: [dgsanth@umn.edu](mailto:dgsanth@umn.edu)

Website: <https://cla.umn.edu/anthropology/graduate>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Anthropology offers graduate education in sociocultural and linguistic anthropology, archaeology, and biological anthropology. The program admits students only for the PhD, although some students do earn a master's degree as part of their PhD program.

Major areas of faculty research and graduate student training in sociocultural and linguistic anthropology include art and visual culture, critical theory, cultures of capitalism, discourse and power, experimental writing, gender and sexuality, medical anthropology, memory and haunting, multi-species ethnography, new materialisms, philosophical anthropology, science and technology studies, sovereignty and the state, and temporality and futurity. Regional specializations include Europe, the Pacific, the Middle East, North America, the Caribbean, East Asia, and South Asia.

The program in archaeology applies social and ecological theories to produce new anthropological insights into the roles of material culture and the environment in indigenous, prehistoric, and historical contexts. Our archaeologists apply a range of scientific methods in the field and the laboratory to understand human-environmental interactions in the past, and to advance knowledge of landscape and site formation processes. Regional specializations include Europe, Asia, Latin America, and North America.

The program in biological anthropology offers training and research opportunities in two main areas: paleoanthropology and behavioral ecology. The paleoanthropology specialty combines biological anthropology and Paleolithic archaeology in the reconstruction of the evolution and behavior of primates, including hominins, through the application of evolutionary theory to the analysis of skeletal morphology, faunal remains, site taphonomy, and lithic technology. The behavioral ecology specialty involves the study of the behavior and ecology of living primate species, including humans, through field studies and the analysis of long-term data. Regional specializations include Africa, Southwest Asia, Central Asia, and Europe.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.30.

A bachelor of arts degree or equivalent is required for admission.

### **Special Application Requirements:**

Three letters of recommendation and scores from the General test of the GRE should be submitted along with your application. Admission is for fall semester only; the deadline for all materials is December 1.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:



- TOEFL
  - Internet Based - Total Score: 100
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 84

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of B earned for each course.

Language requirements depend upon student's special area of research.

### Outside Coursework (12 credits)

Select 12 credits in consultation with the advisor. Course options are not limited to this list. Other courses can be applied to this requirement with approval by the advisor and director of graduate studies.

- [AMIN 5890](#) - Readings in American Indian and Indigenous History (3.0 cr)
- [AMST 8920](#) - Topics in American Studies (3.0 cr)
- [ANAT 5095](#) - Advanced Problems in Anatomy (1.0 - 6.0 cr)
- [ANAT 5150](#) - Human Gross Anatomy (5.0 cr)
- [ARCH 5671](#) - Historic Preservation (3.0 cr)
- [ARCH 5673](#) - Historic Property Research and Documentation (3.0 cr)
- [ARTS 5760](#) - Experimental Film and Video (4.0 cr)
- [BTHX 5210](#) - Ethics of Human Subjects Research (3.0 cr)
- [CGSC 8041](#) - Cognitive Neuroscience (4.0 cr)
- [CL 8910](#) - Advanced Topics in Comparative Literature (3.0 cr)
- [CLA 8000](#) - Topics in Graduate Studies (1.0 - 3.0 cr)
- [CNES 5993](#) - Directed Studies (1.0 - 4.0 cr)
- [COMM 5211](#) - Critical Media Studies: Theory and Methods (3.0 cr)
- [CVM 6908](#) - Anatomy II (3.0 cr)
- [EEB 5371](#) - Principles of Systematics (3.0 cr)
- [EEB 5407](#) - Ecology (3.0 cr)
- [EEB 8201](#) - Graduate Foundations in Ecology, Evolution and Behavior Semester 1 (4.0 cr)
- [EEB 8202](#) - Graduate Foundations in Ecology, Evolution and Behavior - Semester 2 (4.0 cr)
- [EEB 8990](#) - Graduate Seminar (1.0 - 3.0 cr)
- [EEB 8991](#) - Independent Study: Ecology, Evolution, and Behavior (1.0 - 10.0 cr)
- [ENGL 5300](#) - Readings in American Minority Literature (3.0 cr)
- [ENGL 8400](#) - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)
- [EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)
- [ESCI 5302](#) - Isotope Geology (3.0 cr)
- [ESPM 5031](#) - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)
- [FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- [FREN 8240](#) - Critical Issues: French and Francophone Cinema (3.0 - 9.0 cr)



GEOG 5511 - Principles of Cartography (4.0 cr)  
GEOG 5561 - Principles of Geographic Information Science (4.0 cr)  
GEOG 8230 - Theoretical Geography (3.0 cr)  
GEOG 8260 - Seminar: Physical Geography (2.0 cr)  
GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)  
GIS 5571 - ArcGIS I (3.0 cr)  
GIS 5577 - Spatial Database Design and Administration (3.0 cr)  
GIS 5590 - Special Topics in GIS (3.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)  
GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)  
GSD 8001 - Approaches to Textual Analysis (3.0 cr)  
GWSS 8109 - Feminist Knowledge Production (3.0 cr)  
GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)  
GWSS 8250 - Seminar: Nation, State, and Citizenship (1.0 - 3.0 cr)  
HIST 5547 - Empire and Nations in the Middle East (3.0 cr)  
HIST 5890 - Readings in American Indian and Indigenous History (3.0 cr)  
HIST 5910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 8015 - Scope and Methods of Historical Studies (3.0 cr)  
HIST 8910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 8920 - Topics in African History (1.0 - 4.0 cr)  
HIST 8950 - Topics in Latin American History (1.0 - 4.0 cr)  
HIST 8960 - Topics in History (1.0 - 4.0 cr)  
HMED 8113 - Research Methods in the History of Science, Technology, and Medicine (3.0 cr)  
HSPH 8001 - Who Owns the Past? Common Concerns and Big Questions in Heritage and Public History (3.0 cr)  
HSPH 8003 - Race and Indigeneity in Heritage Representation (3.0 cr)  
HSPH 8006 - Digital Methods for Heritage Studies & Public History (3.0 cr)  
LAW 6063 - Law and Neuroscience (2.0 cr)  
MST 5011 - Museum History and Philosophy (3.0 cr)  
OBIO 8012 - Basic Concepts in Skeletal Biology (2.0 cr)  
PHIL 8602 - Scientific Representation and Explanation (3.0 cr)  
POL 8260 - Topics in Political Theory (3.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
TH 8120 - Seminar (3.0 cr)

#### Thesis Credits

Take 24 doctoral thesis credits.  
ANTH 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

#### Concentration Areas

##### Sociocultural Anthropology (24 credits)

Students must take at least one 8-level seminar in Anthropology both fall and spring semester the first year of study.

##### Required Core Courses (9 credits)

Take the following courses:

ANTH 8001 - Ethnography, Theory, History (3.0 cr)  
ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)  
ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)

##### Major Elective Courses (15 credits)

Select at least 15 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with approval by the advisor and director of graduate studies.

ANTH 5008 - Advanced Flintknapping (3.0 cr)  
ANTH 5009 - Human Behavioral Biology (3.0 cr)  
ANTH 5015W - Biology, Evolution, and Cultural Development of Language & Music [SOCS, WI] (3.0 cr)  
ANTH 5021W - Anthropology of the Middle East [SOCS, GP, WI] (3.0 cr)  
ANTH 5027W - Archaeology of Prehistoric Europe [HIS, WI] (3.0 cr)  
ANTH 5028 - Introduction to Historical Archaeology (3.0 cr)  
ANTH 5041 - Ecological Anthropology (3.0 cr)  
ANTH 5045W - Urban Anthropology [WI] (3.0 cr)  
ANTH 5112 - Reconstructing Hominin Behavior (3.0 cr)  
ANTH 5113 - Primate Evolution (3.0 cr)  
ANTH 5121 - Business Anthropology (2.0 cr)  
ANTH 5128 - Anthropology of Education (3.0 cr)  
ANTH 5221 - Anthropology of Material Culture (3.0 cr)



ANTH 5244 - Interpreting Ancient Bone (4.0 cr)  
ANTH 5255 - Archaeology of Ritual and Religion (3.0 cr)  
ANTH 5269 - Analysis of Stone Tool Technology (4.0 cr)  
ANTH 5327W - Inca, Aztec & Maya Civilizations [HIS, WI] (3.0 cr)  
ANTH 5401 - The Human Fossil Record (3.0 cr)  
ANTH 5402 - Zooarchaeology Laboratory (3.0 cr)  
ANTH 5403 - Quantitative Methods in Biological Anthropology (4.0 cr)  
ANTH 5405 - Human Skeletal Analysis (4.0 cr)  
ANTH 5412 - Comparative Indigenous Feminisms [GP] (3.0 cr)  
ANTH 5442 - Archaeology of the British Isles (3.0 cr)  
ANTH 5448 - Applied Heritage Management (3.0 cr)  
ANTH 5450 - Spatial Analysis in Anthropology: Research Design and Field Applications (3.0 cr)  
ANTH 5501 - Managing Museum Collections (3.0 cr)  
ANTH 5601 - Archaeology and Native Americans [DSJ] (3.0 cr)  
ANTH 5980 - Topics in Anthropology (3.0 cr)  
ANTH 8004 - Foundations of Anthropological Archaeology (3.0 cr)  
ANTH 8005 - Linguistic Anthropology (3.0 cr)  
ANTH 8009 - Prehistoric Pathways to World Civilizations (3.0 cr)  
ANTH 8111 - Evolutionary Morphology (3.0 cr)  
ANTH 8112 - Reconstructing Hominin Behavior (3.0 cr)  
ANTH 8113 - Primate Evolution (3.0 cr)  
ANTH 8114 - Biological Anthropology Graduate Program Seminar: Behavioral Ecology of Primates (3.0 cr)  
ANTH 8120 - Problems in Culture Change and Applied Anthropology (3.0 - 6.0 cr)  
ANTH 8201 - Humans and Nonhumans: Hybrids and Collectives (3.0 cr)  
ANTH 8205 - Economic Anthropology (3.0 cr)  
ANTH 8207 - Political and Social Anthropology (3.0 cr)  
ANTH 8213 - Ecological Anthropology (3.0 cr)  
ANTH 8215 - Anthropology of Gender (3.0 cr)  
ANTH 8219 - Grant Writing (2.0 cr)  
ANTH 8220 - Field School (6.0 cr)  
ANTH 8223 - Anthropology of Place & Space (3.0 cr)  
ANTH 8230 - Anthropological Research Design (3.0 cr)  
ANTH 8244 - Interpreting Ancient Bone (4.0 cr)  
ANTH 8510 - Topics in Archaeology (3.0 cr)  
ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)  
ANTH 8980 - Anthropology Graduate Workshop (1.0 cr)  
ANTH 8991 - Independent Study (1.0 - 18.0 cr)  
ANTH 8992 - Directed Reading (1.0 - 18.0 cr)  
ANTH 8993 - Directed Study (1.0 - 18.0 cr)  
ANTH 8994 - Directed Research (1.0 - 18.0 cr)

-OR-

### **Biological Anthropology (24 credits)**

Students must take at least one 8-level seminar in Anthropology both fall and spring semester the first year of study.

#### **Required Core Courses (9 credits)**

Take the following courses:

ANTH 8111 - Evolutionary Morphology (3.0 cr)  
ANTH 8112 - Reconstructing Hominin Behavior (3.0 cr)  
ANTH 8114 - Biological Anthropology Graduate Program Seminar: Behavioral Ecology of Primates (3.0 cr)

#### **Major Elective Courses (15 credits)**

Select at least 15 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with approval by the advisor and director of graduate studies.

ANTH 5008 - Advanced Flintknapping (3.0 cr)  
ANTH 5009 - Human Behavioral Biology (3.0 cr)  
ANTH 5015W - Biology, Evolution, and Cultural Development of Language & Music [SOCS, WI] (3.0 cr)  
ANTH 5021W - Anthropology of the Middle East [SOCS, GP, WI] (3.0 cr)  
ANTH 5027W - Archaeology of Prehistoric Europe [HIS, WI] (3.0 cr)  
ANTH 5028 - Introduction to Historical Archaeology (3.0 cr)  
ANTH 5041 - Ecological Anthropology (3.0 cr)  
ANTH 5045W - Urban Anthropology [WI] (3.0 cr)  
ANTH 5112 - Reconstructing Hominin Behavior (3.0 cr)  
ANTH 5113 - Primate Evolution (3.0 cr)  
ANTH 5121 - Business Anthropology (2.0 cr)  
ANTH 5128 - Anthropology of Education (3.0 cr)  
ANTH 5221 - Anthropology of Material Culture (3.0 cr)





ANTH 5244 - Interpreting Ancient Bone (4.0 cr)  
ANTH 5255 - Archaeology of Ritual and Religion (3.0 cr)  
ANTH 5269 - Analysis of Stone Tool Technology (4.0 cr)  
ANTH 5327W - Inca, Aztec & Maya Civilizations [HIS, WI] (3.0 cr)  
ANTH 5401 - The Human Fossil Record (3.0 cr)  
ANTH 5402 - Zooarchaeology Laboratory (3.0 cr)  
ANTH 5403 - Quantitative Methods in Biological Anthropology (4.0 cr)  
ANTH 5405 - Human Skeletal Analysis (4.0 cr)  
ANTH 5412 - Comparative Indigenous Feminisms [GP] (3.0 cr)  
ANTH 5442 - Archaeology of the British Isles (3.0 cr)  
ANTH 5448 - Applied Heritage Management (3.0 cr)  
ANTH 5450 - Spatial Analysis in Anthropology: Research Design and Field Applications (3.0 cr)  
ANTH 5501 - Managing Museum Collections (3.0 cr)  
ANTH 5601 - Archaeology and Native Americans [DSJ] (3.0 cr)  
ANTH 5980 - Topics in Anthropology (3.0 cr)  
ANTH 8001 - Ethnography, Theory, History (3.0 cr)  
ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)  
ANTH 8004 - Foundations of Anthropological Archaeology (3.0 cr)  
ANTH 8005 - Linguistic Anthropology (3.0 cr)  
ANTH 8009 - Prehistoric Pathways to World Civilizations (3.0 cr)  
ANTH 8113 - Primate Evolution (3.0 cr)  
ANTH 8120 - Problems in Culture Change and Applied Anthropology (3.0 - 6.0 cr)  
ANTH 8201 - Humans and Nonhumans: Hybrids and Collectives (3.0 cr)  
ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)  
ANTH 8205 - Economic Anthropology (3.0 cr)  
ANTH 8207 - Political and Social Anthropology (3.0 cr)  
ANTH 8213 - Ecological Anthropology (3.0 cr)  
ANTH 8215 - Anthropology of Gender (3.0 cr)  
ANTH 8219 - Grant Writing (2.0 cr)  
ANTH 8220 - Field School (6.0 cr)  
ANTH 8223 - Anthropology of Place & Space (3.0 cr)  
ANTH 8230 - Anthropological Research Design (3.0 cr)  
ANTH 8244 - Interpreting Ancient Bone (4.0 cr)  
ANTH 8510 - Topics in Archaeology (3.0 cr)  
ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)  
ANTH 8980 - Anthropology Graduate Workshop (1.0 cr)  
ANTH 8991 - Independent Study (1.0 - 18.0 cr)  
ANTH 8992 - Directed Reading (1.0 - 18.0 cr)  
ANTH 8993 - Directed Study (1.0 - 18.0 cr)  
ANTH 8994 - Directed Research (1.0 - 18.0 cr)

-OR-

#### **Archaeology (24 credits)**

Students must take at least one 8-level seminar in Anthropology both fall and spring semester the first year of study.

#### **Required Core Courses (9 credits)**

Take the following courses:

ANTH 8004 - Foundations of Anthropological Archaeology (3.0 cr)  
ANTH 8009 - Prehistoric Pathways to World Civilizations (3.0 cr)  
ANTH 8230 - Anthropological Research Design (3.0 cr)

#### **Methods Course (3 credits)**

Select at least 3 credits from the following in consultation with the advisor. Additional courses taken from this list can be applied towards the Major Electives requirement.

ANTH 4101 - Decolonizing Archives (3.0 cr)  
ANTH 5269 - Analysis of Stone Tool Technology (4.0 cr)  
ANTH 5402 - Zooarchaeology Laboratory (3.0 cr)  
ANTH 5403 - Quantitative Methods in Biological Anthropology (4.0 cr)  
ANTH 5450 - Spatial Analysis in Anthropology: Research Design and Field Applications (3.0 cr)

-OR-

#### **Archaeology Major Electives Courses (12 credits)**

Select at least 12 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with approval by the advisor and director of graduate studies.

ANTH 5008 - Advanced Flintknapping (3.0 cr)  
ANTH 5009 - Human Behavioral Biology (3.0 cr)  
ANTH 5015W - Biology, Evolution, and Cultural Development of Language & Music [SOCS, WI] (3.0 cr)



ANTH 5021W - Anthropology of the Middle East [SOCS, GP, WI] (3.0 cr)  
ANTH 5027W - Archaeology of Prehistoric Europe [HIS, WI] (3.0 cr)  
ANTH 5028 - Introduction to Historical Archaeology (3.0 cr)  
ANTH 5041 - Ecological Anthropology (3.0 cr)  
ANTH 5045W - Urban Anthropology [WI] (3.0 cr)  
ANTH 5112 - Reconstructing Hominin Behavior (3.0 cr)  
ANTH 5113 - Primate Evolution (3.0 cr)  
ANTH 5121 - Business Anthropology (2.0 cr)  
ANTH 5128 - Anthropology of Education (3.0 cr)  
ANTH 5221 - Anthropology of Material Culture (3.0 cr)  
ANTH 5244 - Interpreting Ancient Bone (4.0 cr)  
ANTH 5255 - Archaeology of Ritual and Religion (3.0 cr)  
ANTH 5269 - Analysis of Stone Tool Technology (4.0 cr)  
ANTH 5327W - Inca, Aztec & Maya Civilizations [HIS, WI] (3.0 cr)  
ANTH 5401 - The Human Fossil Record (3.0 cr)  
ANTH 5402 - Zooarchaeology Laboratory (3.0 cr)  
ANTH 5403 - Quantitative Methods in Biological Anthropology (4.0 cr)  
ANTH 5405 - Human Skeletal Analysis (4.0 cr)  
ANTH 5412 - Comparative Indigenous Feminisms [GP] (3.0 cr)  
ANTH 5442 - Archaeology of the British Isles (3.0 cr)  
ANTH 5448 - Applied Heritage Management (3.0 cr)  
ANTH 5450 - Spatial Analysis in Anthropology: Research Design and Field Applications (3.0 cr)  
ANTH 5501 - Managing Museum Collections (3.0 cr)  
ANTH 5601 - Archaeology and Native Americans [DSJ] (3.0 cr)  
ANTH 5980 - Topics in Anthropology (3.0 cr)  
ANTH 8001 - Ethnography, Theory, History (3.0 cr)  
ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)  
ANTH 8005 - Linguistic Anthropology (3.0 cr)  
ANTH 8111 - Evolutionary Morphology (3.0 cr)  
ANTH 8112 - Reconstructing Hominin Behavior (3.0 cr)  
ANTH 8113 - Primate Evolution (3.0 cr)  
ANTH 8114 - Biological Anthropology Graduate Program Seminar: Behavioral Ecology of Primates (3.0 cr)  
ANTH 8120 - Problems in Culture Change and Applied Anthropology (3.0 - 6.0 cr)  
ANTH 8201 - Humans and Nonhumans: Hybrids and Collectives (3.0 cr)  
ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)  
ANTH 8205 - Economic Anthropology (3.0 cr)  
ANTH 8207 - Political and Social Anthropology (3.0 cr)  
ANTH 8213 - Ecological Anthropology (3.0 cr)  
ANTH 8215 - Anthropology of Gender (3.0 cr)  
ANTH 8219 - Grant Writing (2.0 cr)  
ANTH 8220 - Field School (6.0 cr)  
ANTH 8223 - Anthropology of Place & Space (3.0 cr)  
ANTH 8244 - Interpreting Ancient Bone (4.0 cr)  
ANTH 8510 - Topics in Archaeology (3.0 cr)  
ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)  
ANTH 8980 - Anthropology Graduate Workshop (1.0 cr)  
ANTH 8991 - Independent Study (1.0 - 18.0 cr)  
ANTH 8992 - Directed Reading (1.0 - 18.0 cr)  
ANTH 8993 - Directed Study (1.0 - 18.0 cr)  
ANTH 8994 - Directed Research (1.0 - 18.0 cr)



### *Twin Cities Campus*

## Art History M.A.

*Art History*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Art History, University of Minnesota, 338 Heller Hall, 271 19th Ave S, Minneapolis, MN 55455 (612-624-4500; fax: 612-626-8679)

Email: [arthist@umn.edu](mailto:arthist@umn.edu)

Website: <http://www.arthist.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Art History graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Art History PhD program.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

### **Special Application Requirements:**

Note: The Art History graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Art History PhD program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 30 major credits and 6 credits outside the major. The final exam is written. A capstone project is required.

**Capstone Project:** The Plan B capstone project requires two Plan B papers demonstrating the student's mastery of the essential skills of scholarship.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

Language Requirement: Reading Proficiency

A minimum GPA of 3.50 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Reading proficiency in a modern foreign research language is required. Additional modern or ancient languages may be required by the student's advisor, depending on the field.

### **Required Course (3 credits)**

Take the following course:



[ARTH 8001](#) - Art Historiography: Theory and Methods (3.0 cr)

**Major Coursework (18 credits)**

Select at least 9 credits from one of the following to satisfy the primary area requirement; 6 credits from another to satisfy the secondary area of interest; and 3 credits from a third area to meet the Global Perspectives requirement. All courses must be selected in consultation with the advisor.

**Contemporary**

- [ARTH 5411](#) - Gender and Sexuality in Art Since 1863 (3.0 cr)
- [ARTH 5413](#) - Alternative Media: Video, Performance, Digital Art (3.0 cr)
- [ARTH 5417](#) - Twentieth Century Theory and Criticism (3.0 cr)
- [ARTH 5466](#) - Contemporary Art (3.0 cr)
- [ARTH 8440](#) - Seminar: Contemporary Art (3.0 cr)

**Early Modern Europe and the Atlantic World**

- [ARTH 5302](#) - The Image Multiplied: Prints in Early Modern Europe (3.0 cr)
- [ARTH 5313](#) - Spanish Baroque Masters: Tradition and Experimentation in Golden Age Spain [HIS] (3.0 cr)
- [ARTH 5335](#) - Baroque Rome: Art and Politics in the Papal Capital (3.0 cr)
- [ARTH 5336](#) - Transformations in 17th Century Art: Caravaggio, Velazquez, and Bernini (3.0 cr)
- [ARTH 8320](#) - Seminar: Issues in Early Modern Visual Culture (3.0 cr)
- [ARTH 8340](#) - Seminar: Baroque Art (3.0 cr)

**East Asia**

- [ARTH 5765](#) - Early Chinese Art (3.0 cr)
- [ARTH 5766](#) - Chinese Painting (3.0 cr)
- [ARTH 5769](#) - Connoisseurship and Curatorial Practice in Early Chinese Art (3.0 cr)
- [ARTH 8720](#) - Seminar: East Asian Art (3.0 cr)

**Film/Photography**

- [ARTH 5655](#) - African-American Cinema [AH, DSJ] (3.0 cr)
- [ARTH 8920](#) - Seminar: Film History and Criticism (3.0 cr)

**Islamic**

- [ARTH 5781](#) - Age of Empire: The Mughals, Safavids, and Ottomans (3.0 cr)
- [ARTH 5783](#) - Art, Diplomacy and Empire (3.0 cr)
- [ARTH 5785](#) - Art of Islamic Iran (3.0 cr)
- [ARTH 8710](#) - Seminar: Islamic Art (3.0 cr)
- [ARTH 8783](#) - Art, Diplomacy, and Empire (3.0 cr)

**Modern Europe**

- [ARTH 5422](#) - Off the Wall: History of Graphic Arts in Europe and America in the Modern Age (3.0 cr)
- [ARTH 8400](#) - Seminar: Issues in 19th-Century Art (3.0 cr)

**American**

- [ARTH 8520](#) - Seminar: American Art and Material Culture (3.0 cr)

**South Asia**

- [ARTH 5773](#) - Making Place: Concepts of Space in Indian Art and Architecture (3.0 cr)
- [ARTH 5774](#) - The Body in Indian Art (3.0 cr)
- [ARTH 5777](#) - The Diversity of Traditions: Indian Art 1200 to Present (3.0 cr)
- [ARTH 5778](#) - Piety, Power, and Passion: Traditions of South Asian Painting (3.0 cr)
- [ARTH 8770](#) - Seminar: Art of India (3.0 cr)

**Electives (9 credits)**

Select 9 elective credits from the following, at least 3 of which must be ARTH credits, in consultation with the advisor. Other courses may be applied to this requirement with advisor and director of graduate studies approval. ARTH 5930 cannot be applied to the Electives requirement.

[ARTH 5xxx](#)  
[ARTH 8xxx](#)

**Outside Coursework**

Select 6 credits in consultation with the advisor and the director of graduate studies.



### *Twin Cities Campus*

## Art History Minor

*Art History*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Art History, 338 Heller Hall, 271 19th Avenue South, Minneapolis, MN 55455 (612-624-4500; fax: 612-626-8679)

Email: [arthist@umn.edu](mailto:arthist@umn.edu)

Website: <http://www.arthist.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 11
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Our current faculty and institutional strengths support specialization in the art and visual/material culture of the following overlapping fields: American; contemporary; early modern Europe and the Atlantic world; East Asia; film/photography; Islamic; modern Europe; and South Asia.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Art History director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B earned for each, to be considered for the minor.

The minimum cumulative GPA for minor field coursework is 3.50.

#### **Coursework (11 to 12 credits)**

Masters students select 11 credits, and doctoral students select 12 credits from the following in consultation with the Art History director of graduate studies:

- [ARTH 5335](#) - Baroque Rome: Art and Politics in the Papal Capital (3.0 cr)
- [ARTH 5336](#) - Transformations in 17th Century Art: Caravaggio, Velazquez, and Bernini (3.0 cr)
- [ARTH 5411](#) - Gender and Sexuality in Art Since 1863 (3.0 cr)
- [ARTH 5413](#) - Alternative Media: Video, Performance, Digital Art (3.0 cr)
- [ARTH 5417](#) - Twentieth Century Theory and Criticism (3.0 cr)
- [ARTH 5466](#) - Contemporary Art (3.0 cr)
- [ARTH 5655](#) - African-American Cinema [AH, DSJ] (3.0 cr)
- [ARTH 5765](#) - Early Chinese Art (3.0 cr)



ARTH 5766 - Chinese Painting (3.0 cr)  
ARTH 5773 - Making Place: Concepts of Space in Indian Art and Architecture (3.0 cr)  
ARTH 5774 - The Body in Indian Art (3.0 cr)  
ARTH 5777 - The Diversity of Traditions: Indian Art 1200 to Present (3.0 cr)  
ARTH 5778 - Piety, Power, and Passion: Traditions of South Asian Painting (3.0 cr)  
ARTH 5781 - Age of Empire: The Mughals, Safavids, and Ottomans (3.0 cr)  
ARTH 5783 - Art, Diplomacy and Empire (3.0 cr)  
ARTH 5785 - Art of Islamic Iran (3.0 cr)  
ARTH 5787 - Visual Cultures in Contact: Cross-Cultural Interaction in the Ancient and Early Medieval Worlds (3.0 cr)  
ARTH 5950 - Topics: Art History (3.0 cr)  
ARTH 5993 - Directed Study (1.0 - 4.0 cr)  
ARTH 5994 - Directed Research (1.0 - 4.0 cr)  
ARTH 8190 - Seminar: Issues in Ancient Art and Archaeology (3.0 cr)  
ARTH 8200 - Seminar: Medieval Art (3.0 cr)  
ARTH 8320 - Seminar: Issues in Early Modern Visual Culture (3.0 cr)  
ARTH 8340 - Seminar: Baroque Art (3.0 cr)  
ARTH 8400 - Seminar: Issues in 19th-Century Art (3.0 cr)  
ARTH 8440 - Seminar: Contemporary Art (3.0 cr)  
ARTH 8500 - Issues in Latin American Art (3.0 cr)  
ARTH 8520 - Seminar: American Art and Material Culture (3.0 cr)  
ARTH 8710 - Seminar: Islamic Art (3.0 cr)  
ARTH 8720 - Seminar: East Asian Art (3.0 cr)  
ARTH 8770 - Seminar: Art of India (3.0 cr)  
ARTH 8783 - Art, Diplomacy, and Empire (3.0 cr)  
ARTH 8920 - Seminar: Film History and Criticism (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Art History Ph.D.**

*Art History*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Art History, 338 Heller Hall, 271 19th Ave S, Minneapolis, MN 55455 (612-624-4500; fax: 612-626-8679)

Email: [arthist@umn.edu](mailto:arthist@umn.edu)

Website: <http://www.arthist.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 78
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The University of Minnesota's doctoral program in art history trains scholars who go on to careers in universities, colleges, museums, and other arts institutions throughout the nation and the world. The faculty's unique range of expertise allow us to offer specialized training that only a few other institutions worldwide are able to match. Our current faculty and institutional strengths support specialization in the art and visual/material culture of the following overlapping fields: American; contemporary; early modern Europe and the Atlantic world; East Asia; film/photography; Islamic; modern Europe; and South Asia.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

In addition to transcripts and test scores, applicants must submit a writing sample, statement of objectives (personal statement) outlining their current and future research interests, and three letters of recommendation. Please refer to the program website and contact the DGS Art History director of graduate studies for further information: <https://cla.umn.edu/art-history/graduate/apply>.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

42 credits are required in the major.

12 credits are required outside the major.



24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: See other program requirements below:

A minimum GPA of 3.50 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

At least 6 8xxx-level ARTH credits are required, in addition to ARTH 8001. ARTH 8xxx-level seminars must be taken from at least 2 different faculty members.

A maximum of 2 directed study or directed research courses can be applied to degree requirements.

Language requirement: Reading proficiency in two modern foreign research languages. Additional modern or ancient languages may be required by the student's advisor depending on field.

#### **Required Course (3 credits)**

Take the following course:

[ARTH 8001](#) - Art Historiography: Theory and Methods (3.0 cr)

#### **Major Coursework (30 credits)**

Select at least 18 credits from one of the following to satisfy the primary area requirement; 9 credits from another to satisfy the secondary area of interest; and 3 credits from a third area to meet the Global Perspectives requirement. All courses must be selected in consultation with the advisor.

##### **Contemporary**

- [ARTH 5411](#) - Gender and Sexuality in Art Since 1863 (3.0 cr)
- [ARTH 5413](#) - Alternative Media: Video, Performance, Digital Art (3.0 cr)
- [ARTH 5417](#) - Twentieth Century Theory and Criticism (3.0 cr)
- [ARTH 5466](#) - Contemporary Art (3.0 cr)
- [ARTH 8440](#) - Seminar: Contemporary Art (3.0 cr)

##### **Early Modern Europe and the Atlantic World**

- [ARTH 5302](#) - The Image Multiplied: Prints in Early Modern Europe (3.0 cr)
- [ARTH 5313](#) - Spanish Baroque Masters: Tradition and Experimentation in Golden Age Spain [HIS] (3.0 cr)
- [ARTH 5335](#) - Baroque Rome: Art and Politics in the Papal Capital (3.0 cr)
- [ARTH 5336](#) - Transformations in 17th Century Art: Caravaggio, Velazquez, and Bernini (3.0 cr)
- [ARTH 8320](#) - Seminar: Issues in Early Modern Visual Culture (3.0 cr)
- [ARTH 8340](#) - Seminar: Baroque Art (3.0 cr)

##### **East Asia**

- [ARTH 5765](#) - Early Chinese Art (3.0 cr)
- [ARTH 5766](#) - Chinese Painting (3.0 cr)
- [ARTH 5769](#) - Connoisseurship and Curatorial Practice in Early Chinese Art (3.0 cr)
- [ARTH 8720](#) - Seminar: East Asian Art (3.0 cr)

##### **Film/Photography**

- [ARTH 5655](#) - African-American Cinema [AH, DSJ] (3.0 cr)
- [ARTH 8920](#) - Seminar: Film History and Criticism (3.0 cr)

##### **Islamic**

- [ARTH 5781](#) - Age of Empire: The Mughals, Safavids, and Ottomans (3.0 cr)
- [ARTH 5783](#) - Art, Diplomacy and Empire (3.0 cr)
- [ARTH 5785](#) - Art of Islamic Iran (3.0 cr)
- [ARTH 8710](#) - Seminar: Islamic Art (3.0 cr)
- [ARTH 8783](#) - Art, Diplomacy, and Empire (3.0 cr)

##### **Modern Europe**

- [ARTH 5422](#) - Off the Wall: History of Graphic Arts in Europe and America in the Modern Age (3.0 cr)
- [ARTH 8400](#) - Seminar: Issues in 19th-Century Art (3.0 cr)

##### **American**

- [ARTH 8520](#) - Seminar: American Art and Material Culture (3.0 cr)

##### **South Asia**

- [ARTH 5773](#) - Making Place: Concepts of Space in Indian Art and Architecture (3.0 cr)
- [ARTH 5774](#) - The Body in Indian Art (3.0 cr)
- [ARTH 5777](#) - The Diversity of Traditions: Indian Art 1200 to Present (3.0 cr)
- [ARTH 5778](#) - Piety, Power, and Passion: Traditions of South Asian Painting (3.0 cr)





[ARTH 8770](#) - Seminar: Art of India (3.0 cr)

**Electives (9 credits)**

Select 9 elective credits from the following, at least 3 of which must be ARTH credits, in consultation with the advisor. Other courses may be applied to this requirement with advisor and director of graduate studies approval. ARTH 5930 cannot be applied to the Electives requirement.

ARTH 5xxx  
ARTH 8xxx

**Outside Coursework (12 credits)**

Select 12 credits in consultation with the advisor and the director of graduate studies, at least 6 credits of which are not art historical in content.

**Thesis Credits**

Take 24 doctoral thesis credits.

[ARTH 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### ***Twin Cities Campus***

## **Art M.F.A.**

*Art Department*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Art, E201 Regis Center for Art, 405 21st Avenue S, Minneapolis, MN 55455 (612-625-8096; fax: 612-625-7881).

Email: [artdept@umn.edu](mailto:artdept@umn.edu)

Website: <http://www.art.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 64
- This program does not require summer semesters for timely completion.
- Degree: Master of Fine Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MFA program places major emphasis on creative artistic work of high quality. It promotes not only the conceptual and technical education of the professional artist in their artistic practice, encouraging critical inquiry, excellence, and an understanding of the history of art, but also an experimental approach toward each media. The following four areas of study are available: Drawing, Painting, and Printmaking; Sculpture and Ceramics; Photography and Moving Images; Interdisciplinary Art and Social Practice. The MFA is considered a terminal degree in the field of fine arts and is typically the degree required to teach at the college or university level.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Admission to the MFA program is highly competitive. In addition to meeting the University's application requirements, students applying to the program must demonstrate a high degree of capability and commitment in their artistic portfolio and in their statements of artistic and academic intent. Applicants must submit a portfolio electronically with documentation of artwork completed in the three years prior to admission. Instructions for submitting the portfolio and supplemental materials including three letters of recommendation may be found at the department's website: [www.art.umn.edu](http://www.art.umn.edu)

Students are admitted for fall semester only.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan B:** Plan B requires 58 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The capstone project comprises participation in the University's Katherine E. Nash Gallery MFA thesis exhibition and a supporting paper.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

The MFA is a 3-year, full-time program, that provides studio space for the three consecutive years for the pursuit of artistic research.

### Seminar Courses (9 credits)

Take the following courses. ARTS 8402 must be taken fall of Year 1; Take ARTS 8403 Spring of Year 2; ARTS 8404 must be taken fall of Year 3.

[ARTS 8402](#) - Theoretical Constructions in Contemporary Art (3.0 cr)

[ARTS 8403](#) - MFA Professional Practices and Teaching Pedagogy (3.0 cr)

[ARTS 8404](#) - MFA Thesis Research + Writing (3.0 cr)

### MFA Critique Seminars (9 credits)

Take ARTS 8410 fall of Year 1, spring of Year 1, and fall of Year 2.

[ARTS 8410](#) - MFA Critique Seminar (3.0 cr)

### Studio Credits (24 credits)

Select credits from the following in consultation with the advisor. ARTS 8420 and 8450 can be repeated.

[ARTS 5110](#) - Advanced Drawing (4.0 cr)

[ARTS 5120](#) - Advanced Painting (4.0 cr)

[ARTS 5140](#) - Advanced Printmaking (4.0 cr)

[ARTS 5250](#) - Art + Performance (4.0 cr)

[ARTS 5260](#) - Art + Interdisciplinary Collaborations (3.0 cr)

[ARTS 5610](#) - New Media: Making Art Interactive (4.0 cr)

[ARTS 5650](#) - Advanced Sound Art (4.0 cr)

[ARTS 5710](#) - Advanced Photography (4.0 cr)

[ARTS 5750](#) - Advanced Narrative Digital Filmmaking (4.0 cr)

[ARTS 5760](#) - Experimental Film and Video (4.0 cr)

[ARTS 5770](#) - Animation (4.0 cr)

[ARTS 5780](#) - Advanced Super 8 and 16 MM Filmmaking (4.0 cr)

[ARTS 5810](#) - Advanced Ceramics (4.0 cr)

[ARTS 5850](#) - Advanced Foundry and Metal Sculpture (4.0 cr)

[ARTS 5860](#) - Advanced Sculpture (4.0 cr)

[ARTS 5890](#) - 3D Modeling and Digital Fabrication (4.0 cr)

[ARTS 8420](#) - MFA Studio (1.0 - 6.0 cr)

[GCC 5013](#) - Making Sense of Climate Change - Science, Art, and Agency [CIV] (3.0 cr)

### Outside Coursework (6 credits)

Select at least 6 credits of art theory or art history coursework, in consultation with the advisor, from the following. Other courses may be substituted with prior approval from the director of graduate studies.

ARTH 5xxx

### Creative Thesis (16 credits)

Take 8 credits each semester of Year 3 in consultation with the advisor.

[ARTS 8450](#) - MFA Creative Thesis (1.0 - 9.0 cr)



### ***Twin Cities Campus***

## **Art Minor**

*Art Department*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Art, E201 Regis Center for Art, 405 21st Ave S, Minneapolis, MN 55455 (612-625-8096; fax: 612-625-7881)

Email: [artdept@umn.edu](mailto:artdept@umn.edu)

Website: <http://www.art.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The minor program in art places major emphasis on creative artistic work of high quality. It promotes not only the conceptual and technical education of the professional artist in their artistic practice, encouraging critical inquiry, excellence, and an understanding of the history of art, but also an experimental approach toward each media. The following media areas are available: ceramics, drawing and painting, photography, printmaking, sculpture, and experimental and media arts.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

#### **Required Course**

[ARTS 8402](#) - Theoretical Constructions in Contemporary Art (3.0 cr)

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

Coursework is chosen in consultation with the art director of graduate studies.

#### **Electives**

Take 6 - 9 credit(s) from the following:

- ART 5xxx
- ART 8xxx

#### **Doctoral**

Coursework is chosen in consultation with the art director of graduate studies.

#### **Electives**

Take at least 9 credits from the following:



ART 5xxx  
ART 8xxx



### **Twin Cities Campus**

## **Asian Literatures, Cultures, and Media M.A.**

*Asian and Middle Eastern Studies*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Asian Languages and Literatures, 220 Folwell Hall, 9 Pleasant St SE, Minneapolis, MN 55455 (612-625-6534; fax: 612-624-5513)

Email: [all@umn.edu](mailto:all@umn.edu)

Website: <https://cla.umn.edu/asian-middle-eastern-studies>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Asian Literatures, Cultures, and Media (ALCM) graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the ALCM PhD program. Refer to the Asian Literatures, Cultures, and Media website at <https://cla.umn.edu/asian-middle-eastern-studies> for more information.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Only students admitted to the ALCM PhD program are considered for the MA.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is written and oral.

This program may be completed with a minor.



Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Advanced knowledge in the chosen language.

A minimum GPA of 3.5 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

**Required Courses (6 credits)**

Take the following courses:

[AMES 8001](#) - Critical Approaches to Asian and Middle Eastern Studies (3.0 cr)

[AMES 8002](#) - Research Seminar (3.0 cr)

**Electives (24 credits)**

Select at least 24 credits from the following in consultation with the advisor:

**Language Courses (0 to 8 credits)**

[ARAB 5101](#) - Advanced Arabic I (4.0 cr)

[ARAB 5102](#) - Advanced Arabic II (4.0 cr)

[CHN 4041](#) - Advanced Readings in Modern Chinese I (4.0 cr)

[CHN 4042](#) - Advanced Readings in Modern Chinese II (4.0 cr)

[HNDI 4005](#) - Advanced Hindi I for Graduate Research (4.0 cr)

[HNDI 4006](#) - Advanced Hindi II for Graduate Research (4.0 cr)

[JPN 4041](#) - Advanced Japanese Conversation and Composition I (4.0 cr)

[JPN 4042](#) - Advanced Japanese Conversation and Composition II (4.0 cr)

[KOR 4041](#) - Advanced Readings in Modern Korean I (4.0 cr)

[KOR 4042](#) - Advanced Readings in Modern Korean II (4.0 cr)

[URDU 4005](#) - Advanced Urdu I for Graduate Research (4.0 cr)

[URDU 4006](#) - Advanced Urdu II for Graduate Research (4.0 cr)

**Seminars and Courses (16 to 24 credits)**

Select remaining credits from the following, in consultation with the advisor, to complete the 30-credit requirement. Alternative courses can be chosen with advisor approval.

ALL 5xxx

ALL 8xxx

[ANTH 5980](#) - Topics in Anthropology (3.0 cr)

[ANTH 8810](#) - Topics in Sociocultural Anthropology (3.0 cr)

[ARTH 5765](#) - Early Chinese Art (3.0 cr)

[ARTH 8710](#) - Seminar: Islamic Art (3.0 cr)

[ARTH 8720](#) - Seminar: East Asian Art (3.0 cr)

[ARTH 8920](#) - Seminar: Film History and Criticism (3.0 cr)

[ARTH 8950](#) - Seminar: Issues in the History of Art (3.0 cr)

[GWSS 5490](#) - Topics: Political Economy and Global Studies (3.0 cr)

[HIST 5940](#) - Topics in Asian History (1.0 - 4.0 cr)

[HIST 5960](#) - Topics in History (1.0 - 4.0 cr)

[HIST 8960](#) - Topics in History (1.0 - 4.0 cr)

[MIMS 8001](#) - Theories of the Moving Image (3.0 cr)

[MIMS 8003](#) - Historiography of the Moving Image (3.0 cr)



### **Twin Cities Campus**

## **Asian Literatures, Cultures, and Media Minor**

*Asian and Middle Eastern Studies*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Asian Languages and Literatures, 220 Folwell Hall, 9 Pleasant Street SE, Minneapolis, MN 55455 (612-625-6534; fax: 612-624-5513).

Email: [all@umn.edu](mailto:all@umn.edu)

Website: <http://all.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Asian literatures, cultures, and media (ALCM) program enables students to pursue the study of Asian texts and media, broadly understood. The program encourages work that questions the boundaries of traditional area studies, demands proficiency in the language(s) of concentration, and provides opportunities for students to design a flexible program of study. Students must designate a language of concentration on their ALCM program application form. Currently, students may select Arabic, Chinese, Japanese, Korean, or Hindi/Urdu for their language of concentration. However, it is possible to select another South Asian language with permission of the director of graduate Studies. For details, see the graduate program website at [www.all.umn.edu](http://www.all.umn.edu).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer first with their major field advisor and director of graduate studies, and the Asian Literatures, Cultures, and Media (ALCM) director of graduate studies regarding feasibility and requirements, and to identify an ALCM advisor.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

In addition to credit requirements, students must take and pass at the terminal MA level - the language translation examination section of the ALCM MA qualifying examination.

Minor coursework offered on the A/F and S/N basis may be taken S/N with approval of the advisor and ALCM director of graduate studies.

#### **Required Course (3 credits)**

Take the following course:

[AMES 8001](#) - Critical Approaches to Asian and Middle Eastern Studies (3.0 cr)

#### **Electives (9 Credits)**

Select at least 9 credits from the following in consultation with the ALCM director of graduate studies:

ALL 5xxx





ALL 8xxx

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Doctoral



### **Twin Cities Campus**

## **Asian Literatures, Cultures, and Media Ph.D.**

*Asian and Middle Eastern Studies*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Asian Languages and Literatures, 220 Folwell Hall, 9 Pleasant St SE, Minneapolis, MN 55455 (612-625-6534; fax: 612-624-5513)

Email: [all@umn.edu](mailto:all@umn.edu)

Website: <http://all.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 72
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Asian literatures, cultures, and media (ALCM) program enables students to pursue the study of Asian texts and media, broadly understood. The program encourages work that questions the boundaries of traditional area studies, demands proficiency in the language(s) of concentration, and provides opportunities for students to design a flexible program of study.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

--A bachelor's degree from an accredited US institution or foreign equivalent

--Strong academic record from a relevant humanities or social science discipline

--A proposed language of concentration (Arabic, Chinese, Japanese, Korean, Hindi/Urdu, or other South Asian language with approval of the director of graduate studies)

--At least three years of college-level study in the proposed language of concentration, or a demonstration of comparable linguistic proficiency as approved by the director of graduate studies

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

48 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Reading and speaking competence in the language.

A minimum GPA of 3.50 is required for students to remain in good standing.

At least 3 semesters must be completed before filing a Degree Program Form.

The language requirement is met by satisfactory completion of the MA-level qualifying examination.

### Required Courses (6 credits)

Take the following courses:

[AMES 8001](#) - Critical Approaches to Asian and Middle Eastern Studies (3.0 cr)

[AMES 8002](#) - Research Seminar (3.0 cr)

### Electives (42 credits)

#### Language Courses (0 to 8 credits)

Select up to 8 language credits as needed in consultation with the advisor.

[ARAB 5101](#) - Advanced Arabic I (4.0 cr)

[ARAB 5102](#) - Advanced Arabic II (4.0 cr)

[CHN 4041](#) - Advanced Readings in Modern Chinese I (4.0 cr)

[CHN 4042](#) - Advanced Readings in Modern Chinese II (4.0 cr)

[HNDI 4005](#) - Advanced Hindi I for Graduate Research (4.0 cr)

[HNDI 4006](#) - Advanced Hindi II for Graduate Research (4.0 cr)

[JPN 4041](#) - Advanced Japanese Conversation and Composition I (4.0 cr)

[JPN 4042](#) - Advanced Japanese Conversation and Composition II (4.0 cr)

[KOR 4041](#) - Advanced Readings in Modern Korean I (4.0 cr)

[KOR 4042](#) - Advanced Readings in Modern Korean II (4.0 cr)

[URDU 4005](#) - Advanced Urdu I for Graduate Research (4.0 cr)

[URDU 4006](#) - Advanced Urdu II for Graduate Research (4.0 cr)

#### Seminars and Courses (34 to 42 credits)

Select credits from the following in consultation with the advisor to complete the 42 course credits required. Alternative courses can be chosen with advisor approval.

ALL 5xxx

ALL 8xxx

[ANTH 5980](#) - Topics in Anthropology (3.0 cr)

[ANTH 8810](#) - Topics in Sociocultural Anthropology (3.0 cr)

[ARTH 5765](#) - Early Chinese Art (3.0 cr)

[ARTH 8710](#) - Seminar: Islamic Art (3.0 cr)

[ARTH 8720](#) - Seminar: East Asian Art (3.0 cr)

[ARTH 8920](#) - Seminar: Film History and Criticism (3.0 cr)

[ARTH 8950](#) - Seminar: Issues in the History of Art (3.0 cr)

[GWSS 5490](#) - Topics: Political Economy and Global Studies (3.0 cr)

[HIST 5940](#) - Topics in Asian History (1.0 - 4.0 cr)

[HIST 5960](#) - Topics in History (1.0 - 4.0 cr)

[HIST 8960](#) - Topics in History (1.0 - 4.0 cr)

[MIMS 8001](#) - Theories of the Moving Image (3.0 cr)

[MIMS 8003](#) - Historiography of the Moving Image (3.0 cr)

### Thesis Credits

Take 24 doctoral thesis credits.

[AMES 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Asian Studies MA**

*Asian and Middle Eastern Studies*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Asian Languages and Literatures, 220 Folwell Hall, 9 Pleasant St SE, Minneapolis, MN 55455 (612-625-6534; fax: 612-624-5513)

Email: [all@umn.edu](mailto:all@umn.edu)

Website: <https://cla.umn.edu/asian-lang-lit>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Asian Studies MA program is a terminal degree that provides students from a wide range of backgrounds with language proficiency in one Asian or Middle Eastern language, and the relevant knowledge of histories, literatures, and cultures to pursue a wide range of careers, including: government; nonprofit institutions and social work; law, journalism and business; K-12 and community college education; library and archival work; and translation and interpretation. The degree also prepares students interested in pursuing a doctorate in related graduate programs, including the University's Asian Literatures, Cultures, and Media PhD.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is written.



This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: See Language Course Requirements

A minimum GPA of 3.3 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Plan A language requirement: Intermediate-advanced knowledge of the chosen language by completing or demonstrating linguistic proficiency comparable to ARAB 5102, CHN 4008, HNDI 4006, URDU 4006, JPN 4006, or KOR 4006.

Plan B language requirement: Intermediate knowledge of the chosen language by completing or demonstrating linguistic proficiency comparable to ARAB 4122, CHN 4004, CHN 4006, HNDI 4004, URDU 4004, JPN 4004, or KOR 4004.

### Required Course (3 Credits)

Take the following course:

[AMES 8001](#) - Critical Approaches to Asian and Middle Eastern Studies (3.0 cr)

### Language Courses (0 to 9 credits)

Select up to 9 credits as needed in consultation with the advisor. Plan A students who need coursework to meet language requirements must take ARAB 5102, CHN 4008, HNDI 4006, URDU 4006, JPN 4006, or KOR 4006. Plan B students who need coursework to meet language requirements must take ARAB 4122, CHN 4004, CHN 4006, HNDI 4004, URDU 4004, JPN 4004, or KOR 4004.

[ARAB 4101](#) - Beginning Arabic I for Graduate Student Research (5.0 cr)

[ARAB 4102](#) - Beginning Arabic II for Graduate Student Research (5.0 cr)

[ARAB 4121](#) - Intermediate Arabic I for Graduate Student Research (5.0 cr)

[ARAB 4122](#) - Intermediate Arabic II for Graduate Student Research (5.0 cr)

[ARAB 5040](#) - Readings in Arabic Texts (3.0 cr)

[ARAB 5101](#) - Advanced Arabic I (4.0 cr)

[ARAB 5102](#) - Advanced Arabic II (4.0 cr)

[CHN 4001](#) - Beginning Modern Chinese I for Graduate Student Research (5.0 cr)

[CHN 4002](#) - Beginning Modern Chinese II for Graduate Student Research (5.0 cr)

[CHN 4003](#) - Intermediate Modern Chinese I for Graduate Student Research (5.0 cr)

[CHN 4004](#) - Intermediate Modern Chinese II for Graduate Student Research (5.0 cr)

[CHN 4005](#) - Accelerated Beginning Modern Chinese for Graduate Student Research (5.0 cr)

[CHN 4006](#) - Accelerated Intermediate Modern Chinese for Graduate Student Research (5.0 cr)

[CHN 4007](#) - Advanced Modern Chinese I for Graduate Student Research (4.0 cr)

[CHN 4008](#) - Advanced Modern Chinese II for Graduate Student Research (4.0 cr)

[CHN 4041](#) - Advanced Readings in Modern Chinese I (4.0 cr)

[CHN 4042](#) - Advanced Readings in Modern Chinese II (4.0 cr)

[HNDI 4001](#) - Beginning Hindi I for Graduate Student Research (5.0 cr)

[HNDI 4002](#) - Beginning Hindi II for Graduate Student Research (5.0 cr)

[HNDI 4003](#) - Intermediate Hindi I for Graduate Student Research (5.0 cr)

[HNDI 4004](#) - Intermediate Hindi II for Graduate Student Research (5.0 cr)

[HNDI 4005](#) - Advanced Hindi I for Graduate Research (4.0 cr)

[HNDI 4006](#) - Advanced Hindi II for Graduate Research (4.0 cr)

[HNDI 4015](#) - Accelerated Beginning Hindi for Graduate Research (5.0 cr)

[JPN 4001](#) - Beginning Japanese I for Graduate Student Research (5.0 cr)

[JPN 4002](#) - Beginning Japanese II for Graduate Student Research (5.0 cr)

[JPN 4003](#) - Intermediate Japanese I for Graduate Student Research (5.0 cr)

[JPN 4004](#) - Intermediate Japanese II for Graduate Student Research (5.0 cr)

[JPN 4005](#) - Third Year Japanese I for Graduate Student Research (4.0 cr)

[JPN 4006](#) - Third Year Japanese II for Graduate Student Research (4.0 cr)

[JPN 4041](#) - Advanced Japanese Conversation and Composition I (4.0 cr)

[JPN 4042](#) - Advanced Japanese Conversation and Composition II (4.0 cr)

[KOR 4001](#) - Beginning Korean I for Graduate Student Research (5.0 cr)

[KOR 4002](#) - Beginning Korean II for Graduate Student Research (5.0 cr)

[KOR 4003](#) - Intermediate Korean I for Graduate Student Research (5.0 cr)

[KOR 4004](#) - Intermediate Korean II for Graduate Student Research (5.0 cr)

[KOR 4005](#) - Third Year Korean I for Graduate Student Research (4.0 cr)

[KOR 4006](#) - Third Year Korean II for Graduate Student Research (4.0 cr)



- [KOR 4041](#) - Advanced Readings in Modern Korean I (4.0 cr)
- [KOR 4042](#) - Advanced Readings in Modern Korean II (4.0 cr)
- [URDU 4001](#) - Beginning Urdu I for Graduate Student Research (5.0 cr)
- [URDU 4002](#) - Beginning Urdu II for Graduate Student Research (5.0 cr)
- [URDU 4003](#) - Intermediate Urdu I for Graduate Student Research (5.0 cr)
- [URDU 4004](#) - Intermediate Urdu II for Graduate Student Research (5.0 cr)
- [URDU 4005](#) - Advanced Urdu I for Graduate Research (4.0 cr)
- [URDU 4006](#) - Advanced Urdu II for Graduate Research (4.0 cr)
- [URDU 4015](#) - Accelerated Beginning Urdu for Graduate Research (5.0 cr)

#### **Electives (8 to 27 credits)**

Select courses from the following list, in consultation with the advisor, to complete the minimum number of course credits required for the Plan A or Plan B degree. Other elective courses may be taken with approval of the advisor.

ALL 5xxx

ALL 8xxx

- [ANTH 5980](#) - Topics in Anthropology (3.0 cr)
- [ANTH 8810](#) - Topics in Sociocultural Anthropology (3.0 cr)
- [ARTH 8720](#) - Seminar: East Asian Art (3.0 cr)
- [ARTH 8950](#) - Seminar: Issues in the History of Art (3.0 cr)
- [GWSS 5490](#) - Topics: Political Economy and Global Studies (3.0 cr)
- [HIST 5940](#) - Topics in Asian History (1.0 - 4.0 cr)
- [HIST 5960](#) - Topics in History (1.0 - 4.0 cr)
- [HIST 8960](#) - Topics in History (1.0 - 4.0 cr)
- [MIMS 8001](#) - Theories of the Moving Image (3.0 cr)
- [MIMS 8003](#) - Historiography of the Moving Image (3.0 cr)

#### **Thesis Credits**

Plan A students must take 10 master's thesis credits.

- [AMES 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

## **Program Sub-plans**

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

#### **Integrated BA Asian Languages and Literatures / MA Asian Studies**

The Integrated BA/MA is available to eligible University undergraduates pursuing the Asian Languages and Literatures BA degree. Applicants must have a minimum GPA of 3.30 and be within 30 credits of completing the BA to be eligible, with preference given to those with a demonstrated high proficiency in their language of concentration. Applications to the BA/MA are submitted spring semester of the junior year, and admission is contingent on a formal admissions process.

Students admitted to the BA/MA must maintain timely degree progress to ensure completion of the BA no later than the end of their fourth (senior) year. Up to 10 graduate-level credits (5xxx courses) completed in the fourth (senior) year can be applied to the MA degree, with the remaining MA degree requirements completed during the fifth year of study. No credits can be double counted to meet both BA and MA credit requirements.



### **Twin Cities Campus**

## **Audiology Au.D.**

*Speech-Language-Hearing Sciences*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Speech-Language-Hearing Sciences, 115 Shevlin Hall, 164 Pillsbury Dr SE, Minneapolis, MN 55455 (612-624-9535; fax: 612-624-7586).

Email: [slhsgrad@umn.edu](mailto:slhsgrad@umn.edu)

Website: <http://www.slhs.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 102
- This program requires summer semesters for timely completion.
- Degree: Doctor of Audiology

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The AuD program, designed to meet audiologist licensure/certification standards, emphasizes diagnostics, rehabilitative techniques and technology, counseling approaches, and human development. Its curriculum and outcome-based learning activities prepare graduates to engage in clinical service delivery and interpret and incorporate research findings into clinical practice.

Individuals interested in pursuing an advanced degree in audiology should apply directly to the audiology AuD program. Students admitted to the AuD are eligible to apply to the University's Speech-Language-Hearing Sciences MA/Audiology track.

The doctoral (AuD) education program in audiology at the University of Minnesota - Twin Cities is accredited by the Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) of the American Speech-Language-Hearing Association, 2200 Research Boulevard #310, Rockville, Maryland 20850, 800-498-2071 or 301-296-5700.

## **Accreditation**

This program is accredited by Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA).

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

### **Special Application Requirements:**

Previous coursework in social/behavioral sciences, biological sciences, and physical sciences (physics or chemistry) is recommended.

Applicants are expected to have completed coursework in statistics (including hypothesis testing), as well as the following prerequisite courses:

SLHS 3302: Anatomy & Physiology of the Speech & Hearing Mechanisms

SLHS 3303: Language Acquisition & Science

SLHS 3304: Phonetics

SLHS 3305W: Speech Science

SLHS 3306: Hearing Science

SLHS 4801: Hearing Measurement and Disorders

SLHS 4802: Rehabilitative Audiology

Students admitted without having completed the above prerequisites must complete them upon admission. Prerequisite courses do not count toward the minimum AuD course requirements outlined below, and students admitted without the coursework can expect an additional, 5th year to complete the AuD.



All offers of AuD admission are contingent upon the results of a criminal background check administered by the Minnesota Department of Human Services and completion of immunization requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

94 credits are required in the major.

8 credits are required outside the major.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

The AuD is a four-year plan of study for students entering with a background in speech-language-hearing sciences. Students without such a background should expect an additional year of study. During the final year, students complete a clinical externship. Summative evaluations include a written comprehensive examination followed by an oral exam and a written capstone project that includes an oral presentation and an oral defense of the project.

### Required Courses (42 credits)

Take the following courses. Courses must be taken A/F and be completed with a grade of B- or higher.

- [SLHS 5401](#) - Counseling and Professional Issues (3.0 cr)
- [SLHS 5801](#) - Advanced Audiologic Assessment (3.0 cr)
- [SLHS 5802](#) - Hearing Aids I (3.0 cr)
- [SLHS 5803](#) - Pediatric Audiology (3.0 cr)
- [SLHS 5804](#) - Cochlear Implants (3.0 cr)
- [SLHS 5805](#) - Advanced Rehabilitative Audiology (3.0 cr)
- [SLHS 5806](#) - Auditory Processing Disorders (3.0 cr)
- [SLHS 5807](#) - Noise and Hearing Conservation (3.0 cr)
- [SLHS 5808](#) - Pathophysiology of Hearing Disorders (3.0 cr)
- [SLHS 8801](#) - Electrophysiologic Assessment of Auditory Function (3.0 cr)
- [SLHS 8802](#) - Hearing Aids II (3.0 cr)
- [SLHS 8803](#) - Signals and Systems in Audiology (3.0 cr)
- [SLHS 8805](#) - Hearing Science Foundations of Audiology (3.0 cr)
- [SLHS 8807](#) - Balance Assessment (3.0 cr)

### Audiology Capstone (6 credits)

Take 6 credits of the following in consultation with the advisor:

- [SLHS 8806](#) - Audiology Capstone (1.0 - 6.0 cr)

### Clinical Education in Audiology (17 credits)

Take 17 credits of the following:

- [SLHS 8820](#) - Clinical Education in Audiology (1.0 - 8.0 cr)

### Audiology Externship (17 credits)

Take 17 credits of the following:

- [SLHS 8840](#) - Audiology Externship (1.0 - 8.0 cr)

### Laboratory Module in Audiology (2 credits)

Take 2 credits of the following, must be completed with a grade of B- or higher:

- [SLHS 5810](#) - Laboratory Module in Audiology (1.0 - 2.0 cr)

### Clinical Research and Practice: Grand Rounds (4 credits)

Take 4 credits of the following:





[SLHS 5820](#) - Clinical Research and Practice: Grand Rounds (1.0 - 6.0 cr)

**Clinical Foundations in Audiology (2 credits)**

Take 2 credits of the following:

[SLHS 5830](#) - Clinical Foundations in Audiology (1.0 - 8.0 cr)

**Directed Research (4 credits)**

Take 4 credits in consultation with the advisor, fall semester of Year 3, on the S/N grade basis.

[SLHS 8994](#) - Directed Research (1.0 - 12.0 cr)

**Outside Coursework (8 credits)**

Select a minimum of 8 credits from the following in consultation with the advisor. At least 2 of the 8 credits must be from non-SLHS courses.

[ABUS 4022W](#) - Management in Organizations [WI] (3.0 cr)

[ABUS 4023W](#) - Communicating for Results [WI] (3.0 cr)

[ABUS 4041](#) - Dynamics of Leadership (3.0 cr)

[ABUS 4104](#) - Management and Human Resource Practices (3.0 cr)

[ABUS 4701](#) - Introduction to Marketing (3.0 cr)

[ADDS 5021](#) - Introduction to Evidence Based Practices and the Helping Relationship (3.0 cr)

[BTHX 5000](#) - Topics in Bioethics (1.0 - 4.0 cr)

[BTHX 5100](#) - Introduction to Clinical Ethics (3.0 cr)

[CGSC 8410](#) - Perspectives in Learning, Perception, and Cognition (2.0 cr)

[CI 5451](#) - Teaching Reading in Middle and Secondary Grades (3.0 cr)

[CI 5642](#) - Assessing English Learners (3.0 cr)

[CI 5653](#) - Methods in Teaching English as a Second Language (ESL) in Higher Education (3.0 cr)

[CPSY 4302](#) - Infant Development (3.0 cr)

[CPSY 4329](#) - Biological Foundations of Development (3.0 cr)

[CPSY 4341](#) - Perceptual Development (3.0 cr)

[CPSY 4343](#) - Cognitive Development (3.0 cr)

[CSPH 5101](#) - Introduction to Integrative Healing Practices (3.0 cr)

[CSPH 5111](#) - Ways of Thinking about Health (2.0 cr)

[CSPH 5708](#) - Mind-Body Science and the Art of Transformation (1.0 cr)

[CSPH 5806](#) - Wellbeing and Resiliency for Health Professionals (1.0 cr)

[CSPH 5807](#) - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)

[EPSY 5101](#) - Intelligence and Creativity (3.0 cr)

[EPSY 5135](#) - Human Relations Workshop (4.0 cr)

[EPSY 5400](#) - Special Topics in Counseling Psychology (1.0 - 4.0 cr)

[EPSY 5415](#) - Child and Adolescent Development and Counseling (4.0 cr)

[EPSY 5451](#) - College Students Today (3.0 cr)

[EPSY 5461](#) - Cross-Cultural Counseling (3.0 cr)

[EPSY 5609](#) - Family-centered Services (3.0 cr)

[EPSY 5616W](#) - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)

[EPSY 5625](#) - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)

[EPSY 5641](#) - Foundations of Deaf Education (3.0 cr)

[EPSY 5642](#) - Early Intervention for Infants, Toddlers and Families: Deaf and Hard of Hearing (3.0 cr)

[EPSY 5643](#) - Seminar: Identity, Culture and Diversity in Deaf Education (2.0 cr)

[EPSY 5644](#) - Early Childhood Language and Literacy Development and Best Practices: Deaf and Hard of Hearing (3.0 cr)

[EPSY 5645](#) - Deaf Plus: Educating and Understanding Deaf Students with Disabilities (1.0 cr)

[EPSY 5654](#) - Current Research, Issues Trends in Deaf Education (1.0 cr)

[EPSY 5657](#) - Interventions for Behavioral Problems in School Settings (3.0 cr)

[EPSY 5661](#) - Introduction to Autism Spectrum Disorder (3.0 cr)

[EPSY 5663](#) - Assessment and Intervention for Individuals with Autism Spectrum Disorder (3.0 cr)

[EPSY 5681](#) - Educating Preschoolers with Disabilities: Specialized Approaches and Interventions (3.0 cr)

[EPSY 5851](#) - Engaging Diverse Students and Families (3.0 cr)

[EPSY 8600](#) - Special Topics: Special Education Issues (1.0 - 3.0 cr)

[FSOS 4107](#) - Traumatic Stress and Resilience in Vulnerable Families Across the Lifespan (3.0 cr)

[FSOS 5937](#) - Parent-Child Interaction (3.0 cr)

[FSOS 5942](#) - Diverse Family Experiences (3.0 cr)

[FSOS 8101](#) - Family Stress, Coping, and Adaptation (3.0 cr)

[GCC 5022](#) - The Human Experience of Sensory Loss: Seeking Equitable and Effective Solutions [TS] (3.0 cr)

[GERO 5125](#) - Gerontology Service Learning (3.0 cr)

[HINF 5501](#) - US Health Care System: Information Challenges in Clinical Care (1.0 cr)

[HSM 4065](#) - Information Privacy and Security in Health Services Management [TS] (3.0 cr)

[HSM 4531](#) - Human Resources in Health Care Settings (3.0 cr)

[KIN 8211](#) - Seminar: Perception and Action (3.0 cr)

[LING 8921](#) - Seminar in Language and Cognition (3.0 cr)

[NSCI 5101](#) - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)



NSCI 5111 - Medical Neuroscience for Graduate Students (5.0 cr)  
OLPD 5211 - Introduction to the Undereducated Adult (1.0 cr)  
OLPD 5356 - Disability Policy and Services (3.0 cr)  
OTOL 8234 - Anatomy of the Head and Neck and Temporal Bone Dissection (2.0 cr)  
OTOL 8247 - Anatomy and Physiology of Hearing and Balance (3.0 cr)  
PA 5451 - Immigration, Health and Public Policy (3.0 cr)  
PHAR 5201 - Applied Medical Terminology (2.0 cr)  
PSY 4036 - Perceptual Issues in Visual Impairment (3.0 cr)  
PSY 4960 - Seminar in Psychology (1.0 - 4.0 cr)  
PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)  
PSY 5054 - Psychology of Language (3.0 cr)  
PSY 5062 - Cognitive Neuropsychology (3.0 cr)  
PSY 5137 - Introduction to Behavioral Genetics (3.0 cr)  
PSY 5138 - Adult Development and Aging (3.0 cr)  
PSY 5205 - Applied Social Psychology (3.0 cr)  
PSY 5960 - Topics in Psychology (1.0 - 4.0 cr)  
PSY 8037 - Psychophysics and Audition (3.0 cr)  
PUBH 6055 - Social Inequalities in Health (2.0 cr)  
PUBH 6370 - Social Epidemiology (2.0 cr)  
PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)  
PUBH 6904 - Nutrition and Aging (2.0 cr)  
PUBH 8805 - Sociological Theory in Health Services Research (3.0 cr)  
SLHS 4402 - Assessment and Treatment in Speech-Language Pathology (3.0 cr)  
SLHS 5502 - Voice and Cleft Palate (3.0 cr)  
SLHS 5602 - Speech Sound Disorders: Assessment and Treatment across Languages (3.0 cr)  
SLHS 5603 - Assessment and Intervention of Language Disorders in Children (3.0 cr)  
SLHS 5605 - Language and Cognitive Disorders in Adults (3.0 cr)  
SLHS 5606 - Introduction to Augmentative and Alternative Communication (3.0 cr)  
SLHS 5609 - Child Language Disorders in Diverse Populations (3.0 cr)  
SLHS 5900 - Topic in Speech-Language-Hearing Sciences (2.0 cr)  
SLHS 8530 - Seminar: Speech (3.0 cr)  
SOC 4246 - Sociology of Health and Illness (3.0 cr)  
SPAN 5985 - Sociolinguistic Perspectives on Spanish in the United States (3.0 cr)

**Joint- or Dual-degree Coursework:** AuD/PhD in Speech-Language-Hearing Sciences Student may take a total of 9 credits in common among the academic programs.



### *Twin Cities Campus*

## Classical and Near Eastern Studies M.A.

*Classical & Near Eastern Studies*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Classical and Near Eastern Studies, 245 Nicholson Hall, 216 Pillsbury Dr. SE, Minneapolis, MN 55455 (612-625-5353; fax: 612-624-4894)

Email: [cnes@umn.edu](mailto:cnes@umn.edu)

Website: <http://cnes.cla.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 40
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Classical and Near Eastern Studies (CNES) is an interdisciplinary department that brings together faculty and graduate students who might in other settings be dispersed among a wide range of programs. CNES is dedicated to rigorous philological and literary training and to the conviction that the ancient Mediterranean world is best studied as a diverse but richly integrated cultural whole. The master's-level tracks allow students to concentrate in the area and period that most appeal to them, but students are strongly encouraged to take courses across the entire range of the department's offerings and to develop a broad, multidisciplinary approach to research and teaching. Related special facilities include the Center for Medieval Studies, the Center for Jewish Studies, the Center for Modern Greek Studies and the Program in Religious Studies.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.50.

For the Classics track, students should have sufficient knowledge to begin graduate reading courses in either Greek or Latin and at least intermediate ability in the other language.

Other requirements to be completed before admission:

In addition to the online University application, applicants must complete the Department of Classical and Near Eastern Studies application. Other supporting materials, including recommendations and a writing sample, can be uploaded directly into the University's online application. For non-native speakers of English, a copy of TOEFL results is required. Students may be admitted in any academic term, but financial assistance is normally available only to applicants admitted for fall semester.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

Key to [test abbreviations](#)(GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 24 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The Plan B capstone comprises two research papers from departmental seminars, graded B+ or higher, that make substantive use of at least one modern scholarly language other than English.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Translation proficiency exams offered 1x semester

A minimum GPA of 3.25 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

### Outside Coursework (6 credits)

Select at least 6 credits in consultation with the advisor.

### Plan Options

#### Plan A Requirements

Take at least 10 master's thesis credits.

[CNES 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Classics

The Classics track provides broad training in the literature of ancient Greece and Rome in its cultural context. Work in Greek and Latin is supplemented by courses in a related field or area of interest. This track requires nearly equal emphasis on courses and seminars in Greek and in Latin.

Language Requirements: One modern research language as appropriate (normally French, German, or Italian), and reading proficiency in both Greek and Latin as certified by departmental exam based on a set reading list.

Final examinations: the final examinations are written (Greek and Latin reading proficiency) and oral (general).

### Required Coursework (24 credits)

#### Language Courses (15 credits)

Select at least 15 credits from the following in consultation with the advisor. No more than 6 credits of 51xx and/or 52xx courses can be used to meet this requirement.

GRK 5xxx

GRK 8xxx

LAT 5xxx

LAT 8xxx

#### Seminar Courses (6 credits)

Select at least one Greek seminar and at least one Latin seminar in consultation with the advisor.

[GRK 8910](#) - Seminar (3.0 cr)

[LAT 8910](#) - Seminar (3.0 cr)

#### Prose Composition Course (3 credits)

Select at least one of the following in consultation with the advisor:

[GRK 5701](#) - Prose Composition (3.0 cr)

[LAT 5701](#) - Latin Prose Composition (3.0 cr)

### Greek

The Greek track provides a core of advanced work in Greek supplemented by a related field or area of interest.



Language Requirements: One modern research language as appropriate, preferably French, German, or Italian, and reading proficiency in Greek as demonstrated by a departmental examination based on a set reading list.

Final examinations: the final examinations are written (Greek reading proficiency) and oral (general).

**Required Coursework (24 credits)**

**Language Courses (15 credits)**

Select at least 15 credits from the following in consultation with the advisor. No more than 6 credits of 51xx and/or 52xx credits can be applied to this requirement.

GRK 5xxx

GRK 8xxx

**Seminar Courses (6 credits)**

Select two seminars, at least one of which must be GRK 8910, in consultation with the advisor.

[GRK 8910](#) - Seminar (3.0 cr)

[CNES 8190](#) - Seminar: Issues in Ancient Art and Archaeology (3.0 cr)

**Prose Composition Course (3 credits)**

Take the following course:

[GRK 5701](#) - Prose Composition (3.0 cr)

**Latin**

The Latin track provides a core of advanced work in Latin supplemented by a related field or area of interest.

Language Requirements: One modern research language as appropriate, preferably French, German, or Italian, and reading proficiency in Latin as demonstrated by a departmental examination based on a set reading list.

Final examinations: the final examinations are written (Latin reading proficiency) and oral (general).

**Required Coursework (24 credits)**

**Language Courses (15 credits)**

Select at least 15 credits from the following in consultation with the advisor. No more than 6 credits of 51xx and/or 52xx credits can be applied to this requirement.

LAT 5xxx

LAT 8xxx

**Seminar Courses (6 credits)**

Select two seminars, at least one of which must be LAT 8910, in consultation with the advisor.

[LAT 8910](#) - Seminar (3.0 cr)

[CNES 8190](#) - Seminar: Issues in Ancient Art and Archaeology (3.0 cr)

**Prose Composition Course (3 credits)**

Take the following course:

[LAT 5701](#) - Latin Prose Composition (3.0 cr)

**Religions in Antiquity**

The Religions in Antiquity track is comparative in both method and content. Although students may focus on a particular religious tradition, they will nonetheless study several ancient religions.

Language Requirements: Proficiency in one modern language (usually German) and master's-level proficiency in classical Hebrew, Greek, or Latin as demonstrated by a departmental examination based on a set reading list.

Final examinations: the final examinations are written (ancient language reading proficiency) and oral (general).

**Required Course (3 credits)**

Take the following course. An alternative course may be applied to this requirement with director of graduate studies approval.

[RELS 5001](#) - Theory and Method in the Study of Religion: Critical Approaches to the Study of Religion (3.0 cr)

**Distribution Requirement (21 credits)**

Select at least one course from three of the following four areas for a total of 12 credits, and the remaining 9 credits of the distribution requirement with approval by the director of graduate studies. At least one 8-level course is required. At least 12 of the 21 credits must involve substantial primary readings in an ancient language.

**Hebrew Bible or Ancient Near East**

[CNES 8513](#) - Scripture and Interpretation (3.0 cr)

**Greek and Roman Religions**

[CNES 5071](#) - Greek and Hellenistic Religions (3.0 cr)

[RELS 5071](#) - Greek and Hellenistic Religions (3.0 cr)

**Ancient Judaism**



[CNES 5204](#) - The Dead Sea Scrolls (3.0 cr)

[HEBR 5300](#) - Post-Biblical Hebrew: Second Temple Period (3.0 cr)

[RELS 5204](#) - The Dead Sea Scrolls (3.0 cr)

[RELS 5504](#) - Development of Israelite Religion II (3.0 cr)

**New Testament and Early Christianity**

[CNES 5072](#) - The Birth of Christianity [AH] (3.0 cr)

[GRK 5200](#) - Biblical Greek (3.0 cr)

[GRK 8400](#) - Readings in Patristic Greek (3.0 cr)

[RELS 5072](#) - The Birth of Christianity [AH] (3.0 cr)



### *Twin Cities Campus*

## Classical and Near Eastern Studies Minor

*Classical & Near Eastern Studies*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Classical and Near Eastern Studies, 245 Nicholson Hall, 216 Pillsbury Drive SE, Minneapolis, MN 55455 (612-625-5353; fax: 612-624-4894)

Email: [cnes@umn.edu](mailto:cnes@umn.edu)

Website: <http://cnes.cla.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Classical and Near Eastern Studies (CNES) is an interdisciplinary department that brings together faculty and graduate students who might in other settings be dispersed among a wide range of programs. CNES is dedicated to rigorous philological and literary training, and to the conviction that the ancient Mediterranean world is best studied as a diverse but richly integrated cultural whole.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.50.

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the CNES director of graduate studies regarding feasibility and requirements.

Students should have sufficient language proficiency, as determined by the Classical and Near Eastern Studies director of graduate studies, to pursue the minor successfully.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

Language Requirement: Reading proficiency in either Greek or Latin.

#### **Coursework (9 to 12 credits)**

Masters students select at least 9 credits, and doctoral students select at least 12 credits of minor field coursework. Course selection is individualized based on the academic and professional goals of the student, and requires approval of the Classical and Near Eastern Studies director of graduate studies.

### Program Sub-plans

Students are required to complete one of the following sub-plans.



Students may not complete the program with more than one sub-plan.

Masters

Doctoral





### *Twin Cities Campus*

## Classical and Near Eastern Studies Ph.D.

*Classical & Near Eastern Studies*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Classical and Near Eastern Studies, 245 Nicholson Hall, 216 Pillsbury Dr. SE, Minneapolis, MN 55455 (612-625-5353; fax: 612-624-4894)

Email: [cnes@umn.edu](mailto:cnes@umn.edu)

Website: <http://cnes.cla.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 69
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Classical and Near Eastern Studies (CNES) is an interdisciplinary department that brings together faculty and graduate students who might in other settings be dispersed among a wide range of programs. CNES is dedicated to rigorous philological and literary training and to the conviction that the ancient Mediterranean world is best studied as a diverse but richly integrated cultural whole. The various tracks allow students to concentrate in the area and period that most appeal to them, but students are strongly encouraged to take courses across the entire range of the department's offerings and to develop a broad, multidisciplinary approach to research and teaching. Related special facilities include the Center for Medieval Studies, the Center for Jewish Studies, the Consortium for the Study of the Pre-Modern World, and the Program in Religions Studies.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

In addition to the online University application, applicants must complete the Department of Classical and Near Eastern Studies application (also available for download on the department website); other supporting materials, including recommendations and a writing sample, can be uploaded directly into the University's online application. For nonnative speakers of English, a copy of TOEFL results is required. Students may be admitted in any academic term, but financial assistance is normally available only to applicants admitted for fall semester.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

Key to [test abbreviations](#)(GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

33 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: German and a second modern research language.

A minimum GPA of 3.50 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

### Outside Coursework (12 credits)

Select 12 credits outside the major in consultation with the advisor and director of graduate studies.

### Thesis Credits

Take at least 24 doctoral thesis credits.

[CNES 8888](#) - Thesis Credits: Doctoral (1.0 - 24.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Classics

The Classics track requires extensive advanced work in both Latin and Greek, together with some study in a related field or area of interest. The track requires nearly equal emphasis on courses and seminars in Greek and in Latin.

Language Requirements: German, plus another modern language, preferably French or Italian, as well as reading proficiency in both Greek and Latin, as demonstrated by a departmental examination based on a set reading list.

### Language Coursework (24 credits)

#### Language Courses (21 credits)

Select at least 9 credits of Greek and 9 credits of Latin, in consultation with the advisor, plus additional language courses for a total of 21 credits. Of the 18 credits, at least half must be from Greek or Latin seminar courses (6 seminar credits from one language and 3 seminar credits from the other). 51xx and 52xx courses cannot be applied to this requirement.

[GRK 5705](#) - Introduction to the Historical-Comparative Grammar of Greek and Latin (3.0 cr)

[GRK 5993](#) - Directed Studies (1.0 - 4.0 cr)

[GRK 5994](#) - Directed Research (1.0 - 12.0 cr)

[GRK 5996](#) - Directed Instruction (1.0 - 12.0 cr)

[GRK 8100](#) - Readings in Greek Prose (3.0 cr)

[GRK 8120](#) - Greek Text Course (3.0 cr)

[GRK 8200](#) - Readings in Greek Verse (3.0 cr)

[GRK 8262](#) - Survey of Greek Literature I (3.0 cr)

[GRK 8263](#) - Survey of Greek Literature II (3.0 cr)

[GRK 8300](#) - Readings in Greek Texts (3.0 cr)

[GRK 8400](#) - Readings in Patristic Greek (3.0 cr)

[GRK 8910](#) - Seminar (3.0 cr)

[LAT 5703](#) - Epigraphy (3.0 cr)

[LAT 5705](#) - Introduction to the Historical-Comparative Grammar of Greek and Latin (3.0 cr)

[LAT 5993](#) - Directed Studies (1.0 - 4.0 cr)

[LAT 5994](#) - Directed Research (1.0 - 12.0 cr)

[LAT 5996](#) - Directed Instruction (1.0 - 12.0 cr)

[LAT 8100](#) - Readings in Latin Prose (3.0 cr)

[LAT 8120](#) - Latin Text Course (3.0 cr)

[LAT 8200](#) - Readings in Latin Verse (3.0 cr)

[LAT 8262](#) - Survey of Latin Literature I (3.0 cr)

[LAT 8263](#) - Survey of Latin Literature II (3.0 cr)

[LAT 8267](#) - Graduate Survey of Latin Literature of Late Antiquity (3.0 cr)

[LAT 8300](#) - Readings in Latin Texts (3.0 cr)



LAT 8910 - Seminar (3.0 cr)

**Prose Composition Course (3 credits)**

Select one of the following in consultation with the advisor:

GRK 5701 - Prose Composition (3.0 cr)

LAT 5701 - Latin Prose Composition (3.0 cr)

**Art or Archaeology Coursework (3 credits)**

Select at least 3 credits from the following in consultation with the advisor. Other coursework may be applied to this requirement with director of graduate studies approval.

ANTH 5027W - Archaeology of Prehistoric Europe [HIS, WI] (3.0 cr)

ANTH 5221 - Anthropology of Material Culture (3.0 cr)

ANTH 5269 - Analysis of Stone Tool Technology (4.0 cr)

ANTH 5401 - The Human Fossil Record (3.0 cr)

ANTH 5402 - Zooarchaeology Laboratory (3.0 cr)

ANTH 5448 - Applied Heritage Management (3.0 cr)

ANTH 5980 - Topics in Anthropology (3.0 cr)

ANTH 8004 - Foundations of Anthropological Archaeology (3.0 cr)

ANTH 8112 - Reconstructing Hominin Behavior (3.0 cr)

ANTH 8230 - Anthropological Research Design (3.0 cr)

ANTH 8244 - Interpreting Ancient Bone (4.0 cr)

ANTH 8510 - Topics in Archaeology (3.0 cr)

ARTH 5335 - Baroque Rome: Art and Politics in the Papal Capital (3.0 cr)

ARTH 5785 - Art of Islamic Iran (3.0 cr)

ARTH 5787 - Visual Cultures in Contact: Cross-Cultural Interaction in the Ancient and Early Medieval Worlds (3.0 cr)

ARTH 5950 - Topics: Art History (3.0 cr)

ARTH 8190 - Seminar: Issues in Ancient Art and Archaeology (3.0 cr)

ARTH 8200 - Seminar: Medieval Art (3.0 cr)

ARTH 8710 - Seminar: Islamic Art (3.0 cr)

**Ancient History Coursework (6 credits)**

Select at least 6 credits in Ancient History from the following, in consultation with the director of graduate studies.

CNES 5502 - Ancient Israel: From Conquest to Exile (3.0 cr)

HIST 5053 - Doing Roman History: Sources, Methods, and Trends (3.0 cr)

HIST 5115 - Medieval Latin Historians (3.0 cr)

HIST 5281 - European Intellectual History: The Early Modern Period, Antiquity to 1750 (3.0 cr)

HIST 5547 - Empire and Nations in the Middle East (3.0 cr)

HIST 5611 - New Directions in the Middle Ages, ca. 300-1100 (3.0 cr)

HIST 8015 - Scope and Methods of Historical Studies (3.0 cr)

**Religions in Antiquity**

**Required Coursework (9 credits)**

Take the following courses:

CNES 8513 - Scripture and Interpretation (3.0 cr)

RELS 5001 - Theory and Method in the Study of Religion: Critical Approaches to the Study of Religion (3.0 cr)

RELS 8190 - Comparative Seminar in Religions in Antiquity (3.0 cr)

**Concentration Areas**

Select one of the two following concentration areas. In addition, select a primary language of competence, and at least one secondary language of competence.

**Ancient Near East and Hebrew Bible (24 credits)**

This concentration area focuses on the religions, literatures, and cultures of Mesopotamia, Canaan, and Israel from the 2nd millennium BCE to the arrival of Roman rule in the first century BCE. The required primary language is Hebrew. Secondary language options are Aramaic, Akkadian, Ugaritic, or Greek.

**Concentration Area Coursework (24 credits)**

Select at least 24 credits from the following in consultation with the advisor. Other coursework may be applied to this requirement with advisor approval.

ANTH 4049 - Religion and Culture (3.0 cr)

ANTH 5027W - Archaeology of Prehistoric Europe [HIS, WI] (3.0 cr)

CNES 5071 - Greek and Hellenistic Religions (3.0 cr)

CNES 5072 - The Birth of Christianity [AH] (3.0 cr)

CNES 5121 - Gender and Body in Early Christianity [AH] (3.0 cr)

CNES 5204 - The Dead Sea Scrolls (3.0 cr)

CNES 5502 - Ancient Israel: From Conquest to Exile (3.0 cr)

CNES 8530 - Religions of the Ancient Mediterranean World (3.0 cr)

CNES 8550 - Gender and Body in Ancient Religion (3.0 cr)

CNES 8570 - Readings in Religious Texts (3.0 cr)



GRK 5200 - Biblical Greek (3.0 cr)  
GRK 8400 - Readings in Patristic Greek (3.0 cr)  
HEBR 5200 - Advanced Classical Hebrew (3.0 cr)  
HEBR 5300 - Post-Biblical Hebrew: Second Temple Period (3.0 cr)  
HIST 5053 - Doing Roman History: Sources, Methods, and Trends (3.0 cr)  
HIST 5614 - The Medieval Church (3.0 cr)  
HIST 8110 - Medieval History: Research Seminar (3.0 cr)  
HIST 8930 - Topics in Ancient History (1.0 - 4.0 cr)  
LAT 5200 - Advanced Reading in Later Latin (3.0 cr)  
RELS 5013W - Biblical Law and Jewish Ethics [WI] (3.0 cr)  
RELS 5071 - Greek and Hellenistic Religions (3.0 cr)  
RELS 5072 - The Birth of Christianity [AH] (3.0 cr)  
RELS 5121 - Gender and Body in Early Christianity [AH] (3.0 cr)

-OR-

**Greek and Roman Religions, Formative Judaism, and Early Christianity (24 credits)**

This concentration area focuses on the religions, literatures, and cultures of Greece, Rome and the Mediterranean world, with potential focal points in Egypt, Asia Minor, or Syria-Palestine. It centers on the period from Alexander the Great to Marcus Aurelius, and encompasses Second Temple Judaism and early Christianity, including New Testament literature. The required primary language is Greek or Latin. Secondary language options are Hebrew, Aramaic, Coptic, Greek, or Latin.

**Concentration Area Coursework (24 credits)**

Select at least 24 credits from the following in consultation with the advisor. Other coursework may be applied to this requirement with advisor approval.

ANTH 4049 - Religion and Culture (3.0 cr)  
ANTH 5027W - Archaeology of Prehistoric Europe [HIS, WI] (3.0 cr)  
CNES 5071 - Greek and Hellenistic Religions (3.0 cr)  
CNES 5072 - The Birth of Christianity [AH] (3.0 cr)  
CNES 5121 - Gender and Body in Early Christianity [AH] (3.0 cr)  
CNES 5204 - The Dead Sea Scrolls (3.0 cr)  
CNES 5502 - Ancient Israel: From Conquest to Exile (3.0 cr)  
CNES 8530 - Religions of the Ancient Mediterranean World (3.0 cr)  
CNES 8550 - Gender and Body in Ancient Religion (3.0 cr)  
CNES 8570 - Readings in Religious Texts (3.0 cr)  
GRK 5200 - Biblical Greek (3.0 cr)  
GRK 8400 - Readings in Patristic Greek (3.0 cr)  
HEBR 5200 - Advanced Classical Hebrew (3.0 cr)  
HEBR 5300 - Post-Biblical Hebrew: Second Temple Period (3.0 cr)  
HIST 5053 - Doing Roman History: Sources, Methods, and Trends (3.0 cr)  
HIST 5614 - The Medieval Church (3.0 cr)  
HIST 8110 - Medieval History: Research Seminar (3.0 cr)  
HIST 8930 - Topics in Ancient History (1.0 - 4.0 cr)  
LAT 5200 - Advanced Reading in Later Latin (3.0 cr)  
RELS 5013W - Biblical Law and Jewish Ethics [WI] (3.0 cr)  
RELS 5071 - Greek and Hellenistic Religions (3.0 cr)  
RELS 5072 - The Birth of Christianity [AH] (3.0 cr)  
RELS 5121 - Gender and Body in Early Christianity [AH] (3.0 cr)



### **Twin Cities Campus**

## **Cognitive Science M.S.**

CLA Dean's Office

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Center for Cognitive Sciences

205 Elliott Hall

75 E. River Parkway

Minneapolis, MN 55455

Email: [cogsci@umn.edu](mailto:cogsci@umn.edu)

Website: <http://www.cogsciphd.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MS Cognitive Science program is structured to allow students the flexibility to pursue a wide variety of research topics, and to integrate methodologies and perspectives from different disciplines. In addition to a course that introduces students to the field of Cognitive Science, at least three course credits from each of the following areas are required: cognitive psychology, computer science/artificial intelligence, linguistics, neuroscience and philosophy.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is written and oral.

**Plan C:** Plan C requires 30 major credits and 0 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

#### **Introduction Course (3 credits)**

Take one of the following courses in consultation with the advisor. A substitute course can be applied to this requirement with approval of the director of graduate studies.

[CGSC 8000](#) - Seminar: Philosophy of the Cognitive Sciences (3.0 cr)

or [CGSC 8041](#) - Cognitive Neuroscience (4.0 cr)

#### **Electives (17 to 27 credits)**



All students must select at least 3 credits from each of the following 5 disciplines for a total of 15 credits. Plan A students choose an additional 1-2 credits, Plan B students an additional 5-6 credits, and Plan C students an additional 11-12 credits from this list to meet the 30-credit minimum. Substitute coursework can be applied to this requirement with the approval of the advisor and director of graduate studies.

**Cognitive Psychology (3 credits)**

- CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)
- EPSY 5114 - Psychology of Student Learning (3.0 cr)
- EPSY 8112 - Mathematical Cognition (3.0 cr)
- EPSY 8116 - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)
- EPSY 8117 - Writing Empirical Paper and Research/Grant Proposals in Education and Psychology (3.0 cr)
- EPSY 8118 - Advanced Cognitive Psychology (3.0 cr)
- PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)
- PSY 5015 - Cognition, Computation, and Brain (3.0 cr)
- PSY 5062 - Cognitive Neuropsychology (3.0 cr)
- PSY 5064 - Brain and Emotion (3.0 cr)
- PSY 8010 - Advanced Topics in Learning (3.0 cr)
- PSY 8031 - Seminar: Visual Perception (2.0 cr)
- PSY 8036 - Topics in Computational Vision (3.0 cr)
- PSY 8042 - Proseminar in Cognition, Brain, and Behavior (3.0 cr)
- PSY 8055 - Seminar: Cognitive Neuroscience (3.0 cr)
- PSY 8056 - Seminar: Psychology of Language (3.0 cr)

**Computer Science (3 credits)**

- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
- CSCI 5127W - Embodied Computing: Design & Prototyping [WI] (3.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
- CSCI 5511 - Artificial Intelligence I (3.0 cr)
- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)
- CSCI 5561 - Computer Vision (3.0 cr)
- CSCI 5609 - Visualization (3.0 cr)
- CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)
- CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)
- CSCI 8211 - Advanced Computer Networks and Their Applications (3.0 cr)
- CSCI 8551 - Intelligent Agents (3.0 cr)
- CSCI 8725 - Databases for Bioinformatics (3.0 cr)

**Linguistics (3 credits)**

Please note LING 8900 may be used depending on the specific topic taken.

- LING 5001 - Introduction to Linguistics (4.0 cr)
- LING 5201 - Syntactic Theory I (3.0 cr)
- LING 5202 - Syntactic Theory II (3.0 cr)
- LING 5205 - Semantics (3.0 cr)
- LING 5206 - Linguistic Pragmatics (3.0 cr)
- LING 5801 - Introduction to Computational Linguistics (3.0 cr)
- LING 8200 - Topics in Syntax and Semantics (3.0 cr)
- LING 8210 - Seminar in Syntax (3.0 cr)
- LING 8900 - Seminar: Topics in Linguistics (3.0 cr)
- LING 8921 - Seminar in Language and Cognition (3.0 cr)

**Neuroscience (3 credits)**

- NSC 5202 - Theoretical Neuroscience: Systems and Information Processing (3.0 cr)
- NSC 5461 - Cellular and Molecular Neuroscience (4.0 cr)
- NSC 5561 - Systems Neuroscience (4.0 cr)
- NSC 8217 - Systems and Computational Neuroscience (2.0 cr)

**Philosophy (3 credits)**

- PHIL 5615 - Mind, Bodies and Machines (3.0 cr)
- PHIL 8131 - Epistemology Survey (3.0 cr)
- PHIL 8180 - Seminar: Philosophy of Language (3.0 cr)
- PHIL 8182 - Formal Semantics of Natural Language (3.0 cr)
- PHIL 8620 - Seminar: Philosophy of the Biological Sciences (3.0 cr)
- PHIL 8670 - Seminar: Philosophy of Science (3.0 cr)

**Plan Options**

**Plan A**

All Plan A students must take at least 10 master's thesis credits.

- CGSC 8777 - Thesis Credit: Masters (1.0 - 10.0 cr)



-OR-

**Plan B**

All Plan B students must take 6 credits of the following:

[CGSC 8991](#) - Independent Study (1.0 - 4.0 cr)



### *Twin Cities Campus*

## Cognitive Science Minor

CLA Dean's Office

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Center for Cognitive Sciences, University of Minnesota, 205 Elliott Hall, 75 East River Road, Minneapolis, MN 55455 (612-626-3570; fax: 612-626-7253)

Email: [cogsci@umn.edu](mailto:cogsci@umn.edu)

Website: <http://www.cogsci.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9 to 10
- Length of program in credits (Doctorate): 12 to 13
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The cognitive science minor provides an opportunity for students to pursue integrated coursework, which emphasizes theory and methods in cognitive science.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Cognitive Science director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

The minimum cumulative GPA for coursework applied to the minor is 3.00.

### **Coursework**

#### **Introduction Course (3 to 4 credits)**

Select one of the following courses, or a substitute course, with the approval of the Cognitive Science director of graduate studies.

[CGSC 8000](#) - Seminar: Philosophy of the Cognitive Sciences (3.0 cr)

or [CGSC 8041](#) - Cognitive Neuroscience (4.0 cr)

#### **Electives (5 to 9 credits)**

Master's students select at least 5 credits, and doctoral students select at least 9 credits from the following to meet minimum requirements for the minor. Approval of the Cognitive Science director of graduate studies is required.

#### **Cognitive Science**

[CGSC 8410](#) - Perspectives in Learning, Perception, and Cognition (2.0 cr)

#### **Cognitive Psychology**

[CPSY 8301](#) - Developmental Psychology: Cognitive Processes (4.0 cr)

[EPSY 5114](#) - Psychology of Student Learning (3.0 cr)

[EPSY 8112](#) - Mathematical Cognition (3.0 cr)

[EPSY 8116](#) - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)

[EPSY 8118](#) - Advanced Cognitive Psychology (3.0 cr)





PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)

PSY 5015 - Cognition, Computation, and Brain (3.0 cr)

PSY 5062 - Cognitive Neuropsychology (3.0 cr)

PSY 5064 - Brain and Emotion (3.0 cr)

PSY 8010 - Advanced Topics in Learning (3.0 cr)

PSY 8031 - Seminar: Visual Perception (2.0 cr)

PSY 8036 - Topics in Computational Vision (3.0 cr)

PSY 8042 - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

PSY 8055 - Seminar: Cognitive Neuroscience (3.0 cr)

PSY 8056 - Seminar: Psychology of Language (3.0 cr)

PSY 8201 - Social Cognition (3.0 cr)

#### Computer Science

CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)

CSCI 5127W - Embodied Computing: Design & Prototyping [WI] (3.0 cr)

CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)

CSCI 5511 - Artificial Intelligence I (3.0 cr)

CSCI 5521 - Introduction to Machine Learning (3.0 cr)

CSCI 5525 - Machine Learning (3.0 cr)

CSCI 5561 - Computer Vision (3.0 cr)

CSCI 5609 - Visualization (3.0 cr)

CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)

CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)

CSCI 8551 - Intelligent Agents (3.0 cr)

#### Linguistics

LING 5001 - Introduction to Linguistics (4.0 cr)

LING 5201 - Syntactic Theory I (3.0 cr)

LING 5202 - Syntactic Theory II (3.0 cr)

LING 5205 - Semantics (3.0 cr)

LING 5206 - Linguistic Pragmatics (3.0 cr)

LING 5801 - Introduction to Computational Linguistics (3.0 cr)

LING 8200 - Topics in Syntax and Semantics (3.0 cr)

LING 8210 - Seminar in Syntax (3.0 cr)

LING 8900 - Seminar: Topics in Linguistics (3.0 cr)

LING 8921 - Seminar in Language and Cognition (3.0 cr)

#### Neuroscience

NSC 5202 - Theoretical Neuroscience: Systems and Information Processing (3.0 cr)

NSC 5461 - Cellular and Molecular Neuroscience (4.0 cr)

NSC 5561 - Systems Neuroscience (4.0 cr)

NSC 8217 - Systems and Computational Neuroscience (2.0 cr)

#### Philosophy

PHIL 4615 - Minds, Bodies, and Machines (3.0 cr)

PHIL 8131 - Epistemology Survey (3.0 cr)

PHIL 8180 - Seminar: Philosophy of Language (3.0 cr)

PHIL 8182 - Formal Semantics of Natural Language (3.0 cr)

PHIL 8620 - Seminar: Philosophy of the Biological Sciences (3.0 cr)

PHIL 8670 - Seminar: Philosophy of Science (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Cognitive Science Ph.D.**

CLA Dean's Office

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Center for Cognitive Sciences, University of Minnesota, 205 Elliott Hall, 75 East River Road, Minneapolis, MN 55455 (612-626-3570; fax: 612-626-7253)

Email: [cogsci@umn.edu](mailto:cogsci@umn.edu)

Website: <http://www.cogsci.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Cognitive science is broadly concerned with integrating contemporary approaches to the study of mind/brain, and with the systems and processes underlying the acquisition and use of knowledge. The coherence of the program lies in its intellectual focus on cognition. This program spans cellular, behavioral, and psychological levels of scientific analysis in the study of cognition in a single unified graduate program. It integrates the diverse content, methods, and perspectives of a number of different disciplines (e.g., anthropology, biology, artificial intelligence, linguistics, neuroscience, philosophy, and psychology), which are concerned with or in some sense inform our understanding of cognition. The PhD program trains cognitive scientists to conduct research integrating methodologies and content knowledge from a variety of approaches. In order to ensure an interdisciplinary approach, each student has two co-advisors from the cognitive science graduate faculty, each representing a different discipline from within the cognitive sciences.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Applications should be received no later than December 1 of the preceding academic year. Entry is usually in fall semester but may be permitted in other semesters in exceptional cases.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

36 credits are required in the major.

0 credits are required outside the major.



24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

Coursework offered on both the A/F and S/N grade basis must be taken A/F to be applied to major-field requirements.

Students are required to take one core course with a GCSC designator, as well as 3 credits from the research breadth area.

### **Introduction Course (3 credits)**

Select one of the following courses in consultation with the advisor. A substitute course can be applied to this requirement with approval of the director of graduate studies.

[CGSC 8000](#) - Seminar: Philosophy of the Cognitive Sciences (3.0 cr)

or [CGSC 8041](#) - Cognitive Neuroscience (4.0 cr)

### **Electives (30 credits)**

Select at least 3 credits from each of the disciplines below, in consultation with the advisor, for a total of 18 credits. The remaining 12 credits can be from the following list or other coursework as appropriate for the research focus. Advisor approval is required.

#### **Cognitive Psychology (3 credits)**

[CPSY 8301](#) - Developmental Psychology: Cognitive Processes (4.0 cr)

[EPSY 5114](#) - Psychology of Student Learning (3.0 cr)

[EPSY 8112](#) - Mathematical Cognition (3.0 cr)

[EPSY 8116](#) - Reading for Meaning: Cognitive Processes in the Comprehension of Texts (3.0 cr)

[EPSY 8117](#) - Writing Empirical Paper and Research/Grant Proposals in Education and Psychology (3.0 cr)

[EPSY 8118](#) - Advanced Cognitive Psychology (3.0 cr)

[PSY 5014](#) - Psychology of Human Learning and Memory (3.0 cr)

[PSY 5015](#) - Cognition, Computation, and Brain (3.0 cr)

[PSY 5062](#) - Cognitive Neuropsychology (3.0 cr)

[PSY 5064](#) - Brain and Emotion (3.0 cr)

[PSY 8010](#) - Advanced Topics in Learning (3.0 cr)

[PSY 8031](#) - Seminar: Visual Perception (2.0 cr)

[PSY 8036](#) - Topics in Computational Vision (3.0 cr)

[PSY 8042](#) - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

[PSY 8055](#) - Seminar: Cognitive Neuroscience (3.0 cr)

[PSY 8056](#) - Seminar: Psychology of Language (3.0 cr)

#### **Computer Science (3 credits)**

[CSCI 5115](#) - User Interface Design, Implementation and Evaluation (3.0 cr)

[CSCI 5127W](#) - Embodied Computing: Design & Prototyping [WI] (3.0 cr)

[CSCI 5421](#) - Advanced Algorithms and Data Structures (3.0 cr)

[CSCI 5511](#) - Artificial Intelligence I (3.0 cr)

[CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)

[CSCI 5525](#) - Machine Learning (3.0 cr)

[CSCI 5561](#) - Computer Vision (3.0 cr)

[CSCI 5609](#) - Visualization (3.0 cr)

[CSCI 5619](#) - Virtual Reality and 3D Interaction (3.0 cr)

[CSCI 8115](#) - Human-Computer Interaction and User Interface Technology (3.0 cr)

[CSCI 8211](#) - Advanced Computer Networks and Their Applications (3.0 cr)

[CSCI 8551](#) - Intelligent Agents (3.0 cr)

[CSCI 8725](#) - Databases for Bioinformatics (3.0 cr)

#### **Linguistics (3 credits)**

Please note LING 8900 may be used depending on the specific topic taken.

[LING 5001](#) - Introduction to Linguistics (4.0 cr)

[LING 5201](#) - Syntactic Theory I (3.0 cr)

[LING 5202](#) - Syntactic Theory II (3.0 cr)

[LING 5205](#) - Semantics (3.0 cr)

[LING 5206](#) - Linguistic Pragmatics (3.0 cr)

[LING 5801](#) - Introduction to Computational Linguistics (3.0 cr)

[LING 8200](#) - Topics in Syntax and Semantics (3.0 cr)

[LING 8210](#) - Seminar in Syntax (3.0 cr)

[LING 8900](#) - Seminar: Topics in Linguistics (3.0 cr)

[LING 8921](#) - Seminar in Language and Cognition (3.0 cr)

#### **Neuroscience (3 credits)**



NSC 5202 - Theoretical Neuroscience: Systems and Information Processing (3.0 cr)

NSC 5461 - Cellular and Molecular Neuroscience (4.0 cr)

NSC 5561 - Systems Neuroscience (4.0 cr)

NSC 8217 - Systems and Computational Neuroscience (2.0 cr)

**Philosophy (3 credits)**

PHIL 5615 - Mind, Bodies and Machines (3.0 cr)

PHIL 8131 - Epistemology Survey (3.0 cr)

PHIL 8180 - Seminar: Philosophy of Language (3.0 cr)

PHIL 8182 - Formal Semantics of Natural Language (3.0 cr)

PHIL 8620 - Seminar: Philosophy of the Biological Sciences (3.0 cr)

PHIL 8670 - Seminar: Philosophy of Science (3.0 cr)

**Research Breadth (3 credits)**

CGSC 8410 - Perspectives in Learning, Perception, and Cognition (2.0 cr)

CGSC 8991 - Independent Study (1.0 - 4.0 cr)

**Thesis Credits**

Take 24 doctoral thesis credits.

CGSC 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### *Twin Cities Campus*

## Communication Studies M.A.

*Communication Studies*

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Communication Studies, 225 Ford Hall, 224 Church Street S.E., Minneapolis, MN 55455 (612-624-5800; fax: 612-624-6544).

Website: <http://www.comm.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 33
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Communication Studies graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Communication Studies PhD program.

The Communication Studies program has a national reputation for excellence in the areas of critical media studies, interpersonal communication, and rhetoric. Our graduate students are highly motivated scholars at the cutting edge of communication research with an equally strong commitment to becoming skilled instructors. Although most students emphasize one of these areas, students take courses across each of the three sub-disciplines.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.50.

### **Special Application Requirements:**

Note: The Communication Studies graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Communication Studies PhD program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan B:** Plan B requires 24 to 27 major credits and 6 to 9 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** A publishable, article-length paper consisting of the student's original research.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.50 is required for students to remain in good standing.

### **Major Coursework (24 to 27 credits)**

Select 24 to 27 credits from the following in consultation with the advisor:

[COMM 5110](#) - Special Topics in Communication Theory (3.0 cr)

[COMM 5211](#) - Critical Media Studies: Theory and Methods (3.0 cr)



COMM 5221 - Media, Race, and Identity (3.0 cr)  
COMM 5231 - Media Outlaws (3.0 cr)  
COMM 5250 - Environmental Communication (3.0 cr)  
COMM 5261 - Political Economy of Media Culture (3.0 cr)  
COMM 5401 - Advanced Theories of Communication (3.0 cr)  
COMM 5402 - Advanced Interpersonal Communication (3.0 cr)  
COMM 5411 - Small Group Communication Research (3.0 cr)  
COMM 5431 - The Process of Persuasion (3.0 cr)  
COMM 5441 - Communication in Human Organizations (3.0 cr)  
COMM 5451W - Intercultural Communication Processes [WI] (3.0 cr)  
COMM 5611 - Survey of Rhetorical Theory (3.0 cr)  
COMM 5615W - Introduction to Rhetorical Criticism [WI] (3.0 cr)  
COMM 5617 - History and Criticism of U.S. Public Discourse: 1630-1865 (3.0 cr)  
COMM 5970 - Directed Study (1.0 - 3.0 cr)  
COMM 8000 - Communication Studies Research Colloquium (1.0 cr)  
COMM 8101 - Introduction to Graduate Communication Studies (3.0 cr)  
COMM 8210 - Seminar: Selected Topics in U.S. Electronic Media (3.0 cr)  
COMM 8402 - Seminar: Interpersonal Communication (3.0 cr)  
COMM 8403 - Seminar: Emotion and Communication (3.0 cr)  
COMM 8451 - Seminar: Intercultural and Diversity Research (3.0 cr)  
COMM 8452 - Seminar: Methods of Intercultural/Diversity Facilitation (3.0 cr)  
COMM 8502 - Seminar: Communication Theory Construction (3.0 cr)  
COMM 8504 - Seminar: Rhetorical Criticism (3.0 cr)  
COMM 8606 - Seminar: Rhetorical Analysis of Campaigns and Movements (3.0 cr)  
COMM 8611 - Seminar: Rhetoric (3.0 cr)  
COMM 8625 - Seminar: Communication Ethics (3.0 cr)  
COMM 8910 - Advanced Topics in Communication Studies (3.0 cr)  
COMM 8994 - Directed Research (1.0 - 3.0 cr)

#### Outside Coursework (6 to 9 credits)

Select credits outside the major, in consultation with the advisor and director of graduate studies, to meet the 33-credit requirement. Other courses can be applied to this requirement with advisor approval.

AFRO 5866 - The Civil Rights and Black Power Movement, 1954-1984 (3.0 cr)  
AMES 5920 - Topics in Asian Culture (3.0 cr)  
AMST 4101 - Gender, Sexuality, and Politics in America [HIS, DSJ] (3.0 cr)  
AMST 8202 - Theoretical Foundations and Current Practice in American Studies (3.0 cr)  
AMST 8231 - Cultural Fallout: The Cold War and Its Legacy, Readings (3.0 cr)  
AMST 8920 - Topics in American Studies (3.0 cr)  
ANTH 8001 - Ethnography, Theory, History (3.0 cr)  
ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)  
ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)  
ARTH 5417 - Twentieth Century Theory and Criticism (3.0 cr)  
BTHX 8000 - Advanced Topics in Bioethics (1.0 - 4.0 cr)  
CL 8910 - Advanced Topics in Comparative Literature (3.0 cr)  
CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)  
CPSY 8360 - Special Topics in Developmental Psychology (1.0 - 3.0 cr)  
CSCL 5555 - Introduction to Semiotics (3.0 cr)  
CSCL 5833 - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)  
CSCL 5993 - Directed Study (1.0 - 3.0 cr)  
EMS 8100 - Workshop in Early Modern Studies (1.0 - 3.0 cr)  
ENGL 5140 - Readings in 18th Century Literature and Culture (3.0 cr)  
ENGL 5805 - Writing for Publication (3.0 cr)  
ENGL 8090 - Seminar in Special Subjects (3.0 cr)  
ENGL 8150 - Seminar in Shakespeare (3.0 cr)  
ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)  
ENGL 8992 - Directed Reading in Language, Literature, Culture, Rhetoric, Composition, or Creative Writing (1.0 - 9.0 cr)  
EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)  
EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)  
EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)  
EPSY 5261 - Introductory Statistical Methods (3.0 cr)  
EPSY 5262 - Intermediate Statistical Methods (3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
EPSY 8252 - Statistical Methods in Education II (3.0 cr)  
FREN 8230 - Critical Issues: Criticism and Thought (3.0 - 9.0 cr)  
FSOS 8001 - Conceptual Frameworks in the Family (3.0 cr)



FW 8394 - Research in Fisheries (1.0 - 4.0 cr)  
FW 8494 - Research in Wildlife (1.0 - 4.0 cr)  
GEOG 8230 - Theoretical Geography (3.0 cr)  
GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)  
GWSS 5104 - Transnational Feminist Theory (3.0 cr)  
GWSS 5406 - Black Feminist Thought in the American and African Diasporas (3.0 cr)  
GWSS 5502 - Gender and Public Policy (3.0 cr)  
GWSS 8210 - Seminar: Feminist Theory & Praxis (3.0 cr)  
GWSS 8230 - Seminar: Cultural Criticism and Media Studies (3.0 cr)  
GWSS 8250 - Seminar: Nation, State, and Citizenship (1.0 - 3.0 cr)  
GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)  
HIST 5283 - Marx, Capital and History: An Introduction to Marxist Theory and History (3.0 cr)  
HIST 5900 - Topics in European/Medieval History (1.0 - 4.0 cr)  
HIST 5960 - Topics in History (1.0 - 4.0 cr)  
HIST 8025 - Politics of Historical Memory (3.0 cr)  
HIST 8910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 8993 - Directed Study (1.0 - 16.0 cr)  
JOUR 8290 - Special Topics in Strategic Communication (3.0 cr)  
JOUR 8650 - Seminar: Psychology of Media Effects (3.0 cr)  
KIN 5371 - Sport and Society (3.0 cr)  
KIN 5511 - Sport and Gender (3.0 cr)  
LING 5900 - Topics in Linguistics (3.0 cr)  
MIMS 8001 - Theories of the Moving Image (3.0 cr)  
MIMS 8003 - Historiography of the Moving Image (3.0 cr)  
OLPD 5128 - Anthropology of Education (3.0 cr)  
PA 5290 - Topics in Planning (0.5 - 4.0 cr)  
PA 5490 - Topics in Social Policy (1.0 - 4.0 cr)  
PA 5721 - Energy Systems and Policy (3.0 cr)  
PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)  
PHIL 8510 - Seminar: Aesthetics Studies (3.0 cr)  
POL 8260 - Topics in Political Theory (3.0 cr)  
PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)  
PSY 8203 - Impression Management (3.0 cr)  
PSY 8205 - Principles of Social Psychology (3.0 cr)  
RELS 8190 - Comparative Seminar in Religions in Antiquity (3.0 cr)  
SAGR 8010 - Colloquium in Sustainable Agriculture (2.0 cr)  
SCMC 5993 - Directed Study (1.0 - 3.0 cr)  
SOC 8090 - Topics in Sociology (1.5 - 3.0 cr)  
SOC 8311 - Political Sociology (3.0 cr)  
SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)  
SOC 8801 - Sociological Research Methods (4.0 cr)  
SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)  
TH 8120 - Seminar (3.0 cr)  
WRIT 5775 - The Rhetorical Tradition: Classical Period (3.0 cr)  
WRIT 5776 - The Rhetorical Tradition: Modern Era (3.0 cr)  
WRIT 8510 - Seminar in Rhetoric (3.0 cr)  
WRIT 8550 - Seminar in Technology, Culture, and Communication (3.0 cr)



### *Twin Cities Campus*

## Communication Studies Minor

*Communication Studies*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Communication Studies, 225 Ford Hall, 224 Church Street S.E., Minneapolis, MN 55455  
(612-624-5800; fax: 612-624-6544)

Website: <http://www.comm.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate minor in Communication Studies is open to all University graduate students currently pursuing an advanced degree in another area of study. Students pursuing complementary subjects such as American Studies, Political Science, Cultural Studies, Sociology, Mass Communication, and Feminist Studies are strongly encouraged to consider pursuing a minor in Communication Studies.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the Communication Studies minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Communication Studies director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

All courses applied to the minor must be taken on the A/F grade basis, with a minimum grade of C+ earned for each.

The minimum cumulative GPA for minor field coursework is 3.5.

#### **Required Coursework (6 to 12 credits)**

Master's students select at least 6 credits, and doctoral students at least 12 credits from the following in consultation with the Communication Studies director of graduate studies:

- [COMM 5110](#) - Special Topics in Communication Theory (3.0 cr)
- [COMM 5211](#) - Critical Media Studies: Theory and Methods (3.0 cr)
- [COMM 5221](#) - Media, Race, and Identity (3.0 cr)
- [COMM 5231](#) - Media Outlaws (3.0 cr)
- [COMM 5250](#) - Environmental Communication (3.0 cr)
- [COMM 5261](#) - Political Economy of Media Culture (3.0 cr)
- [COMM 5401](#) - Advanced Theories of Communication (3.0 cr)
- [COMM 5402](#) - Advanced Interpersonal Communication (3.0 cr)
- [COMM 5411](#) - Small Group Communication Research (3.0 cr)
- [COMM 5431](#) - The Process of Persuasion (3.0 cr)





- COMM 5441 - Communication in Human Organizations (3.0 cr)
- COMM 5451W - Intercultural Communication Processes [WI] (3.0 cr)
- COMM 5611 - Survey of Rhetorical Theory (3.0 cr)
- COMM 5615W - Introduction to Rhetorical Criticism [WI] (3.0 cr)
- COMM 5617 - History and Criticism of U.S. Public Discourse: 1630-1865 (3.0 cr)
- COMM 5970 - Directed Study (1.0 - 3.0 cr)
- COMM 8210 - Seminar: Selected Topics in U.S. Electronic Media (3.0 cr)
- COMM 8402 - Seminar: Interpersonal Communication (3.0 cr)
- COMM 8403 - Seminar: Emotion and Communication (3.0 cr)
- COMM 8451 - Seminar: Intercultural and Diversity Research (3.0 cr)
- COMM 8452 - Seminar: Methods of Intercultural/Diversity Facilitation (3.0 cr)
- COMM 8502 - Seminar: Communication Theory Construction (3.0 cr)
- COMM 8504 - Seminar: Rhetorical Criticism (3.0 cr)
- COMM 8606 - Seminar: Rhetorical Analysis of Campaigns and Movements (3.0 cr)
- COMM 8611 - Seminar: Rhetoric (3.0 cr)
- COMM 8625 - Seminar: Communication Ethics (3.0 cr)
- COMM 8910 - Advanced Topics in Communication Studies (3.0 cr)
- COMM 8994 - Directed Research (1.0 - 3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



**Twin Cities Campus**

## Communication Studies Ph.D.

Communication Studies

College of Liberal Arts

Link to a [list of faculty](#) for this program.

**Contact Information:**

Department of Communication Studies, 225 Ford Hall, 224 Church Street SE, Minneapolis, MN 55455 (612-624-5800; fax: 612-624-6544).

Website: <https://cla.umn.edu/comm-studies/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 66 to 72
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Communication Studies program has a national reputation for excellence in the areas of critical media studies, interpersonal communication, and rhetoric. Our graduate students are highly motivated scholars at the cutting edge of communication research with an equally strong commitment to becoming skilled instructors. Although most students emphasize one of these areas, students take courses across each of the three subdisciplines en route to designing their PhD thesis research project.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.50.

A bachelor's or master's degree in Communication Studies or a related field.

Other requirements to be completed before admission:

Application requirements include:

- At least 15 undergraduate or graduate credits in speech or communications courses related to the proposed emphasis area
- Transcripts of all post-secondary academic work
- Statement of purpose, including academic and professional objectives
- Diversity statement
- Sample of academic writing (15 - 25 pages)
- Three letters of recommendation
- Resume/CV

The application deadline is December 1 for the following fall semester. Admission is for fall semester only.

All prerequisites must be completed before admission.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80



Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

33 to 36 credits are required in the major.  
9 to 12 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.50 is required for students to remain in good standing.

### Coursework

#### Introductory Coursework (7 credits)

Take the following courses. Take COMM 8000 4 times for a total of 4 credits.

- COMM 8000 - Communication Studies Research Colloquium (1.0 cr)
- COMM 8101 - Introduction to Graduate Communication Studies (3.0 cr)

#### Research Methods (6 credits)

Select 6 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

- ANTH 8001 - Ethnography, Theory, History (3.0 cr)
- ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)
- COMM 5411 - Small Group Communication Research (3.0 cr)
- COMM 5611 - Survey of Rhetorical Theory (3.0 cr)
- COMM 8110 - Seminar: Communication Research Methods (3.0 cr)
- COMM 8211 - Critical Communication Studies: History, Theory, Method (3.0 cr)
- COMM 8504 - Seminar: Rhetorical Criticism (3.0 cr)
- CSCL 5555 - Introduction to Semiotics (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- FW 8394 - Research in Fisheries (1.0 - 4.0 cr)
- FW 8494 - Research in Wildlife (1.0 - 4.0 cr)
- GWSS 8201 - Feminist Theory and Methods in the Social Sciences (3.0 cr)
- GWSS 8210 - Seminar: Feminist Theory & Praxis (3.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)
- WRIT 5775 - The Rhetorical Tradition: Classical Period (3.0 cr)
- WRIT 5776 - The Rhetorical Tradition: Modern Era (3.0 cr)

#### Major Coursework (20-23 credits)

Select courses from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

- COMM 5110 - Special Topics in Communication Theory (3.0 cr)
- COMM 5211 - Critical Media Studies: Theory and Methods (3.0 cr)
- COMM 5221 - Media, Race, and Identity (3.0 cr)
- COMM 5231 - Media Outlaws (3.0 cr)
- COMM 5250 - Environmental Communication (3.0 cr)
- COMM 5261 - Political Economy of Media Culture (3.0 cr)
- COMM 5401 - Advanced Theories of Communication (3.0 cr)
- COMM 5402 - Advanced Interpersonal Communication (3.0 cr)
- COMM 5411 - Small Group Communication Research (3.0 cr)
- COMM 5431 - The Process of Persuasion (3.0 cr)
- COMM 5441 - Communication in Human Organizations (3.0 cr)
- COMM 5451W - Intercultural Communication Processes [WI] (3.0 cr)



COMM 5611 - Survey of Rhetorical Theory (3.0 cr)  
COMM 5615W - Introduction to Rhetorical Criticism [WI] (3.0 cr)  
COMM 5617 - History and Criticism of U.S. Public Discourse: 1630-1865 (3.0 cr)  
COMM 5970 - Directed Study (1.0 - 3.0 cr)  
COMM 8210 - Seminar: Selected Topics in U.S. Electronic Media (3.0 cr)  
COMM 8402 - Seminar: Interpersonal Communication (3.0 cr)  
COMM 8403 - Seminar: Emotion and Communication (3.0 cr)  
COMM 8451 - Seminar: Intercultural and Diversity Research (3.0 cr)  
COMM 8452 - Seminar: Methods of Intercultural/Diversity Facilitation (3.0 cr)  
COMM 8502 - Seminar: Communication Theory Construction (3.0 cr)  
COMM 8504 - Seminar: Rhetorical Criticism (3.0 cr)  
COMM 8606 - Seminar: Rhetorical Analysis of Campaigns and Movements (3.0 cr)  
COMM 8611 - Seminar: Rhetoric (3.0 cr)  
COMM 8625 - Seminar: Communication Ethics (3.0 cr)  
COMM 8910 - Advanced Topics in Communication Studies (3.0 cr)  
COMM 8994 - Directed Research (1.0 - 3.0 cr)

### Outside Coursework (9-12 credits)

Select credits outside the major in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

AFRO 5866 - The Civil Rights and Black Power Movement, 1954-1984 (3.0 cr)  
AMES 5920 - Topics in Asian Culture (3.0 cr)  
AMST 4101 - Gender, Sexuality, and Politics in America [HIS, DSJ] (3.0 cr)  
AMST 8202 - Theoretical Foundations and Current Practice in American Studies (3.0 cr)  
AMST 8231 - Cultural Fallout: The Cold War and Its Legacy, Readings (3.0 cr)  
AMST 8920 - Topics in American Studies (3.0 cr)  
ANTH 8001 - Ethnography, Theory, History (3.0 cr)  
ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)  
ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)  
ARTH 5417 - Twentieth Century Theory and Criticism (3.0 cr)  
BTHX 8000 - Advanced Topics in Bioethics (1.0 - 4.0 cr)  
CL 8910 - Advanced Topics in Comparative Literature (3.0 cr)  
CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)  
CPSY 8360 - Special Topics in Developmental Psychology (1.0 - 3.0 cr)  
CSCL 5555 - Introduction to Semiotics (3.0 cr)  
CSCL 5833 - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)  
CSCL 5993 - Directed Study (1.0 - 3.0 cr)  
EMS 8100 - Workshop in Early Modern Studies (1.0 - 3.0 cr)  
ENGL 5140 - Readings in 18th Century Literature and Culture (3.0 cr)  
ENGL 5805 - Writing for Publication (3.0 cr)  
ENGL 8090 - Seminar in Special Subjects (3.0 cr)  
ENGL 8150 - Seminar in Shakespeare (3.0 cr)  
ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)  
ENGL 8992 - Directed Reading in Language, Literature, Culture, Rhetoric, Composition, or Creative Writing (1.0 - 9.0 cr)  
EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)  
EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)  
EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)  
EPSY 5261 - Introductory Statistical Methods (3.0 cr)  
EPSY 5262 - Intermediate Statistical Methods (3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
EPSY 8252 - Statistical Methods in Education II (3.0 cr)  
FREN 8230 - Critical Issues: Criticism and Thought (3.0 - 9.0 cr)  
FSOS 8001 - Conceptual Frameworks in the Family (3.0 cr)  
FW 8394 - Research in Fisheries (1.0 - 4.0 cr)  
FW 8494 - Research in Wildlife (1.0 - 4.0 cr)  
GEOG 8230 - Theoretical Geography (3.0 cr)  
GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)  
GWSS 5104 - Transnational Feminist Theory (3.0 cr)  
GWSS 5406 - Black Feminist Thought in the American and African Diasporas (3.0 cr)  
GWSS 5502 - Gender and Public Policy (3.0 cr)  
GWSS 8210 - Seminar: Feminist Theory & Praxis (3.0 cr)  
GWSS 8230 - Seminar: Cultural Criticism and Media Studies (3.0 cr)  
GWSS 8250 - Seminar: Nation, State, and Citizenship (1.0 - 3.0 cr)  
GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)  
HIST 5283 - Marx, Capital and History: An Introduction to Marxist Theory and History (3.0 cr)



HIST 5900 - Topics in European/Medieval History (1.0 - 4.0 cr)  
HIST 5960 - Topics in History (1.0 - 4.0 cr)  
HIST 8025 - Politics of Historical Memory (3.0 cr)  
HIST 8910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 8993 - Directed Study (1.0 - 16.0 cr)  
JOUR 8290 - Special Topics in Strategic Communication (3.0 cr)  
JOUR 8650 - Seminar: Psychology of Media Effects (3.0 cr)  
KIN 5371 - Sport and Society (3.0 cr)  
KIN 5511 - Sport and Gender (3.0 cr)  
LING 5900 - Topics in Linguistics (3.0 cr)  
MIMS 8001 - Theories of the Moving Image (3.0 cr)  
MIMS 8003 - Historiography of the Moving Image (3.0 cr)  
OLPD 5128 - Anthropology of Education (3.0 cr)  
PA 5290 - Topics in Planning (0.5 - 4.0 cr)  
PA 5490 - Topics in Social Policy (1.0 - 4.0 cr)  
PA 5721 - Energy Systems and Policy (3.0 cr)  
PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)  
PHIL 8510 - Seminar: Aesthetics Studies (3.0 cr)  
POL 8260 - Topics in Political Theory (3.0 cr)  
PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)  
PSY 8203 - Impression Management (3.0 cr)  
PSY 8205 - Principles of Social Psychology (3.0 cr)  
RELS 8190 - Comparative Seminar in Religions in Antiquity (3.0 cr)  
SAGR 8010 - Colloquium in Sustainable Agriculture (2.0 cr)  
SCMC 5993 - Directed Study (1.0 - 3.0 cr)  
SOC 8090 - Topics in Sociology (1.5 - 3.0 cr)  
SOC 8311 - Political Sociology (3.0 cr)  
SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)  
SOC 8801 - Sociological Research Methods (4.0 cr)  
SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)  
TH 8120 - Seminar (3.0 cr)  
WRIT 5775 - The Rhetorical Tradition: Classical Period (3.0 cr)  
WRIT 5776 - The Rhetorical Tradition: Modern Era (3.0 cr)  
WRIT 8510 - Seminar in Rhetoric (3.0 cr)  
WRIT 8550 - Seminar in Technology, Culture, and Communication (3.0 cr)

#### Thesis Credits

Take 24 doctoral thesis credits.

COMM 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Comparative Literature M.A.**

*Cultural Studies & Comparative Literature*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Cultural Studies and Comparative Literature, 235 Nicholson Hall, 216 Pillsbury Drive SE, Minneapolis, MN 55455 (612-624-8099; fax: 612-625-4170)

Email: [cscl@umn.edu](mailto:cscl@umn.edu)

Website: <https://cla.umn.edu/cscl/graduate>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Comparative Literature (CL) graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Comparative Literature PhD program.

Comparative literature is the oldest field of literary criticism, dating back to the seventeenth century. Among the wide range of studies currently conducted in comparative literature nationally and internationally, this program focuses on theories of literary criticism and its explanatory bases; indeed the program is seen as one of the principal initiators of such fields of study. This program is likewise engaged in pushing the bounds of critical inquiry in related domains of literary studies, directing much of its energies toward the intersection of literature with other media (in various constellations of word, sound, and image) and literatures of the global North with those of the global South, engaging problems ranging from narrative to postcolonial studies. The curriculum emphasizes seminars and directed research.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Note: The Comparative Literature graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Comparative Literature PhD program.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80
  - Speaking test score: 0

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** Passing the Comparative Literature doctoral preliminary written and oral examinations, or completing one Plan B paper of approximately 40 pages.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Proficiency in two languages (other than English)

A minimum GPA of 3.50 is required for students to remain in good standing.

### Required Courses (9 credits)

Take the following courses:

[CSCL 8001](#) - Basic Research Seminar in Cultural Studies and Comparative Literature I (3.0 cr)

[CSCL 8002](#) - Basic Research Seminar in Comparative Literature II (3.0 cr)

[CSCL 8901](#) - Intro to the Profession: Critical Methods of Research, Pedagogy, and Creative Work in the Humanities (3.0 cr)

### Major Electives (9 credits)

Select credits from the following in consultation with the advisor and director of graduate studies:

[CSCL 5281](#) - European Intellectual History: The Early Modern Period, Antiquity to 1750 (3.0 cr)

[CSCL 5282](#) - European Intellectual History: The Modern Period, 1750-Present (3.0 cr)

[CSCL 5302](#) - Aesthetics and the Valuation of Art (3.0 cr)

[CSCL 5305](#) - Vision and Visuality: An Intellectual History (3.0 cr)

[CSCL 5331](#) - Discourse of the Novel (3.0 cr)

[CSCL 5401](#) - Origins of Cultural Studies (3.0 cr)

[CSCL 5411](#) - Avant-Garde Cinema (4.0 cr)

[CSCL 5555](#) - Introduction to Semiotics (3.0 cr)

[CSCL 5666](#) - Film Music: Theory, History, Practice (4.0 cr)

[CSCL 5833](#) - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)

[CSCL 5910](#) - Topics in Cultural Studies and Comparative Literature (3.0 - 4.0 cr)

[CSCL 8910](#) - Advanced Topics in Comparative Literature (3.0 cr)

[CSCL 8992](#) - Directed Reading in Comparative Literature (1.0 - 4.0 cr)

[CSCL 8993](#) - Directed Study (1.0 - 4.0 cr)

[CSCL 8994](#) - Directed Research (1.0 - 4.0 cr)

### Additional Coursework (6 credits)

Select 6 credits from the following in consultation with the advisor. Other courses, including courses from the Major Electives list not applied to that requirement, can be used with advisor and director of graduate studies approval.

[CSCL 5xxx](#)

[CSCL 8xxx](#)

[SCMC 5001](#) - Critical Debates in the Study of Cinema and Media Culture (4.0 cr)

[SCMC 5002](#) - Advanced Film Analysis (4.0 cr)

### Outside Coursework (6 credits)

Select 6 credits of coursework outside the major in consultation with the advisor and director of graduate studies. Other courses can be applied to this requirement with advisor and director of graduate studies approval.



### *Twin Cities Campus*

## Comparative Literature Minor

*Cultural Studies & Comparative Literature*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Cultural Studies and Comparative Literature, 235 Nicholson Hall, 216 Pillsbury Drive SE, Minneapolis, MN 55455 (612-624-8099; fax: 612-625-4170)

Email: [cscl@umn.edu](mailto:cscl@umn.edu)

Website: <https://cla.umn.edu/cscl/graduate>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Comparative literature is the oldest field of literary criticism, dating back to the seventeenth century. Among the wide range of studies currently conducted in comparative literature nationally and internationally, this program focuses on theories of literary criticism and its explanatory bases; indeed the program is seen as one of the principal initiators of such fields of study.

This program is likewise engaged in pushing the bounds of critical inquiry in related domains of literary studies, directing much of its energies toward the intersection of literature with other media (in various constellations of word, sound, and image) and of literatures of the global North with those of the global South, engaging problems ranging from narrative to postcolonial studies. The curriculum emphasizes seminars and directed research.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Comparative Literature director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

The minimum cumulative GPA for minor field coursework is 3.50.

#### **Required Courses (6 credits)**

Take the following courses:

[CSCL 8001](#) - Basic Research Seminar in Cultural Studies and Comparative Literature I (3.0 cr)

[CSCL 8002](#) - Basic Research Seminar in Comparative Literature II (3.0 cr)

#### **Electives (3 to 6 credits)**

Masters students select 3 credits, and doctoral students select 6 credits from the following, in consultation with the Comparative Literature director of graduate studies. Other courses may be applied to this requirement with Comparative Literature director of graduate studies approval.

[CSCL 5281](#) - European Intellectual History: The Early Modern Period, Antiquity to 1750 (3.0 cr)





CSCL 5282 - European Intellectual History: The Modern Period, 1750-Present (3.0 cr)  
CSCL 5302 - Aesthetics and the Valuation of Art (3.0 cr)  
CSCL 5305 - Vision and Visuality: An Intellectual History (3.0 cr)  
CSCL 5331 - Discourse of the Novel (3.0 cr)  
CSCL 5401 - Origins of Cultural Studies (3.0 cr)  
CSCL 5411 - Avant-Garde Cinema (4.0 cr)  
CSCL 5555 - Introduction to Semiotics (3.0 cr)  
CSCL 5666 - Film Music: Theory, History, Practice (4.0 cr)  
CSCL 5833 - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)  
CSCL 5910 - Topics in Cultural Studies and Comparative Literature (3.0 - 4.0 cr)  
CSCL 8910 - Advanced Topics in Comparative Literature (3.0 cr)  
CSCL 8992 - Directed Reading in Comparative Literature (1.0 - 4.0 cr)  
CSCL 8993 - Directed Study (1.0 - 4.0 cr)  
CSCL 8994 - Directed Research (1.0 - 4.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Master's

Doctoral



### **Twin Cities Campus**

## **Comparative Literature Ph.D.**

*Cultural Studies & Comparative Literature*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Cultural Studies and Comparative Literature, 235 Nicholson Hall, 216 Pillsbury Dr SE, Minneapolis, MN (612-624-8099; fax: 612-625-4170).

Email: [cscl@umn.edu](mailto:cscl@umn.edu)

Website: <https://cla.umn.edu/cscl/graduate>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 66
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Comparative literature is the oldest field of literary criticism, dating back to the seventeenth century. Among the wide range of studies currently conducted in comparative literature nationally and internationally, this program focuses on theories of literary criticism and its explanatory bases; indeed the program is seen as one of the principal initiators of such fields of study. This program is likewise engaged in pushing the bounds of critical inquiry in related domains of literary studies, directing much of its energies toward the intersection of literature with other media (in various constellations of word, sound, and image) and literatures of the global North with those of the global South, engaging problems ranging from narrative to postcolonial studies. The curriculum emphasizes seminars and directed research.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A BS and/or MA degree in a humanities or a social science discipline, or other relevant field.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

30 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.



Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Proficiency in two languages (other than English)

A minimum GPA of 3.50 is required for students to remain in good standing.

Coursework should include at least 12 8xxx-level course credits, excluding CSCL 8001 and CSCL 8002.

Application of 4xxx-level courses toward degree requirements requires approval of the advisor and director of graduate studies.

#### **Required Courses (9 credits)**

Take the following courses:

[CSCL 8001](#) - Basic Research Seminar in Cultural Studies and Comparative Literature I (3.0 cr)

[CSCL 8002](#) - Basic Research Seminar in Comparative Literature II (3.0 cr)

[CSCL 8901](#) - Intro to the Profession: Critical Methods of Research, Pedagogy, and Creative Work in the Humanities (3.0 cr)

#### **Major Electives (12 credits)**

Select 12 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with advisor and director of graduate studies approval.

[CSCL 5281](#) - European Intellectual History: The Early Modern Period, Antiquity to 1750 (3.0 cr)

[CSCL 5282](#) - European Intellectual History: The Modern Period, 1750-Present (3.0 cr)

[CSCL 5302](#) - Aesthetics and the Valuation of Art (3.0 cr)

[CSCL 5305](#) - Vision and Visuality: An Intellectual History (3.0 cr)

[CSCL 5331](#) - Discourse of the Novel (3.0 cr)

[CSCL 5401](#) - Origins of Cultural Studies (3.0 cr)

[CSCL 5411](#) - Avant-Garde Cinema (4.0 cr)

[CSCL 5555](#) - Introduction to Semiotics (3.0 cr)

[CSCL 5666](#) - Film Music: Theory, History, Practice (4.0 cr)

[CSCL 5833](#) - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)

[CSCL 5910](#) - Topics in Cultural Studies and Comparative Literature (3.0 - 4.0 cr)

[CSCL 8910](#) - Advanced Topics in Comparative Literature (3.0 cr)

[CSCL 8992](#) - Directed Reading in Comparative Literature (1.0 - 4.0 cr)

[CSCL 8993](#) - Directed Study (1.0 - 4.0 cr)

[CSCL 8994](#) - Directed Research (1.0 - 4.0 cr)

#### **Related Courses (9 credits)**

Select 9 credits from the following in consultation with the advisor. Other courses, including courses from the Major Electives list not applied to that requirement, can be used with advisor and director of graduate studies approval.

[CSCL 5xxx](#)

[CSCL 8xxx](#)

[SCMC 5001](#) - Critical Debates in the Study of Cinema and Media Culture (4.0 cr)

[SCMC 5002](#) - Advanced Film Analysis (4.0 cr)

#### **Outside Coursework (12 credits)**

Select 12 credits outside the major in consultation with the advisor and director of graduate studies. Other courses can be applied to this requirement with advisor and director of graduate studies approval.

[MIMS 5910](#) - Topics in Moving Image Studies (2.0 - 4.0 cr)

[MIMS 8001](#) - Theories of the Moving Image (3.0 cr)

[MIMS 8003](#) - Historiography of the Moving Image (3.0 cr)

#### **Thesis Credits**

Take 24 doctoral thesis credits.

[CSCL 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Comparative Studies in Discourse and Society M.A.**

*Cultural Studies & Comparative Literature*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Cultural Studies and Comparative Literature, 216 Pillsbury Drive SE, Minneapolis, MN 55455 (612-624-8099; fax: 612-625-4170)

Email: [cscl@umn.edu](mailto:cscl@umn.edu)

Website: <https://cla.umn.edu/cscl>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Comparative Studies and Discourse in Society (CSDS) graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the CSDS PhD program.

While most traditional humanistic disciplines tend to focus either on a given mode of discourse (e.g., art history, musicology) or a specific cultural context (e.g., American studies, European languages and literatures), this program engages broader topics of discourse and cultural production both shape and are shaped by life in time, space, matter, and society. Drawing on a variety of theoretical positions, close attention is paid to various types of discourse, such as music, film, myth, ritual, architecture, landscape and urban design, painting, sculpture, and literature in elite, popular, folk, and mass culture, understanding these as both a site and an instrument of contestation and negotiation among social forces. More generally, the program seeks to re-associate intellectual and cultural history with social and political history, to set discourse of various sorts within a social context, and to consider specific social formations within the ongoing historical process. In all this, the program encourages work that is interdisciplinary (at times, even anti-disciplinary) as well as cross-cultural. The curriculum emphasizes seminars and directed research.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The CSDS graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the CSDS PhD program.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** Passing the doctoral preliminary written and oral examinations, or completing one Plan B paper of approximately 40 pages.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Proficiency in two languages (other than English)

A minimum GPA of 3.50 is required for students to remain in good standing.

### Required Courses (9 credits)

Take the following courses:

[CSCL 8001](#) - Basic Research Seminar in Cultural Studies and Comparative Literature I (3.0 cr)

[CSCL 8002](#) - Basic Research Seminar in Comparative Literature II (3.0 cr)

[CSCL 8901](#) - Intro to the Profession: Critical Methods of Research, Pedagogy, and Creative Work in the Humanities (3.0 cr)

### Major Electives (9 credits)

Select credits from the following in consultation with the advisor and director of graduate studies:

[CSCL 5281](#) - European Intellectual History: The Early Modern Period, Antiquity to 1750 (3.0 cr)

[CSCL 5282](#) - European Intellectual History: The Modern Period, 1750-Present (3.0 cr)

[CSCL 5302](#) - Aesthetics and the Valuation of Art (3.0 cr)

[CSCL 5305](#) - Vision and Visuality: An Intellectual History (3.0 cr)

[CSCL 5331](#) - Discourse of the Novel (3.0 cr)

[CSCL 5401](#) - Origins of Cultural Studies (3.0 cr)

[CSCL 5411](#) - Avant-Garde Cinema (4.0 cr)

[CSCL 5555](#) - Introduction to Semiotics (3.0 cr)

[CSCL 5666](#) - Film Music: Theory, History, Practice (4.0 cr)

[CSCL 5833](#) - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)

[CSCL 5910](#) - Topics in Cultural Studies and Comparative Literature (3.0 - 4.0 cr)

[CSCL 8910](#) - Advanced Topics in Comparative Literature (3.0 cr)

[CSCL 8992](#) - Directed Reading in Comparative Literature (1.0 - 4.0 cr)

[CSCL 8993](#) - Directed Study (1.0 - 4.0 cr)

[CSCL 8994](#) - Directed Research (1.0 - 4.0 cr)

### Related Courses (6 credits)

Select 6 credits from the following in consultation with the advisor. Other courses, including courses from the Major Electives list not applied to that requirement, can be used with advisor and director of graduate studies approval.

[CSCL 5xxx](#)

[CSCL 8xxx](#)

[SCMC 5001](#) - Critical Debates in the Study of Cinema and Media Culture (4.0 cr)

[SCMC 5002](#) - Advanced Film Analysis (4.0 cr)

### Outside Coursework (6 credits)

Select 6 credits of coursework outside the major in consultation with the advisor and director of graduate studies. Other courses can be applied to this requirement with advisor and director of graduate studies approval.



### **Twin Cities Campus**

## **Comparative Studies in Discourse and Society Minor**

*Cultural Studies & Comparative Literature*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Cultural Studies and Comparative Literature, 235 Nicholson Hall, 216 Pillsbury Drive SE, Minneapolis, MN 55455 (612-624-8099; fax: 612-625-4170)

Email: [cscl@umn.edu](mailto:cscl@umn.edu)

Website: <https://cla.umn.edu/cscl>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

While most traditional humanistic disciplines tend to focus either on a given mode of discourse (e.g., art history, musicology) or a specific cultural context (e.g., American studies, European languages and literatures), this program engages a broader problematic--how discourse and cultural production both shape and are shaped by life in time, space, matter, and society. Drawing on a variety of theoretical positions, close attention is paid to various types of discourse, such as music, film, myth, ritual, architecture, landscape and urban design, painting, sculpture, and literature in elite, popular, folk, and mass culture, understanding these as both a site and an instrument of contestation and negotiation among social forces. More generally, the program seeks to re-associate intellectual and cultural history with social and political history, to set discourse of various sorts within a social context, and to consider specific social formations within the ongoing historical process. In all this, the program encourages work that is interdisciplinary (at times, even anti-disciplinary) as well as cross-cultural. The curriculum emphasizes seminars and directed research.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Comparative Studies in Discourse and Society director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.50 is required for students to remain in good standing.

#### **Required Courses (6 credits)**

All students pursuing the minor take the following courses:

[CSCL 8001](#) - Basic Research Seminar in Cultural Studies and Comparative Literature I (3.0 cr)

[CSCL 8002](#) - Basic Research Seminar in Comparative Literature II (3.0 cr)

#### **Electives (3 to 6 credits)**

Masters students select 3 credits and doctoral students select 6 credits from the following, in consultation with the Comparative



Studies in Discourse and Society director of graduate studies. Other courses may be applied to this requirement with Comparative Studies in Discourse and Society director of graduate studies approval.

[CSCL 5281](#) - European Intellectual History: The Early Modern Period, Antiquity to 1750 (3.0 cr)

[CSCL 5282](#) - European Intellectual History: The Modern Period, 1750-Present (3.0 cr)

[CSCL 5302](#) - Aesthetics and the Valuation of Art (3.0 cr)

[CSCL 5305](#) - Vision and Visuality: An Intellectual History (3.0 cr)

[CSCL 5331](#) - Discourse of the Novel (3.0 cr)

[CSCL 5401](#) - Origins of Cultural Studies (3.0 cr)

[CSCL 5411](#) - Avant-Garde Cinema (4.0 cr)

[CSCL 5555](#) - Introduction to Semiotics (3.0 cr)

[CSCL 5666](#) - Film Music: Theory, History, Practice (4.0 cr)

[CSCL 5833](#) - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)

[CSCL 5910](#) - Topics in Cultural Studies and Comparative Literature (3.0 - 4.0 cr)

[CSCL 8910](#) - Advanced Topics in Comparative Literature (3.0 cr)

[CSCL 8992](#) - Directed Reading in Comparative Literature (1.0 - 4.0 cr)

[CSCL 8993](#) - Directed Study (1.0 - 4.0 cr)

[CSCL 8994](#) - Directed Research (1.0 - 4.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Comparative Studies in Discourse and Society Ph.D.**

*Cultural Studies & Comparative Literature*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Cultural Studies and Comparative Literature, 235 Nicholson Hall, 216 Pillsbury Dr SE, Minneapolis, MN 55455 (612-624-8099; fax: 612-625-4170)

Email: [cscl@umn.edu](mailto:cscl@umn.edu)

Website: <https://cla.umn.edu/cscl>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 66
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

While most traditional humanistic disciplines tend to focus either on a given mode of discourse (e.g., art history, musicology) or a specific cultural context (e.g., American studies, European languages and literatures), this program engages a broader problematic--how discourse and cultural production both shape and are shaped by life in time, space, matter, and society. Drawing on a variety of theoretical positions, close attention is paid to various types of discourse, such as music, film, myth, ritual, architecture, landscape and urban design, painting, sculpture, and literature in elite, popular, folk, and mass culture, understanding these as both a site and an instrument of contestation and negotiation among social forces. More generally, the program seeks to re-associate intellectual and cultural history with social and political history, to set discourse of various sorts within a social context, and to consider specific social formations within the ongoing historical process. In all this, the program encourages work that is interdisciplinary (at times, even anti-disciplinary) as well as cross-cultural. The curriculum emphasizes seminars and directed research.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A BA and/or MA degree in a humanities or a social science discipline, or other relevant field.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

30 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.





This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Proficiency in two languages (other than English)

A minimum GPA of 3.50 is required for students to remain in good standing.

Coursework should include at least 12 8xxx-level course credits, excluding CSCL 8001, CSCL 8002, and CSCL 8901.

Application of 4xxx-level courses toward degree requirements requires approval of the advisor and director of graduate studies.

#### **Required Courses (9 credits)**

Take the following courses:

[CSCL 8001](#) - Basic Research Seminar in Cultural Studies and Comparative Literature I (3.0 cr)

[CSCL 8002](#) - Basic Research Seminar in Comparative Literature II (3.0 cr)

[CSCL 8901](#) - Intro to the Profession: Critical Methods of Research, Pedagogy, and Creative Work in the Humanities (3.0 cr)

#### **Major Electives (12 credits)**

Select 12 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with advisor and director of graduate studies approval.

[CSCL 5281](#) - European Intellectual History: The Early Modern Period, Antiquity to 1750 (3.0 cr)

[CSCL 5282](#) - European Intellectual History: The Modern Period, 1750-Present (3.0 cr)

[CSCL 5302](#) - Aesthetics and the Valuation of Art (3.0 cr)

[CSCL 5305](#) - Vision and Visuality: An Intellectual History (3.0 cr)

[CSCL 5331](#) - Discourse of the Novel (3.0 cr)

[CSCL 5401](#) - Origins of Cultural Studies (3.0 cr)

[CSCL 5411](#) - Avant-Garde Cinema (4.0 cr)

[CSCL 5555](#) - Introduction to Semiotics (3.0 cr)

[CSCL 5666](#) - Film Music: Theory, History, Practice (4.0 cr)

[CSCL 5833](#) - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)

[CSCL 5910](#) - Topics in Cultural Studies and Comparative Literature (3.0 - 4.0 cr)

[CSCL 8910](#) - Advanced Topics in Comparative Literature (3.0 cr)

[CSCL 8992](#) - Directed Reading in Comparative Literature (1.0 - 4.0 cr)

[CSCL 8993](#) - Directed Study (1.0 - 4.0 cr)

[CSCL 8994](#) - Directed Research (1.0 - 4.0 cr)

#### **Related Courses (9 credits)**

Select 9 credits from the following in consultation with the advisor. Other courses, including courses from the Major Electives list not applied to that requirement, can be used with advisor and director of graduate studies approval.

[CSCL 5xxx](#)

[CSCL 8xxx](#)

[SCMC 5001](#) - Critical Debates in the Study of Cinema and Media Culture (4.0 cr)

[SCMC 5002](#) - Advanced Film Analysis (4.0 cr)

#### **Outside Coursework (12 credits)**

Select 12 credits outside the major in consultation with the advisor and director of graduate studies. Other courses can be applied to this requirement with advisor and director of graduate studies approval.

[MIMS 5910](#) - Topics in Moving Image Studies (2.0 - 4.0 cr)

[MIMS 8001](#) - Theories of the Moving Image (3.0 cr)

[MIMS 8003](#) - Historiography of the Moving Image (3.0 cr)

#### **Thesis Credits**

Take 24 doctoral thesis credits.

[CSCL 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



**Twin Cities Campus**

## Creative Writing M.F.A.

English Language & Literature

College of Liberal Arts

Link to a [list of faculty](#) for this program.

**Contact Information:**

Department of English, 222 Lind Hall, 207 Church Street SE, Minneapolis, MN 55455 (612-625-6366; fax: 612-624-8228)

Email: [creawrit@umn.edu](mailto:creawrit@umn.edu)

Website: <http://cla.umn.edu/creative-writing>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 45
- This program does not require summer semesters for timely completion.
- Degree: Master of Fine Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The creative writing program in the Department of English offers the master of fine arts (MFA) degree for students committed to pursuing the writing life. This three-year degree provides advanced, graduate-level coursework in writing, language, and literature, as well as study in a related field. The third year of the program focuses on the final development of a book-length manuscript suitable for publication. At the heart of the program are writing workshops in poetry, fiction, and literary nonfiction, and courses in the "Reading as Writers" and "Topics in Advanced Writing" series, which enable writers to explore a variety of issues relating to contemporary themes in American and world literature. The program encourages experimentation across genres, fostering the discovery of new and varied forms for a developing voice. Students also have the opportunity to work editorially on "Great River Review," the graduate literary magazine.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

The program does not require a graduate degree for admission.

**Special Application Requirements:**

The MFA in Creative Writing does not require undergraduate work in English literature or an undergraduate degree in literature. Students come from a variety of educational backgrounds and life experiences. Applicants should be aware, however, that graduate coursework in literature and/or language is required once admitted to the program.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan C:** Plan C requires 42 major credits and 3 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The capstone project is a publishable thesis manuscript of poetry, fiction, or literary nonfiction. The final exam is an oral defense of the thesis manuscript and literary essay.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

### Required Courses (8 credits)

Take the following courses:

[ENGW 8101](#) - Reading Across Genres (4.0 cr)

[ENGW 8180](#) - Thesis Seminar: Multi-Genre (4.0 cr)

### Literature/Language Electives (10 credits)

Select coursework from the following in consultation with the advisor. At least 3 credits must be from ENGL courses. Other courses can be applied to this requirement with advisor and director of graduate studies approval.

[ENGL 5020](#) - Studies in Narrative (3.0 cr)

[ENGL 5040](#) - Theories of Film (3.0 cr)

[ENGL 5090](#) - Readings in Special Subjects (1.0 - 4.0 cr)

[ENGL 5110](#) - Medieval Literatures and Cultures: Intro to Medieval Studies (3.0 cr)

[ENGL 5121](#) - Readings in Early Modern Literature and Culture (3.0 cr)

[ENGL 5140](#) - Readings in 18th Century Literature and Culture (3.0 cr)

[ENGL 5150](#) - Readings in 19th-Century Literature and Culture (3.0 cr)

[ENGL 5170](#) - Readings in 20th-Century Literature and Culture (3.0 cr)

[ENGL 5300](#) - Readings in American Minority Literature (3.0 cr)

[ENGL 5501](#) - Origins of Cultural Studies (3.0 cr)

[ENGL 5510](#) - Readings in Criticism and Theory (3.0 cr)

[ENGL 5593](#) - The African-American Novel (3.0 cr)

[ENGL 5597](#) - Seminar: Harlem Renaissance (3.0 cr)

[ENGL 5701](#) - Great River Review (4.0 cr)

[ENGL 5743](#) - History of Rhetoric and Writing (3.0 cr)

[ENGL 5790](#) - Topics in Rhetoric, Composition, and Language (3.0 cr)

[ENGL 5805](#) - Writing for Publication (3.0 cr)

[ENGL 5992](#) - Directed Readings, Study, or Research (1.0 - 3.0 cr)

[ENGL 8090](#) - Seminar in Special Subjects (3.0 cr)

[ENGL 8110](#) - Seminar: Medieval Literature and Culture (3.0 cr)

[ENGL 8120](#) - Seminar in Early Modern Literature and Culture (3.0 cr)

[ENGL 8140](#) - Seminar in 18th Century Literature and Culture (3.0 cr)

[ENGL 8150](#) - Seminar in Shakespeare (3.0 cr)

[ENGL 8170](#) - Seminar in 19th-Century British Literature and Culture (3.0 cr)

[ENGL 8180](#) - Seminar in 20th-Century British Literature and Culture (3.0 cr)

[ENGL 8190](#) - Seminar in 20th-Century Anglophone Literatures and Cultures (3.0 cr)

[ENGL 8200](#) - Seminar in American Literature (3.0 cr)

[ENGL 8290](#) - Topics, Figures, and Themes in American Literature (3.0 cr)

[ENGL 8300](#) - Seminar in American Minority Literature (3.0 cr)

[ENGL 8600](#) - Seminar in Language, Rhetoric, Literacy, and Composition (3.0 cr)

[ENGL 8610](#) - Seminar in Language and Discourse Studies (3.0 cr)

[ENGW 5130](#) - Topics in Graduate Creative Writing (4.0 cr)

[ENGW 5310](#) - Reading as Writers (4.0 cr)

[ENGW 5701](#) - Great River Review (4.0 cr)

[ENGW 5993](#) - Directed Study in Writing (1.0 - 4.0 cr)

[ENGW 8110](#) - Seminar: Writing of Fiction (4.0 cr)

[ENGW 8120](#) - Seminar: Writing of Poetry (4.0 cr)

[ENGW 8130](#) - Seminar: Writing of Literary Nonfiction (4.0 cr)

### MFA Creative Thesis (4 credits)

Take ENGW 8990 in consultation with the advisor.

[ENGW 8990](#) - MFA Creative Thesis (2.0 - 8.0 cr)



### **Creative Writing Electives (4 credits)**

Select 4 credits from the following in consultation with the advisor:

- ENGW 5102 - Graduate Fiction Writing (4.0 cr)
- ENGW 5104 - Graduate Poetry Writing (4.0 cr)
- ENGW 5106 - Graduate Literary Nonfiction Writing (4.0 cr)
- ENGW 5130 - Topics in Graduate Creative Writing (4.0 cr)
- ENGW 5310 - Reading as Writers (4.0 cr)
- ENGW 5606W - Literary Aspects of Journalism [WI] (3.0 cr)
- ENGW 5701 - Great River Review (4.0 cr)
- ENGW 5993 - Directed Study in Writing (1.0 - 4.0 cr)
- ENGW 8110 - Seminar: Writing of Fiction (4.0 cr)
- ENGW 8120 - Seminar: Writing of Poetry (4.0 cr)
- ENGW 8130 - Seminar: Writing of Literary Nonfiction (4.0 cr)

### **Outside Coursework (3 credits)**

Select at least 3 credits outside the English department in consultation with the advisor.

### **Genres**

#### **Fiction Genre (16 credits)**

Complete coursework in consultation with advisor. ENGW 5102 must be completed twice.

- ENGW 5102 - Graduate Fiction Writing (4.0 cr)
- ENGW 8110 - Seminar: Writing of Fiction (4.0 cr)

#### **Secondary Genre**

Select one of the following:

- ENGW 5104 - Graduate Poetry Writing (4.0 cr)
- ENGW 5106 - Graduate Literary Nonfiction Writing (4.0 cr)
- ENGW 5130 - Topics in Graduate Creative Writing (4.0 cr)

-OR-

#### **Nonfiction Genre (16 credits)**

Complete coursework in consultation with advisor. ENGW 5106 must be completed twice.

- ENGW 5106 - Graduate Literary Nonfiction Writing (4.0 cr)
- ENGW 8130 - Seminar: Writing of Literary Nonfiction (4.0 cr)

#### **Secondary Genre**

Select one of the following:

- ENGW 5102 - Graduate Fiction Writing (4.0 cr)
- ENGW 5104 - Graduate Poetry Writing (4.0 cr)
- ENGW 5130 - Topics in Graduate Creative Writing (4.0 cr)

-OR-

#### **Poetry Genre (16 credits)**

Complete coursework in consultation with advisor. ENGW 5104 must be completed twice.

- ENGW 5104 - Graduate Poetry Writing (4.0 cr)
- ENGW 8120 - Seminar: Writing of Poetry (4.0 cr)

#### **Secondary Genre**

Select one of the following:

- ENGW 5102 - Graduate Fiction Writing (4.0 cr)
- ENGW 5106 - Graduate Literary Nonfiction Writing (4.0 cr)
- ENGW 5130 - Topics in Graduate Creative Writing (4.0 cr)



### *Twin Cities Campus*

## Developmental Studies and Social Change Minor

CLA Dean's Office

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Interdisciplinary Center for the Study of Global Change, University of Minnesota, 537 Heller Hall, 271 19th Ave S, Minneapolis, MN 55455 (612-624-0832; fax: 612-625-1879)

Email: [icgc@umn.edu](mailto:icgc@umn.edu)

Website: <http://www.icgc.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The minor is administered by the Interdisciplinary Center for the Study of Global Change (ICGC) and is open to University graduate students interested in a structured program of study in an interdisciplinary and globally oriented field. By focusing on the social basis of change in the global south, the minor program engages a wide range of academic disciplines, including the social sciences, humanities, and biological sciences. Among the broad themes addressed in minor program seminars: social and environmental change; human rights and human security; development; international peace and conflict; and arts and humanities perspectives on global social justice. The minor program focuses on three areas: (1) The relationships between large-scale processes of political, economic, and social change, and the particular conditions of lived experience in the global south; (2) Specifically interdisciplinary perspectives (encompassing the social sciences, the biological sciences, and the humanities) on this general thematic concern; and (3) Preparation of masters and doctoral students to conduct interdisciplinary and international research.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

Other requirements to be completed before admission:

Required: Enrollment in a University masters or doctoral program

Preferred: Applicants with an ICGC fellowship

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the director of graduate studies for the minor regarding feasibility and requirements.

Applications to the minor are accepted on a rolling basis.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

#### **Electives (3 credits)**

Select at least 3 elective credits in consultation with major advisor and the DSSC director of graduate studies. Other courses may be substituted with the approval of the DSSC Director of Graduate Studies. Coursework from the major program cannot be applied to this requirement.

#### **Afro-American Studies**



- AFRO 5101 - Seminar: Introduction to Africa and the African Diaspora (3.0 cr)
- AFRO 5103 - World History and Africa (3.0 cr)
- AFRO 5120 - Social and Intellectual Movements in the African Diaspora (3.0 cr)
- AFRO 5191 - Seminar: The African American Experience in South Africa (3.0 cr)
- AFRO 5910 - Topics in African American and African Studies (3.0 cr)
- AFRO 8202 - Seminar: Intellectual History of Race (3.0 cr)
- AFRO 8554 - Seminar: Gender, Race, Nation, and Policy--Perspectives from Within the African Diaspora (3.0 cr)
- AFRO 8910 - Topics in Studies of Africa and the African Diaspora (3.0 cr)

#### **American Indian Studies**

- AMIN 5409 - American Indian Women: Ethnographic and Ethnohistorical Perspectives [HIS, DSJ] (3.0 cr)
- AMIN 5890 - Readings in American Indian and Indigenous History (3.0 cr)

#### **American Studies**

- AMST 8239 - Gender, Race, Class, Ethnicity, and Sexuality in the United States: Readings (3.0 cr)
- AMST 8240 - Gender, Race, Class, Ethnicity, and Sexuality in the United States: Topical Development (3.0 cr)

#### **Anthropology**

- ANTH 5041 - Ecological Anthropology (3.0 cr)
- ANTH 8001 - Ethnography, Theory, History (3.0 cr)
- ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)
- ANTH 8120 - Problems in Culture Change and Applied Anthropology (3.0 - 6.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- ANTH 8205 - Economic Anthropology (3.0 cr)
- ANTH 8207 - Political and Social Anthropology (3.0 cr)
- ANTH 8213 - Ecological Anthropology (3.0 cr)
- ANTH 8215 - Anthropology of Gender (3.0 cr)

#### **Apparel Studies**

- APST 8267 - Dress and Culture (3.0 cr)

#### **Applied Economics**

- APEC 5321 - Regional Economic Analysis (3.0 cr)
- APEC 5511 - Labor Economics (3.0 cr)
- APEC 5731 - Economic Growth and International Development (3.0 cr)
- APEC 5751 - Global Trade and Policy (3.0 cr)
- APEC 8601 - Natural Resource Economics (3.0 cr)
- APEC 8602 - Economics of the Environment (3.0 cr)
- APEC 8701 - Trade and Development I (2.0 cr)
- APEC 8702 - Trade and Development II (2.0 cr)

#### **Chicano Studies**

- CHIC 5920 - Topics in Chicana(o) Studies (3.0 cr)

#### **Communication Studies**

- COMM 8211 - Critical Communication Studies: History, Theory, Method (3.0 cr)
- COMM 8451 - Seminar: Intercultural and Diversity Research (3.0 cr)

#### **Comparative Literature and Cultural Studies**

- CSCL 8001 - Basic Research Seminar in Cultural Studies and Comparative Literature I (3.0 cr)
- CSCL 8002 - Basic Research Seminar in Comparative Literature II (3.0 cr)
- CSCL 8362 - Modernity and Its Others (4.0 cr)
- CSCL 8910 - Advanced Topics in Comparative Literature (3.0 cr)
- CSCL 8920 - Advanced Topics in Comparative Literature (3.0 cr)

#### **Conservation Biology**

- CONS 8095 - Contemporary Problems in Conservation Biology (1.0 cr)

#### **Curriculum and Instruction**

- CI 5747 - Global and Environmental Education: Content and Practice (3.0 cr)

#### **Design**

- DES 5165 - Design and Globalization (3.0 cr)
- DES 8166 - Material Culture and Design (3.0 cr)

#### **Economics**

- ECON 8311 - Economic Growth and Development (2.0 cr)
- ECON 8312 - Economic Growth and Development (2.0 cr)
- ECON 8313 - Economic Growth and Development (2.0 cr)
- ECON 8381 - Advanced Topics in Economic Development (2.0 cr)
- ECON 8391 - Workshop in Economic Growth and Development (1.0 cr)
- ECON 8401 - International Trade and Payments Theory (2.0 cr)
- ECON 8402 - International Trade and Payments Theory (2.0 cr)
- ECON 8403 - International Trade and Payments Theory (2.0 cr)
- ECON 8404 - International Trade and Payments Theory (2.0 cr)
- ECON 8481 - Advanced Topics in International Trade (2.0 cr)
- ECON 8482 - Advanced Topics in International Trade (2.0 cr)



ECON 8491 - Workshop in Trade and Development (1.0 cr)  
ECON 8492 - Workshop in Trade and Development (1.0 - 3.0 cr)

**English Literature**

ENGL 5510 - Readings in Criticism and Theory (3.0 cr)  
ENGL 8190 - Seminar in 20th-Century Anglophone Literatures and Cultures (3.0 cr)  
ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)  
ENGL 8510 - Studies in Criticism and Theory (3.0 cr)  
ENGL 8520 - Seminar: Cultural Theory and Practice (3.0 cr)  
ENGL 8530 - Seminar in Feminist Criticism (3.0 cr)

**Environmental Sciences, Policy and Management**

ESPM 5061 - Water Quality and Natural Resources (3.0 cr)  
ESPM 5241 - Natural Resource and Environmental Policy (3.0 cr)  
ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)  
ESPM 5261 - Economics and Natural Resources Management (4.0 cr)

**Fisheries and Wildlife**

FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)  
FW 8452 - Conservation Biology (3.0 cr)

**French**

FREN 5470 - Post/Colonial Francophone Literatures (3.0 cr)

**Geography**

GEOG 5385 - Globalization and Development: Political Economy (4.0 cr)  
GEOG 8005 - Proseminar: Population Geography (3.0 cr)  
GEOG 8007 - Proseminar: Theories of Development and Change (3.0 cr)  
GEOG 8101 - Proseminar: Nature and Society (3.0 cr)  
GEOG 8212 - Africa (3.0 cr)  
GEOG 8213 - East Asia and China (3.0 cr)  
GEOG 8214 - South Asia (3.0 cr)  
GEOG 8220 - Agrarian Change and Rural Development (3.0 cr)  
GEOG 8240 - Medical Geography (3.0 cr)  
GEOG 8336 - Development Theory and the State (3.0 cr)

**Gender, Women, and Sexuality Studies**

GWSS 5104 - Transnational Feminist Theory (3.0 cr)  
GWSS 5290 - Topics: Biology, Health, and Environmental Studies (3.0 cr)  
GWSS 5390 - Topics: Visual, Cultural, and Literary Studies (3.0 cr)  
GWSS 5490 - Topics: Political Economy and Global Studies (3.0 cr)  
GWSS 8101 - Intellectual History of Feminism (3.0 cr)  
GWSS 8102 - Advanced Studies in Sexuality (3.0 cr)  
GWSS 8103 - Feminist Theories of Knowledge (3.0 cr)  
GWSS 8108 - Genealogies of Feminist Theory (3.0 cr)  
GWSS 8109 - Feminist Knowledge Production (3.0 cr)  
GWSS 8201 - Feminist Theory and Methods in the Social Sciences (3.0 cr)  
GWSS 8301 - Feminist Literary Criticism (3.0 cr)

**Global Studies**

GLOS 5602 - Other Worlds: Globality and Culture (3.0 cr)  
GLOS 5900 - Topics in Global Studies (1.0 - 4.0 cr)

**History**

HIST 5439 - Environment and Society in Africa (3.0 cr)  
HIST 5468 - Social Change in Modern China (3.0 cr)  
HIST 5479 - History of Chinese Cities and Urban Life (3.0 cr)  
HIST 5547 - Empire and Nations in the Middle East (3.0 cr)  
HIST 5633 - Socio-Economic History of China (3.0 cr)  
HIST 5881 - American Foreign Relations to 1895 (3.0 cr)  
HIST 5890 - Readings in American Indian and Indigenous History (3.0 cr)  
HIST 5901 - Latin America Proseminar: Colonial (3.0 cr)  
HIST 5902 - Latin America Proseminar: Modern (3.0 cr)  
HIST 5920 - Topics in African History (3.0 cr)  
HIST 5932 - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)  
HIST 5940 - Topics in Asian History (1.0 - 4.0 cr)  
HIST 5950 - Topics in Latin American History (1.0 - 4.0 cr)  
HIST 5962 - Bell Library Research Seminar in Comparative World History, ca. 1000-1800 CE (3.0 cr)  
HIST 5964 - Comparative Economic History (3.0 cr)  
HIST 5980 - Topics in Comparative Women's History (3.0 - 4.0 cr)  
HIST 5990 - Readings in Comparative History (3.0 cr)  
HIST 8239 - Readings in Gender, Race, Class, and/or Ethnicity in the United States (3.0 cr)  
HIST 8240 - Topics in Research in Gender, Race, Class, or Ethnicity in the United States (3.0 cr)



- HIST 8245 - Human Rights: A Global History (3.0 cr)
- HIST 8390 - Research in American Indian History (3.0 cr)
- HIST 8464 - Research in Yuan, Ming, and Qing History (3.0 cr)
- HIST 8465 - Research in Yuan, Ming, and Qing History (3.0 cr)
- HIST 8630 - Seminar in World History (3.0 cr)
- HIST 8709 - Seminar: History of Sexuality (3.0 cr)
- HIST 8920 - Topics in African History (1.0 - 4.0 cr)
- HIST 8940 - Topics in Asian History (1.0 - 4.0 cr)
- HIST 8944 - Research Seminar: New Directions in African Social History I (3.0 cr)
- HIST 8945 - Research Seminar: New Directions in African Social History II (3.0 cr)
- HIST 8950 - Topics in Latin American History (1.0 - 4.0 cr)
- HIST 8990 - Topics in Comparative History-Research (3.0 cr)

**History of Science and Technology**

- HSCI 5244 - Nature's History: Science, Humans, and the Environment (3.0 cr)
- HSCI 5331 - Technology and American Culture (3.0 cr)
- HSCI 5332 - Science in the Shaping of America (3.0 cr)
- HSCI 8441 - Women in Science: Historical Perspectives (3.0 cr)
- HSCI 8940 - Seminar: History of Science and Technology in the Americas (3.0 cr)
- HSCI 8950 - Seminar: Science and Technology in Cultural Settings (3.0 cr)

**Housing Studies**

- HSG 8463 - Housing: Race and Class (3.0 cr)

**Journalism and Mass Communication**

- JOUR 8513 - Seminar: Ethnographic Methods in Mass Communication Research (3.0 cr)
- JOUR 8681 - Seminar: International Media Perspectives (3.0 cr)
- JOUR 8721 - Seminar: Communication Agencies as Social Institutions (3.0 cr)
- JOUR 8801 - Seminar: Comparative Research in Mass Communication, a Cross-National Approach (3.0 cr)

**Music**

- MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)

**Organizational Leadership, Policy and Development**

- OLPD 5103 - Comparative Education (3.0 cr)
- OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)
- OLPD 5121 - Educational Reform in International Context (3.0 cr)
- OLPD 5124 - Critical Issues in International Education and Educational Exchange (3.0 cr)
- OLPD 5128 - Anthropology of Education (3.0 cr)
- OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)
- OLPD 8121 - Doctoral Seminar: Comparative and International Development Education (1.0 - 6.0 cr)

**Philosophy**

- PHIL 8600 - Workshop in the Philosophy of Science (1.0 cr)
- PHIL 8660 - Seminar: Social and Cultural Studies of Science (3.0 cr)
- PHIL 8670 - Seminar: Philosophy of Science (3.0 cr)

**Political Science**

- POL 5410 - Topics in Comparative Politics (1.0 - 3.0 cr)
- POL 5477 - Struggles and Issues in the Middle East (4.0 cr)
- POL 5525 - Federal Indian Policy (3.0 cr)
- POL 5833 - The United States in the Global Economy US For Econ Policy (3.0 - 4.0 cr)
- POL 5885 - International Conflict and Security (3.0 cr)
- POL 8235 - Democratic Theory (3.0 cr)
- POL 8275 - Contemporary Political Thought (3.0 cr)
- POL 8401 - International Relations (3.0 cr)
- POL 8402 - International Security (3.0 cr)
- POL 8403 - International Norms and Institutions (3.0 cr)
- POL 8404 - International Hierarchy (3.0 cr)
- POL 8405 - International Political Economy (3.0 cr)
- POL 8406 - Politics of International Finance (3.0 cr)
- POL 8407 - Morality in World Politics (3.0 cr)
- POL 8408 - International Relations of the Environment (3.0 cr)
- POL 8411 - Political Psychology and Foreign Policy (3.0 cr)
- POL 8412 - American Foreign Policy (3.0 cr)
- POL 8460 - Topics in International Relations (3.0 cr)
- POL 8601 - Introduction to Comparative Politics (3.0 cr)
- POL 8605 - Government and Politics in Africa (3.0 cr)
- POL 8608 - Government and Politics of Russia and the Commonwealth of Independent States (3.0 cr)
- POL 8611 - Chinese Politics (3.0 cr)
- POL 8619 - Latin American Politics (3.0 cr)
- POL 8633 - Comparative Sociopolitical Change (3.0 cr)





- POL 8637 - Comparative Political Economy (3.0 cr)
- POL 8641 - Comparative Mass Political Behavior (3.0 cr)
- POL 8643 - Comparative Political Institutions (3.0 cr)
- POL 8660 - Topics in Comparative Politics (3.0 cr)

#### **Portuguese**

- PORT 5530 - Brazilian Literary and Cultural Studies (3.0 cr)
- PORT 5540 - Literatures and Cultures of Lusophone Africa (3.0 cr)
- PORT 5910 - Topics in Lusophone Cultures and Literatures (3.0 cr)

#### **Public Affairs**

- PA 5301 - Population Methods & Issues for the United States & Global South (3.0 cr)
- PA 5421 - Racial Inequality and Public Policy (3.0 cr)
- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PA 5480 - Topics in Race, Ethnicity, and Public Policy (1.0 - 3.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5511 - Community Economic Development (3.0 cr)
- PA 5521 - Development Planning and Policy Analysis (4.0 cr)
- PA 5522 - International Development Policy, Families, and Health (3.0 cr)
- PA 5590 - Topics in Economic and Community Development (1.0 - 3.0 cr)
- PA 5601 - Global Survey of Gender and Public Policy (3.0 cr)
- PA 5690 - Topics in Women, Gender and Public Policy (0.5 - 3.0 cr)
- PA 5701 - Science and State (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5721 - Energy Systems and Policy (3.0 cr)
- PA 5722 - Economics of Natural Resource and Environmental Policy (3.0 cr)
- PA 5801 - Global Public Policy (3.0 cr)
- PA 5890 - Topics in Foreign Policy and International Affairs (1.0 - 5.0 cr)
- PA 8686 - Feminist Organizations (3.0 cr)
- PA 8690 - Advanced Topics in Women, Gender and Public Policy (1.0 - 3.0 cr)
- PA 8811 - Strategic Issues in International Economic Policy (3.0 cr)
- PA 8890 - Advanced Topics in Foreign Policy and International Affairs (1.0 - 3.0 cr)

#### **Public Health**

- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)

#### **Sociology**

- SOC 8211 - The Sociology of Race & Racialization (3.0 cr)
- SOC 8221 - Sociology of Gender (3.0 cr)
- SOC 8290 - Topics in Race, Class, Gender and other forms of Durable Inequality (3.0 cr)
- SOC 8311 - Political Sociology (3.0 cr)
- SOC 8701 - Sociological Theory (4.0 cr)
- SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)

#### **Spanish**

- SPAN 5531 - Hispanic Literature of the United States (3.0 cr)
- SPAN 5985 - Sociolinguistic Perspectives on Spanish in the United States (3.0 cr)
- SPAN 8960 - Workshop: Research in Hispanic Cultural Issues (3.0 cr)
- SPAN 8990 - Advanced Comparative Research of Caribbean Genres (3.0 cr)
- SPPT 5930 - Selected Topics in Hispanic and Lusophone Cultural Discourse (1.0 - 3.0 cr)

#### **Studies in Cinema and Media Culture**

- SCMC 5001 - Critical Debates in the Study of Cinema and Media Culture (4.0 cr)

#### **Studies of Science and Technology**

- SST 8400 - Seminar: Science, Technology, and Society (3.0 cr)
- SST 8420 - Seminar: Social and Cultural Studies of Science (3.0 cr)

#### **Sustainable Agriculture**

- SAGR 8010 - Colloquium in Sustainable Agriculture (2.0 cr)
- SAGR 8020 - Field Experience in Sustainable Agriculture (1.0 - 4.0 cr)

#### **Theatre Arts**

- TH 5117 - Performance and Social Change (3.0 cr)

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### **Masters**

#### **Required Courses (5 credits)**



Take the following courses in consultation with the DSSC director of graduate studies. Take DSSC 8310 for 1 credit.

[DSSC 8111](#) - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)

[DSSC 8112](#) - Scholarship and Public Responsibility (1.0 cr)

[DSSC 8310](#) - Topics in Development Studies and Social Change (1.0 - 3.0 cr)

#### Doctoral

##### Required Courses (9 credits)

Take the following courses in consultation with the DSSC director of graduate studies. Take DSSC 8310 for 2 credits.

[DSSC 8111](#) - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)

[DSSC 8112](#) - Scholarship and Public Responsibility (1.0 cr)

[DSSC 8211](#) - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)

Take 2 or more credit(s) from the following:

- [DSSC 8310](#) - Topics in Development Studies and Social Change (1.0 - 3.0 cr)



### *Twin Cities Campus*

## Early Modern Studies Minor

History Department

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of History, 1030 Heller Hall, 271 19th Avenue South, Minneapolis, MN 55455 (612-625-6303; fax: 612-624-9813).

Email: [emsdgs@umn.edu](mailto:emsdgs@umn.edu)

Website: <http://www.cemh.umn.edu/minor>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 7
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Early Modern Studies (EMS) minor encourages inquiry into the early modern period, roughly 1300 to 1800 C.E., using insights and perspectives from multiple disciplines. The minor provides graduate students with solid grounding in the theories and multi-disciplinary methods used by scholars studying the early modern period; and draws electives from courses offered by departments across the College of Liberal Arts as well as the History of Science, Technology, and Medicine graduate program. The University has numerous library collections and research centers that include a focus on the early modern period. For more information on the minor, visit [www.cemh.umn.edu/minor](http://www.cemh.umn.edu/minor).

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Early Modern Studies director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Courses applied to the minor that are offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of B earned for each.

The minimum cumulative GPA for minor field coursework is 3.0.

### **Required Courses (4 to 6 credits)**

Take the following courses in consultation with the EMS director of graduate studies. Masters students take 1 credit, and doctoral students take 3 credits of EMS 8100. Doctoral students may register for EMS 8100 in any credit combination.

[EMS 8250](#) - Seminar in Early Modern Studies (3.0 cr)

[EMS 8100](#) - Workshop in Early Modern Studies (1.0 - 3.0 cr)

### **Electives (3 to 6 credits)**

Masters students select 3 elective credits, and doctoral students select 6 elective credits from the following to complete minimum credit requirements. Other courses can be applied to this requirement with approval of the EMS director of graduate studies.

[ARCH 5423](#) - Gothic Architecture (3.0 cr)

[ARCH 5424](#) - Renaissance Architecture (3.0 cr)



ARCH 5425 - Baroque Architecture (3.0 cr)  
ARTH 5335 - Baroque Rome: Art and Politics in the Papal Capital (3.0 cr)  
ARTH 5777 - The Diversity of Traditions: Indian Art 1200 to Present (3.0 cr)  
ARTH 5781 - Age of Empire: The Mughals, Safavids, and Ottomans (3.0 cr)  
ARTH 5785 - Art of Islamic Iran (3.0 cr)  
ARTH 8320 - Seminar: Issues in Early Modern Visual Culture (3.0 cr)  
ARTH 8340 - Seminar: Baroque Art (3.0 cr)  
CSCL 5281 - European Intellectual History: The Early Modern Period, Antiquity to 1750 (3.0 cr)  
EMS 5500 - Topics in Early Modern Studies (3.0 cr)  
EMS 8500 - Topics in Early Modern Studies (3.0 cr)  
EMS 8993 - Directed Study (1.0 - 6.0 cr)  
ENGL 5121 - Readings in Early Modern Literature and Culture (3.0 cr)  
ENGL 5140 - Readings in 18th Century Literature and Culture (3.0 cr)  
ENGL 8120 - Seminar in Early Modern Literature and Culture (3.0 cr)  
ENGL 8150 - Seminar in Shakespeare (3.0 cr)  
FREN 8271 - The Novel of the Ancien Regime (3.0 cr)  
FREN 8371 - The Rule of Reason, The Reign of Madness: Readings in Early Modern France (3.0 cr)  
GER 5712 - History of the German Language II (3.0 cr)  
GER 8210 - Seminar in Early Modern German Literature and Culture (3.0 cr)  
GER 8220 - Seminar in 18th-Century German Literature and Culture (3.0 cr)  
HIST 5281 - European Intellectual History: The Early Modern Period, Antiquity to 1750 (3.0 cr)  
HIST 5286 - Galileo and the Beginnings of Modern Science (3.0 cr)  
HIST 5379 - Problems in Early American History (3.0 cr)  
HIST 5469 - Historiographies of China, 1000-1700 (3.0 cr)  
HIST 5547 - Empire and Nations in the Middle East (3.0 cr)  
HIST 5612 - New Directions in the Middle Ages, ca. 1100-1500 (3.0 cr)  
HIST 5633 - Socio-Economic History of China (3.0 cr)  
HIST 5715 - Readings in European Women's History: 1450-1750 (3.0 cr)  
HIST 5801 - Seminar in Early American History (3.0 cr)  
HIST 5901 - Latin America Proseminar: Colonial (3.0 cr)  
HIST 5962 - Bell Library Research Seminar in Comparative World History, ca. 1000-1800 CE (3.0 cr)  
HIST 5964 - Comparative Economic History (3.0 cr)  
HIST 8715 - Research on European Women's History, 1450-1750 (3.0 cr)  
HIST 8801 - Seminar in Early American History (3.0 cr)  
HIST 8858 - Research in Early American History (3.0 cr)  
HMED 8001 - Foundations in the History of Early Medicine (3.0 cr)  
HSCI 5611 - Enlightenment, Revolution, and the Rise of Modern Science (3.0 cr)  
HSCI 8125 - Foundations for Research in the Scientific Revolution (3.0 cr)  
HSCI 8900 - Seminar: History of Early Physical Science (3.0 cr)  
LAT 5200 - Advanced Reading in Later Latin (3.0 cr)  
MUS 5624 - Music of J. S. Bach (3.0 cr)  
MUS 8182 - Opera History in Context: Monteverdi and Mozart (3.0 cr)  
MUS 8632 - Seminar: Music in Early Modern Europe (3.0 cr)  
PHIL 4055 - Kant (3.0 cr)  
PHIL 8010 - Workshop in History of Philosophy (1.0 cr)  
PHIL 8085 - Seminar: History of Philosophy--Modern Philosophers (3.0 cr)  
PHIL 8090 - Seminar: History of Modern Philosophy (3.0 cr)  
POL 8252 - Early Modern Political Thought (3.0 cr)  
PORT 5520 - Portuguese Literary and Cultural Studies (3.0 cr)  
PORT 5530 - Brazilian Literary and Cultural Studies (3.0 cr)  
RELS 5612 - Baroque Rome: Art and Politics in the Papal Capital (3.0 cr)  
RELS 5721 - North Africa since 1500: Islam, Colonialism, and Independence (3.0 cr)  
SPAN 5170 - The Literature of the Spanish Empire and Its Decline (3.0 cr)  
SPAN 5180 - Don Quixote (3.0 cr)  
SPAN 5190 - The Crisis of the Old Regime: Spanish Literature of the Enlightenment and Romanticism (3.0 cr)  
SPAN 5316 - Spanish Picaresque Narratives (3.0 cr)  
SPAN 8212 - Spanish Theater of the 16th Century: Drama up to Lope (3.0 cr)  
SPAN 8223 - The Poetry of the Spanish Golden Age (3.0 cr)  
SPAN 8312 - Two Spanish Masterpieces: [Libro de Buen Amor] and [La Celestina] (3.0 cr)  
SPPT 8400 - Topics in Modern Hispanic and Lusophone Culture (3.0 cr)  
TH 8112 - History and Theory of Western Theatre: Medieval Through Renaissance (3.0 cr)  
TH 8113 - History and Theory of Western Theatre: National Theatres to the French Revolution (3.0 cr)



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### *Twin Cities Campus*

## Economics M.A.

*Economics*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Economics, 4-101 Hanson Hall, 1925 4th Street South, Minneapolis MN 55455 (612-625-6833; fax: 612-624-0209)

Email: [econdgs@umn.edu](mailto:econdgs@umn.edu)

Website: <https://cla.umn.edu/economics/graduate>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: Students are admitted only for the PhD in economics; the MA is an optional part of the PhD program.

The economics graduate program offers degree work in both theoretical and applied fields of economics with an emphasis on quantitative economic analysis. The strong quantitative component in this degree emphasizes multivariate calculus, linear algebra, and econometrics (statistical methods of economic data). Economics coursework consists of microeconomic theory, macroeconomic theory, economic growth, price theory, cost-benefit analysis, econometrics, economic modelling and forecasting, industrial organization, economic development, game theory, optimization theory, and financial, computational, international, mathematical, monetary, public, and labor economics. Fields of specialization and written preliminary examinations include microeconomic theory, macroeconomic theory, econometrics, economic growth and development, financial economics, game theory, computational economics, industrial organization, labor economics, international economics, mathematical economics, monetary economics, and public economics.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### **Special Application Requirements:**

Note: The Economics graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Economics PhD program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is written. A capstone project is required.

**Capstone Project:** Two Plan B projects consisting of research papers or literature reviews are required; the PhD written preliminary exams required in two fields outside of economic theory ("field exams") may be used to satisfy either or both of the Plan B projects.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C+ earned for each.

#### **Required Core Courses (16 Credits)**



Take the following courses for 16 credits:

- ECON 8101 - Microeconomic Theory (2.0 cr)
- ECON 8102 - Microeconomic Theory (2.0 cr)
- ECON 8103 - Microeconomic Theory (2.0 cr)
- ECON 8104 - Microeconomic Theory (2.0 cr)
- ECON 8105 - Macroeconomic Theory (2.0 cr)
- ECON 8106 - Macroeconomic Theory (2.0 cr)
- ECON 8107 - Macroeconomic Theory (2.0 cr)
- ECON 8108 - Macroeconomic Theory (2.0 cr)

#### **Economics Electives (8 Credits)**

Select at least 8 credits of electives in consultation with the director of graduate studies.

- ECON 8117 - Noncooperative Game Theory (2.0 cr)
- ECON 8118 - Noncooperative Game Theory (2.0 cr)
- ECON 8181 - Advanced Topics in Microeconomics (2.0 cr)
- ECON 8182 - Advanced Topics in Microeconomics (2.0 cr)
- ECON 8185 - Advanced Topics in Macroeconomics (2.0 cr)
- ECON 8186 - Advanced Topics in Macroeconomics (2.0 cr)
- ECON 8205 - Applied Econometrics (2.0 cr)
- ECON 8206 - Applied Econometrics (2.0 cr)
- ECON 8207 - Applied Econometrics (2.0 cr)
- ECON 8208 - Applied Econometrics (2.0 cr)
- ECON 8311 - Economic Growth and Development (2.0 cr)
- ECON 8312 - Economic Growth and Development (2.0 cr)
- ECON 8401 - International Trade and Payments Theory (2.0 cr)
- ECON 8402 - International Trade and Payments Theory (2.0 cr)
- ECON 8403 - International Trade and Payments Theory (2.0 cr)
- ECON 8501 - Wages and Employment (2.0 cr)
- ECON 8502 - Wages and Employment (2.0 cr)
- ECON 8503 - Wages and Employment (2.0 cr)
- ECON 8581 - Advanced Topics in Labor Economics (2.0 cr)
- ECON 8582 - Advanced Topics in Labor Economics (2.0 cr)
- ECON 8601 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8602 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8603 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8701 - Monetary Economics (2.0 cr)
- ECON 8702 - Monetary Economics (2.0 cr)
- ECON 8703 - Monetary Economics (2.0 cr)
- ECON 8704 - Financial Economics (2.0 cr)
- ECON 8705 - Financial Economics (2.0 cr)
- ECON 8801 - Public Economics (2.0 cr)
- ECON 8802 - Public Economics (2.0 cr)
- ECON 8803 - Public Economics (2.0 cr)

#### **Outside Coursework (6 Credits)**

Take at least 6 credits outside the major. Courses are selected in consultation with the director of graduate studies.

- CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)
- CSCI 5512 - Artificial Intelligence II (3.0 cr)
- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)
- CSCI 5715 - From GPS and Virtual Globes to Spatial Computing (3.0 cr)
- CSCI 5801 - Software Engineering I (3.0 cr)
- CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)
- FINA 8802 - Theory of Capital Markets I: Discrete Time (2.0 cr)
- FINA 8803 - Theory of Capital Markets II: Continuous Time (2.0 cr)
- FINA 8810 - Topics in Asset Pricing (2.0 cr)
- FINA 8812 - Corporate Finance I (2.0 cr)
- FINA 8820 - Topics in Corporate Finance (2.0 cr)
- IE 8534 - Advanced Topics in Operations Research (4.0 cr)
- MATH 5485 - Introduction to Numerical Methods I (4.0 cr)
- MATH 5486 - Introduction To Numerical Methods II (4.0 cr)
- MATH 5615H - Honors: Introduction to Analysis I (4.0 cr)
- MATH 5616H - Honors: Introduction to Analysis II (4.0 cr)
- MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)



MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8201 - General Algebra (3.0 cr)  
MATH 8271 - Lie Groups and Lie Algebras (3.0 cr)  
MATH 8301 - Manifolds and Topology (3.0 cr)  
MATH 8302 - Manifolds and Topology (3.0 cr)  
MATH 8306 - Algebraic Topology (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8445 - Numerical Analysis of Differential Equations (3.0 cr)  
MATH 8501 - Differential Equations and Dynamical Systems I (3.0 cr)  
MATH 8502 - Differential Equations and Dynamical Systems II (3.0 cr)  
MATH 8520 - Topics in Dynamical Systems (1.0 - 3.0 cr)  
MATH 8571 - Theory of Evolutionary Equations (3.0 cr)  
MATH 8572 - Theory of Evolutionary Equations (3.0 cr)  
MATH 8583 - Theory of Partial Differential Equations (3.0 cr)  
MATH 8590 - Topics in Partial Differential Equations (1.0 - 3.0 cr)  
MATH 8601 - Real Analysis (3.0 cr)  
MATH 8602 - Real Analysis (3.0 cr)  
MATH 8651 - Theory of Probability Including Measure Theory (3.0 cr)  
MATH 8652 - Theory of Probability Including Measure Theory (3.0 cr)  
MATH 8659 - Stochastic Processes (3.0 cr)  
NSCI 5101 - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)  
PSY 5015 - Cognition, Computation, and Brain (3.0 cr)  
PSY 5018H - Mathematical Models of Human Behavior (3.0 cr)  
PSY 5062 - Cognitive Neuropsychology (3.0 cr)  
PSY 5064 - Brain and Emotion (3.0 cr)  
PSY 5065 - Functional Imaging: Hands-on Training (3.0 cr)  
PSY 5137 - Introduction to Behavioral Genetics (3.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)  
STAT 8056 - Statistical Learning and Data Mining (3.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)  
STAT 8102 - Theory of Statistics 2 (3.0 cr)  
STAT 8501 - Introduction to Stochastic Processes with Applications (3.0 cr)





### **Twin Cities Campus**

## **Economics Minor**

*Economics*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Economics, 4-101 Hanson Hall, 1925 4th Street South, Minneapolis MN 55455 (612-625-6833; fax: 612-624-0209)

Email: [econdgs@umn.edu](mailto:econdgs@umn.edu)

Website: <https://cla.umn.edu/economics/graduate>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The economics graduate program offers degree work in both theoretical and applied fields of economics with an emphasis on quantitative economic analysis. The strong quantitative component in this degree emphasizes multivariate calculus, linear algebra, and econometrics (statistical methods of economic data). Economics coursework consists of microeconomic theory, macroeconomic theory, economic growth, price theory, cost-benefit analysis, econometrics, economic modelling and forecasting, industrial organization, economic development, game theory, optimization theory, and financial, computational, international, mathematical, monetary, public, and labor economics. Fields of specialization and written preliminary examinations include microeconomic theory, macroeconomic theory, econometrics, economic growth and development, financial economics, game theory, computational economics, industrial organization, labor economics, international economics, mathematical economics, monetary economics, and public economics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the Economics minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Economics director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

All courses must be taken A/F and completed with grades of B or better (one 8xxx-level course may carry a grade of C).

The minimum cumulative GPA for minor field coursework is 3.0.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

All coursework must be pre-approved by the Economics director of graduate studies. Students without previous coursework equivalent to the 4-level economic theory courses must take at least 4 credits of 4-level micro analysis, 4-level macro theory, 8-level micro theory, or 8-level macro theory coursework.



### Coursework (6 credits)

Select 6 credits from the following in consultation with the Economics director of graduate studies:

- ECON 4161 - Microeconomic Analysis I (2.0 cr)
- ECON 4162 - Microeconomic Analysis II (2.0 cr)
- ECON 4163 - Microeconomic Analysis III (2.0 cr)
- ECON 4164 - Microeconomic Analysis IV (2.0 cr)
- ECON 4165 - Macroeconomic Theory (2.0 cr)
- ECON 4166 - Macroeconomic Theory (2.0 cr)
- ECON 4167 - Macroeconomic Theory (2.0 cr)
- ECON 4168 - Macroeconomic Theory (2.0 cr)
- ECON 8101 - Microeconomic Theory (2.0 cr)
- ECON 8102 - Microeconomic Theory (2.0 cr)
- ECON 8103 - Microeconomic Theory (2.0 cr)
- ECON 8104 - Microeconomic Theory (2.0 cr)
- ECON 8105 - Macroeconomic Theory (2.0 cr)
- ECON 8106 - Macroeconomic Theory (2.0 cr)
- ECON 8107 - Macroeconomic Theory (2.0 cr)
- ECON 8108 - Macroeconomic Theory (2.0 cr)

### Doctoral

All courses must be selected in consultation with the Economics director of graduate studies.

### Sequence Requirement (8 credits)

Select 8 credits from the following in consultation with the Economics director of graduate studies:

#### Microeconomic Theory Sequence

- ECON 8101 - Microeconomic Theory (2.0 cr)
- ECON 8102 - Microeconomic Theory (2.0 cr)
- ECON 8103 - Microeconomic Theory (2.0 cr)
- ECON 8104 - Microeconomic Theory (2.0 cr)

#### Macroeconomic Theory Sequence

- ECON 8105 - Macroeconomic Theory (2.0 cr)
- ECON 8106 - Macroeconomic Theory (2.0 cr)
- ECON 8107 - Macroeconomic Theory (2.0 cr)
- ECON 8108 - Macroeconomic Theory (2.0 cr)

### Electives (4 credits)

Select 4 credits from the following course sequences in consultation with the Economics director of graduate studies. Selected coursework must be taken in the order in which its sequence is offered.

- ECON 8117 - Noncooperative Game Theory (2.0 cr)
- ECON 8118 - Noncooperative Game Theory (2.0 cr)
- ECON 8205 - Applied Econometrics (2.0 cr)
- ECON 8206 - Applied Econometrics (2.0 cr)
- ECON 8207 - Applied Econometrics (2.0 cr)
- ECON 8208 - Applied Econometrics (2.0 cr)
- ECON 8311 - Economic Growth and Development (2.0 cr)
- ECON 8312 - Economic Growth and Development (2.0 cr)
- ECON 8401 - International Trade and Payments Theory (2.0 cr)
- ECON 8402 - International Trade and Payments Theory (2.0 cr)
- ECON 8403 - International Trade and Payments Theory (2.0 cr)
- ECON 8501 - Wages and Employment (2.0 cr)
- ECON 8502 - Wages and Employment (2.0 cr)
- ECON 8503 - Wages and Employment (2.0 cr)
- ECON 8601 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8602 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8603 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8701 - Monetary Economics (2.0 cr)
- ECON 8702 - Monetary Economics (2.0 cr)
- ECON 8703 - Monetary Economics (2.0 cr)
- ECON 8704 - Financial Economics (2.0 cr)
- ECON 8705 - Financial Economics (2.0 cr)
- ECON 8801 - Public Economics (2.0 cr)
- ECON 8802 - Public Economics (2.0 cr)
- ECON 8803 - Public Economics (2.0 cr)



**Twin Cities Campus**  
**Economics Ph.D.**  
*Economics*  
**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

**Contact Information:**

Department of Economics, 4-101 Hanson Hall, 1925 4th Street South, Minneapolis MN 55455 (612-625-6833; fax: 612-624-0209)

Email: [econdgs@umn.edu](mailto:econdgs@umn.edu)

Website: <https://cla.umn.edu/economics/graduate>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: Students are admitted only for the PhD in economics; the MA is an optional part of the PhD program. The economics graduate program offers degree work in both theoretical and applied fields of economics with an emphasis on quantitative economic analysis. The strong quantitative component in this degree emphasizes multivariate calculus, linear algebra, and econometrics (statistical methods of economic data). Economics coursework consists of microeconomic theory, macroeconomic theory, economic growth, price theory, cost-benefit analysis, econometrics, economic modelling and forecasting, industrial organization, economic development, game theory, optimization theory, and financial, computational, international, mathematical, monetary, public, and labor economics. Fields of specialization and written preliminary examinations include microeconomic theory, macroeconomic theory, econometrics, economic growth and development, financial economics, game theory, computational economics, industrial organization, labor economics, international economics, mathematical economics, monetary economics, and public economics.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.50.

### Special Application Requirements:

Coursework in linear algebra and multivariate calculus is required.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Quantitative Reasoning: 162

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Internet Based - Speaking Score: 23
- IELTS
  - Total Score: 7.5

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#) (GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

24 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.20 is required for students to remain in good standing.

At least 3 semesters must be completed before filing a Degree Program Form.

Coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C earned.

The number of courses taken to prepare for the preliminary examinations is determined through consultation with the advisor.

Students may begin doctoral thesis credit registration, with advisor approval starting Year 2 of the program.

### Required Core Courses (16 credits)

Take the following courses for 16 credits:

[ECON 8101](#) - Microeconomic Theory (2.0 cr)

[ECON 8102](#) - Microeconomic Theory (2.0 cr)

[ECON 8103](#) - Microeconomic Theory (2.0 cr)

[ECON 8104](#) - Microeconomic Theory (2.0 cr)

[ECON 8105](#) - Macroeconomic Theory (2.0 cr)

[ECON 8106](#) - Macroeconomic Theory (2.0 cr)

[ECON 8107](#) - Macroeconomic Theory (2.0 cr)

[ECON 8108](#) - Macroeconomic Theory (2.0 cr)

### Electives (8 credits)

Select at least 8 credits from the following in consultation with the advisor:

[ECON 8117](#) - Noncooperative Game Theory (2.0 cr)

[ECON 8118](#) - Noncooperative Game Theory (2.0 cr)

[ECON 8181](#) - Advanced Topics in Microeconomics (2.0 cr)

[ECON 8182](#) - Advanced Topics in Microeconomics (2.0 cr)

[ECON 8185](#) - Advanced Topics in Macroeconomics (2.0 cr)

[ECON 8186](#) - Advanced Topics in Macroeconomics (2.0 cr)

[ECON 8205](#) - Applied Econometrics (2.0 cr)

[ECON 8206](#) - Applied Econometrics (2.0 cr)

[ECON 8207](#) - Applied Econometrics (2.0 cr)

[ECON 8208](#) - Applied Econometrics (2.0 cr)

[ECON 8311](#) - Economic Growth and Development (2.0 cr)

[ECON 8312](#) - Economic Growth and Development (2.0 cr)

[ECON 8401](#) - International Trade and Payments Theory (2.0 cr)

[ECON 8402](#) - International Trade and Payments Theory (2.0 cr)

[ECON 8403](#) - International Trade and Payments Theory (2.0 cr)

[ECON 8501](#) - Wages and Employment (2.0 cr)

[ECON 8502](#) - Wages and Employment (2.0 cr)

[ECON 8503](#) - Wages and Employment (2.0 cr)

[ECON 8581](#) - Advanced Topics in Labor Economics (2.0 cr)

[ECON 8582](#) - Advanced Topics in Labor Economics (2.0 cr)

[ECON 8601](#) - Industrial Organization and Government Regulation (2.0 cr)

[ECON 8602](#) - Industrial Organization and Government Regulation (2.0 cr)

[ECON 8603](#) - Industrial Organization and Government Regulation (2.0 cr)

[ECON 8701](#) - Monetary Economics (2.0 cr)

[ECON 8702](#) - Monetary Economics (2.0 cr)

[ECON 8703](#) - Monetary Economics (2.0 cr)

[ECON 8704](#) - Financial Economics (2.0 cr)

[ECON 8705](#) - Financial Economics (2.0 cr)

[ECON 8801](#) - Public Economics (2.0 cr)

[ECON 8802](#) - Public Economics (2.0 cr)

[ECON 8803](#) - Public Economics (2.0 cr)

### Outside Coursework (12 credits)



Select at least 12 elective credits from the following in consultation with the director of graduate studies.

CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5512 - Artificial Intelligence II (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5715 - From GPS, Google Maps, and Uber to Spatial Data Science (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)  
FINA 8802 - Theory of Capital Markets I: Discrete Time (2.0 cr)  
FINA 8803 - Theory of Capital Markets II: Continuous Time (2.0 cr)  
FINA 8810 - Topics in Asset Pricing (2.0 cr)  
FINA 8812 - Corporate Finance I (2.0 cr)  
FINA 8820 - Topics in Corporate Finance (2.0 cr)  
IE 8534 - Advanced Topics in Operations Research (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5615H - Honors: Introduction to Analysis I (4.0 cr)  
MATH 5616H - Honors: Introduction to Analysis II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8201 - General Algebra (3.0 cr)  
MATH 8271 - Lie Groups and Lie Algebras (3.0 cr)  
MATH 8301 - Manifolds and Topology (3.0 cr)  
MATH 8302 - Manifolds and Topology (3.0 cr)  
MATH 8306 - Algebraic Topology (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8445 - Numerical Analysis of Differential Equations (3.0 cr)  
MATH 8501 - Differential Equations and Dynamical Systems I (3.0 cr)  
MATH 8502 - Differential Equations and Dynamical Systems II (3.0 cr)  
MATH 8520 - Topics in Dynamical Systems (1.0 - 3.0 cr)  
MATH 8571 - Theory of Evolutionary Equations (3.0 cr)  
MATH 8572 - Theory of Evolutionary Equations (3.0 cr)  
MATH 8583 - Theory of Partial Differential Equations (3.0 cr)  
MATH 8590 - Topics in Partial Differential Equations (1.0 - 3.0 cr)  
MATH 8601 - Real Analysis (3.0 cr)  
MATH 8602 - Real Analysis (3.0 cr)  
MATH 8651 - Theory of Probability Including Measure Theory (3.0 cr)  
MATH 8652 - Theory of Probability Including Measure Theory (3.0 cr)  
MATH 8659 - Stochastic Processes (3.0 cr)  
NSCI 5101 - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)  
PSY 5015 - Cognition, Computation, and Brain (3.0 cr)  
PSY 5018H - Mathematical Models of Human Behavior (3.0 cr)  
PSY 5062 - Cognitive Neuropsychology (3.0 cr)  
PSY 5064 - Brain and Emotion (3.0 cr)  
PSY 5065 - Functional Imaging: Hands-on Training (3.0 cr)  
PSY 5137 - Introduction to Behavioral Genetics (3.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)  
STAT 8056 - Statistical Learning and Data Mining (3.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)  
STAT 8102 - Theory of Statistics 2 (3.0 cr)  
STAT 8501 - Introduction to Stochastic Processes with Applications (3.0 cr)

#### Thesis Credits

Take at least 24 doctoral thesis credits.

ECON 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **English M.A.**

*English Language & Literature*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of English Language and Literature, Lind Hall, 207 Church Street S.E., Minneapolis, MN 55455 (612-625-3882; fax: 612-624-8228).

Email: [gradeng@umn.edu](mailto:gradeng@umn.edu)

Website: <http://english.cla.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Over the past 20 years, the field of English studies has changed dramatically from a discipline concerned with studying the literary works produced by English speakers in Britain and the United States to encompass writings in English from around the globe. The concerns of literary scholars have broadened to include not only textual analyses but also cultural, social, political, and economic contexts. The field of literature itself now encompasses not only the traditional genres of poetry, prose (fiction and belles-lettres), and drama, but also extra-literary discourses: popular culture, film, television, legal documents, conduct books, and manifestos. The Department of English has been in the forefront of interdisciplinary projects, thanks to the efforts of a faculty committed to research in American studies, medieval studies, feminist studies, film studies, and cultural studies. At the same time, the department maintains the core concerns of the discipline: the traditional study of the literatures and languages in English as well as develops writers for the present and future through the master of fine arts in creative writing degree. The department is engaged in two simultaneous projects: to preserve the core curriculum and to re-imagine its future shape.

The department offers a master of arts in English language and literature. The MA offers training in the areas of literary history, literary theory and interpretation, language, linguistics, rhetoric, and composition. Students in the MA can develop specific concentrations through consultation with the director of graduate studies.

Course requirements for the MA program are broadly defined, allowing the student to shape a personal program of study. The English program encourages and supports interdisciplinary work.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

A minimum of four courses in English, three of which must be at the upper-division level, is required for degree program admission. The courses should be widely distributed.

#### **Special Application Requirements:**

Required admission materials include three letters of recommendation; a short essay explaining scholarly, professional, and personal goals and reason(s) for choosing the University of Minnesota; and a writing sample, such as a course paper. Candidates for all degrees are admitted fall semester only; all materials must be received by December 1st.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 105
- IELTS
  - Total Score: 7.5



- MELAB  
- Final score: 88

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project is made up of three Plan B papers. Each is a tightly argued essay of about 5,000 words, usually a reworking of a paper done originally for a course.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: A reading knowledge of one language.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Course (3 credits)

Take the following course:

[ENGL 5001](#) - Ph.D. Colloquium: Introduction to Literary Theory and Literary Studies in the Modern University (3.0 cr)

### Major Electives (21 credits)

Select two emphases. One emphasis must comprise at least 12 credits and the other at least 9 credits, chosen in consultation with the advisor and director of graduate studies.

- [ENGL 5020](#) - Studies in Narrative (3.0 cr)
- [ENGL 5040](#) - Theories of Film (3.0 cr)
- [ENGL 5090](#) - Readings in Special Subjects (1.0 - 4.0 cr)
- [ENGL 5110](#) - Medieval Literatures and Cultures: Intro to Medieval Studies (3.0 cr)
- [ENGL 5121](#) - Readings in Early Modern Literature and Culture (3.0 cr)
- [ENGL 5140](#) - Readings in 18th Century Literature and Culture (3.0 cr)
- [ENGL 5150](#) - Readings in 19th-Century Literature and Culture (3.0 cr)
- [ENGL 5170](#) - Readings in 20th-Century Literature and Culture (3.0 cr)
- [ENGL 5300](#) - Readings in American Minority Literature (3.0 cr)
- [ENGL 5501](#) - Origins of Cultural Studies (3.0 cr)
- [ENGL 5510](#) - Readings in Criticism and Theory (3.0 cr)
- [ENGL 5593](#) - The African-American Novel (3.0 cr)
- [ENGL 5597](#) - Seminar: Harlem Renaissance (3.0 cr)
- [ENGL 5701](#) - Great River Review (4.0 cr)
- [ENGL 5743](#) - History of Rhetoric and Writing (3.0 cr)
- [ENGL 5790](#) - Topics in Rhetoric, Composition, and Language (3.0 cr)
- [ENGL 5805](#) - Writing for Publication (3.0 cr)
- [ENGL 5992](#) - Directed Readings, Study, or Research (1.0 - 3.0 cr)
- [ENGL 8090](#) - Seminar in Special Subjects (3.0 cr)
- [ENGL 8110](#) - Seminar: Medieval Literature and Culture (3.0 cr)
- [ENGL 8120](#) - Seminar in Early Modern Literature and Culture (3.0 cr)
- [ENGL 8140](#) - Seminar in 18th Century Literature and Culture (3.0 cr)
- [ENGL 8150](#) - Seminar in Shakespeare (3.0 cr)
- [ENGL 8170](#) - Seminar in 19th-Century British Literature and Culture (3.0 cr)
- [ENGL 8180](#) - Seminar in 20th-Century British Literature and Culture (3.0 cr)
- [ENGL 8190](#) - Seminar in 20th-Century Anglophone Literatures and Cultures (3.0 cr)
- [ENGL 8200](#) - Seminar in American Literature (3.0 cr)
- [ENGL 8290](#) - Topics, Figures, and Themes in American Literature (3.0 cr)
- [ENGL 8300](#) - Seminar in American Minority Literature (3.0 cr)
- [ENGL 8400](#) - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)
- [ENGL 8510](#) - Studies in Criticism and Theory (3.0 cr)
- [ENGL 8520](#) - Seminar: Cultural Theory and Practice (3.0 cr)
- [ENGL 8530](#) - Seminar in Feminist Criticism (3.0 cr)
- [ENGL 8600](#) - Seminar in Language, Rhetoric, Literacy, and Composition (3.0 cr)



[ENGL 8610](#) - Seminar in Language and Discourse Studies (3.0 cr)

[ENGL 8992](#) - Directed Reading in Language, Literature, Culture, Rhetoric, Composition, or Creative Writing (1.0 - 9.0 cr)

**Outside Coursework (6 credits)**

Select 6 credits outside the major from the following, in consultation with the director of graduate studies:

[AFRO 5866](#) - The Civil Rights and Black Power Movement, 1954-1984 (3.0 cr)

[AMIN 5402](#) - American Indians and the Cinema [AH, DSJ] (3.0 cr)

[CI 5404](#) - Multicultural Literature for Children and Adolescents (3.0 cr)

[CI 8400](#) - Special Topics in Children's and Young Adult Literature (1.0 - 6.0 cr)

GER 5xxx

[GWSS 8260](#) - Seminar: Race, Representation and Resistance (3.0 cr)

[GWSS 8270](#) - Seminar: Theories of Body (3.0 cr)

HIST 5xxx

SCAN 5xxx

TH 5xxx





### **Twin Cities Campus**

## **English Minor**

*English Language & Literature*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of English Language and Literature, 207 Lind Hall, 207 Church Street S.E., Minneapolis, MN 55455 (612-625-3882; fax: 612-624-8228)

Email: [gradeng@umn.edu](mailto:gradeng@umn.edu)

Website: <http://english.cla.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

During the past 20 years, the field of English studies has changed dramatically from a discipline concerned with studying the literary works produced by English speakers in Britain and the United States to encompass writings in English from around the globe. The concerns of literary scholars have broadened to include not only textual analyses but also cultural, social, political, and economic contexts. The field of literature itself now encompasses not only the traditional genres of poetry, prose (fiction and belles-lettres), and drama, but also extra-literary discourses: popular culture, film, television, legal documents, conduct books, and manifestos. The Department of English has been in the forefront of interdisciplinary projects, thanks to the efforts of a faculty committed to research in American studies, medieval studies, feminist studies, film studies, and cultural studies. At the same time, the department maintains the core concerns of the discipline: the traditional study of the literatures and languages in English as well as develops writers for the present and future through the master of fine arts in creative writing degree. The department is engaged in two simultaneous projects: to preserve the core curriculum and to reimagine its future shape.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the English director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

The minimum cumulative GPA for minor field coursework is 3.00.

#### **Coursework (6 to 12 credits)**

Master's students select 9 credits, and doctoral students select 12 credits from the following in consultation with the English director of graduate studies.

[ENGL 5020](#) - Studies in Narrative (3.0 cr)

[ENGL 5040](#) - Theories of Film (3.0 cr)

[ENGL 5090](#) - Readings in Special Subjects (1.0 - 4.0 cr)

[ENGL 5110](#) - Medieval Literatures and Cultures: Intro to Medieval Studies (3.0 cr)

[ENGL 5121](#) - Readings in Early Modern Literature and Culture (3.0 cr)



ENGL 5140 - Readings in 18th Century Literature and Culture (3.0 cr)  
ENGL 5150 - Readings in 19th-Century Literature and Culture (3.0 cr)  
ENGL 5170 - Readings in 20th-Century Literature and Culture (3.0 cr)  
ENGL 5300 - Readings in American Minority Literature (3.0 cr)  
ENGL 5501 - Origins of Cultural Studies (3.0 cr)  
ENGL 5510 - Readings in Criticism and Theory (3.0 cr)  
ENGL 5593 - The African-American Novel (3.0 cr)  
ENGL 5597 - Seminar: Harlem Renaissance (3.0 cr)  
ENGL 5701 - Great River Review (4.0 cr)  
ENGL 5743 - History of Rhetoric and Writing (3.0 cr)  
ENGL 5790 - Topics in Rhetoric, Composition, and Language (3.0 cr)  
ENGL 5805 - Writing for Publication (3.0 cr)  
ENGL 5992 - Directed Readings, Study, or Research (1.0 - 3.0 cr)  
ENGL 8090 - Seminar in Special Subjects (3.0 cr)  
ENGL 8110 - Seminar: Medieval Literature and Culture (3.0 cr)  
ENGL 8120 - Seminar in Early Modern Literature and Culture (3.0 cr)  
ENGL 8140 - Seminar in 18th Century Literature and Culture (3.0 cr)  
ENGL 8150 - Seminar in Shakespeare (3.0 cr)  
ENGL 8170 - Seminar in 19th-Century British Literature and Culture (3.0 cr)  
ENGL 8180 - Seminar in 20th-Century British Literature and Culture (3.0 cr)  
ENGL 8190 - Seminar in 20th-Century Anglophone Literatures and Cultures (3.0 cr)  
ENGL 8200 - Seminar in American Literature (3.0 cr)  
ENGL 8290 - Topics, Figures, and Themes in American Literature (3.0 cr)  
ENGL 8300 - Seminar in American Minority Literature (3.0 cr)  
ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)  
ENGL 8510 - Studies in Criticism and Theory (3.0 cr)  
ENGL 8520 - Seminar: Cultural Theory and Practice (3.0 cr)  
ENGL 8530 - Seminar in Feminist Criticism (3.0 cr)  
ENGL 8600 - Seminar in Language, Rhetoric, Literacy, and Composition (3.0 cr)  
ENGL 8610 - Seminar in Language and Discourse Studies (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **English Ph.D.**

*English Language & Literature*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of English Language and Literature, 207 Lind Hall, 207 Church Street S.E., Minneapolis, MN 55455 (612-625-3882; fax: 612-624-8228)

Email: [gradeng@umn.edu](mailto:gradeng@umn.edu)

Website: <http://english.cla.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 63
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Over the past 20 years, the field of English studies has changed dramatically from a discipline concerned with studying the literary works produced by English speakers in Britain and the United States to encompass writings in English from around the globe. The concerns of literary scholars have broadened to include not only textual analyses but also cultural, social, political, and economic contexts. The field of literature itself now encompasses not only the traditional genres of poetry, prose (fiction and belles-lettres), and drama, but also extra-literary discourses: popular culture, film, television, legal documents, conduct books, and manifestos. The Department of English has been in the forefront of interdisciplinary projects, thanks to the efforts of a faculty committed to research in American studies, medieval studies, feminist studies, film studies, and cultural studies. At the same time, the department maintains the core concerns of the discipline: the traditional study of the literatures and languages in English as well as develops writers for the present and future through the master of fine arts in creative writing degree. The department is engaged in two simultaneous projects: to preserve the core curriculum and to re-imagine its future shape.

Course requirements for the PhD program are broadly defined, allowing the student to shape a personal program of study. The English program encourages and supports interdisciplinary work.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

A minimum of four courses in English, three of which must be at the upper division level, is required. The courses should be widely distributed.

#### **Special Application Requirements:**

Required application materials include three letters of recommendation; a short essay explaining scholarly, professional, and personal goals and reason(s) for choosing the University of Minnesota; and a writing sample, such as a course paper. Candidates are admitted fall semester only; all materials must be received by December 1st.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 105
  - Paper Based - Total Score: 620
- IELTS
  - Total Score: 7.5
- MELAB
  - Final score: 88



Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

27 to 33 credits are required in the major.  
6 to 12 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Rdg knowledge of 2 languages, or proficiency in 1

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

### Required Courses (6 Credits)

Take the following courses. Take ENGL 5800 for 3 credits.

[ENGL 5001](#) - Ph.D. Colloquium: Introduction to Literary Theory and Literary Studies in the Modern University (3.0 cr)

[ENGL 5800](#) - Practicum in the Teaching of English (1.0 - 3.0 cr)

### Major Electives (21 to 27 credits)

Select at least 12 credits from the chosen emphasis area, plus 9 credits from 3 categories other than the emphasis area, to meet the 21-credit requirement. Up to 6 additional credits from this list may be applied to the outside coursework requirement. All courses must be selected in consultation with the advisor.

[ENGL 5020](#) - Studies in Narrative (3.0 cr)

[ENGL 5040](#) - Theories of Film (3.0 cr)

[ENGL 5090](#) - Readings in Special Subjects (1.0 - 4.0 cr)

[ENGL 5110](#) - Medieval Literatures and Cultures: Intro to Medieval Studies (3.0 cr)

[ENGL 5121](#) - Readings in Early Modern Literature and Culture (3.0 cr)

[ENGL 5140](#) - Readings in 18th Century Literature and Culture (3.0 cr)

[ENGL 5150](#) - Readings in 19th-Century Literature and Culture (3.0 cr)

[ENGL 5170](#) - Readings in 20th-Century Literature and Culture (3.0 cr)

[ENGL 5300](#) - Readings in American Minority Literature (3.0 cr)

[ENGL 5501](#) - Origins of Cultural Studies (3.0 cr)

[ENGL 5510](#) - Readings in Criticism and Theory (3.0 cr)

[ENGL 5593](#) - The African-American Novel (3.0 cr)

[ENGL 5597](#) - Seminar: Harlem Renaissance (3.0 cr)

[ENGL 5701](#) - Great River Review (4.0 cr)

[ENGL 5743](#) - History of Rhetoric and Writing (3.0 cr)

[ENGL 5790](#) - Topics in Rhetoric, Composition, and Language (3.0 cr)

[ENGL 5805](#) - Writing for Publication (3.0 cr)

[ENGL 5992](#) - Directed Readings, Study, or Research (1.0 - 3.0 cr)

[ENGL 8090](#) - Seminar in Special Subjects (3.0 cr)

[ENGL 8110](#) - Seminar: Medieval Literature and Culture (3.0 cr)

[ENGL 8120](#) - Seminar in Early Modern Literature and Culture (3.0 cr)

[ENGL 8140](#) - Seminar in 18th Century Literature and Culture (3.0 cr)

[ENGL 8150](#) - Seminar in Shakespeare (3.0 cr)

[ENGL 8170](#) - Seminar in 19th-Century British Literature and Culture (3.0 cr)

[ENGL 8180](#) - Seminar in 20th-Century British Literature and Culture (3.0 cr)

[ENGL 8190](#) - Seminar in 20th-Century Anglophone Literatures and Cultures (3.0 cr)

[ENGL 8200](#) - Seminar in American Literature (3.0 cr)

[ENGL 8290](#) - Topics, Figures, and Themes in American Literature (3.0 cr)

[ENGL 8300](#) - Seminar in American Minority Literature (3.0 cr)

[ENGL 8400](#) - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)

[ENGL 8510](#) - Studies in Criticism and Theory (3.0 cr)

[ENGL 8520](#) - Seminar: Cultural Theory and Practice (3.0 cr)

[ENGL 8530](#) - Seminar in Feminist Criticism (3.0 cr)



[ENGL 8600](#) - Seminar in Language, Rhetoric, Literacy, and Composition (3.0 cr)

[ENGL 8610](#) - Seminar in Language and Discourse Studies (3.0 cr)

[ENGL 8992](#) - Directed Reading in Language, Literature, Culture, Rhetoric, Composition, or Creative Writing (1.0 - 9.0 cr)

#### **Outside Coursework (6 to 12 Credits)**

Select 12 credits from the following in consultation with the advisor. Students applying 6 Major Electives credits to this requirement must select at least 6 additional credits of outside coursework to complete the 12-credit requirement.

AFRO 5xxx

AFRO 8xxx

AMIN 5xxx

AMIN 8xxx

ARTH 5xxx

ARTH 8xxx

CI 5xxx

CI 8xxx

CL 8xxx

CSCL 5xxx

ENGW 5xxx

[FREN 8110](#) - Topics in Early Medieval French Literature (3.0 cr)

[FREN 8114](#) - Troubadour Lyric and Old Occitan Language (3.0 cr)

[FREN 8230](#) - Critical Issues: Criticism and Thought (3.0 - 9.0 cr)

GER 5xxx

GER 8xxx

[GLOS 5403](#) - Human Rights Advocacy (3.0 cr)

[GLOS 5900](#) - Topics in Global Studies (1.0 - 4.0 cr)

[GWSS 5104](#) - Transnational Feminist Theory (3.0 cr)

[GWSS 8230](#) - Seminar: Cultural Criticism and Media Studies (3.0 cr)

[GWSS 8270](#) - Seminar: Theories of Body (3.0 cr)

HIST 5xxx

HIST 8xxx

LAT 5xxx

LAT 8xxx

[LAW 6702](#) - Legal History Workshop (2.0 cr)

[LAW 6718](#) - Immigration and Criminal Law: Immigration Consequences of Crimes and Criminalizing Migration (2.0 cr)

[LAW 6886](#) - International Human Rights Law (3.0 cr)

SCAN 5xxx

TH 5xxx

TH 8xxx

[WRIT 5531](#) - Introduction to Writing Theory and Pedagogy (3.0 cr)

[WRIT 5671](#) - Visual Rhetoric (3.0 cr)

#### **Thesis Credits**

Take 24 doctoral thesis credits.

[ENGL 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### *Twin Cities Campus*

## Feminist and Critical Sexuality Studies Minor

*Gender, Women and Sexuality*

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Gender, Women, and Sexuality Studies, 425 Ford Hall, 224 Church Street SE, Minneapolis, MN 55455 (612-624-6006)

Email: [gwss@umn.edu](mailto:gwss@umn.edu)

Website: <http://www.gwss.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 15
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate minor program in Feminist and Critical Sexuality Studies is located in the Department of Gender, Women, and Sexuality Studies (GWSS). The minor is designed for students with widely flexible interests and academic aims looking for advanced graduate academic training in feminist and critical sexuality studies. The program is also designed to provide an interdisciplinary graduate program in GLBTQ studies.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Feminist and Critical Sexuality Studies director of graduate studies regarding feasibility and requirements.

Students must submit a letter of application to the Director of Graduate Studies in the Department of Gender, Women and Sexuality Studies articulating a clear relationship between their doctoral research and the goals, curriculum, and scholarly resources of the minor. A focus or strong interest in interdisciplinary work is preferred.

A prerequisite undergraduate major or minor in gender, women and/or GLBTQ/sexuality studies is preferred. General knowledge of relevant scholarship in some combination of previous coursework, research and writing, and/or organizational activity/experience is expected.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

All coursework applied to the minor must be taken on the A/F grade basis.

The minimum cumulative GPA for minor field coursework is 3.75.

#### **Required Courses (3 credits)**

Select one of the following courses in consultation with the Feminist and Critical Sexuality director of graduate studies:

[GWSS 8108](#) - Genealogies of Feminist Theory (3.0 cr)



GWSS 8109 - Feminist Knowledge Production (3.0 cr)

**Electives (12 credits)**

Select courses from the following in consultation with the Feminist and Critical Sexuality director of graduate studies. Other courses may be applied with director of graduate studies approval.

GWSS 5104 - Transnational Feminist Theory (3.0 cr)

GWSS 5190 - Topics: Theory, Knowledge, and Power (3.0 cr)

GWSS 5290 - Topics: Biology, Health, and Environmental Studies (3.0 cr)

GWSS 5406 - Black Feminist Thought in the American and African Diasporas (3.0 cr)

GWSS 8103 - Feminist Theories of Knowledge (3.0 cr)

GWSS 8210 - Seminar: Feminist Theory & Praxis (3.0 cr)

GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)

GWSS 8230 - Seminar: Cultural Criticism and Media Studies (3.0 cr)

GWSS 8250 - Seminar: Nation, State, and Citizenship (1.0 - 3.0 cr)

GWSS 8260 - Seminar: Race, Representation and Resistance (3.0 cr)

GWSS 8270 - Seminar: Theories of Body (3.0 cr)

GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)

**Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

**Doctoral**



### *Twin Cities Campus*

## Feminist Studies M.A.

*Gender, Women and Sexuality*

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Gender, Women, and Sexuality Studies, 425 Ford Hall, 224 Church Street SE, Minneapolis, MN 55455 (612-624-6006)

Email: [gwss@umn.edu](mailto:gwss@umn.edu)

Website: <http://www.gwss.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 40
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Feminist Studies graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Feminist PhD program.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

### **Special Application Requirements:**

Note: The Feminist Studies graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Feminist PhD program.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 28 major credits and 12 credits outside the major. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.50 is required for students to remain in good standing.





At least 4 semesters must be completed before filing a Degree Program Form.

**Required Core and Colloquia (16 credits)**

**Required Core (12 credits)**

Take the following courses:

- GWSS 8107 - Feminist Pedagogies (3.0 cr)
- GWSS 8108 - Genealogies of Feminist Theory (3.0 cr)
- GWSS 8109 - Feminist Knowledge Production (3.0 cr)

Take one of the following courses. Students completing GWSS 8997 must take it for 3 credits.

- AMST 8801 - Dissertation Seminar (3.0 cr)
- or DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)
- or GWSS 8997 - Dissertation Seminar (1.0 - 3.0 cr)

**Required Colloquia (4 credits)**

Take GWSS 8996 for 1 credit 4 times for a total of 4 credits.

- GWSS 8996 - Feminist Studies Colloquium (1.0 cr)

**GWSS Seminars (6 credits)**

Select 6 credits from the following:

- GWSS 5104 - Transnational Feminist Theory (3.0 cr)
- GWSS 5406 - Black Feminist Thought in the American and African Diasporas (3.0 cr)
- GWSS 8103 - Feminist Theories of Knowledge (3.0 cr)
- GWSS 8210 - Seminar: Feminist Theory & Praxis (3.0 cr)
- GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)
- GWSS 8230 - Seminar: Cultural Criticism and Media Studies (3.0 cr)
- GWSS 8250 - Seminar: Nation, State, and Citizenship (1.0 - 3.0 cr)
- GWSS 8260 - Seminar: Race, Representation and Resistance (3.0 cr)
- GWSS 8270 - Seminar: Theories of Body (3.0 cr)
- GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)
- GWSS 8993 - Directed Study (1.0 - 6.0 cr)

**Research Methods & Tools (6 credits)**

Take at least 6 credits from the following list. Substitute courses can be applied to this requirement with the approval of the director of graduate studies.

- AMST 8201 - Historical Foundations of American Studies (3.0 cr)
- AMST 8202 - Theoretical Foundations and Current Practice in American Studies (3.0 cr)
- ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- GEOG 8290 - Seminar in GIS and Cartography (3.0 cr)
- GWSS 8201 - Feminist Theory and Methods in the Social Sciences (3.0 cr)
- HSPH 8002 - Core Practices in Heritage Studies and Public History (3.0 cr)
- HSPH 8006 - Digital Methods for Heritage Studies & Public History (3.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)

**Outside Coursework (12 credits)**

Take at least 12 credits outside the major in consultation with the advisor.

- AFRO 5101 - Seminar: Introduction to Africa and the African Diaspora (3.0 cr)
- AFRO 5866 - The Civil Rights and Black Power Movement, 1954-1984 (3.0 cr)
- AFRO 8202 - Seminar: Intellectual History of Race (3.0 cr)
- AFRO 8590 - Contemporary Literary and Cultural Studies (3.0 cr)
- AFRO 8910 - Topics in Studies of Africa and the African Diaspora (3.0 cr)
- AMES 5866 - Gender and Sexuality in Modern Arabic Literature (3.0 cr)
- AMES 8001 - Critical Approaches to Asian and Middle Eastern Studies (3.0 cr)
- AMIN 8301 - Critical Indigenous Theory (3.0 cr)
- AMIN 8910 - Topics in American Indian and Indigenous Studies (1.0 - 3.0 cr)
- AMST 8920 - Topics in American Studies (3.0 cr)
- ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)
- BTHX 8510 - Gender and the Politics of Health (3.0 cr)
- COMM 5211 - Critical Media Studies: Theory and Methods (3.0 cr)
- COMM 8210 - Seminar: Selected Topics in U.S. Electronic Media (3.0 cr)
- COMM 8910 - Advanced Topics in Communication Studies (3.0 cr)
- CSCL 8910 - Advanced Topics in Comparative Literature (3.0 cr)
- DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)
- DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)



- DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)
- ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)
- GEOG 8230 - Theoretical Geography (3.0 cr)
- GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)
- HSPH 8001 - Who Owns the Past? Common Concerns and Big Questions in Heritage and Public History (3.0 cr)
- HSPH 8003 - Race and Indigeneity in Heritage Representation (3.0 cr)
- PHIL 8710 - Seminar: Feminist Philosophy (3.0 cr)
- POL 8253 - Late Modern Political Thought (3.0 cr)
- POL 8260 - Topics in Political Theory (3.0 cr)
- SOC 8211 - The Sociology of Race & Racialization (3.0 cr)



### **Twin Cities Campus**

## **Feminist Studies Ph.D.**

*Gender, Women and Sexuality*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Gender, Women, and Sexuality Studies, 425 Ford Hall, 224 Church Street SE, Minneapolis, MN 55455 (612-624-6006)

Email: [gwss@umn.edu](mailto:gwss@umn.edu)

Website: <http://www.gwss.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 64
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Ph.D in Feminist Studies is designed to help students develop a high level of competence in feminist theories, research methods, interdisciplinarity, and pedagogies. Our graduates demonstrate a high level of competence in interdisciplinary feminist theories, research methods, and pedagogies. Our graduate program provides a rigorous interdisciplinary education designed to develop well-prepared scholars in the field of feminist studies and gender, women, and sexuality studies. Feminist studies PhD students pursue general and specialized courses in feminist studies while conducting scholarly research and analysis that truly drives change. Our graduate students are scholars, teachers, and activists, bringing to their work remarkable intelligence and a commitment to analyzing how power operates in and across societies, economies, and cultures. To guarantee a high level of interdisciplinary exchange, the program is designed to bring feminist studies doctoral students together with graduate minor students who are pursuing a disciplinary specialty in their own home department. Along with feminist studies, the contribution of queer and trans\* studies in regard to gender, sexuality, and biological bodies is also a central component of our graduate program. We offer a wide variety of courses, with emphases in:

&#9679; Critical race and transnational feminisms

&#9679; Social movements

&#9679; Critical gender and sexualities, trans\*, and queer studies

&#9679; Feminist ethnography and geography

&#9679; Feminist health, medicine, and science studies

&#9679; Intersections of race, ethnicity, and nationalism

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

Preferred but not required:

- Academic training/undergraduate degree in gender, women, and/or sexuality studies, or related field
- Masters degree in gender, women, and sexuality studies or a related field
- Activist or political advocacy in these areas is considered but not required

### **Special Application Requirements:**



Applicants must submit three letters of recommendation, a writing sample, a current curriculum vitae, and a clearly written statement of career interests, goals, and objectives. The application deadline is December 1; all applications are evaluated once each year in December. Graduate study in the program begins in the fall semester following admission.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

28 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.50 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

Students may take up to two courses S/N, in consultation with the director of graduate studies

### Interdisciplinary Core and Required Courses (16 credits)

#### Required Core (9 credits)

Take the following courses:

[GWSS 8107](#) - Feminist Pedagogies (3.0 cr)

[GWSS 8108](#) - Genealogies of Feminist Theory (3.0 cr)

[GWSS 8109](#) - Feminist Knowledge Production (3.0 cr)

#### Dissertation Workshop Requirement (3 credits)

Select one of the following in consultation with the advisor. GWSS 8997, if selected, must be taken for 3 credits.

[GWSS 8997](#) - Dissertation Seminar (1.0 - 3.0 cr)

or [DSSC 8211](#) - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)

#### Colloquia Credits (4 credits)

Take 1 credit of GWSS 8996 for 4 semesters for a total of 4 credits. When registered for GWSS 8996, participation in all colloquium presentations and discussions, and written reflections on the presentations, is required. This course does not count towards the overall S/N limit.

[GWSS 8996](#) - Feminist Studies Colloquium (1.0 cr)

#### GWSS Seminars (6 credits)

Take 6 credits from the following in consultation with the advisor:

[GWSS 5104](#) - Transnational Feminist Theory (3.0 cr)

[GWSS 5406](#) - Black Feminist Thought in the American and African Diasporas (3.0 cr)

[GWSS 8103](#) - Feminist Theories of Knowledge (3.0 cr)

[GWSS 8210](#) - Seminar: Feminist Theory & Praxis (3.0 cr)



- GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)
- GWSS 8230 - Seminar: Cultural Criticism and Media Studies (3.0 cr)
- GWSS 8250 - Seminar: Nation, State, and Citizenship (1.0 - 3.0 cr)
- GWSS 8260 - Seminar: Race, Representation and Resistance (3.0 cr)
- GWSS 8270 - Seminar: Theories of Body (3.0 cr)
- GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)
- GWSS 8993 - Directed Study (1.0 - 6.0 cr)

#### Research Methods and Tools (6 credits)

Select at least 6 credits from the list below, or in consultation with the director of graduate studies. Up to 6 of these credits can be applied to the 12-credit requirement for outside coursework.

- AMST 8201 - Historical Foundations of American Studies (3.0 cr)
- ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- COMM 5211 - Critical Media Studies: Theory and Methods (3.0 cr)
- COMM 8211 - Critical Communication Studies: History, Theory, Method (3.0 cr)
- CSCL 8910 - Advanced Topics in Comparative Literature (3.0 cr)
- ENGL 8610 - Seminar in Language and Discourse Studies (3.0 cr)
- GEOG 8290 - Seminar in GIS and Cartography (3.0 cr)
- HIST 5011 - Measuring the Past: Quantitative Methods for Historical Research (4.0 cr)
- HIST 8015 - Scope and Methods of Historical Studies (3.0 cr)
- HIST 8031 - Doing Digital History (3.0 cr)
- HIST 8122 - Public Histories (3.0 cr)
- HSPH 8002 - Core Practices in Heritage Studies and Public History (3.0 cr)
- HSPH 8006 - Digital Methods for Heritage Studies & Public History (3.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)

#### Outside Coursework (6 to 12 credits)

Take 6 to 12 credits from the following, in consultation with the director of graduate studies, to complete the required 12 credits of outside coursework. Other courses may be applied to this requirement with director of graduate studies approval.

- AFRO 5101 - Seminar: Introduction to Africa and the African Diaspora (3.0 cr)
- AFRO 5866 - The Civil Rights and Black Power Movement, 1954-1984 (3.0 cr)
- AFRO 8202 - Seminar: Intellectual History of Race (3.0 cr)
- AFRO 8910 - Topics in Studies of Africa and the African Diaspora (3.0 cr)
- AMES 5866 - Gender and Sexuality in Modern Arabic Literature (3.0 cr)
- AMES 5920 - Topics in Asian Culture (3.0 cr)
- AMES 8990 - Directed Readings (1.0 - 4.0 cr)
- AMIN 8301 - Critical Indigenous Theory (3.0 cr)
- AMIN 8910 - Topics in American Indian and Indigenous Studies (1.0 - 3.0 cr)
- AMST 8920 - Topics in American Studies (3.0 cr)
- AMST 8970 - Independent Study in American Studies (1.0 - 9.0 cr)
- ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)
- ANTH 8992 - Directed Reading (1.0 - 18.0 cr)
- ARAB 5040 - Readings in Arabic Texts (3.0 cr)
- ARAB 5992 - Directed Readings (1.0 - 3.0 cr)
- BTHX 5520 - Social Justice and Bioethics (3.0 cr)
- CHIC 5412 - Comparative Indigenous Feminisms [GP] (3.0 cr)
- CHIC 5920 - Topics in Chicana(o) Studies (3.0 cr)
- CHIC 5993 - Directed Studies (1.0 - 3.0 cr)
- COMM 5211 - Critical Media Studies: Theory and Methods (3.0 cr)
- COMM 5221 - Media, Race, and Identity (3.0 cr)
- COMM 8210 - Seminar: Selected Topics in U.S. Electronic Media (3.0 cr)
- COMM 8994 - Directed Research (1.0 - 3.0 cr)
- DNCE 5993 - Directed Studies (1.0 - 4.0 cr)
- DSSC 8111 - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)
- DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)
- DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)
- ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)
- ENGL 8610 - Seminar in Language and Discourse Studies (3.0 cr)
- ENGW 8120 - Seminar: Writing of Poetry (4.0 cr)
- ENGW 8130 - Seminar: Writing of Literary Nonfiction (4.0 cr)
- GEOG 8230 - Theoretical Geography (3.0 cr)
- GEOG 8290 - Seminar in GIS and Cartography (3.0 cr)
- GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)
- GIS 5576 - Spatial Digital Humanities (3.0 cr)



[GLOS 5403](#) - Human Rights Advocacy (3.0 cr)  
[GLOS 5993](#) - Directed Studies (1.0 - 4.0 cr)  
[HIST 5932](#) - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)  
[HIST 8910](#) - Topics in U.S. History (1.0 - 4.0 cr)  
[HIST 8960](#) - Topics in History (1.0 - 4.0 cr)  
[HIST 8993](#) - Directed Study (1.0 - 16.0 cr)  
[HMED 8002](#) - Foundations in the History of Modern Medicine, 1800-present (3.0 cr)  
[HSPH 8003](#) - Race and Indigeneity in Heritage Representation (3.0 cr)  
[PHIL 8110](#) - Seminar: Metaphysics (3.0 cr)  
[PHIL 8510](#) - Seminar: Aesthetics Studies (3.0 cr)  
[POL 8201](#) - Understanding Political Theory (3.0 cr)  
[POL 8260](#) - Topics in Political Theory (3.0 cr)  
[PUBH 6115](#) - Worker Protection Law (1.0 cr)  
[SOC 8093](#) - Directed Study (1.0 - 4.0 cr)  
[TH 8120](#) - Seminar (3.0 cr)

**Thesis Credits**

Take 24 doctoral thesis credits.

[GWSS 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **French M.A.**

*French & Italian*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of French and Italian, 314 Folwell Hall, 9 Pleasant Street SE, Minneapolis, MN 55455 (612-626-0418, fax: 612-624-6021)

Email: [frit@umn.edu](mailto:frit@umn.edu)

Website: <http://www.frit.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 34
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The French program, which offers MA and PhD degrees, covers all areas of French literature and culture from the Middle Ages to the present. Traditional areas of study and scholarship are inflected by the faculty's interests, expertise, and research in areas that are shaping the discipline of French studies. The program, which fosters interdisciplinary research, has particular strengths in literary and cultural studies, critical theory, feminist studies, medieval studies, cinema studies, and francophone studies.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

Applicants must submit three letters of recommendation from persons familiar with their scholarship and research potential, a complete set of official transcripts, a sample of their academic writing, evidence of spoken French proficiency (audio sample or phone interview), and a written statement of research interests and goals.

#### **Special Application Requirements:**

A BA in French (or equivalent), with a literary emphasis, is required for the MA programs. Applicants have generally completed at least 18 credits in French literature and culture. Prospective students whose undergraduate degree is in another field, but who have taken substantial coursework in French and are strongly motivated to pursue literary studies, are invited to contact the director of graduate studies in French.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 18 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grade basis must be taken A/F.

### Pro-seminar (2 credits)

Take the following course:

[FREN 5265](#) - Graduate Proseminar in French Studies (2.0 cr)

### Seminars (12 to 18 credits)

Plan A students select 4 seminars, including at least 1 seminar from 3 of the 4 periods for a total of 12 credits. Plan B students select 6 seminars, including at least 1 seminar from each of the following 4 periods, for a total of 18 credits. Other courses may be substituted with advisor approval.

#### 1500 to 1800

[FREN 8200](#) - Topics in Early Modern French & Francophone Literatures and Cultures (3.0 cr)

[FREN 8271](#) - The Novel of the Ancien Regime (3.0 cr)

[FRIT 5240](#) - Topics in French & Italian Literatures & Cultures (3.0 cr)

#### 1800 to Present

[FREN 8210](#) - Narrative, History, and Memory: Topics (3.0 cr)

[FREN 8220](#) - Staging the Common (3.0 cr)

[FREN 8291](#) - Jean Genet's Writings and French Institutions (3.0 cr)

[FREN 8371](#) - The Rule of Reason, The Reign of Madness: Readings in Early Modern France (3.0 cr)

#### Francophone/Global French

[FREN 5470](#) - Post/Colonial Francophone Literatures (3.0 cr)

[FREN 8230](#) - Critical Issues: Criticism and Thought (3.0 - 9.0 cr)

[FREN 8240](#) - Critical Issues: French and Francophone Cinema (3.0 - 9.0 cr)

[FREN 8280](#) - Ethics and Aesthetics in French and Francophone Writing (3.0 cr)

[FREN 8410](#) - Topics in Quebecois Literature (3.0 cr)

[FREN 8420](#) - Critical Issues: Francophone Literature (3.0 cr)

#### Other French Culture

[FREN 5350](#) - Topics in Literature and Culture (3.0 cr)

### Pedagogy Seminar (3 credits)

Take the following course:

[FRIT 5999](#) - Teaching of French and Italian: Theory and Practice (3.0 cr)

### Practicum (1 credits)

Take the following course:

[FREN 5995](#) - Directed Teaching (1.0 cr)

### Outside Coursework (6 credits)

Select 6 credits outside the major in consultation with the advisor.

### Plan Options

#### Plan A

Plan A students take 10 master's thesis credits.

[FREN 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)





### **Twin Cities Campus**

## **French Minor**

*French & Italian*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of French and Italian, 314 Folwell Hall, 9 Pleasant Street S.E., Minneapolis, MN 55455 (612-624-4308; fax: 612-624-6021)

Email: [frit@umn.edu](mailto:frit@umn.edu)

Website: <http://www.frit.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The French program covers all areas of French literature and culture from the Middle Ages to the present. Traditional areas of study and scholarship are inflected by the faculty's interests, expertise, and research in areas that are shaping the discipline of French studies. The program, which fosters interdisciplinary research, has particular strengths in literary and cultural studies, critical theory, feminist studies, medieval studies, and francophone studies.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the French director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Coursework applied to the minor must be taken on the A/F grade basis, with a minimum grade of B- earned for each course.

#### **Coursework (9 to 12 credits)**

Masters students select 9 credits, and doctoral students select 12 credits from the following in consultation with the French director of graduate studies.

- [FREN 5470](#) - Post/Colonial Francophone Literatures (3.0 cr)
- [FREN 8200](#) - Topics in Early Modern French & Francophone Literatures and Cultures (3.0 cr)
- [FREN 8210](#) - Narrative, History, and Memory: Topics (3.0 cr)
- [FREN 8220](#) - Staging the Common (3.0 cr)
- [FREN 8230](#) - Critical Issues: Criticism and Thought (3.0 - 9.0 cr)
- [FREN 8240](#) - Critical Issues: French and Francophone Cinema (3.0 - 9.0 cr)
- [FREN 8271](#) - The Novel of the Ancien Regime (3.0 cr)
- [FREN 8280](#) - Ethics and Aesthetics in French and Francophone Writing (3.0 cr)
- [FREN 8291](#) - Jean Genet's Writings and French Institutions (3.0 cr)
- [FREN 8371](#) - The Rule of Reason, The Reign of Madness: Readings in Early Modern France (3.0 cr)
- [FREN 8410](#) - Topics in Quebecois Literature (3.0 cr)
- [FREN 8420](#) - Critical Issues: Francophone Literature (3.0 cr)



FRIT 5240 - Topics in French & Italian Literatures & Cultures (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### *Twin Cities Campus*

## French Ph.D.

*French & Italian*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of French and Italian, 314 Folwell Hall, 9 Pleasant Street SE, Minneapolis, MN 55455 (612-626-0418; fax: 612-624-6021).

Email: [frit@umn.edu](mailto:frit@umn.edu)

Website: <http://www.frit.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 78
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The French PhD program covers all areas of French literature and culture from the renaissance to the present. Traditional areas of study and scholarship are inflected by the faculty's interests, expertise, and research in areas that are shaping the discipline of French studies. The program, which fosters interdisciplinary research, has particular strengths in literary and cultural studies, critical theory, feminist studies, early modern studies, cinema studies, disability studies, and francophone studies.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

An MA in French (or equivalent) is required.

Other requirements to be completed before admission:

Applicants have generally completed at least 18 credits in French literature and culture. Prospective students whose undergraduate degree is in another field, but who have taken substantial coursework in French and are strongly motivated to pursue literary studies, are invited to contact the director of graduate studies in French.

#### **Special Application Requirements:**

Applicants must submit three letters of recommendation from persons familiar with their scholarship and research potential, a complete set of official transcripts, a sample of their academic writing, and a written statement of research interests and goals. Students may be contacted for evidence of spoken French proficiency (via a phone interview or other). International student applicants should also submit scores for the TOEFL or equivalent English proficiency testing program. The program offers funding packages; see <https://cla.umn.edu/french-italian/graduate/funding> for information.

Submission of all application materials submission by January 10 ensures consideration for fellowships and graduate instructorships for the next academic year. New teaching assistants and fellowship recipients are only admitted for fall semester; others may be admitted in mid-year.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

45 credits are required in the major.

9 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Proficiency in foreign language other than French

A minimum GPA of 2.8 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of B- earned for each course.

### Required Courses (6 credits)

Take the following courses:

[FRIT 5999](#) - Teaching of French and Italian: Theory and Practice (3.0 cr)

[FREN 5995](#) - Directed Teaching (1.0 cr)

[FREN 5265](#) - Graduate Proseminar in French Studies (2.0 cr)

### Major Electives (39 credits)

Select seminars, which must include at least 1 seminar from 3 of the 4 periods, in consultation with the advisor. Other courses may be substituted with advisor approval.

#### 1500 to 1800

[FREN 8200](#) - Topics in Early Modern French & Francophone Literatures and Cultures (3.0 cr)

[FREN 8271](#) - The Novel of the Ancien Regime (3.0 cr)

[FRIT 5240](#) - Topics in French & Italian Literatures & Cultures (3.0 cr)

#### 1800 to Present

[FREN 8210](#) - Narrative, History, and Memory: Topics (3.0 cr)

[FREN 8220](#) - Staging the Common (3.0 cr)

[FREN 8291](#) - Jean Genet's Writings and French Institutions (3.0 cr)

[FREN 8371](#) - The Rule of Reason, The Reign of Madness: Readings in Early Modern France (3.0 cr)

#### Francophone/Global French

[FREN 5470](#) - Post/Colonial Francophone Literatures (3.0 cr)

[FREN 8230](#) - Critical Issues: Criticism and Thought (3.0 - 9.0 cr)

[FREN 8240](#) - Critical Issues: French and Francophone Cinema (3.0 - 9.0 cr)

[FREN 8280](#) - Ethics and Aesthetics in French and Francophone Writing (3.0 cr)

[FREN 8410](#) - Topics in Quebecois Literature (3.0 cr)

[FREN 8420](#) - Critical Issues: Francophone Literature (3.0 cr)

#### Other French Culture

[FREN 5350](#) - Topics in Literature and Culture (3.0 cr)

### Outside Coursework (9 credits)

Select 9 credits outside the major in consultation with the advisor. Foreign language credits cannot be applied to this requirement.

### Thesis Credits

Take 24 doctoral thesis credits.

[FREN 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Geographic Information Science M.G.I.S.**

*Geography, Environment, Society*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Geography, 414 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455 (612-624-1498; fax: 612-624-1044)

Email: [mgis@umn.edu](mailto:mgis@umn.edu)

Website: <http://cla.umn.edu/mgis>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 35
- This program does not require summer semesters for timely completion.
- Degree: Master of Geographic Information Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The professional master of geographic information science (MGIS), administered by the Department of Geography, provides graduate-level work in the theory, applications, and technology of geographic information science (GIS). Courses for the program are divided into three broad categories. Core courses provide the conceptual and theoretical underpinnings for a comprehensive, well-rounded knowledge of GIS; a set of technology courses focuses on specific software and techniques of GIS; and elective courses provide additional breadth to the program by allowing students to take courses related to their area of interest.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Completion of a college-level course in statistics and computer programming, either through previous coursework or online (subject to approval by the GIS director of graduate studies), prior to or during the first year of the MGIS program.

### **Special Application Requirements:**

Applicants must submit an application form; transcripts; a clearly written personal statement of career interests and goals; and three letters of recommendation from persons familiar with their academic and/or employment background. The GRE is not required. All materials must be submitted by January 30 for fall semester entrance and by September 1 for spring semester entrance.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Internet Based - Writing Score: 24
  - Internet Based - Reading Score: 22
- IELTS
  - Total Score: 7.5
- MELAB
  - Final score: 84

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan C:** Plan C requires 29 major credits and 6 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Students must complete a professional portfolio, and a set of concluding experiences including a public presentation, an exit survey, and a final meeting with an advisor.

### Required Courses (13 credits)

Take the following courses in consultation with the advisor. Courses must be taken A/F, with a minimum grade of B- earned for each.

[FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)

or [GEOG 5561](#) - Principles of Geographic Information Science (4.0 cr)

[GIS 5571](#) - ArcGIS I (3.0 cr)

[GIS 5572](#) - ArcGIS II (3.0 cr)

[GIS 8501](#) - GIS Project Management and Professional Development (3.0 cr)

### Advanced GIS Focus Courses (6 credits)

Select at least 3 credits of 5-level coursework and at least 3 credits of 8-level coursework from the following in consultation with the advisor. If FNRM 8205 is selected, it must be taken for 3 credits. If GIS 8990 is selected, it must be taken for 3 credits. Courses must be taken A/F with a minimum grade of B- earned for each.

[CSCI 5715](#) - From GPS and Virtual Globes to Spatial Computing (3.0 cr)

[ESPM 5295](#) - GIS in Environmental Science and Management (4.0 cr)

[FNRM 5462](#) - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)

[GEOG 5543](#) - Advanced Geocomputing (3.0 cr)

[GEOG 5562](#) - GIS Development Practicum (3.0 cr)

[GEOG 5563](#) - Advanced Geographic Information Science (3.0 cr)

[GEOG 5564](#) - Urban Geographic Information Science and Analysis (3.0 cr)

[GEOG 5588](#) - Advanced Geovisualization (3.0 cr)

[GIS 5574](#) - Web GIS and Services (3.0 cr)

[GIS 5577](#) - Spatial Database Design and Administration (3.0 cr)

[GIS 5578](#) - GIS Programming (3.0 cr)

[CSCI 8715](#) - Spatial Data Science Research (3.0 cr)

[FNRM 8205](#) - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)

[GEOG 8290](#) - Seminar in GIS and Cartography (3.0 cr)

[GEOG 8291](#) - Seminar in GIS, Technology, and Society (3.0 cr)

[GEOG 8292](#) - Seminar in GIS: Spatial Analysis and Modeling (3.0 cr)

[GEOG 8293](#) - CyberGIS (3.0 cr)

[GEOG 8294](#) - Spatiotemporal Modeling and Simulation (3.0 cr)

[GIS 8990](#) - Research Problems in GIS (1.0 - 6.0 cr)

### Electives (10 credits)

Select at least 10 elective credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

[GEOG 5511](#) - Principles of Cartography (4.0 cr)

[GEOG 5531](#) - Numerical Spatial Analysis (4.0 cr)

[GEOG 5541](#) - Principles of Geocomputing (3.0 cr)

[GEOG 5543](#) - Advanced Geocomputing (3.0 cr)

[GEOG 5562](#) - GIS Development Practicum (3.0 cr)

[GEOG 5563](#) - Advanced Geographic Information Science (3.0 cr)

[GEOG 5564](#) - Urban Geographic Information Science and Analysis (3.0 cr)

[GEOG 5588](#) - Advanced Geovisualization (3.0 cr)

[GEOG 8290](#) - Seminar in GIS and Cartography (3.0 cr)

[GEOG 8291](#) - Seminar in GIS, Technology, and Society (3.0 cr)

[GEOG 8292](#) - Seminar in GIS: Spatial Analysis and Modeling (3.0 cr)

[GEOG 8293](#) - CyberGIS (3.0 cr)

[GEOG 8294](#) - Spatiotemporal Modeling and Simulation (3.0 cr)

[GIS 5530](#) - GIS Internship (1.0 - 3.0 cr)

[GIS 5555](#) - Basic Spatial Analysis (3.0 cr)



GIS 5573 - Introduction to Digital Mapping: ArcGIS Basics (2.0 cr)  
GIS 5574 - Web GIS and Services (3.0 cr)  
GIS 5576 - Spatial Digital Humanities (3.0 cr)  
GIS 5577 - Spatial Database Design and Administration (3.0 cr)  
GIS 5578 - GIS Programming (3.0 cr)  
GIS 5590 - Special Topics in GIS (3.0 cr)  
GIS 8990 - Research Problems in GIS (1.0 - 6.0 cr)

**Outside Coursework (6 credits)**

Select at least 6 credits from the following in consultation with the advisor. Digital Archaeology must be taken if Anth 5980 is chosen.

ANTH 5980 - Topics in Anthropology (3.0 cr)  
CSCI 4041 - Algorithms and Data Structures (4.0 cr)  
CSCI 4131 - Internet Programming (3.0 cr)  
CSCI 4707 - Practice of Database Systems (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5561 - Computer Vision (3.0 cr)  
CSCI 5715 - From GPS and Virtual Globes to Spatial Computing (3.0 cr)  
CSCI 8715 - Spatial Data Science Research (3.0 cr)  
ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)  
ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)  
FNRM 5114 - Hydrology and Watershed Management (3.0 cr)  
FNRM 5216 - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)  
FNRM 5228 - Advanced Topics in Assessment and Modeling of Forests (3.0 cr)  
FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)  
FNRM 5362 - Drones: Data, Analysis, and Operations (3.0 cr)  
FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)  
FNRM 8205 - Research Problems: Spatial Data Analysis (1.0 - 5.0 cr)  
GDES 5341 - Interaction Design (3.0 cr)  
GDES 5342 - Advanced Web Design (3.0 cr)  
GDES 5371 - Data Visualization Studio (3.0 cr)  
IDSC 4431 - Advanced Database Design (2.0 cr)  
IDSC 6040 - Information Technology Management (2.0 cr)  
IDSC 6423 - Enterprise Systems (2.0 cr)  
INET 4061 - Data Science I: Fundamentals (4.0 cr)  
INET 4707 - Introduction to Databases (4.0 cr)  
INET 4710 - Data Science II: Big Data Analytics (4.0 cr)  
MOT 5001 - Technological Business Fundamentals (2.0 cr)  
MOT 5002 - Creating Technological Innovation (2.0 cr)  
MSBA 6310 - Programming for Data Science (3.0 cr)  
MSBA 6320 - Data Management, Databases, and Data Warehousing (3.0 cr)  
MSBA 6330 - Big Data Analytics (3.0 cr)  
MSBA 6410 - Exploratory Data Analytics and Visualization (3.0 cr)  
PA 5231 - Transit Planning and Management (3.0 cr)  
PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)  
PA 5928 - Data Management and Visualization with R (1.0 cr)  
PA 5929 - Data Visualization: Telling Stories with Numbers (2.0 cr)  
VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)



### **Twin Cities Campus**

## **Geographic Information Science Minor**

*Geography, Environment, Society*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Geography, 414 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455 (612-624-1498; fax: 612-624-1044).

Email: [mgis@umn.edu](mailto:mgis@umn.edu)

Website: <http://cla.umn.edu/mgis>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The professional master of geographic information science (MGIS), administered by the Department of Geography, offers a master's and doctoral minor.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

The Geographic Information Science (GIS) minor is available to University masters and doctoral students.

Students interested in the minor are strongly encouraged to confer first with their major field advisor and director of graduate studies, and the GIS director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

The minor is developed in consultation with the Geographic Information Science director of graduate studies.

Coursework that is offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of B- earned. The minimum cumulative GPA for the minor field coursework is 3.00.

#### **Required Course (3-4 credits)**

Select 1 of the following introductory courses. Students who have completed an introductory GIS course may substitute a 3-credit course with approval of the GIS director of graduate studies.

[GEOG 5561](#) - Principles of Geographic Information Science (4.0 cr)

or [FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)

#### **Electives**

Select credits in consultation with the GIS director of graduate studies to meet the 9-credit minimum for the masters minor or 12-credit minimum for the doctoral minor. Digital Archaeology is required if ANTH 5980 is chosen.

[ANTH 5980](#) - Topics in Anthropology (3.0 cr)

[CSCI 5715](#) - From GPS and Virtual Globes to Spatial Computing (3.0 cr)





CSCI 8715 - Spatial Data Science Research (3.0 cr)  
ESPM 5031 - Applied Global Positioning Systems for Geographic Information Systems (3.0 cr)  
ESPM 5295 - GIS in Environmental Science and Management (4.0 cr)  
FNRM 5216 - Geodesy, Coordinate, and Surveying Calculations for GIS Professionals (1.0 cr)  
FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)  
FNRM 5362 - Drones: Data, Analysis, and Operations (3.0 cr)  
FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)  
GEOG 5511 - Principles of Cartography (4.0 cr)  
GEOG 5541 - Principles of Geocomputing (3.0 cr)  
GEOG 5543 - Advanced Geocomputing (3.0 cr)  
GEOG 5562 - GIS Development Practicum (3.0 cr)  
GEOG 5563 - Advanced Geographic Information Science (3.0 cr)  
GEOG 5564 - Urban Geographic Information Science and Analysis (3.0 cr)  
GEOG 5588 - Advanced Geovisualization (3.0 cr)  
GEOG 8290 - Seminar in GIS and Cartography (3.0 cr)  
GEOG 8291 - Seminar in GIS, Technology, and Society (3.0 cr)  
GEOG 8292 - Seminar in GIS: Spatial Analysis and Modeling (3.0 cr)  
GEOG 8293 - CyberGIS (3.0 cr)  
GEOG 8294 - Spatiotemporal Modeling and Simulation (3.0 cr)  
GIS 5555 - Basic Spatial Analysis (3.0 cr)  
GIS 5571 - ArcGIS I (3.0 cr)  
GIS 5572 - ArcGIS II (3.0 cr)  
GIS 5573 - Introduction to Digital Mapping: ArcGIS Basics (2.0 cr)  
GIS 5574 - Web GIS and Services (3.0 cr)  
GIS 5576 - Spatial Digital Humanities (3.0 cr)  
GIS 5577 - Spatial Database Design and Administration (3.0 cr)  
GIS 5578 - GIS Programming (3.0 cr)  
PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)  
VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### ***Twin Cities Campus***

## **Geography M.A.**

*Geography, Environment, Society*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Geography, 414 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455 (612-625-6080; fax: 612-624-1044)

Email: [geog-dgs@umn.edu](mailto:geog-dgs@umn.edu)

Website: <http://www.geog.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The geography graduate program at the University of Minnesota reflects the intellectual breadth of the discipline by maintaining strengths in the broad areas of human geography, physical geography, nature-society relationships, and geographic information science. Faculty and students are engaged in teaching and research both within and across these broad areas as evidenced by prominent research themes within the program: culture, place, and flow; environmental change; geographies of the information society; geovisualization; globalization and uneven development; governance, citizenship, and justice; metropolis and world; and nature and society. To support students in gaining both depth and breadth within the discipline, the program is highly individualized with a limited number of requirements. Students work with their advisers to design individual programs suited to their educational and professional goals.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Undergraduate degrees need not be from a program in geography. However, students whose previous work is not in geography may be asked to complete specific courses that do not provide graduate credit.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Internet Based - Writing Score: 24
  - Internet Based - Reading Score: 22
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 84

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** Three Plan B papers are required. These papers have the quality but not the scope of a master's thesis, and usually are enhanced versions of research papers done in connection with coursework and seminars.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

### Required Courses (4 credits)

Take the following courses:

[GEOG 8001](#) - Problems in Geographic Thought (3.0 cr)

[GEOG 8405](#) - Seminar: Graduate Student Professional Development (1.0 cr)

### Methods Course (4 credits)

Take at least 4 credits of methods coursework, chosen in consultation with the advisor

### Major Electives (6 to 16 credits)

All students select 6 8xxx-level credits, and Plan B students select at least 10 additional credits from the following in consultation with the advisor:

[GEOG 8001](#) - Problems in Geographic Thought (3.0 cr)

[GEOG 8002](#) - Research Methods in Geography (3.0 cr)

[GEOG 8005](#) - Proseminar: Population Geography (3.0 cr)

[GEOG 8006](#) - Proseminar: Research Methods in Geography (3.0 cr)

[GEOG 8007](#) - Proseminar: Theories of Development and Change (3.0 cr)

[GEOG 8020](#) - Research Seminar: Economic Geography (3.0 cr)

[GEOG 8101](#) - Proseminar: Nature and Society (3.0 cr)

[GEOG 8102](#) - Proseminar: The State, the Economy, and Spatial Development (3.0 cr)

[GEOG 8103](#) - Proseminar: Physical Geography (3.0 cr)

[GEOG 8105](#) - Proseminar: Historical Geography (3.0 cr)

[GEOG 8106](#) - Seminar: Social and Cultural Geography (3.0 cr)

[GEOG 8107](#) - Geographic Writing (3.0 cr)

[GEOG 8200](#) - Seminar: Urban Geography (2.0 - 3.0 cr)

[GEOG 8201](#) - Explorations in the Geography of Minnesota (3.0 cr)

[GEOG 8211](#) - Federal Policy Research (3.0 cr)

[GEOG 8212](#) - Africa (3.0 cr)

[GEOG 8213](#) - East Asia and China (3.0 cr)

[GEOG 8214](#) - South Asia (3.0 cr)

[GEOG 8220](#) - Agrarian Change and Rural Development (3.0 cr)

[GEOG 8230](#) - Theoretical Geography (3.0 cr)

[GEOG 8240](#) - Medical Geography (3.0 cr)

[GEOG 8260](#) - Seminar: Physical Geography (2.0 cr)

[GEOG 8270](#) - Seminar: Climatology (3.0 cr)

[GEOG 8280](#) - Biogeography (3.0 cr)

[GEOG 8290](#) - Seminar in GIS and Cartography (3.0 cr)

[GEOG 8291](#) - Seminar in GIS, Technology, and Society (3.0 cr)

[GEOG 8292](#) - Seminar in GIS: Spatial Analysis and Modeling (3.0 cr)

[GEOG 8293](#) - CyberGIS (3.0 cr)

[GEOG 8294](#) - Spatiotemporal Modeling and Simulation (3.0 cr)

[GEOG 8301](#) - Advanced Qualitative Methods (3.0 cr)

[GEOG 8302](#) - Research Development (3.0 cr)

[GEOG 8336](#) - Development Theory and the State (3.0 cr)

[GEOG 8350](#) - Seminar: World Population (3.0 cr)

[GEOG 8420](#) - Teaching Practicum (1.0 cr)

[GEOG 8800](#) - Seminar: Development of Geographic Thought (3.0 cr)

[GEOG 8970](#) - Directed Readings (1.0 - 5.0 cr)

[GEOG 8980](#) - Topics: Geography (1.0 - 3.0 cr)

### Outside Coursework (6 credits)

Select 6 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with advisor



approval.

[ANTH 8810](#) - Topics in Sociocultural Anthropology (3.0 cr)

[CSCI 5715](#) - From GPS, Google Maps, and Uber to Spatial Data Science (3.0 cr)

[FNRM 5203](#) - Forest Fire and Disturbance Ecology (3.0 cr)

[FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)

[FNRM 5362](#) - Drones: Data, Analysis, and Operations (3.0 cr)

[GWSS 8210](#) - Seminar: Feminist Theory & Praxis (3.0 cr)

[GWSS 8490](#) - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)

[NR 5021](#) - Statistics for Agricultural and Natural Resource Professionals (3.0 cr)

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[SOC 5811](#) - Social Statistics for Graduate Students [MATH] (4.0 cr)

## Plan Options

### Plan A

#### Thesis Credits

Take 10 master's thesis credits.

[GEOG 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Geography Minor**

*Geography, Environment, Society*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Geography, 414 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455 (612-625-6080; fax: 612-624-1044)

Email: [geog-dgs@umn.edu](mailto:geog-dgs@umn.edu)

Website: <http://www.geog.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The geography graduate program at Minnesota reflects the intellectual breadth of the discipline by maintaining strengths in the broad areas of human geography, physical geography, nature-society relationships, and geographic information science.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Geography director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

The minor must be developed in consultation with a faculty advisor, who is selected in consultation with the Geography director of graduate studies.

The minimum cumulative GPA is 3.0 for minor field coursework applied to the PhD-level minor.

### **Coursework (9 to 12 credits)**

Master's students select 9 credits, and doctoral students select 12 credits from the following in consultation with the Geography director of graduate studies:

- [GEOG 5361](#) - Geography and Real Estate (4.0 cr)
- [GEOG 5374](#) - The City in Film (4.0 cr)
- [GEOG 5385](#) - Globalization and Development: Political Economy (4.0 cr)
- [GEOG 5393](#) - Rural Landscapes and Environments (4.0 cr)
- [GEOG 5401](#) - Geography of Environmental Systems and Global Change (3.0 cr)
- [GEOG 5426](#) - Climatic Variations (3.0 cr)
- [GEOG 5431](#) - Plant and Animal Geography (3.0 cr)
- [GEOG 5511](#) - Principles of Cartography (4.0 cr)
- [GEOG 5530](#) - Cartography Internship (2.0 - 7.0 cr)
- [GEOG 5531](#) - Numerical Spatial Analysis (4.0 cr)
- [GEOG 5541](#) - Principles of Geocomputing (3.0 cr)



- GEOG 5543 - Advanced Geocomputing (3.0 cr)
- GEOG 5561 - Principles of Geographic Information Science (4.0 cr)
- GEOG 5562 - GIS Development Practicum (3.0 cr)
- GEOG 5564 - Urban Geographic Information Science and Analysis (3.0 cr)
- GEOG 5588 - Advanced Geovisualization (3.0 cr)
- GEOG 5839 - Introduction to Dendrochronology (3.0 cr)
- GEOG 5900 - Topics in Geography (3.0 cr)
- GEOG 8001 - Problems in Geographic Thought (3.0 cr)
- GEOG 8002 - Research Methods in Geography (3.0 cr)
- GEOG 8005 - Proseminar: Population Geography (3.0 cr)
- GEOG 8006 - Proseminar: Research Methods in Geography (3.0 cr)
- GEOG 8007 - Proseminar: Theories of Development and Change (3.0 cr)
- GEOG 8020 - Research Seminar: Economic Geography (3.0 cr)
- GEOG 8101 - Proseminar: Nature and Society (3.0 cr)
- GEOG 8102 - Proseminar: The State, the Economy, and Spatial Development (3.0 cr)
- GEOG 8103 - Proseminar: Physical Geography (3.0 cr)
- GEOG 8105 - Proseminar: Historical Geography (3.0 cr)
- GEOG 8106 - Seminar: Social and Cultural Geography (3.0 cr)
- GEOG 8107 - Geographic Writing (3.0 cr)
- GEOG 8200 - Seminar: Urban Geography (2.0 - 3.0 cr)
- GEOG 8201 - Explorations in the Geography of Minnesota (3.0 cr)
- GEOG 8211 - Federal Policy Research (3.0 cr)
- GEOG 8212 - Africa (3.0 cr)
- GEOG 8214 - South Asia (3.0 cr)
- GEOG 8220 - Agrarian Change and Rural Development (3.0 cr)
- GEOG 8230 - Theoretical Geography (3.0 cr)
- GEOG 8240 - Medical Geography (3.0 cr)
- GEOG 8260 - Seminar: Physical Geography (2.0 cr)
- GEOG 8270 - Seminar: Climatology (3.0 cr)
- GEOG 8280 - Biogeography (3.0 cr)
- GEOG 8290 - Seminar in GIS and Cartography (3.0 cr)
- GEOG 8291 - Seminar in GIS, Technology, and Society (3.0 cr)
- GEOG 8292 - Seminar in GIS: Spatial Analysis and Modeling (3.0 cr)
- GEOG 8293 - CyberGIS (3.0 cr)
- GEOG 8294 - Spatiotemporal Modeling and Simulation (3.0 cr)
- GEOG 8301 - Advanced Qualitative Methods (3.0 cr)
- GEOG 8302 - Research Development (3.0 cr)
- GEOG 8336 - Development Theory and the State (3.0 cr)
- GEOG 8350 - Seminar: World Population (3.0 cr)
- GEOG 8405 - Seminar: Graduate Student Professional Development (1.0 cr)
- GEOG 8420 - Teaching Practicum (1.0 cr)
- GEOG 8800 - Seminar: Development of Geographic Thought (3.0 cr)
- GEOG 8970 - Directed Readings (1.0 - 5.0 cr)
- GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Geography Ph.D.**

*Geography, Environment, Society*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Geography, 414 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455 (612-625-6080; fax: 612-624-1044)

Email: [geog-dgs@umn.edu](mailto:geog-dgs@umn.edu)

Website: <http://www.geog.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 52
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The geography graduate program at Minnesota reflects the intellectual breadth of the discipline by maintaining strengths in the broad areas of human geography, physical geography, nature-society relationships, and geographic information science. Faculty and students are engaged in teaching and research both within and across these broad areas as evidenced by prominent research themes within the program: culture, place, and flow; environmental change; geographies of the information society; geovisualization; globalization and uneven development; governance, citizenship, and justice; metropolis and world; and nature and society. To support students in gaining both depth and breadth within the discipline, the program is highly individualized with a limited number of requirements. Students work with their advisers to design individual programs suited to their educational and professional goals.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Undergraduate degrees need not be from a program in geography. However, students whose previous work is not in geography may be asked to complete specific courses that do not provide graduate credit.

Graduate degrees need not be from a program in geography. However, students whose previous work is not in geography may be asked to complete specific courses that do not provide graduate credit.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Internet Based - Writing Score: 24
  - Internet Based - Reading Score: 22
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 84

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

16 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Courses (4 credits)

Take the following courses, preferably during the first year of study:

[GEOG 8001](#) - Problems in Geographic Thought (3.0 cr)

[GEOG 8405](#) - Seminar: Graduate Student Professional Development (1.0 cr)

### Methods Course (3 credits)

Select 3 credits of methods coursework in consultation with the advisor and subject to director of graduate studies approval.

### Proposal-writing Course (3 credits)

Take the following course. Other coursework may be applied to this requirement with director of graduate studies approval.

[GEOG 8302](#) - Research Development (3.0 cr)

### Major Electives (6 credits)

Select 6 credits from the following, at least 3 credits of which must be from a GEOG 82xx course. Other coursework may be applied to this requirement with advisor approval.

[GEOG 8101](#) - Proseminar: Nature and Society (3.0 cr)

[GEOG 8102](#) - Proseminar: The State, the Economy, and Spatial Development (3.0 cr)

[GEOG 8103](#) - Proseminar: Physical Geography (3.0 cr)

[GEOG 8105](#) - Proseminar: Historical Geography (3.0 cr)

[GEOG 8106](#) - Seminar: Social and Cultural Geography (3.0 cr)

[GEOG 8107](#) - Geographic Writing (3.0 cr)

[GEOG 8200](#) - Seminar: Urban Geography (2.0 - 3.0 cr)

[GEOG 8201](#) - Explorations in the Geography of Minnesota (3.0 cr)

[GEOG 8211](#) - Federal Policy Research (3.0 cr)

[GEOG 8212](#) - Africa (3.0 cr)

[GEOG 8213](#) - East Asia and China (3.0 cr)

[GEOG 8214](#) - South Asia (3.0 cr)

[GEOG 8220](#) - Agrarian Change and Rural Development (3.0 cr)

[GEOG 8230](#) - Theoretical Geography (3.0 cr)

[GEOG 8240](#) - Medical Geography (3.0 cr)

[GEOG 8260](#) - Seminar: Physical Geography (2.0 cr)

[GEOG 8270](#) - Seminar: Climatology (3.0 cr)

[GEOG 8280](#) - Biogeography (3.0 cr)

[GEOG 8290](#) - Seminar in GIS and Cartography (3.0 cr)

[GEOG 8291](#) - Seminar in GIS, Technology, and Society (3.0 cr)

[GEOG 8292](#) - Seminar in GIS: Spatial Analysis and Modeling (3.0 cr)

[GEOG 8293](#) - CyberGIS (3.0 cr)

[GEOG 8294](#) - Spatiotemporal Modeling and Simulation (3.0 cr)

[GEOG 8301](#) - Advanced Qualitative Methods (3.0 cr)

[GEOG 8302](#) - Research Development (3.0 cr)

[GEOG 8336](#) - Development Theory and the State (3.0 cr)

[GEOG 8350](#) - Seminar: World Population (3.0 cr)

[GEOG 8405](#) - Seminar: Graduate Student Professional Development (1.0 cr)

[GEOG 8420](#) - Teaching Practicum (1.0 cr)

[GEOG 8800](#) - Seminar: Development of Geographic Thought (3.0 cr)

[GEOG 8970](#) - Directed Readings (1.0 - 5.0 cr)

[GEOG 8980](#) - Topics: Geography (1.0 - 3.0 cr)

### Outside Coursework (12 credits)

Select 12 credits in consultation with the advisor.

[AMST 8920](#) - Topics in American Studies (3.0 cr)

[ANTH 8203](#) - Research Methods in Social and Cultural Anthropology (3.0 cr)





ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)  
DSSC 8111 - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)  
DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)  
DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)  
DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)  
ESCI 5980 - Seminar: Current Topics in Earth Sciences (1.0 - 4.0 cr)  
FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
GIS 5555 - Basic Spatial Analysis (3.0 cr)  
GIS 5571 - ArcGIS I (3.0 cr)  
GIS 5572 - ArcGIS II (3.0 cr)  
GIS 5574 - Web GIS and Services (3.0 cr)  
GIS 5577 - Spatial Database Design and Administration (3.0 cr)  
GIS 5590 - Special Topics in GIS (3.0 cr)  
GLOS 5900 - Topics in Global Studies (1.0 - 4.0 cr)  
GRAD 5105 - Practicum in University Teaching for Nonnative English Speakers (1.0 - 2.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)  
GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)  
GRAD 8401 - Dissertation Proposal Development Seminar (3.0 cr)  
GWSS 8108 - Genealogies of Feminist Theory (3.0 cr)  
GWSS 8210 - Seminar: Feminist Theory & Praxis (3.0 cr)  
GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)  
GWSS 8260 - Seminar: Race, Representation and Resistance (3.0 cr)  
GWSS 8270 - Seminar: Theories of Body (3.0 cr)  
GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)  
HIST 5910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 5960 - Topics in History (1.0 - 4.0 cr)  
HIST 5993 - Directed Study (1.0 - 16.0 cr)  
HIST 8920 - Topics in African History (1.0 - 4.0 cr)  
HIST 8960 - Topics in History (1.0 - 4.0 cr)  
HIST 8970 - Advanced Research in Quantitative History (3.0 cr)  
HIST 8993 - Directed Study (1.0 - 16.0 cr)  
HSCI 5211 - Biology and Culture in the 19th and 20th Centuries [CIV] (3.0 cr)  
PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)  
POL 8990 - Directed Readings and Research in Political Science (1.0 - 7.0 cr)  
SOC 8090 - Topics in Sociology (1.5 - 3.0 cr)  
SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)

#### Thesis Credits

Take 24 doctoral thesis credits.

GEOG 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Germanic Studies M.A.**

*German, Nordic, Slavic & Dutch*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of German, Nordic, Slavic & Dutch, 320 Folwell Hall, 9 Pleasant Street SE, Minneapolis, MN 55455 (612-625-2080; fax: 612-624-8297)

Email: [gradgsd@umn.edu](mailto:gradgsd@umn.edu)

Website: <http://www.cla.umn.edu/gnsd>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Germanic Studies program in the Department of German, Nordic, Slavic & Dutch (GNSD) is distinguished for its interdisciplinary approach to the study of literature and culture. The program equips students to be creative scholars and skillful teachers through research and teaching programs covering the literature and culture of German-speaking and Nordic countries. Students work closely with faculty dedicated to scholarly innovation, teaching excellence, and interdisciplinary collaboration.

The Germanic Studies program offers both MA and PhD degrees which are tailored to students individual needs and interdisciplinary interests. Students have the option to pursue a track in German (MA, PhD), Germanic Medieval Studies (MA, PhD) or Scandinavian Studies (MA) by completing a specified number of courses in one of those areas.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

BA or equivalent in German, Scandinavian, or related field. Students are usually admitted to the PhD program, but the MA must be completed first. Applicants must have fluency in German or a Scandinavian language.

#### **Special Application Requirements:**

In addition to the University's application requirements, the department requires the following: a copy of one or more papers representative of the applicant's level of scholarly development (not to exceed 25 total pages); three letters of recommendation; the General (Aptitude) Test of the GRE (required for master's program applicants except those whose native language is not English). Students are admitted for fall semester only. All application materials may be uploaded into the online application and must be submitted by December 15.

For the online application or for more information about graduate education admissions, see the General Information section of this website.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Internet Based - Speaking Score: 27



- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B paper is usually a seminar paper from a specific course, improved and reworked in consultation with the advisor. For students completing the MA with a track, the Plan B must be focused on that selected track.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C earned.

Students must demonstrate oral and written proficiency in German or one Scandinavian language.

### Required Core (6 credits)

Take the following courses:

[GSD 5103](#) - Teaching of Germanic Languages (3.0 cr)

[GSD 8001](#) - Approaches to Textual Analysis (3.0 cr)

### Outside Coursework (6 credits)

Select 6 credits outside the major in consultation with the advisor and the director of graduate studies. Directed Study, Directed Research, and Directed Readings courses may be applied to this requirement with advisor and director of graduate studies approval.

CSCL 5xxx  
CSCL 8xxx  
CSDS 5xxx  
CSDS 8xxx  
ENGL 5xxx  
ENGL 8xxx  
HIST 5xxx  
HIST 8xxx  
RUSS 5xxx

### Germanic Studies -No Track

#### Electives for Germanic Studies - No Track (0 to 18 credits)

Students completing one of the tracks are exempt from this Electives requirement. Students completing the MA without a track select 18 credits from the following, in consultation with the advisor and director of graduate studies to complete the 30-credit minimum. GER 5011 cannot be applied to the Electives requirement.

DTCH 5xxx  
FIN 5xxx  
GER 5xxx  
GER 8xxx  
SCAN 5xxx  
SCAN 8xxx



## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### German

#### Electives (15 credits)

Select 15 credits from the following in consultation with the advisor and director of graduate studies. GER 5011 cannot be applied to this requirement.

GER 5xxx

GER 8xxx

#### Additional Elective (3 credits)

Select 3 credits from the following in consultation with the advisor and director of graduate studies. GER 5011 cannot be applied to this requirement.

DTCH 5xxx

FIN 5xxx

GER 5xxx

GER 8xxx

SCAN 5xxx

SCAN 8xxx

### Germanic Medieval Studies

#### Electives (15 credits)

Select 15 credits from the following in consultation with the advisor and director of graduate studies.

[ENGL 4612](#) - Old English I (3.0 cr)

[ENGL 4613](#) - Old English II (3.0 cr)

[GER 5711](#) - History of the German Language I (3.0 cr)

[GER 5721](#) - Introduction to Middle High German (3.0 cr)

[GER 5734](#) - Old Saxon (3.0 cr)

[GER 5740](#) - Topics in Germanic Medieval Studies (3.0 cr)

[GER 8200](#) - Seminar in Medieval German Literature and Culture (3.0 cr)

[GER 8210](#) - Seminar in Early Modern German Literature and Culture (3.0 cr)

[SCAN 5502](#) - The Icelandic Saga (3.0 cr)

[SCAN 5701](#) - Old Norse Language and Literature (3.0 cr)

[SCAN 5703](#) - Old Norse Poetry (3.0 cr)

[SCAN 8500](#) - Seminar in Medieval Scandinavian Languages and Literature (3.0 cr)

#### Additional Elective (3 credits)

Select 3 credits from the following in consultation with the advisor and director of graduate studies. GER 5011 cannot be applied to this requirement.

DTCH 5xxx

FIN 5xxx

GER 5xxx

GER 8xxx

SCAN 5xxx

SCAN 8xxx

### Scandinavian Studies

#### Electives (15 credits)

Select 15 credits from the following in consultation with the advisor and director of graduate studies.

FIN 5xxx

SCAN 5xxx

SCAN 8xxx

#### Additional Elective (3 credits)

Select 3 credits from the following in consultation with the advisor and director of graduate studies. GER 5011 cannot be applied to this requirement.

DTCH 5xxx

FIN 5xxx

GER 5xxx

GER 8xxx

SCAN 5xxx

SCAN 8xxx



### *Twin Cities Campus*

## Germanic Studies Minor

*German, Nordic, Slavic & Dutch*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of German, Nordic, Slavic & Dutch, 320 Folwell Hall, 9 Pleasant Street SE, Minneapolis, MN 55455 (612-625-2080; fax: 612-624-8297).

Email: [gradgsd@umn.edu](mailto:gradgsd@umn.edu)

Website: <http://cla.umn.edu/gnsd>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 15
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Germanic Studies program in the Department of German, Nordic, Slavic & Dutch (GNSD) is distinguished for its interdisciplinary approach to the study of literature and culture. The program equips students to be creative scholars and skillful teachers through research and teaching programs covering the literature and culture of German-speaking and Nordic countries. Students work closely with faculty dedicated to scholarly innovation, teaching excellence, and interdisciplinary collaboration. GNSD faculty represent all historical areas of specialization from the medieval to the contemporary periods.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Germanic Studies director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Coursework applied to the minor must be taken on the A/F grade basis, with a minimum grade of C earned for each course.

The minimum cumulative GPA for minor field coursework is 3.00.

### **Required Course (3 credits)**

All students take the following course:

[GSD 8001](#) - Approaches to Textual Analysis (3.0 cr)

### **Electives (6 to 12 credits)**

Masters students select at least 6 credits, and doctoral students select at least 12 credits from the following in consultation with the Germanic Studies director of graduate studies. GER 5011 cannot be applied toward the minors credit requirements.

DTCH 5xxx

FIN 5xxx



GER 5xxx  
GER 8xxx  
SCAN 5xxx  
SCAN 8xxx

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Germanic Studies Ph.D.**

*German, Nordic, Slavic & Dutch*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of German, Nordic, Slavic & Dutch, 320 Folwell Hall, 9 Pleasant Street SE, Minneapolis, MN 55455 (612-625-2080; fax: 612-624-8297)

Email: [gradgsd@umn.edu](mailto:gradgsd@umn.edu)

Website: <http://www.cla.umn.edu/gnsd>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Germanic studies program in the Department of German, Nordic, Slavic & Dutch (GNSD) is distinguished for its interdisciplinary approach to the study of literature and culture. The program equips students to be creative scholars and skillful teachers through research and teaching programs covering the literature and culture of German-speaking and Nordic countries. Students work closely with faculty dedicated to scholarly innovation, teaching excellence, and interdisciplinary collaboration.

The Germanic studies program offers both MA and PhD degrees and allows students to tailor their programs to their individual needs and interdisciplinary interests. Students have the option to pursue a track in German (MA, PhD), Germanic Medieval studies (MA, PhD), or Scandinavian studies (MA) by completing a specified number of courses in one of those areas.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

MA or equivalent from another institution in German or a related field.

Other requirements to be completed before admission:

Students with a BA only are usually admitted to the PhD program, but the MA must be completed first.

Applicants must have fluency in German.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Internet Based - Speaking Score: 27
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: See requirements listed below.

A minimum GPA of 3.00 is required for students to remain in good standing.

All courses graded on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of C for each.

Reading competence in two languages or a high degree of proficiency in one language other than English or German.

Two semesters of teaching experience are required.

### Required Core (9 credits)

Take the following courses:

[GSD 5103](#) - Teaching of Germanic Languages (3.0 cr)

[GSD 8001](#) - Approaches to Textual Analysis (3.0 cr)

[GSD 8801](#) - Dissertation Seminar (3.0 cr)

### Outside Coursework (12 credits)

Select 12 credits outside the major in consultation with the advisor and director of graduate studies. Directed Study, Directed Research, and Directed Readings courses may be applied to this requirement with advisor and director of graduate studies approval. Up to 2 courses from the MA may be applied to this requirement.

CSCL 5xxx  
CSCL 8xxx  
CSDS 5xxx  
CSDS 8xxx  
ENGL 5xxx  
ENGL 8xxx  
HIST 5xxx  
HIST 8xxx  
RUSS 5xxx

### Thesis Credits

Take 24 doctoral thesis credits.

[GSD 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

### Germanic Studies - No Emphasis

#### Electives (0 to 15 credits)

Students completing one of the tracks are exempt from this Electives requirement.

Students completing the PhD without a track select 15 credits from the following, in consultation with the advisor and director of graduate studies, to complete the minimum credit requirements. GER 5011 cannot be applied to the Electives requirement.

DTCH 5xxx  
FIN 5xxx  
GER 5xxx  
GER 8xxx  
SCAN 5xxx  
SCAN 8xxx





## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### German

#### Electives (12 credits)

Select 12 credits from the following in consultation with the advisor and director of graduate studies. GER 5011 cannot be applied to this requirement.

GER 5xxx

GER 8xxx

#### Additional Elective (3 credits)

Select 3 credits from the following in consultation with the advisor and director of graduate studies. GER 5011 cannot be applied to this requirement.

DTCH 5xxx

FIN 5xxx

GER 5xxx

GER 8xxx

SCAN 5xxx

SCAN 8xxx

### Germanic Medieval Studies

#### Electives (12 credits)

Select 12 credits from the following in consultation with the advisor and director of graduate studies:

[ENGL 4612](#) - Old English I (3.0 cr)

[ENGL 4613](#) - Old English II (3.0 cr)

[GER 5711](#) - History of the German Language I (3.0 cr)

[GER 5721](#) - Introduction to Middle High German (3.0 cr)

[GER 5734](#) - Old Saxon (3.0 cr)

[GER 5740](#) - Topics in Germanic Medieval Studies (3.0 cr)

[GER 8200](#) - Seminar in Medieval German Literature and Culture (3.0 cr)

[GER 8210](#) - Seminar in Early Modern German Literature and Culture (3.0 cr)

[SCAN 5502](#) - The Icelandic Saga (3.0 cr)

[SCAN 5701](#) - Old Norse Language and Literature (3.0 cr)

[SCAN 5703](#) - Old Norse Poetry (3.0 cr)

[SCAN 8500](#) - Seminar in Medieval Scandinavian Languages and Literature (3.0 cr)

#### Additional Elective (3 credits)

Select 3 credits from the following in consultation with the advisor and director of graduate studies. GER 5011 cannot be applied to this requirement.

DTCH 5xxx

FIN 5xxx

GER 5xxx

GER 8xxx

SCAN 5xxx

SCAN 8xxx



### **Twin Cities Campus**

## **Health Communication M.A.**

*School of Journalism & Mass Communication*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

111 Murphy Hall  
206 Church Street  
Minneapolis, MN 55455  
612/625-0120  
Email: [sjmchc@umn.edu](mailto:sjmchc@umn.edu)  
Website: <http://sjmc.umn.edu/grad>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Hubbard School of Journalism & Mass Communication's (HSJMC) MA health communication (integrated BA/MA track) program prepares students for healthcare careers that rely on the strategic use of health information to communicate with patient and nonpatient publics, care providers, administrators and other public health stakeholders. The program is designed around a curriculum of academic and professional skills courses from strategic communication, public health and other relevant disciplines.

The curriculum includes a summer practicum experience in a health media or health care organization. The program's balance of conceptual prowess and practical skills prepares its graduates to be expert health communication professionals in a variety of health care positions. Students who complete this program will have a combination of specific message strategy/content development skills and the subject knowledge demanded by the healthcare workplace. Every workplace now requires professionals who can communicate clearly and strategically about their subject matter with multiple audiences and using a variety of communication channels. This is especially true in the arena of health care.

This program provides an Integrated BA/MA option for eligible University of Minnesota journalism/strategic communication track BA students also interested in completing the school's health communication MA degree. The integrated BA journalism/MA health communication sub-plan enables students to complete both degrees in five years.

The combination of skills and context courses at the undergraduate level, and the sophisticated academic and practice-based courses at the graduate level will ensure that graduates of this program are fully prepared to contribute to their workplaces from day one.

Students who complete this program will have a combination of specific message strategy/content development skills and the subject knowledge demanded by the healthcare workplace. Every workplace now requires professionals who can communicate clearly and strategically about their subject matter with multiple audiences and using a variety of communication channels. This is especially true in the arena of health care. The combination of skills and context courses at the undergraduate level, and the sophisticated academic and practice-based courses at the graduate level will ensure that graduates of this program are fully prepared to contribute to their workplaces from day one.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

Students must be enrolled in the BA in journalism/strategic communication track to apply for Integrated BA journalism/MA health communication sub-plan admission. Admission is considered for summer term only; the application deadline is February 15.



### Special Application Requirements:

Applicants must submit a department application; a statement of objectives articulating interest and readiness for the program; a complete set of transcripts; an academic and professional work sample; a resume or curriculum vita; and scores from the General Test of the GRE.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 155
  - General Test - Analytical Writing: 4.5

Key to [test abbreviations](#)(GRE).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is written. A capstone project is required.

**Capstone Project:** JOUR 8193, Health Communication Capstone, allows you to focus on different aspects of health communication relevant to your interests. Students will prepare a final project publishable article, a multimedia projection, an original research paper or other options aimed at a particular audience. This project is completed during the second semester of the MA program.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 0 semesters must be completed before filing a Degree Program Form.

### Core Courses

- JOUR 5541 - Mass Communication and Public Health (3.0 cr)
- JOUR 5542 - Theory-based Health Message Design (3.0 cr)
- JOUR 5543 - Public Health Campaign Evaluation (3.0 cr)
- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)

### Electives

Take 12 or more credit(s) from the following:

- JOUR 5501 - Communication, Public Opinion, and Social Media (3.0 cr)
- JOUR 8650 - Seminar: Psychology of Media Effects (3.0 cr)
- JOUR 8720 - Seminar: Mass Media and Health (3.0 cr)
- PUBH 6025 *{Inactive}*(2.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6085 *{Inactive}*(2.0 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7226 - Media Relations Practicum (1.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- WRIT 4501 - Usability and Human Factors in Technical Communication (3.0 cr)
- WRIT 5112 - Information Design: Theory and Practice (3.0 cr)
- WRIT 8520 - Seminar in Scientific and Technical Communication (3.0 cr)
- WRIT 8550 - Seminar in Technology, Culture, and Communication (3.0 cr)
- WRIT 5561 - Editing and Style for Technical Communicators (3.0 cr)

### Capstone

- JOUR 8193 - Health Communication Capstone (3.0 cr)

### Practicum

- JOUR 8194 - Health Communication Practicum (3.0 cr)



## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Integrated BA Journalism/ MA Health Communication

This sub-plan is limited to students completing the program under Plan B.

The SJMC offers an early-admission opportunity for eligible University of Minnesota journalism/strategic communication BA students also interested in completing the health communication MA degree. The integrated BA journalism/MA health communication sub-plan enables journalism/strategic communication majors to take 9 credits during their senior (fourth) year, and to complete the MA after a fifth year of full-time graduate study plus one summer. Interested journalism/strategic communication undergraduates should contact the SJMC advisor for more information. The integrated BA journalism/MA health communication sub-plan application deadline is February 15 of the student's junior year, and admission to the sub-plan is contingent on a formal admissions process. Students admitted to the sub-plan must maintain timely degree progress to ensure all undergraduate degree requirements are completed by the end of their fourth year. The sub-plan is open to journalism/strategic communication track undergraduates only. Double majors may apply, but only if they choose to complete the senior project requirement in journalism.



### **Twin Cities Campus**

## **Hispanic and Lusophone Literatures, Cultures, and Linguistics M.A.**

*Spanish & Portuguese Studies*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Spanish and Portuguese Studies, 214 Folwell Hall, 9 Pleasant Street SE, Minneapolis, Minnesota, 55455 (612-625-5858; fax: 612-625-3549)

Email: [spptgrad@umn.edu](mailto:spptgrad@umn.edu)

Website: <http://spanport.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: Students are admitted only to the PhD program.

The Hispanic and Lusophone Literatures, Cultures, and Linguistics MA program provides students with a focused and rigorous formation in the literatures, languages, and cultures of Spain, Latin America, and the Portuguese speaking world. Students choose one of three areas of emphasis: Hispanic Literatures & Cultures, Lusophone Literatures & Cultures, or Hispanic Linguistics

The Hispanic Literatures and Cultures track provides solid intellectual and professional preparation in Iberian and Latin American literatures and cultures. Works and intellectual movements are studied in their historical, social, and cultural contexts, combining the approaches of literary and cultural criticism with those of intellectual history, sociology, gender and sexuality studies, among others.

The Linguistics track is centered on the relation between language and its context of use, encompassing social, pragmatic, and discourse factors. It provides students with a strong background in the following areas of Hispanic linguistics: phonetics, phonology, syntax, pragmatics and discourse, historical linguistics, language variation, and second language acquisition.

The Lusophone Literatures & Cultures track prepares students in Portuguese studies, understood as an interdisciplinary critical formation through which the cultures and literatures of Portugal, Brazil, and Lusophone Africa are approached. Students are trained in the main historical periods, cultural movements, and social issues pertaining to the Portuguese-speaking world, both nationally and transnationally, within relevant comparative frameworks.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Required: Fluency in Spanish or Portuguese

Preferred: Undergraduate degree or substantial coursework in the fields of Hispanic literatures and cultures, Lusophone literatures and cultures, or Hispanic linguistics

### **Special Application Requirements:**

The application deadline is December 15 for the following fall semester. Application materials include:

the departmental application;

personal statement;

writing sample representing level of scholarly development

three letters of recommendation;

a 5-minute voice sample;



a curriculum vitae;

TOEFL, MELAB, or IELTS scores; and transcripts.

For more information, refer to <http://spanport.umn.edu/grad/applying.html>.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Part 1 (Composition) score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 30 major credits and 6 credits outside the major. The final exam is written and oral.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.50 is required for students to remain in good standing.

Students must have reading knowledge of a foreign language outside of their principal area of study. With advisor approval, students may take one 5xxx-level course outside the department S/N; one course within the department outside the area of study S/N; and language courses S/N.

### Required Courses (6 Credits)

Take the following courses:

- [SPPT 5995](#) - Directed Teaching (1.0 cr)
- [SPPT 5999](#) - The Teaching of College-Level Spanish: Theory and Practice (3.0 cr)
- [SPPT 8920](#) - Introduction to Hispanic and Lusophone Literatures, Cultures, and Languages (2.0 cr)

### Outside Coursework (6 Credits)

Select at least 6 credits of outside coursework in consultation with the advisor. Directed study, directed readings, and topics courses must be approved by the advisor.

- [ADDS 5081](#) - Multicultural Foundations of Behavioral Health (3.0 cr)
- [AFRO 5101](#) - Seminar: Introduction to Africa and the African Diaspora (3.0 cr)
- [AFRO 5910](#) - Topics in African American and African Studies (3.0 cr)
- [AFRO 5993](#) - Directed Study (1.0 - 3.0 cr)
- [AFRO 8202](#) - Seminar: Intellectual History of Race (3.0 cr)
- [AFRO 8910](#) - Topics in Studies of Africa and the African Diaspora (3.0 cr)
- [AMES 5920](#) - Topics in Asian Culture (3.0 cr)
- [AMES 8001](#) - Critical Approaches to Asian and Middle Eastern Studies (3.0 cr)
- [ANTH 5041](#) - Ecological Anthropology (3.0 cr)
- [ANTH 8005](#) - Linguistic Anthropology (3.0 cr)
- [ARAB 5040](#) - Readings in Arabic Texts (3.0 cr)
- [ARAB 5992](#) - Directed Readings (1.0 - 3.0 cr)
- [CHIC 5920](#) - Topics in Chicana(o) Studies (3.0 cr)
- [CI 5608](#) - CARLA Summer Institute Seminar (1.0 - 4.0 cr)
- [CI 5628](#) - Analyzing Learner Language in Second Language Acquisition (3.0 cr)
- [CI 5656](#) - Teaching Literacy in Second Language Classrooms (3.0 cr)
- [CI 5670](#) - Foundations of Dual Language and Immersion Education (3.0 cr)



CI 8416 - Speculative Fiction, Radical Imagination, and Social Change (3.0 cr)  
CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)  
CI 8689 - Language and Education Policy (3.0 cr)  
CI 8695 - Problems: Second Languages and Cultures Education (1.0 - 6.0 cr)  
CNES 5071 - Greek and Hellenistic Religions (3.0 cr)  
CNES 8513 - Scripture and Interpretation (3.0 cr)  
COMM 5211 - Critical Media Studies: Theory and Methods (3.0 cr)  
CSCL 5833 - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)  
DSSC 8111 - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)  
DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)  
DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)  
DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)  
EMS 8100 - Workshop in Early Modern Studies (1.0 - 3.0 cr)  
EMS 8250 - Seminar in Early Modern Studies (3.0 cr)  
ENGL 5140 - Readings in 18th Century Literature and Culture (3.0 cr)  
ENGL 5510 - Readings in Criticism and Theory (3.0 cr)  
ENGL 5805 - Writing for Publication (3.0 cr)  
ENGL 8090 - Seminar in Special Subjects (3.0 cr)  
ENGL 8170 - Seminar in 19th-Century British Literature and Culture (3.0 cr)  
EPSY 5261 - Introductory Statistical Methods (3.0 cr)  
EPSY 5262 - Intermediate Statistical Methods (3.0 cr)  
FREN 5350 - Topics in Literature and Culture (3.0 cr)  
FREN 5470 - Post/Colonial Francophone Literatures (3.0 cr)  
FREN 8110 - Topics in Early Medieval French Literature (3.0 cr)  
FREN 8190 - Old French Workshop (1.0 cr)  
FREN 8230 - Critical Issues: Criticism and Thought (3.0 - 9.0 cr)  
FREN 8240 - Critical Issues: French and Francophone Cinema (3.0 - 9.0 cr)  
FREN 8420 - Critical Issues: Francophone Literature (3.0 cr)  
FREN 8992 - Directed Readings for Graduate Students (1.0 - 5.0 cr)  
GEOG 8230 - Theoretical Geography (3.0 cr)  
GIS 5573 - Introduction to Digital Mapping: ArcGIS Basics (2.0 cr)  
GLOS 5993 - Directed Studies (1.0 - 4.0 cr)  
GRAD 5102 - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)  
GRAD 5105 - Practicum in University Teaching for Nonnative English Speakers (1.0 - 2.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)  
GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)  
GWSS 5104 - Transnational Feminist Theory (3.0 cr)  
GWSS 5190 - Topics: Theory, Knowledge, and Power (3.0 cr)  
GWSS 8109 - Feminist Knowledge Production (3.0 cr)  
GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)  
GWSS 8230 - Seminar: Cultural Criticism and Media Studies (3.0 cr)  
GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)  
GWSS 8993 - Directed Study (1.0 - 6.0 cr)  
HIST 5540 - Topics in Mediterranean Studies (1.0 - 4.0 cr)  
HIST 5900 - Topics in European/Medieval History (1.0 - 4.0 cr)  
HIST 5901 - Latin America Proseminar: Colonial (3.0 cr)  
HIST 5910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 5932 - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)  
HIST 5993 - Directed Study (1.0 - 16.0 cr)  
HIST 8025 - Politics of Historical Memory (3.0 cr)  
HIST 8900 - Topics in European/Medieval History (1.0 - 4.0 cr)  
HIST 8960 - Topics in History (1.0 - 4.0 cr)  
HIST 8993 - Directed Study (1.0 - 16.0 cr)  
ITAL 5289 - The Narrow Door: Women Writers and Feminist Practices in Italian Literature and Culture (4.0 cr)  
ITAL 5502 - Making of Modern Italy: From the Enlightenment to the Present (3.0 cr)  
ITAL 5970 - Directed Readings (1.0 - 4.0 cr)  
LAT 5003 - Intermediate Latin Prose for Graduate Student Research (4.0 cr)  
LAT 5004 - Intermediate Latin Poetry for Graduate Research (4.0 cr)  
LING 5201 - Syntactic Theory I (3.0 cr)  
LING 5202 - Syntactic Theory II (3.0 cr)  
LING 5302 - Phonological Theory I (3.0 cr)  
LING 5303 - Phonological Theory II (3.0 cr)  
LING 5461 - Conversation Analysis (3.0 cr)  
LING 5601 - Historical Linguistics (3.0 cr)  
LING 5900 - Topics in Linguistics (1.0 - 4.0 cr)



MIMS 5910 - Topics in Moving Image Studies (2.0 - 4.0 cr)  
MIMS 8001 - Theories of the Moving Image (3.0 cr)  
MIMS 8003 - Historiography of the Moving Image (3.0 cr)  
OLPD 5056 - Case Studies for Policy Research (3.0 cr)  
PHIL 8510 - Seminar: Aesthetics Studies (3.0 cr)  
PHIL 8660 - Seminar: Social and Cultural Studies of Science (3.0 cr)  
POL 8660 - Topics in Comparative Politics (3.0 cr)  
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)  
SCMC 5002 - Advanced Film Analysis (4.0 cr)  
SOC 8190 - Topics in Law, Crime, and Deviance (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Hispanic Literatures and Cultures

This sub-plan is limited to students completing the program under Plan B.

### Spanish Peninsular and/or Spanish American Literatures and Cultures (24 Credits)

Select at least 24 credits from the following in consultation with the advisor:

SPAN 5150 - Contemporary Spanish Literature (3.0 cr)  
SPAN 5160 - Medieval Iberian Literatures and Cultures (3.0 cr)  
SPAN 5170 - The Literature of the Spanish Empire and Its Decline (3.0 cr)  
SPAN 5180 - Don Quixote (3.0 cr)  
SPAN 5190 - The Crisis of the Old Regime: Spanish Literature of the Enlightenment and Romanticism (3.0 cr)  
SPAN 5550 - Caribbean Literature: An Integral Approach (3.0 cr)  
SPAN 5560 - Global Colonial Studies in the Hispanic World (3.0 cr)  
SPAN 5570 - Nineteenth Century Latin America: Enlightened Thought, Nation Building, Literacy, Cultural Discourse (3.0 cr)  
SPAN 5580 - Latin American Cultural Integration in the Neocolonial Order (3.0 cr)  
SPAN 5590 - The Impact of Globalization in Latin American Discourses (3.0 cr)

### Hispanic Linguistics

This sub-plan is limited to students completing the program under Plan B.

### Required Courses (24 Credits)

#### Phonology (6 credits)

Select at least 6 credits from the following in consultation with the advisor:

LING 5302 - Phonological Theory I (3.0 cr)  
SPAN 5711 - The Structure of Modern Spanish: Phonology (3.0 cr)  
SPAN 5721 - Spanish Laboratory Phonology (3.0 cr)

#### Syntax/Pragmatics (6 credits)

Select at least 6 credits from the following in consultation with the advisor:

LING 5201 - Syntactic Theory I (3.0 cr)  
LING 5206 - Linguistic Pragmatics (3.0 cr)  
SPAN 5714 - Theoretical Foundations of Spanish Syntax (3.0 cr)  
SPAN 5716 - Structure of Modern Spanish: Pragmatics (3.0 cr)

#### Electives (12 Credits)

Select at least 12 credits from the following in consultation with the advisor:

SPAN 5701 - History of Ibero-Romance (3.0 cr)  
SPAN 5717 - Spanish Sociolinguistics (3.0 cr)  
SPAN 5718 - Spanish Language Contact (3.0 cr)  
SPAN 5930 - Topics in Ibero-Romance Linguistics (3.0 cr)  
SPAN 5985 - Sociolinguistic Perspectives on Spanish in the United States (3.0 cr)  
SPAN 5991 - The Acquisition of Spanish as a First and Second Language (3.0 cr)

### Lusophone Literatures and Cultures

This sub-plan is limited to students completing the program under Plan B.

### Required Courses (24 Credits)

#### Lusophone Literatures and Culture (12 credits)





Select at least 12 credits from the following in consultation with the advisor:

[PORT 5520](#) - Portuguese Literary and Cultural Studies (3.0 cr)

[PORT 5530](#) - Brazilian Literary and Cultural Studies (3.0 cr)

[PORT 5540](#) - Literatures and Cultures of Lusophone Africa (3.0 cr)

[PORT 5910](#) - Topics in Lusophone Cultures and Literatures (3.0 cr)

or [PORT 5930](#) - Topics in Brazilian Literature (3.0 cr)

**Spanish Peninsular or Spanish-American Literatures & Cultures (12 credits)**

Select at least 12 credits from the following in consultation with the advisor:

[SPAN 5150](#) - Contemporary Spanish Literature (3.0 cr)

[SPAN 5160](#) - Medieval Iberian Literatures and Cultures (3.0 cr)

[SPAN 5170](#) - The Literature of the Spanish Empire and Its Decline (3.0 cr)

[SPAN 5180](#) - Don Quixote (3.0 cr)

[SPAN 5190](#) - The Crisis of the Old Regime: Spanish Literature of the Enlightenment and Romanticism (3.0 cr)

[SPAN 5550](#) - Caribbean Literature: An Integral Approach (3.0 cr)

[SPAN 5560](#) - Global Colonial Studies in the Hispanic World (3.0 cr)

[SPAN 5570](#) - Nineteenth Century Latin America: Enlightened Thought, Nation Building, Literacy, Cultural Discourse (3.0 cr)

[SPAN 5580](#) - Latin American Cultural Integration in the Neocolonial Order (3.0 cr)

[SPAN 5590](#) - The Impact of Globalization in Latin American Discourses (3.0 cr)



### ***Twin Cities Campus***

## **Hispanic and Lusophone Literatures, Cultures, and Linguistics Minor**

*Spanish & Portuguese Studies*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Spanish and Portuguese Studies, 214 Folwell Hall, 9 Pleasant Street SE, Minneapolis, Minnesota, 55455 (612-625-5858; fax: 612-625-3549)

Email: [spptgrad@umn.edu](mailto:spptgrad@umn.edu)

Website: <http://spanport.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 18
- Length of program in credits (Doctorate): 18
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Hispanic and Lusophone Literatures, Cultures, and Linguistics minor allows students in related fields to pursue research with graduate faculty in the department. Faculty have specialties in a variety of fields such as cultural studies, linguistics, political science, law, and textual analysis, and research contacts and visibility in Latin America and Europe.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Hispanic and Lusophone Literatures, Cultures, and Linguistics director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Minor field coursework is determined in consultation with the Hispanic and Lusophone Literatures, Cultures, and Linguistics director of Graduate Studies.

Minor field coursework that is offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of B earned for each course.

The minimum cumulative GPA for minor field coursework is 3.5.

### **Coursework (18 credits)**

Select courses from the following in consultation with the HLLC&M director of graduate studies.

SPAN 5xxx

SPAN 8xxx

PORT 5xxx

PORT 8xxx



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Hispanic and Lusophone Literatures, Cultures, and Linguistics Ph.D.**

*Spanish & Portuguese Studies*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Spanish and Portuguese Studies, 214 Folwell Hall, 9 Pleasant Street SE, Minneapolis, MN, 55455 (612-625-5858; fax 612-625-3549)

Email: [spptgrad@umn.edu](mailto:spptgrad@umn.edu)

Website: <http://spanport.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 79 to 82
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Hispanic and Lusophone Literatures, Cultures, and Linguistics PhD program provides students with a focused and rigorous formation in the literatures, languages, and cultures of Spain, Latin America, and the Portuguese speaking world. Students choose one of three areas of emphasis: Hispanic Literatures & Cultures, Lusophone Literatures & Cultures, or Hispanic Linguistics. In addition to establishing a specialization in one or more areas of Hispanic or Lusophone studies, the program allows and encourages students to pursue comparative or interdisciplinary work. Students complement their work in the department with coursework in other disciplines such as: Gender, Women, and Sexuality Studies; Medieval Studies; Linguistics; Curriculum and Instruction; History; Cultural Studies and Comparative Literature; African-American and African Studies; Human Rights Program; Geography; Sociology; and Moving Image Studies.

The department's faculty is committed to preparing students and giving them the tools to become scholars and teachers of the highest quality. The department has a strong tradition of fostering socio-historical perspectives on literatures, languages, and cultures. The graduate Literature & Cultures faculty is committed to comparative and interdisciplinary research and engages a variety of contemporary theoretical approaches, with strengths in postcolonial theory, social justice and human rights, memory studies, critical race theory, diasporic studies, and gender and sexuality studies. Members of the Hispanic Linguistics faculty are specialists in the fields of sociolinguistics, second language acquisition, syntax, pragmatics, and phonology.

The department offers students in the program faculty mentoring, a seminar, and workshops on professional development, including publishing, teaching, and interviewing. In addition, graduate student workshops in both literatures and cultures and in linguistics foster student-faculty relations and allow graduate students to ready themselves for conference participation. Travel funds are available through the department to allow students to present their papers at conferences in the United States or abroad.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must first apply to, or hold, a master of arts degree (or its equivalent) before applying to the PhD program. A graduate GPA of 3.50 is preferred.

Other requirements to be completed before admission:

Prospective students generally have completed an undergraduate degree or substantial coursework in the fields of Hispanic literatures and cultures, Lusophone literatures and cultures, or Hispanic linguistics, although individuals with other backgrounds may be admitted.

The Graduate Studies Committee may require students admitted without sufficient preparation to take additional coursework beyond the PhD credit requirements.

### **Special Application Requirements:**

Students admitted to the program are required to be fluent in Spanish or Portuguese.



The application deadline is December 15 for the following fall semester. Application materials include:

University of Minnesota Application & Fee  
Department Application  
Transcripts  
TOEFL Test Scores  
Personal Statement  
Diversity Statement (if applicant wishes to be considered for DOVE fellowship)  
Resume/CV  
Writing Sample  
Letters of Recommendation x3  
Five Minute Voice Sample (in Spanish or Portuguese for non-native speakers, in English for native Spanish or Portuguese speakers)

For more information, refer to "How to Apply" at <https://cla.umn.edu/spanish-portuguese/graduate/how-apply-0>.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

43 to 46 credits are required in the major.  
12 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Fluency in Spanish and/or Portuguese

A minimum GPA of 3.50 is required for students to remain in good standing.

Students entering the program with an MA from other institutions must take a minimum of 7 graduate courses (21 credits) in this department.

Students are expected to enroll for at least 9 credits each semester from the term of matriculation through degree completion.

A limited number of courses can be repeated to meet degree requirements. Pre-approval by the advisor and director of graduate studies is required.

### Required Coursework (7 credits)

Take the following courses:

- [SPPT 5999](#) - The Teaching of College-Level Spanish: Theory and Practice (3.0 cr)
- [SPPT 5995](#) - Directed Teaching (1.0 cr)
- [SPPT 8920](#) - Introduction to Hispanic and Lusophone Literatures, Cultures, and Languages (2.0 cr)
- [SPPT 8930](#) - Dissertation & Professionalization Workshop (1.0 cr)

### Outside Coursework (12 credits)

Take 12 credits, selected in consultation with the advisor, from outside the major.

- [ADDS 5081](#) - Multicultural Foundations of Behavioral Health (3.0 cr)



AFRO 5101 - Seminar: Introduction to Africa and the African Diaspora (3.0 cr)  
AFRO 5910 - Topics in African American and African Studies (3.0 cr)  
AFRO 5993 - Directed Study (1.0 - 3.0 cr)  
AFRO 8202 - Seminar: Intellectual History of Race (3.0 cr)  
AFRO 8910 - Topics in Studies of Africa and the African Diaspora (3.0 cr)  
AMES 5920 - Topics in Asian Culture (3.0 cr)  
AMES 8001 - Critical Approaches to Asian and Middle Eastern Studies (3.0 cr)  
ANTH 5041 - Ecological Anthropology (3.0 cr)  
ANTH 8005 - Linguistic Anthropology (3.0 cr)  
ARAB 5040 - Readings in Arabic Texts (3.0 cr)  
ARAB 5992 - Directed Readings (1.0 - 3.0 cr)  
CHIC 5920 - Topics in Chicana(o) Studies (3.0 cr)  
CI 5608 - CARLA Summer Institute Seminar (1.0 - 4.0 cr)  
CI 5628 - Analyzing Learner Language in Second Language Acquisition (3.0 cr)  
CI 5656 - Teaching Literacy in Second Language Classrooms (3.0 cr)  
CI 5670 - Foundations of Dual Language and Immersion Education (3.0 cr)  
CI 8416 - Speculative Fiction, Radical Imagination, and Social Change (3.0 cr)  
CI 8671 - Sociolinguistic Research Approaches to Education (3.0 cr)  
CI 8689 - Language and Education Policy (3.0 cr)  
CI 8695 - Problems: Second Languages and Cultures Education (1.0 - 6.0 cr)  
CNES 5071 - Greek and Hellenistic Religions (3.0 cr)  
CNES 8513 - Scripture and Interpretation (3.0 cr)  
COMM 5211 - Critical Media Studies: Theory and Methods (3.0 cr)  
CSSL 5833 - Marx, Freud, Nietzsche: Intellectual Foundations (3.0 cr)  
DSSC 8111 - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)  
DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)  
DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)  
DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)  
EMS 8100 - Workshop in Early Modern Studies (1.0 - 3.0 cr)  
EMS 8250 - Seminar in Early Modern Studies (3.0 cr)  
ENGL 5140 - Readings in 18th Century Literature and Culture (3.0 cr)  
ENGL 5510 - Readings in Criticism and Theory (3.0 cr)  
ENGL 5805 - Writing for Publication (3.0 cr)  
ENGL 8090 - Seminar in Special Subjects (3.0 cr)  
ENGL 8170 - Seminar in 19th-Century British Literature and Culture (3.0 cr)  
EPSY 5261 - Introductory Statistical Methods (3.0 cr)  
EPSY 5262 - Intermediate Statistical Methods (3.0 cr)  
FREN 5350 - Topics in Literature and Culture (3.0 cr)  
FREN 5470 - Post/Colonial Francophone Literatures (3.0 cr)  
FREN 8110 - Topics in Early Medieval French Literature (3.0 cr)  
FREN 8190 - Old French Workshop (1.0 cr)  
FREN 8230 - Critical Issues: Criticism and Thought (3.0 - 9.0 cr)  
FREN 8240 - Critical Issues: French and Francophone Cinema (3.0 - 9.0 cr)  
FREN 8420 - Critical Issues: Francophone Literature (3.0 cr)  
FREN 8992 - Directed Readings for Graduate Students (1.0 - 5.0 cr)  
GEOG 8230 - Theoretical Geography (3.0 cr)  
GIS 5573 - Introduction to Digital Mapping: ArcGIS Basics (2.0 cr)  
GLOS 5993 - Directed Studies (1.0 - 4.0 cr)  
GRAD 5102 - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)  
GRAD 5105 - Practicum in University Teaching for Nonnative English Speakers (1.0 - 2.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)  
GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)  
GWSS 5104 - Transnational Feminist Theory (3.0 cr)  
GWSS 5190 - Topics: Theory, Knowledge, and Power (3.0 cr)  
GWSS 8109 - Feminist Knowledge Production (3.0 cr)  
GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)  
GWSS 8230 - Seminar: Cultural Criticism and Media Studies (3.0 cr)  
GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)  
GWSS 8993 - Directed Study (1.0 - 6.0 cr)  
HIST 5540 - Topics in Mediterranean Studies (1.0 - 4.0 cr)  
HIST 5900 - Topics in European/Medieval History (1.0 - 4.0 cr)  
HIST 5901 - Latin America Proseminar: Colonial (3.0 cr)  
HIST 5910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 5932 - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)  
HIST 5993 - Directed Study (1.0 - 16.0 cr)



HIST 8025 - Politics of Historical Memory (3.0 cr)  
HIST 8900 - Topics in European/Medieval History (1.0 - 4.0 cr)  
HIST 8960 - Topics in History (1.0 - 4.0 cr)  
HIST 8993 - Directed Study (1.0 - 16.0 cr)  
ITAL 5289 - The Narrow Door: Women Writers and Feminist Practices in Italian Literature and Culture (4.0 cr)  
ITAL 5502 - Making of Modern Italy: From the Enlightenment to the Present (3.0 cr)  
ITAL 5970 - Directed Readings (1.0 - 4.0 cr)  
LAT 5003 - Intermediate Latin Prose for Graduate Student Research (4.0 cr)  
LAT 5004 - Intermediate Latin Poetry for Graduate Research (4.0 cr)  
LING 5201 - Syntactic Theory I (3.0 cr)  
LING 5202 - Syntactic Theory II (3.0 cr)  
LING 5302 - Phonological Theory I (3.0 cr)  
LING 5303 - Phonological Theory II (3.0 cr)  
LING 5461 - Conversation Analysis (3.0 cr)  
LING 5601 - Historical Linguistics (3.0 cr)  
LING 5900 - Topics in Linguistics (1.0 - 4.0 cr)  
MIMS 5910 - Topics in Moving Image Studies (2.0 - 4.0 cr)  
MIMS 8001 - Theories of the Moving Image (3.0 cr)  
MIMS 8003 - Historiography of the Moving Image (3.0 cr)  
OLPD 5056 - Case Studies for Policy Research (3.0 cr)  
PHIL 8510 - Seminar: Aesthetics Studies (3.0 cr)  
POL 8660 - Topics in Comparative Politics (3.0 cr)  
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)  
SCMC 5002 - Advanced Film Analysis (4.0 cr)  
SOC 8190 - Topics in Law, Crime, and Deviance (3.0 cr)

#### Thesis Credits

Take 24 doctoral thesis credits.

SPAN 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

#### Emphasis Options

##### Hispanic Literatures & Cultures (36 credits)

###### Spanish Peninsular Literature Electives (12 credits)

Select 12 credits from the following in consultation with the advisor:

SPAN 5110 - Discursive Formations at the Threshold of 20th-Century Spain (3.0 cr)

SPAN 5150 - Contemporary Spanish Literature (3.0 cr)

SPAN 5160 - Medieval Iberian Literatures and Cultures (3.0 cr)

SPAN 5170 - The Literature of the Spanish Empire and Its Decline (3.0 cr)

SPAN 5180 - Don Quixote (3.0 cr)

SPAN 5190 - The Crisis of the Old Regime: Spanish Literature of the Enlightenment and Romanticism (3.0 cr)

###### Spanish American Literature (12 credits)

Select 12 credits from the following in consultation with the advisor:

SPAN 5550 - Caribbean Literature: An Integral Approach (3.0 cr)

SPAN 5560 - Global Colonial Studies in the Hispanic World (3.0 cr)

SPAN 5570 - Nineteenth Century Latin America: Enlightened Thought, Nation Building, Literacy, Cultural Discourse (3.0 cr)

SPAN 5580 - Latin American Cultural Integration in the Neocolonial Order (3.0 cr)

SPAN 5590 - The Impact of Globalization in Latin American Discourses (3.0 cr)

###### Portuguese Literature (3 credits)

Select 3 credits from the following in consultation with the advisor.

PORT 5520 - Portuguese Literary and Cultural Studies (3.0 cr)

PORT 5530 - Brazilian Literary and Cultural Studies (3.0 cr)

PORT 5540 - Literatures and Cultures of Lusophone Africa (3.0 cr)

PORT 5910 - Topics in Lusophone Cultures and Literatures (3.0 cr)

SPPT 5930 - Selected Topics in Hispanic and Lusophone Cultural Discourse (1.0 - 3.0 cr)

###### Electives (9 credits)

Select 9 credits in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

SPAN 5316 - Spanish Picaresque Narratives (3.0 cr)

SPAN 5531 - Hispanic Literature of the United States (3.0 cr)

SPAN 5910 - Topics in Spanish Peninsular Studies (3.0 cr)

SPAN 5920 - Topics in Spanish-American Studies (3.0 cr)

SPAN 5930 - Topics in Ibero-Romance Linguistics (3.0 cr)

SPAN 8100 - Research in Sociohistorical Approaches to Spanish Literature (3.0 cr)

SPAN 8200 - Spanish Literary Texts: Theories of Formal Structures (3.0 cr)

SPAN 8212 - Spanish Theater of the 16th Century: Drama up to Lope (3.0 cr)



- SPAN 8223 - The Poetry of the Spanish Golden Age (3.0 cr)
- SPAN 8300 - The Construction of Spanish Literary History (3.0 cr)
- SPAN 8312 - Two Spanish Masterpieces: [Libro de Buen Amor] and [La Celestina] (3.0 cr)
- SPAN 8960 - Workshop: Research in Hispanic Cultural Issues (3.0 cr)
- SPAN 8990 - Advanced Comparative Research of Caribbean Genres (3.0 cr)

-OR-

### Lusophone Literatures & Cultures (36 credits)

#### Portuguese and Lusophone Literature (12 credits)

Select 12 credits from the following in consultation with the advisor:

- PORT 5520 - Portuguese Literary and Cultural Studies (3.0 cr)
- PORT 5530 - Brazilian Literary and Cultural Studies (3.0 cr)
- PORT 5540 - Literatures and Cultures of Lusophone Africa (3.0 cr)
- PORT 5910 - Topics in Lusophone Cultures and Literatures (3.0 cr)

#### Spanish Peninsular and Spanish-American Literatures & Cultures (12 credits)

Select 12 credits in consultation with the advisor. One 3-credit course not included in the following list can be applied to this requirement with advisor and director of graduate studies approval.

- SPAN 5110 - Discursive Formations at the Threshold of 20th-Century Spain (3.0 cr)
- SPAN 5150 - Contemporary Spanish Literature (3.0 cr)
- SPAN 5160 - Medieval Iberian Literatures and Cultures (3.0 cr)
- SPAN 5170 - The Literature of the Spanish Empire and Its Decline (3.0 cr)
- SPAN 5180 - Don Quixote (3.0 cr)
- SPAN 5190 - The Crisis of the Old Regime: Spanish Literature of the Enlightenment and Romanticism (3.0 cr)
- SPAN 5550 - Caribbean Literature: An Integral Approach (3.0 cr)
- SPAN 5560 - Global Colonial Studies in the Hispanic World (3.0 cr)
- SPAN 5570 - Nineteenth Century Latin America: Enlightened Thought, Nation Building, Literacy, Cultural Discourse (3.0 cr)
- SPAN 5580 - Latin American Cultural Integration in the Neocolonial Order (3.0 cr)
- SPAN 5590 - The Impact of Globalization in Latin American Discourses (3.0 cr)
- SPAN 5970 - Directed Readings (1.0 - 4.0 cr)

#### Electives (12 credits)

Select 12 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

- PORT 5930 - Topics in Brazilian Literature (3.0 cr)
- SPAN 5316 - Spanish Picaresque Narratives (3.0 cr)
- SPAN 5531 - Hispanic Literature of the United States (3.0 cr)
- SPAN 5910 - Topics in Spanish Peninsular Studies (3.0 cr)
- SPAN 5920 - Topics in Spanish-American Studies (3.0 cr)
- SPAN 8100 - Research in Sociohistorical Approaches to Spanish Literature (3.0 cr)
- SPAN 8200 - Spanish Literary Texts: Theories of Formal Structures (3.0 cr)
- SPAN 8212 - Spanish Theater of the 16th Century: Drama up to Lope (3.0 cr)
- SPAN 8223 - The Poetry of the Spanish Golden Age (3.0 cr)
- SPAN 8300 - The Construction of Spanish Literary History (3.0 cr)
- SPAN 8312 - Two Spanish Masterpieces: [Libro de Buen Amor] and [La Celestina] (3.0 cr)
- SPAN 8960 - Workshop: Research in Hispanic Cultural Issues (3.0 cr)
- SPAN 8990 - Advanced Comparative Research of Caribbean Genres (3.0 cr)

-OR-

### Hispanic Linguistics (39 credits)

#### Linguistic Core Areas (30 credits)

Select 3 credits from each of the 5 core areas for a total of 15 credits. To complete the 30-credit requirement, choose an additional 15 credits from the following. Select coursework in consultation with the advisor.

##### Phonology

Select at least one of the following in consultation with the advisor:

- SPAN 5711 - The Structure of Modern Spanish: Phonology (3.0 cr)
- SPAN 5721 - Spanish Laboratory Phonology (3.0 cr)

##### Syntax/Pragmatics

Select at least one of the following in consultation with the advisor:

- SPAN 5714 - Theoretical Foundations of Spanish Syntax (3.0 cr)
- SPAN 5716 - Structure of Modern Spanish: Pragmatics (3.0 cr)

##### Language Variation

Select at least one of the following in consultation with the advisor:

- SPAN 5717 - Spanish Sociolinguistics (3.0 cr)
- SPAN 5718 - Spanish Language Contact (3.0 cr)
- SPAN 5985 - Sociolinguistic Perspectives on Spanish in the United States (3.0 cr)

##### History of Language





Select at least one of the following in consultation with the advisor:

[SPAN 5701](#) - History of Ibero-Romance (3.0 cr)

**Second Language Acquisition**

Select at least one of the following in consultation with the advisor:

[SPAN 5991](#) - The Acquisition of Spanish as a First and Second Language (3.0 cr)

**Electives (9 credits)**

Select 9 elective credits from the following in consultation with the advisor. Other courses can be chosen with advisor approval.

[ANTH 8005](#) - Linguistic Anthropology (3.0 cr)

[CI 5608](#) - CARLA Summer Institute Seminar (1.0 - 4.0 cr)

[CI 5628](#) - Analyzing Learner Language in Second Language Acquisition (3.0 cr)

[CI 5656](#) - Teaching Literacy in Second Language Classrooms (3.0 cr)

[CI 5670](#) - Foundations of Dual Language and Immersion Education (3.0 cr)

[CI 8416](#) - Speculative Fiction, Radical Imagination, and Social Change (3.0 cr)

[CI 8671](#) - Sociolinguistic Research Approaches to Education (3.0 cr)

[CI 8689](#) - Language and Education Policy (3.0 cr)

[CI 8695](#) - Problems: Second Languages and Cultures Education (1.0 - 6.0 cr)

[EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)

[EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)

[LING 5201](#) - Syntactic Theory I (3.0 cr)

[LING 5202](#) - Syntactic Theory II (3.0 cr)

[LING 5302](#) - Phonological Theory I (3.0 cr)

[LING 5303](#) - Phonological Theory II (3.0 cr)

[LING 5461](#) - Conversation Analysis (3.0 cr)

[LING 5601](#) - Historical Linguistics (3.0 cr)

[LING 5900](#) - Topics in Linguistics (1.0 - 4.0 cr)

[STAT 5021](#) - Statistical Analysis (4.0 cr)



### **Twin Cities Campus**

## **History M.A.**

*History Department*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of History, 1110 Heller Hall, 271 19th Avenue South, Minneapolis, MN 55455 (612-624-5840; fax: 612-624-7096).

Email: [histdgs@umn.edu](mailto:histdgs@umn.edu)

Website: <http://www.hist.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The History graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the History PhD program. For more information, refer to the History program website: [www.hist.umn.edu](http://www.hist.umn.edu).

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

The History graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the History PhD program.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan A:** Plan A requires 15 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B comprises three expanded seminar papers, completed in consultation with the advisor.



This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

Language Requirement: One language other than English

A minimum GPA of 3.50 is required for students to remain in good standing.

Students are only admitted to the PhD program. They may complete an MA while studying for the PhD.

Reading proficiency in one language other than English is required. Some areas of concentration require more than one. In some cases, competence in quantitative methods may replace one of the foreign languages.

### Core Course (3 credits)

Take the following course:

[HIST 8015](#) - Scope and Methods of Historical Studies (3.0 cr)

### History Electives (12 to 21 credits)

Plan A students select 12 credits, and Plan B students select 21 credits from the following in consultation with the advisor:

- [HIST 5053](#) - Doing Roman History: Sources, Methods, and Trends (3.0 cr)
- [HIST 5264](#) - Imperial Russia: Formation and Expansion of the Russian Empire in the 18th and 19th Centuries (3.0 cr)
- [HIST 5478](#) - Tigers and Dragons: The Rise of the East Asian Economies, 1930-Present (3.0 cr)
- [HIST 5479](#) - History of Chinese Cities and Urban Life (3.0 cr)
- [HIST 5513](#) - North Africa since 1500: Islam, Colonialism, and Independence (3.0 cr)
- [HIST 5540](#) - Topics in Mediterranean Studies (1.0 - 4.0 cr)
- [HIST 5547](#) - Empire and Nations in the Middle East (3.0 cr)
- [HIST 5614](#) - The Medieval Church (3.0 cr)
- [HIST 5720](#) - Society/Politics: Modern Europe (3.0 cr)
- [HIST 5801](#) - Seminar in Early American History (3.0 cr)
- [HIST 5802](#) - Readings in American History, 1848-Present (3.0 cr)
- [HIST 5831](#) - Cultural Fallout: The Cold War and Its Legacy: Readings (3.0 cr)
- [HIST 5890](#) - Readings in American Indian and Indigenous History (3.0 cr)
- [HIST 5900](#) - Topics in European/Medieval History (1.0 - 4.0 cr)
- [HIST 5901](#) - Latin America Proseminar: Colonial (3.0 cr)
- [HIST 5902](#) - Latin America Proseminar: Modern (3.0 cr)
- [HIST 5910](#) - Topics in U.S. History (1.0 - 4.0 cr)
- [HIST 5920](#) - Topics in African History (3.0 cr)
- [HIST 5932](#) - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)
- [HIST 5940](#) - Topics in Asian History (1.0 - 4.0 cr)
- [HIST 5960](#) - Topics in History (1.0 - 4.0 cr)
- [HIST 5962](#) - Bell Library Research Seminar in Comparative World History, ca. 1000-1800 CE (3.0 cr)
- [HIST 5980](#) - Topics in Comparative Women's History (3.0 - 4.0 cr)
- [HIST 5993](#) - Directed Study (1.0 - 16.0 cr)
- [HIST 5994](#) - Directed Research (1.0 - 16.0 cr)
- [HIST 8025](#) - Politics of Historical Memory (3.0 cr)
- [HIST 8122](#) - Public Histories (3.0 cr)
- [HIST 8245](#) - Human Rights: A Global History (3.0 cr)
- [HIST 8540](#) - Topics in Mediterranean Studies (1.0 - 4.0 cr)
- [HIST 8630](#) - Seminar in World History (3.0 cr)
- [HIST 8644](#) - Legal History Workshop (3.0 cr)
- [HIST 8645](#) - American Legal History (3.0 cr)
- [HIST 8801](#) - Seminar in Early American History (3.0 cr)
- [HIST 8802](#) - Readings in American History, 1848-Present (3.0 cr)
- [HIST 8900](#) - Topics in European/Medieval History (1.0 - 4.0 cr)
- [HIST 8910](#) - Topics in U.S. History (1.0 - 4.0 cr)
- [HIST 8920](#) - Topics in African History (1.0 - 4.0 cr)
- [HIST 8930](#) - Topics in Ancient History (1.0 - 4.0 cr)
- [HIST 8940](#) - Topics in Asian History (1.0 - 4.0 cr)
- [HIST 8960](#) - Topics in History (1.0 - 4.0 cr)
- [HIST 8990](#) - Topics in Comparative History-Research (3.0 cr)
- [HIST 8993](#) - Directed Study (1.0 - 16.0 cr)
- [HIST 8994](#) - Directed Research (1.0 - 16.0 cr)



### Outside Coursework (6 credits)

Select 6 credits outside the major in consultation with the advisor.

- AFRO 5866 - The Civil Rights and Black Power Movement, 1954-1984 (3.0 cr)
- AFRO 5932 - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)
- AFRO 5993 - Directed Study (1.0 - 3.0 cr)
- AFRO 8202 - Seminar: Intellectual History of Race (3.0 cr)
- AFRO 8910 - Topics in Studies of Africa and the African Diaspora (3.0 cr)
- AMES 5920 - Topics in Asian Culture (3.0 cr)
- AMST 8202 - Theoretical Foundations and Current Practice in American Studies (3.0 cr)
- AMST 8231 - Cultural Fallout: The Cold War and Its Legacy, Readings (3.0 cr)
- AMST 8920 - Topics in American Studies (3.0 cr)
- AMST 8970 - Independent Study in American Studies (1.0 - 9.0 cr)
- ANTH 5021W - Anthropology of the Middle East [SOCS, GP, WI] (3.0 cr)
- ANTH 8510 - Topics in Archaeology (3.0 cr)
- ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)
- ARAB 5101 - Advanced Arabic I (4.0 cr)
- ARAB 5102 - Advanced Arabic II (4.0 cr)
- ARTH 5302 - The Image Multiplied: Prints in Early Modern Europe (3.0 cr)
- ARTH 5781 - Age of Empire: The Mughals, Safavids, and Ottomans (3.0 cr)
- ARTH 5950 - Topics: Art History (3.0 cr)
- ARTH 8190 - Seminar: Issues in Ancient Art and Archaeology (3.0 cr)
- ARTH 8320 - Seminar: Issues in Early Modern Visual Culture (3.0 cr)
- CHIC 5412 - Comparative Indigenous Feminisms [GP] (3.0 cr)
- CHIC 5920 - Topics in Chicana(o) Studies (3.0 cr)
- CHIC 5993 - Directed Studies (1.0 - 3.0 cr)
- CNES 5502 - Ancient Israel: From Conquest to Exile (3.0 cr)
- CNES 8190 - Seminar: Issues in Ancient Art and Archaeology (3.0 cr)
- CNES 8530 - Religions of the Ancient Mediterranean World (3.0 cr)
- COPT 5002 - Elementary Coptic (3.0 cr)
- CSCL 5910 - Topics in Cultural Studies and Comparative Literature (3.0 - 4.0 cr)
- DSSC 8111 - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)
- DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)
- DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)
- DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)
- EMS 8100 - Workshop in Early Modern Studies (1.0 - 3.0 cr)
- EMS 8250 - Seminar in Early Modern Studies (3.0 cr)
- ENGL 5150 - Readings in 19th-Century Literature and Culture (3.0 cr)
- ENGL 5300 - Readings in American Minority Literature (3.0 cr)
- ENGL 5510 - Readings in Criticism and Theory (3.0 cr)
- ENGL 8090 - Seminar in Special Subjects (3.0 cr)
- ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)
- ENGL 8520 - Seminar: Cultural Theory and Practice (3.0 cr)
- FREN 5350 - Topics in Literature and Culture (3.0 cr)
- FREN 8110 - Topics in Early Medieval French Literature (3.0 cr)
- FREN 8114 - Troubadour Lyric and Old Occitan Language (3.0 cr)
- FREN 8190 - Old French Workshop (1.0 cr)
- FREN 8992 - Directed Readings for Graduate Students (1.0 - 5.0 cr)
- GEOG 5385 - Globalization and Development: Political Economy (4.0 cr)
- GEOG 8200 - Seminar: Urban Geography (2.0 - 3.0 cr)
- GEOG 8302 - Research Development (3.0 cr)
- GEOG 8970 - Directed Readings (1.0 - 5.0 cr)
- GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)
- GER 5610 - German Literature in Translation (3.0 cr)
- GER 5734 - Old Saxon (3.0 cr)
- GLOS 5900 - Topics in Global Studies (1.0 - 4.0 cr)
- GRAD 5105 - Practicum in University Teaching for Nonnative English Speakers (1.0 - 2.0 cr)
- GRAD 8401 - Dissertation Proposal Development Seminar (3.0 cr)
- GRK 5003 - Intermediate Greek Prose for Graduate Student Research (4.0 cr)
- GRK 5200 - Biblical Greek (3.0 cr)
- GWSS 5190 - Topics: Theory, Knowledge, and Power (3.0 cr)
- GWSS 5406 - Black Feminist Thought in the American and African Diasporas (3.0 cr)
- GWSS 5502 - Gender and Public Policy (3.0 cr)
- GWSS 8107 - Feminist Pedagogies (3.0 cr)
- GWSS 8108 - Genealogies of Feminist Theory (3.0 cr)
- GWSS 8210 - Seminar: Feminist Theory & Praxis (3.0 cr)



GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)  
GWSS 8270 - Seminar: Theories of Body (3.0 cr)  
GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)  
HMED 8113 - Research Methods in the History of Science, Technology, and Medicine (3.0 cr)  
HMED 8220 - Seminar: Current Topics in the History of Medicine (3.0 cr)  
HNUR 5993 - Directed Readings (1.0 - 5.0 cr)  
HORT 8280 - Current Topics in Applied Plant Sciences (1.0 cr)  
HSCI 8930 - Seminar: History of Technology (3.0 cr)  
HSPH 8001 - Who Owns the Past? Common Concerns and Big Questions in Heritage and Public History (3.0 cr)  
HSPH 8003 - Race and Indigeneity in Heritage Representation (3.0 cr)  
HSPH 8006 - Digital Methods for Heritage Studies & Public History (3.0 cr)  
JOUR 5601W - History of Journalism [WI] (3.0 cr)  
JPN 5041 - Reading Japanese Texts: Literature and Culture (3.0 cr)  
LAT 5001 - Intensive Latin (3.0 cr)  
LAT 5003 - Intermediate Latin Prose for Graduate Student Research (4.0 cr)  
LAT 5004 - Intermediate Latin Poetry for Graduate Research (4.0 cr)  
LAT 5100 - Advanced Reading (3.0 cr)  
LAT 5200 - Advanced Reading in Later Latin (3.0 cr)  
LAT 5993 - Directed Studies (1.0 - 4.0 cr)  
LAT 8100 - Readings in Latin Prose (3.0 cr)  
LAT 8910 - Seminar (3.0 cr)  
LAW 6702 - Legal History Workshop (2.0 cr)  
LAW 7608 - Independent Research and Writing (1.0 - 2.0 cr)  
MEST 5610 - Advanced Topics in Medieval Studies (3.0 - 4.0 cr)  
MIMS 5910 - Topics in Moving Image Studies (2.0 - 4.0 cr)  
MST 5011 - Museum History and Philosophy (3.0 cr)  
MST 5012 - Museum Practices (3.0 cr)  
MST 5020 - Internship (1.0 - 6.0 cr)  
PA 5890 - Topics in Foreign Policy and International Affairs (1.0 - 5.0 cr)  
PHIL 8110 - Seminar: Metaphysics (3.0 cr)  
POL 8252 - Early Modern Political Thought (3.0 cr)  
POL 8260 - Topics in Political Theory (3.0 cr)  
RELS 5001 - Theory and Method in the Study of Religion: Critical Approaches to the Study of Religion (3.0 cr)  
RELS 5993 - Directed Studies (1.0 - 4.0 cr)  
RUSS 5411 - Dostoevsky in Translation [LITR, GP] (3.0 cr)  
SCAN 5701 - Old Norse Language and Literature (3.0 cr)  
SCAN 5703 - Old Norse Poetry (3.0 cr)  
SOC 8090 - Topics in Sociology (1.5 - 3.0 cr)  
SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)  
SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)  
SPAN 5160 - Medieval Iberian Literatures and Cultures (3.0 cr)  
SPAN 5560 - Global Colonial Studies in the Hispanic World (3.0 cr)

## Plan Options

### Plan A

#### Thesis Credits

Take 10 master's thesis credits.

HIST 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

### Plan B



### **Twin Cities Campus**

## **History Minor**

History Department

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of History, 1110 Heller Hall, 271 19th Avenue South, Minneapolis, MN 55455 (612-624-5840); fax: (612-624-7096)

Email: [histdgs@umn.edu](mailto:histdgs@umn.edu)

Website: <http://www.grad.hist.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Areas of concentration in the history minor include Africa; ancient history; East and South Asia; late antiquity and the middle ages; medieval, early modern, and modern Europe; the early modern world; Middle East; Latin America; and the United States and its colonial background. Scholarly resources include Center for Austrian Studies, Center for German and European Studies, Center for Medieval Studies, Immigration History Research Center, Minnesota Population Center, Modern Greek Studies, Center for Early Modern History, Institute for Advanced Study, and Consortium for the Study of the Premodern World.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the History director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

The minimum cumulative GPA for minor field coursework is 3.50.

### **Coursework (6 to 12 credits)**

Masters students select 6 credits from the following list. Doctoral students must take HIST 8015 and 9 additional credits from the list.

Courses are selected in consultation with the History director of graduate studies.

[HIST 5053](#) - Doing Roman History: Sources, Methods, and Trends (3.0 cr)

[HIST 5264](#) - Imperial Russia: Formation and Expansion of the Russian Empire in the 18th and 19th Centuries (3.0 cr)

[HIST 5478](#) - Tigers and Dragons: The Rise of the East Asian Economies, 1930-Present (3.0 cr)

[HIST 5479](#) - History of Chinese Cities and Urban Life (3.0 cr)

[HIST 5513](#) - North Africa since 1500: Islam, Colonialism, and Independence (3.0 cr)

[HIST 5540](#) - Topics in Mediterranean Studies (1.0 - 4.0 cr)

[HIST 5547](#) - Empire and Nations in the Middle East (3.0 cr)

[HIST 5614](#) - The Medieval Church (3.0 cr)

[HIST 5720](#) - Society/Politics: Modern Europe (3.0 cr)

[HIST 5801](#) - Seminar in Early American History (3.0 cr)

[HIST 5802](#) - Readings in American History, 1848-Present (3.0 cr)



- HIST 5831 - Cultural Fallout: The Cold War and Its Legacy: Readings (3.0 cr)
- HIST 5890 - Readings in American Indian and Indigenous History (3.0 cr)
- HIST 5900 - Topics in European/Medieval History (1.0 - 4.0 cr)
- HIST 5901 - Latin America Proseminar: Colonial (3.0 cr)
- HIST 5902 - Latin America Proseminar: Modern (3.0 cr)
- HIST 5910 - Topics in U.S. History (1.0 - 4.0 cr)
- HIST 5920 - Topics in African History (3.0 cr)
- HIST 5932 - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)
- HIST 5940 - Topics in Asian History (1.0 - 4.0 cr)
- HIST 5960 - Topics in History (1.0 - 4.0 cr)
- HIST 5962 - Bell Library Research Seminar in Comparative World History, ca. 1000-1800 CE (3.0 cr)
- HIST 5980 - Topics in Comparative Women's History (3.0 - 4.0 cr)
- HIST 5993 - Directed Study (1.0 - 16.0 cr)
- HIST 8015 - Scope and Methods of Historical Studies (3.0 cr)
- HIST 8021 - History Research Seminar (3.0 cr)
- HIST 8025 - Politics of Historical Memory (3.0 cr)
- HIST 8122 - Public Histories (3.0 cr)
- HIST 8245 - Human Rights: A Global History (3.0 cr)
- HIST 8540 - Topics in Mediterranean Studies (1.0 - 4.0 cr)
- HIST 8630 - Seminar in World History (3.0 cr)
- HIST 8644 - Legal History Workshop (3.0 cr)
- HIST 8645 - American Legal History (3.0 cr)
- HIST 8801 - Seminar in Early American History (3.0 cr)
- HIST 8802 - Readings in American History, 1848-Present (3.0 cr)
- HIST 8900 - Topics in European/Medieval History (1.0 - 4.0 cr)
- HIST 8910 - Topics in U.S. History (1.0 - 4.0 cr)
- HIST 8920 - Topics in African History (1.0 - 4.0 cr)
- HIST 8930 - Topics in Ancient History (1.0 - 4.0 cr)
- HIST 8940 - Topics in Asian History (1.0 - 4.0 cr)
- HIST 8960 - Topics in History (1.0 - 4.0 cr)
- HIST 8990 - Topics in Comparative History-Research (3.0 cr)
- HIST 8993 - Directed Study (1.0 - 16.0 cr)
- HIST 8994 - Directed Research (1.0 - 16.0 cr)

#### History 8015

This course is optional for master's students and is required for doctoral students.

[HIST 8015](#) - Scope and Methods of Historical Studies (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

**Masters**

**Doctoral**



### ***Twin Cities Campus***

## **History Ph.D.**

*History Department*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of History, 1110 Heller Hall, 271 19th Avenue South, Minneapolis, MN 55455 (612-624-5840; fax: 612-624-7096)

Email: [hisdgs@umn.edu](mailto:hisdgs@umn.edu)

Website: <http://www.grad.hist.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 63
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The History graduate program offers the following areas of concentration: Africa; ancient history; East and South Asia; late antiquity and the middle ages; medieval, early modern, and modern Europe; the early modern world; Middle East; Latin America; and the United States and its colonial background. Scholarly resources include Center for Austrian Studies, Center for German and European Studies, Center for Jewish Studies, Center for Medieval Studies, Immigration History Research Center, Minnesota Population Center, Modern Greek Studies, Center for Early Modern History, Institute for Advanced Study, and Consortium for the Study of the Premodern World.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Completion of a Bachelor of Arts degree or equivalent.

Other requirements to be completed before admission:

Alternative English language tests, for applicants for whom English is not the first language, include the PTE Academic (Score: 59) and the Cambridge C1 Advanced (Score: 180). Contact the History Department for more information.

#### **Special Application Requirements:**

The preferred undergraduate GPA is 3.50 (on a 4.00 scale), with grades of A/A- for history coursework expected.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.





## Program Requirements

27 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

Language Requirement: At least one language other than English

A minimum GPA of 3.50 is required for students to remain in good standing.

At least one language requirement must be satisfied prior to the preliminary oral examination.

### History Courses (6 credits)

Take HIST 8015 the first year of study, and HIST 8021 the second or third year of study.

[HIST 8015](#) - Scope and Methods of Historical Studies (3.0 cr)

[HIST 8021](#) - History Research Seminar (3.0 cr)

### Electives (21 credits)

Select 21 credits from the following in consultation with the advisor:

[HIST 5053](#) - Doing Roman History: Sources, Methods, and Trends (3.0 cr)

[HIST 5264](#) - Imperial Russia: Formation and Expansion of the Russian Empire in the 18th and 19th Centuries (3.0 cr)

[HIST 5478](#) - Tigers and Dragons: The Rise of the East Asian Economies, 1930-Present (3.0 cr)

[HIST 5479](#) - History of Chinese Cities and Urban Life (3.0 cr)

[HIST 5513](#) - North Africa since 1500: Islam, Colonialism, and Independence (3.0 cr)

[HIST 5540](#) - Topics in Mediterranean Studies (1.0 - 4.0 cr)

[HIST 5547](#) - Empire and Nations in the Middle East (3.0 cr)

[HIST 5614](#) - The Medieval Church (3.0 cr)

[HIST 5720](#) - Society/Politics: Modern Europe (3.0 cr)

[HIST 5801](#) - Seminar in Early American History (3.0 cr)

[HIST 5802](#) - Readings in American History, 1848-Present (3.0 cr)

[HIST 5831](#) - Cultural Fallout: The Cold War and Its Legacy: Readings (3.0 cr)

[HIST 5890](#) - Readings in American Indian and Indigenous History (3.0 cr)

[HIST 5900](#) - Topics in European/Medieval History (1.0 - 4.0 cr)

[HIST 5901](#) - Latin America Proseminar: Colonial (3.0 cr)

[HIST 5902](#) - Latin America Proseminar: Modern (3.0 cr)

[HIST 5910](#) - Topics in U.S. History (1.0 - 4.0 cr)

[HIST 5920](#) - Topics in African History (3.0 cr)

[HIST 5932](#) - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)

[HIST 5940](#) - Topics in Asian History (1.0 - 4.0 cr)

[HIST 5960](#) - Topics in History (1.0 - 4.0 cr)

[HIST 5962](#) - Bell Library Research Seminar in Comparative World History, ca. 1000-1800 CE (3.0 cr)

[HIST 5980](#) - Topics in Comparative Women's History (3.0 - 4.0 cr)

[HIST 5993](#) - Directed Study (1.0 - 16.0 cr)

[HIST 5994](#) - Directed Research (1.0 - 16.0 cr)

[HIST 8025](#) - Politics of Historical Memory (3.0 cr)

[HIST 8122](#) - Public Histories (3.0 cr)

[HIST 8245](#) - Human Rights: A Global History (3.0 cr)

[HIST 8540](#) - Topics in Mediterranean Studies (1.0 - 4.0 cr)

[HIST 8630](#) - Seminar in World History (3.0 cr)

[HIST 8644](#) - Legal History Workshop (3.0 cr)

[HIST 8645](#) - American Legal History (3.0 cr)

[HIST 8801](#) - Seminar in Early American History (3.0 cr)

[HIST 8802](#) - Readings in American History, 1848-Present (3.0 cr)

[HIST 8900](#) - Topics in European/Medieval History (1.0 - 4.0 cr)

[HIST 8910](#) - Topics in U.S. History (1.0 - 4.0 cr)

[HIST 8920](#) - Topics in African History (1.0 - 4.0 cr)

[HIST 8930](#) - Topics in Ancient History (1.0 - 4.0 cr)

[HIST 8940](#) - Topics in Asian History (1.0 - 4.0 cr)

[HIST 8960](#) - Topics in History (1.0 - 4.0 cr)

[HIST 8990](#) - Topics in Comparative History-Research (3.0 cr)

[HIST 8993](#) - Directed Study (1.0 - 16.0 cr)

[HIST 8994](#) - Directed Research (1.0 - 16.0 cr)



### Outside Coursework (12 credits)

Select 12 credits from the following in consultation with the advisor:

- AFRO 5866 - The Civil Rights and Black Power Movement, 1954-1984 (3.0 cr)
- AFRO 5932 - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)
- AFRO 5993 - Directed Study (1.0 - 3.0 cr)
- AFRO 8202 - Seminar: Intellectual History of Race (3.0 cr)
- AFRO 8910 - Topics in Studies of Africa and the African Diaspora (3.0 cr)
- AMES 5920 - Topics in Asian Culture (3.0 cr)
- AMST 8202 - Theoretical Foundations and Current Practice in American Studies (3.0 cr)
- AMST 8231 - Cultural Fallout: The Cold War and Its Legacy, Readings (3.0 cr)
- AMST 8920 - Topics in American Studies (3.0 cr)
- AMST 8970 - Independent Study in American Studies (1.0 - 9.0 cr)
- ANTH 5021W - Anthropology of the Middle East [SOCS, GP, WI] (3.0 cr)
- ANTH 5045W - Urban Anthropology [WI] (3.0 cr)
- ANTH 8510 - Topics in Archaeology (3.0 cr)
- ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)
- ARAB 5101 - Advanced Arabic I (4.0 cr)
- ARAB 5102 - Advanced Arabic II (4.0 cr)
- ARTH 5302 - The Image Multiplied: Prints in Early Modern Europe (3.0 cr)
- ARTH 5781 - Age of Empire: The Mughals, Safavids, and Ottomans (3.0 cr)
- ARTH 5950 - Topics: Art History (3.0 cr)
- ARTH 8190 - Seminar: Issues in Ancient Art and Archaeology (3.0 cr)
- ARTH 8320 - Seminar: Issues in Early Modern Visual Culture (3.0 cr)
- CHIC 5412 - Comparative Indigenous Feminisms [GP] (3.0 cr)
- CHIC 5920 - Topics in Chicana(o) Studies (3.0 cr)
- CHIC 5993 - Directed Studies (1.0 - 3.0 cr)
- CNES 5502 - Ancient Israel: From Conquest to Exile (3.0 cr)
- CNES 8190 - Seminar: Issues in Ancient Art and Archaeology (3.0 cr)
- CNES 8530 - Religions of the Ancient Mediterranean World (3.0 cr)
- COPT 5002 - Elementary Coptic (3.0 cr)
- CSCL 5910 - Topics in Cultural Studies and Comparative Literature (3.0 - 4.0 cr)
- DSSC 8111 - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)
- DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)
- DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)
- DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)
- EMS 8100 - Workshop in Early Modern Studies (1.0 - 3.0 cr)
- EMS 8250 - Seminar in Early Modern Studies (3.0 cr)
- ENGL 5150 - Readings in 19th-Century Literature and Culture (3.0 cr)
- ENGL 5300 - Readings in American Minority Literature (3.0 cr)
- ENGL 5510 - Readings in Criticism and Theory (3.0 cr)
- ENGL 8090 - Seminar in Special Subjects (3.0 cr)
- ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)
- ENGL 8520 - Seminar: Cultural Theory and Practice (3.0 cr)
- FREN 5350 - Topics in Literature and Culture (3.0 cr)
- FREN 8110 - Topics in Early Medieval French Literature (3.0 cr)
- FREN 8114 - Troubadour Lyric and Old Occitan Language (3.0 cr)
- FREN 8190 - Old French Workshop (1.0 cr)
- FREN 8992 - Directed Readings for Graduate Students (1.0 - 5.0 cr)
- GEOG 5385 - Globalization and Development: Political Economy (4.0 cr)
- GEOG 8200 - Seminar: Urban Geography (2.0 - 3.0 cr)
- GEOG 8302 - Research Development (3.0 cr)
- GEOG 8970 - Directed Readings (1.0 - 5.0 cr)
- GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)
- GER 5610 - German Literature in Translation (3.0 cr)
- GER 5734 - Old Saxon (3.0 cr)
- GLOS 5900 - Topics in Global Studies (1.0 - 4.0 cr)
- GRAD 5105 - Practicum in University Teaching for Nonnative English Speakers (1.0 - 2.0 cr)
- GRAD 8401 - Dissertation Proposal Development Seminar (3.0 cr)
- GRK 5003 - Intermediate Greek Prose for Graduate Student Research (4.0 cr)
- GRK 5200 - Biblical Greek (3.0 cr)
- GWSS 5190 - Topics: Theory, Knowledge, and Power (3.0 cr)
- GWSS 5406 - Black Feminist Thought in the American and African Diasporas (3.0 cr)
- GWSS 5502 - Gender and Public Policy (3.0 cr)
- GWSS 8107 - Feminist Pedagogies (3.0 cr)



GWSS 8108 - Genealogies of Feminist Theory (3.0 cr)  
GWSS 8210 - Seminar: Feminist Theory & Praxis (3.0 cr)  
GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)  
GWSS 8270 - Seminar: Theories of Body (3.0 cr)  
GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)  
HMED 8113 - Research Methods in the History of Science, Technology, and Medicine (3.0 cr)  
HMED 8220 - Seminar: Current Topics in the History of Medicine (3.0 cr)  
HNUR 5993 - Directed Readings (1.0 - 5.0 cr)  
HORT 8280 - Current Topics in Applied Plant Sciences (1.0 cr)  
HSCI 8930 - Seminar: History of Technology (3.0 cr)  
HSPH 8001 - Who Owns the Past? Common Concerns and Big Questions in Heritage and Public History (3.0 cr)  
HSPH 8003 - Race and Indigeneity in Heritage Representation (3.0 cr)  
HSPH 8006 - Digital Methods for Heritage Studies & Public History (3.0 cr)  
JOUR 5601W - History of Journalism [WI] (3.0 cr)  
JPN 5041 - Reading Japanese Texts: Literature and Culture (3.0 cr)  
LAT 5001 - Intensive Latin (3.0 cr)  
LAT 5003 - Intermediate Latin Prose for Graduate Student Research (4.0 cr)  
LAT 5004 - Intermediate Latin Poetry for Graduate Research (4.0 cr)  
LAT 5100 - Advanced Reading (3.0 cr)  
LAT 5200 - Advanced Reading in Later Latin (3.0 cr)  
LAT 5993 - Directed Studies (1.0 - 4.0 cr)  
LAT 8100 - Readings in Latin Prose (3.0 cr)  
LAT 8910 - Seminar (3.0 cr)  
LAW 6702 - Legal History Workshop (2.0 cr)  
LAW 7608 - Independent Research and Writing (1.0 - 2.0 cr)  
MEST 5610 - Advanced Topics in Medieval Studies (3.0 - 4.0 cr)  
MIMS 5910 - Topics in Moving Image Studies (2.0 - 4.0 cr)  
MST 5011 - Museum History and Philosophy (3.0 cr)  
MST 5012 - Museum Practices (3.0 cr)  
MST 5020 - Internship (1.0 - 6.0 cr)  
PA 5890 - Topics in Foreign Policy and International Affairs (1.0 - 5.0 cr)  
PHIL 8110 - Seminar: Metaphysics (3.0 cr)  
POL 8252 - Early Modern Political Thought (3.0 cr)  
POL 8260 - Topics in Political Theory (3.0 cr)  
RELS 5001 - Theory and Method in the Study of Religion: Critical Approaches to the Study of Religion (3.0 cr)  
RELS 5993 - Directed Studies (1.0 - 4.0 cr)  
RUSS 5411 - Dostoevsky in Translation [LITR, GP] (3.0 cr)  
SCAN 5701 - Old Norse Language and Literature (3.0 cr)  
SCAN 5703 - Old Norse Poetry (3.0 cr)  
SOC 8090 - Topics in Sociology (1.5 - 3.0 cr)  
SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)  
SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)  
SPAN 5160 - Medieval Iberian Literatures and Cultures (3.0 cr)  
SPAN 5560 - Global Colonial Studies in the Hispanic World (3.0 cr)

#### Thesis Credits

Take 24 doctoral thesis credits.

HIST 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Human Rights Minor**

*Global Studies Department*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Institute for Global Studies, 232 Social Sciences Building, 267 19th Ave S, Minneapolis, MN 55455 (612-626-1879; fax: 612-626-2242)

Email: [hrrminor@umn.edu](mailto:hrrminor@umn.edu)

Website: <https://cla.umn.edu/human-rights>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The human rights minor provides an interdisciplinary foundation in human rights studies and practical experience in human rights work.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Human Rights director of graduate studies regarding feasibility and requirements.

A letter that includes information regarding the applicants background and motivation for pursuing the minor must be submitted to the Human Rights director of graduate studies.

A minimum GPA of 3.0 is required for admission to the minor.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

All students pursuing the Human Rights minor must complete a non-credit, 6-week, professional internship in the field of human rights under the supervision of Human Rights director of graduate studies. The Human Rights director of graduate studies must approve internship placement. The 200 internship hours can be completed at any time during the course of study.

A maximum of 3 credits applied to the minor can be taken on the S/N grade basis. A minimum grade of B must be earned for each A/F course applied to the minor.

The minimum cumulative GPA for minor field coursework is 3.0.

#### **Core Coursework (6 credits)**

Select 6 credits from the following in consultation with the Human Rights director of graduate studies.

[GLOS 5403](#) - Human Rights Advocacy (3.0 cr)

[HIST 8245](#) - Human Rights: A Global History (3.0 cr)

[LAW 6886](#) - International Human Rights Law (3.0 cr)

[PA 5885](#) - Human Rights Policy: Issues and Actors (3.0 cr)



SOC 8171 - Cross-Disciplinary Perspectives in Human Rights (3.0 cr)

**Electives (3 to 6 credits)**

Master's students select at least 3 credits, and doctoral students select at least 6 credits from the following in consultation with the Human Rights director of graduate studies:

- AFRO 5866 - The Civil Rights and Black Power Movement, 1954-1984 (3.0 cr)
- AFRO 8202 - Seminar: Intellectual History of Race (3.0 cr)
- AFRO 8554 - Seminar: Gender, Race, Nation, and Policy--Perspectives from Within the African Diaspora (3.0 cr)
- AMIN 5890 - Readings in American Indian and Indigenous History (3.0 cr)
- ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)
- BTHX 5100 - Introduction to Clinical Ethics (3.0 cr)
- BTHX 5220 - Standards for Research with Human Participants: A Lecture Series for Researchers (1.0 cr)
- CHIC 5374 - Migrant Farmworkers in the United States: Families, Work, and Advocacy [CIV] (4.0 cr)
- CSPH 5111 - Ways of Thinking about Health (2.0 cr)
- EPSY 5135 - Human Relations Workshop (4.0 cr)
- ESPM 5251 - Natural Resources in Sustainable International Development (3.0 cr)
- GLOS 5403 - Human Rights Advocacy (3.0 cr)
- HRIR 5252 - Employment and Labor Law for the HRIR Professional (2.0 cr)
- KIN 5371 - Sport and Society (3.0 cr)
- LAW 6030 - Contemporary Problems in Freedom of Speech and Press (3.0 cr)
- LAW 6046 - Human Trafficking (2.0 cr)
- LAW 6058 - Human Rights Advocacy (3.0 cr)
- LAW 6621 - Rights in Conflict: Citizenship and Human Rights (2.0 cr)
- LAW 6827 - Women's International Human Rights (2.0 cr)
- LAW 6889 - Laws of War (3.0 cr)
- LAW 7400 - CL: Human Rights Litigation and International Legal Advocacy (3.0 - 4.0 cr)
- LAW 7842 - CL: Immigration and Human Rights (3.0 - 4.0 cr)
- OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)
- PA 5151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)
- PA 5414 - Child Human Rights: Work and Education (3.0 cr)
- PA 5421 - Racial Inequality and Public Policy (3.0 cr)
- PA 5452 - Immigration and Public Policy (3.0 cr)
- PA 5490 - Topics in Social Policy (1.0 - 4.0 cr)
- PA 5601 - Global Survey of Gender and Public Policy (3.0 cr)
- PA 5690 - Topics in Women, Gender and Public Policy (0.5 - 3.0 cr)
- PA 5801 - Global Public Policy (3.0 cr)
- PA 5823 - Managing Humanitarian and Refugee Crises: Challenges for Policymakers & Practitioners (1.0 cr)
- PA 5885 - Human Rights Policy: Issues and Actors (3.0 cr)
- PA 5890 - Topics in Foreign Policy and International Affairs (1.0 - 5.0 cr)
- POL 8260 - Topics in Political Theory (3.0 cr)
- POL 8403 - International Norms and Institutions (3.0 cr)
- POL 8460 - Topics in International Relations (3.0 cr)
- PSY 8210 - Law, Race, and Social Psychology (3.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)
- PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)
- PUBH 6801 - Health and Human Rights (3.0 cr)
- SOC 8190 - Topics in Law, Crime, and Deviance (3.0 cr)

**Program Sub-plans**

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Master's

Doctoral



### **Twin Cities Campus**

## **Italian Studies Minor**

*French & Italian*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of French and Italian, 260 Folwell Hall, 9 Pleasant Street SE, Minneapolis, MN 55455 (612-624-4308; fax: 612-624-6021)

Website: <http://frit.umn.edu/grad/italianminor.php>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Italian Studies minor, available for students in areas such as art history, architecture, French, comparative literature, history, English, and music, is shaped through consultation with the Italian Studies graduate faculty to support students individual academic and professional objectives.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 2.80.

Other requirements to be completed before admission:

Students interested in the Italian Studies minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Italian Studies director of graduate studies regarding feasibility and requirements.

Proficiency in the Italian language is expected. Students proficiency to pursue the minor successfully will be determined by the Italian Studies director of graduate studies.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Up to one 4-level course can be applied to the minor with the approval of the Italian Studies director of graduate studies.

FRIT 5999 cannot be applied toward the minor field requirement.

Coursework from the major field may not be applied to satisfy minor field requirements.

The minimum GPA for minor field coursework is 3.0.

#### **Required Coursework**

Master's students complete at least 6 credits and doctoral students complete at least 12 credits from the following in consultation with the Italian Studies director of graduate studies:



ITAL 5xxx  
ITAL 8xxx  
FRIT 5xxx  
FRIT 8xxx

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Linguistics M.A.**

*Linguistics, Institute of*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Institute of Linguistics, 205 Elliott Hall, 75 East River Road, Minneapolis, MN 55455 (612-624-3331)

Email: [ling@umn.edu](mailto:ling@umn.edu)

Website: <https://cla.umn.edu/linguistics/graduate>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 32 to 36
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Linguistics MA program trains students in the scientific study of the human mental capacity for language. Successful study in this area investigates the syntactic, phonological, and semantic/pragmatic properties of the language systems that humans naturally acquire, and asks what kinds of underlying mental capacity is implicated by these properties.

The program emphasizes the place of this field of study among the cognitive sciences, and provides coursework and individual advising to prepare students to engage with and produce research in the field.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

### **Special Application Requirements:**

Applicants must submit the following application materials by December 15 of the preceding academic year:

University of Minnesota Application form, which includes:

- a CV or resume;
- a statement of purpose;
- a writing sample;
- three letters of recommendation; and
- transcripts from each college or university attended.

Entry is for fall semester only.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS
- MELAB

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan A:** Plan A requires 20 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 26 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.





**Capstone Project:** The Plan B project is an original paper that may develop out of a course project or independent research.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: See other requirements (below)

A minimum GPA of 2.80 is required for students to remain in good standing.

Students must demonstrate competence (the equivalent of two or more years of study) in one language other than English.

Application of 4xxx-level coursework requires approval of the advisor and director of graduate studies.

**Required Coursework (20 credits)**

Take the following courses:

[LING 5001](#) - Introduction to Linguistics (4.0 cr)

[LING 5201](#) - Syntactic Theory I (3.0 cr)

[LING 5202](#) - Syntactic Theory II (3.0 cr)

[LING 5205](#) - Semantics (3.0 cr)

[LING 5302](#) - Phonological Theory I (3.0 cr)

[LING 8105](#) - Field Methods in Linguistics I (4.0 cr)

**Outside Coursework (6 credits)**

Select 6 non-LING credits in consultation with the advisor.

**Plan Options**

**Plan A**

**Thesis Credits**

Take 10 master's thesis credits.

[LING 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan B**

**Research Paper (3 credits)**

Take the following course:

[LING 8005](#) - Research Paper Workshop (3.0 cr)

**Linguistics Electives (3 credits)**

Select 3 credits from the following in consultation with the advisor. Other courses may be selected with advisor approval.

[LING 5206](#) - Linguistic Pragmatics (3.0 cr)

[LING 5303](#) - Phonological Theory II (3.0 cr)

[LING 5461](#) - Conversation Analysis (3.0 cr)

[LING 5462](#) - Field Research in Spoken Language (3.0 cr)

[LING 5601](#) - Historical Linguistics (3.0 cr)

[LING 5801](#) - Introduction to Computational Linguistics (3.0 cr)

[LING 5993](#) - Directed Study (1.0 - 3.0 cr)

[LING 8106](#) - Field Methods in Linguistics II (4.0 cr)

[LING 8200](#) - Topics in Syntax and Semantics (3.0 cr)

[LING 8210](#) - Seminar in Syntax (3.0 cr)

[LING 8300](#) - Topics in Phonetics and Phonology (3.0 cr)

[LING 8500](#) - Topics in Second Language Acquisition (3.0 cr)

[LING 8900](#) - Seminar: Topics in Linguistics (3.0 cr)

[LING 8921](#) - Seminar in Language and Cognition (3.0 cr)

[LING 8991](#) - Independent Study (1.0 - 4.0 cr)



### **Twin Cities Campus**

## **Linguistics Minor**

*Linguistics, Institute of*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Institute of Linguistics, 205 Elliott Hall, 75 East River Road, Minneapolis, MN 55455 (612-624-3331; fax: 612-624-4579)

Email: [ling@umn.edu](mailto:ling@umn.edu)

Website: <http://www.linguistics.umn.edu/grad/>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 10
- Length of program in credits (Doctorate): 16
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Linguistics is the scientific study of human language. Investigation in phonology, syntax, and semantics/pragmatics seeks to determine general principles governing the structure and use of human language and the parameters that determine degree and manner of variation across languages. These core areas constitute the foundation for other subfields of linguistics, including psycholinguistics, sociolinguistics, historical linguistics, computational linguistics, and neurolinguistics.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Masters**

#### **Required Courses**

[LING 5001](#) - Introduction to Linguistics (4.0 cr)

[LING 5201](#) - Syntactic Theory I (3.0 cr)

or [LING 5302](#) - Phonological Theory I (3.0 cr)

One additional LING course (3.0 or more credits) approved by the director of graduate studies.

Take 3 or more credit(s) from the following:

- LING 5xxx
- LING 8xxx

### **Doctoral**

#### **Required Courses**

[LING 5001](#) - Introduction to Linguistics (4.0 cr)

[LING 5201](#) - Syntactic Theory I (3.0 cr)

[LING 5302](#) - Phonological Theory I (3.0 cr)

Two additional LING courses (6.0 or more credits) approved by the director of graduate studies.



Take 6 or more credit(s) from the following:

- LING 5xxx
- LING 8xxx



**Twin Cities Campus**  
**Linguistics Ph.D.**  
*Linguistics, Institute of*  
**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

**Contact Information:**

Institute of Linguistics, 205 Elliott Hall, 75 East River Road, Minneapolis, MN 55455 (612-624-3331; fax: 612-624-4579)

Email: [ling@umn.edu](mailto:ling@umn.edu)

Website: <http://www.linguistics.umn.edu/grad/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 78
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Our program's goal is to train students in the scientific study of the human mental capacity for language. Successful study in this area investigates the syntactic, phonological and semantic/pragmatic properties of language systems that humans naturally acquire, and asks what kind of underlying mental capacity is implicated by these properties.

Our program emphasizes the place of this field of study among the cognitive sciences, and provides coursework and individual advising to prepare students to engage with and produce research in the field.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

Other requirements to be completed before admission:

There are no specific prerequisites for admission.

### Special Application Requirements:

Applicants must submit the following application materials by December 15 of the preceding academic year:

- University of Minnesota Application form;
- a statement of purpose;
- a writing sample;
- three letters of recommendation;
- a supplementary questionnaire;
- transcripts from each college or university attended;
- GRE scores;
- English Language Proficiency Scores (TOEFL, MELAB or IELTS) are required of international applicants.

Entry is for fall semester.

International applicants must submit score(s) from one of the following tests:

- TOEFL

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

42 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: See below.

A minimum GPA of 3.00 is required for students to remain in good standing.

Students must demonstrate competence (the equivalent of two or more years of study) in two languages other than their native language before the PhD can be awarded.

Upon completion of required coursework, students must pass a preliminary written exam. To pass the preliminary written exam, a student must complete (1) a paper judged to be of near publishable quality by the student's committee in the student's primary area of specialization; (2) a paper judged to be of near publishable quality by the student's committee in the student's chosen secondary area of specialization.

Students are required to pass the preliminary oral exam. The preliminary oral exam is a presentation and defense of a research-paper-length dissertation prospectus, which introduces and motivates the student's dissertation topic and provides a detailed plan for completion of the dissertation.

Students are required to complete a dissertation and pass the Final Oral Exam, which is a defense of the completed dissertation.

### Required Courses

- LING 5001 - Introduction to Linguistics (4.0 cr)
- LING 5201 - Syntactic Theory I (3.0 cr)
- LING 5202 - Syntactic Theory II (3.0 cr)
- LING 5205 - Semantics (3.0 cr)
- LING 5302 - Phonological Theory I (3.0 cr)
- LING 5303 - Phonological Theory II (3.0 cr)
- LING 8005 - Research Paper Workshop (3.0 cr)
- LING 8105 - Field Methods in Linguistics I (4.0 cr)
- LING 8106 - Field Methods in Linguistics II (4.0 cr)
- LING 8210 - Seminar in Syntax (3.0 cr)

### Linguistics Seminar Courses

Take 9 or more credit(s) from the following:

- LING 8200 - Topics in Syntax and Semantics (3.0 cr)
- LING 8210 - Seminar in Syntax (3.0 cr)
- LING 8300 - Topics in Phonetics and Phonology (3.0 cr)
- LING 8500 - Topics in Second Language Acquisition (3.0 cr)
- LING 8900 - Seminar: Topics in Linguistics (3.0 cr)
- LING 8921 - Seminar in Language and Cognition (3.0 cr)
- LING 8991 - Independent Study (1.0 - 4.0 cr)

### Supporting Program Courses

The required 12 credits of coursework from outside the major can be in the same field or in different fields. 6 credits of outside coursework from the MA may be used towards the PhD supporting program requirement.

### Thesis Credits

Take 24 or more credit(s) from the following:

- LING 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)
- LING 8888W - Thesis Credit Dissertation Seminar (1.0 - 3.0 cr)



### **Twin Cities Campus**

## **Literacy and Rhetorical Studies Minor**

*Writing Studies Department*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Center for Writing, 10 Nicholson Hall, 216 Pillsbury Drive SE, Minneapolis, MN 55455 (612-626-7583; fax: 612-626-7580)

Email: [writing@umn.edu](mailto:writing@umn.edu)

Website: <http://writing.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The goal of the literacy and rhetorical studies (LRS) minor is to encourage students to contribute to interdisciplinary activity and to create a forum for them and several dozen faculty members at the University whose research and teaching emphasize various facets of writing and communication. By crafting an individualized program of study with the LRS director of graduate studies, including theory, pedagogy, and research, often in a historical context, students can complement their disciplinary degree, and thereby open up new perspectives for their scholarship and teaching.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the LRS director of graduate studies regarding feasibility and requirements.

For specific information about applying for the LRS minor, see: <http://writing.umn.edu/lrs/admission.html>

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

All courses are chosen in consultation with the LRS director of graduate studies as part of the application process, using the planning form available at <http://writing.umn.edu/lrs/about.html>

Masters minor:

- No more than 1 of the 3 courses applied to the minor may be from the home department.
- A substantial paper emerging from one of the three completed courses is required.

Doctoral minor:

- No more than 2 of the 4 courses applied to the minor may be from the home department.
- A capstone writing project emerging from the studies in literacy and/or rhetoric, such as a seminar paper or a completed dissertation chapter, is required.

### **Coursework (9 credits)**



**Literacy Theory or Practice Course (3 credits)**

Select at least 3 credits in consultation with the LRS director of graduate studies.

**Research Methods and Practices Course (3 credits)**

Select at least 3 credits in consultation with the LRS director of graduate studies.

**Historical Topic Course (3 credits)**

Select at least 3 credits in consultation with the LRS director of graduate studies.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Masters

### Doctoral

**Additional Coursework (3 credits)**

Select 3 credits, in consultation with the LRS director of graduate studies, to complete the 12-credit doctoral minor.



### *Twin Cities Campus*

## Mass Communication M.A.

*School of Journalism & Mass Communication*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Hubbard School of Journalism and Mass Communication, 111 Murphy Hall, 206 Church Street SE, Minneapolis, MN 55455 (612-625-1338; fax: 612-625-9525)

Email: [sjmcgrad@umn.edu](mailto:sjmcgrad@umn.edu)

Website: <https://hsjmc.umn.edu/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 35
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master's degree in mass communication emphasizes the theoretical study of mass communication and analysis of media systems and effects. The degree is intended for those who wish to pursue PhD degrees or teaching and research careers, as well as those who seek communication-related professional careers. The general master's program is not designed to provide professional skills training in journalism. Individuals with a bachelor's degree in journalism and mass communication or with strong social science or liberal arts backgrounds in areas such as political science, psychology, sociology, history, and English are encouraged to apply. Individuals with extensive professional experience in mass communication are also welcome. The program is suffused with the study of new communication technologies.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

Other requirements to be completed before admission:

Students for whom English is a second language must meet the minimum acceptable level of spoken-English proficiency either by submitting TOEFL speaking test score of 18 or higher or SETTA test ELP rating of 4 or higher.

Admission is considered for fall semester only; the priority application deadline is January 15, with a rolling deadline of March 1.

Applicants interested in the MA in Mass Communication/JD degree must submit applications to Mass Communication and the Law School, which are reviewed separately. Applicants are asked to identify their intention to pursue the joint degree in their MA statement of intent. For more information, contact [sjmcgrad@umn.edu](mailto:sjmcgrad@umn.edu).

#### **Special Application Requirements:**

Applicants must submit a department application; a clearly written statement of career interests, goals, and objectives; three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of transcripts; academic work samples in English; a resume or curriculum vita; and scores from the General Test of the GRE.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS
- MELAB

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).





For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 19 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

All coursework offered on both the A/F and S/N grade basis must be taken A/F.

### Mass Communication Theory Core Requirements (4 credits)

Take the following courses:

[JOUR 8001](#) - Studies and Theories of Mass Communication (3.0 cr)

[JOUR 8009](#) - Pro-seminar in Mass Communication (1.0 cr)

### Second Theory Requirement (3 credits)

Select 3 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

[JOUR 8002](#) - Studies in Mass Communication II (3.0 cr)

[JOUR 8003](#) - Digital Media Issues and Theories (3.0 cr)

[JOUR 8514](#) - Seminar: Advanced Mass Communication Theories (3.0 cr)

[JOUR 8602](#) - Seminar: History of Mass Communication (3.0 cr)

[JOUR 8620](#) - Seminar: Advertising Theory and Research (3.0 cr)

[JOUR 8621](#) - Seminar: Public Relations Theory and Research (3.0 cr)

[JOUR 8650](#) - Seminar: Psychology of Media Effects (3.0 cr)

[JOUR 8651](#) - Seminar: Mass Communication, Audiences, and Society (3.0 cr)

[JOUR 8661](#) - Seminar: Mediated Political Communication in the Digital Age (3.0 cr)

[JOUR 8675](#) - Seminar: Issues in Information Access and Communication (3.0 cr)

[JOUR 8678](#) - Seminar: Constitutional Law--Theories of Freedom of Expression (3.0 cr)

[JOUR 8681](#) - Seminar: International Media Perspectives (3.0 cr)

[JOUR 8720](#) - Seminar: Mass Media and Health (3.0 cr)

### Methodology Core Requirements (6 credits)

Take the following courses:

[JOUR 8501](#) - Seminar: The Process of Quantitative Mass Communication Research (3.0 cr)

[JOUR 8503](#) - Seminar: Qualitative Methods in Mass Communication Research (3.0 cr)

### Electives (6 credits)

Select 6 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

[JOUR 5501](#) - Communication, Public Opinion, and Social Media (3.0 cr)

[JOUR 5541](#) - Mass Communication and Public Health (3.0 cr)

[JOUR 5552](#) - Law of Internet Communication (3.0 cr)

[JOUR 5601W](#) - History of Journalism [WI] (3.0 cr)

[JOUR 5725](#) - Management of Media Organizations (3.0 cr)

[JOUR 5777](#) - Contemporary Problems in Freedom of Speech and Press (3.0 cr)

[JOUR 8002](#) - Studies in Mass Communication II (3.0 cr)

[JOUR 8003](#) - Digital Media Issues and Theories (3.0 cr)

[JOUR 8502](#) - Seminar: Multi-method research in Mass Communication (3.0 cr)

[JOUR 8504](#) - Seminar: Analyzing Media Content (3.0 cr)

[JOUR 8513](#) - Seminar: Ethnographic Methods in Mass Communication Research (3.0 cr)

[JOUR 8514](#) - Seminar: Advanced Mass Communication Theories (3.0 cr)

[JOUR 8601](#) - Seminar: Methods in Mass Communication History Research (3.0 cr)

[JOUR 8602](#) - Seminar: History of Mass Communication (3.0 cr)

[JOUR 8603](#) - Seminar: Theories and Models in Mass Communication History Research (3.0 cr)



JOUR 8620 - Seminar: Advertising Theory and Research (3.0 cr)  
JOUR 8621 - Seminar: Public Relations Theory and Research (3.0 cr)  
JOUR 8650 - Seminar: Psychology of Media Effects (3.0 cr)  
JOUR 8651 - Seminar: Mass Communication, Audiences, and Society (3.0 cr)  
JOUR 8661 - Seminar: Mediated Political Communication in the Digital Age (3.0 cr)  
JOUR 8673 - Seminar: Media Management (3.0 cr)  
JOUR 8675 - Seminar: Issues in Information Access and Communication (3.0 cr)  
JOUR 8678 - Seminar: Constitutional Law--Theories of Freedom of Expression (3.0 cr)  
JOUR 8679 - Seminar: Research Methods in Media Ethics and Law (3.0 cr)  
JOUR 8681 - Seminar: International Media Perspectives (3.0 cr)  
JOUR 8720 - Seminar: Mass Media and Health (3.0 cr)  
JOUR 8721 - Seminar: Communication Agencies as Social Institutions (3.0 cr)  
JOUR 8801 - Seminar: Comparative Research in Mass Communication, a Cross-National Approach (3.0 cr)  
JOUR 8990 - Special Problems in Mass Communications (3.0 - 4.0 cr)  
JOUR 8993 - Directed Study (1.0 - 6.0 cr)

#### Outside Coursework (6 credits)

Select 6 credits of outside coursework, in consultation with the advisor, from the following. Other courses can be applied to this requirement with advisor approval.

ANTH 8001 - Ethnography, Theory, History (3.0 cr)  
ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)  
ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)  
COMM 8211 - Critical Communication Studies: History, Theory, Method (3.0 cr)  
COMM 8611 - Seminar: Rhetoric (3.0 cr)  
EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)  
EPSY 5245 - Advanced Survey Data Analysis for Categorical and Rating Scale Data (1.0 cr)  
EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)  
EPSY 5261 - Introductory Statistical Methods (3.0 cr)  
EPSY 5262 - Intermediate Statistical Methods (3.0 cr)  
EPSY 8113 - The Psychology of Scientific Reasoning (3.0 cr)  
EPSY 8114 - Seminar: Cognition and Learning (3.0 cr)  
EPSY 8118 - Advanced Cognitive Psychology (3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
EPSY 8252 - Statistical Methods in Education II (3.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
EPSY 8265 - Factor Analysis (3.0 cr)  
EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)  
EPSY 8267 - Applied Multivariate Analysis (3.0 cr)  
EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)  
EPSY 8283 - Research Synthesis and Meta-Analysis (3.0 cr)  
HIST 8015 - Scope and Methods of Historical Studies (3.0 cr)  
HIST 8021 - History Research Seminar (3.0 cr)  
LAW 6007 - Constitutional Law (3.0 cr)  
LAW 6103 - Data Privacy Law (3.0 cr)  
LAW 6207 - Antitrust (3.0 cr)  
LAW 6650 - Advanced Administrative Law (3.0 cr)  
LAW 6804 - Government Secrecy (2.0 cr)  
LAW 6832 - Cybercrime and Cybersecurity (2.0 cr)  
MKTG 8809 - Consumer Behavior Research Methods (2.0 cr)  
MKTG 8810 - Consumer Behavior Special Topics (2.0 cr)  
MKTG 8811 - Consumer Attitudes and Persuasion I (2.0 cr)  
MKTG 8812 - Consumer Attitudes and Persuasion II (2.0 cr)  
MKTG 8813 - Consumer Judgment and Decision Making I (2.0 cr)  
MKTG 8814 - Consumer Judgment and Decision Making II (2.0 cr)  
MKTG 8831 - Seminar: Inter-Organizational Relations (4.0 cr)  
MKTG 8842 - Quantitative Modeling I (2.0 cr)  
MKTG 8843 - Quantitative Modeling II (2.0 cr)  
MKTG 8851 - Seminar: Marketing Management and Strategy I (2.0 cr)  
MKTG 8852 - Marketing Management & Strategy II (2.0 cr)  
MSBA 6310 - Programming for Data Science (3.0 cr)  
MSBA 6320 - Data Management, Databases, and Data Warehousing (3.0 cr)  
MSBA 6330 - Big Data Analytics (3.0 cr)  
MSBA 6410 - Exploratory Data Analytics and Visualization (3.0 cr)  
MSBA 6420 - Predictive Analytics (3.0 cr)



- POL 8360 - Topics in American Politics (3.0 cr)
- POL 8460 - Topics in International Relations (3.0 cr)
- PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)
- PSY 5015 - Cognition, Computation, and Brain (3.0 cr)
- PSY 5052 - Psychology of Attention (3.0 cr)
- PSY 5062 - Cognitive Neuropsychology (3.0 cr)
- PSY 5101 - Personality: Current Theory and Research (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5206 - Social Psychology and Health Behavior (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)
- PSY 5708 - Organizational Psychology (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8205 - Principles of Social Psychology (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- PSY 8209 - Research Methods in Social Psychology (3.0 cr)
- PSY 8815 - Analysis of Psychological Data (4.0 cr)
- PUBH 6250 - Foundations of Public Health (2.0 cr)
- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
- PUBH 6450 - Biostatistics I (4.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)
- SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)
- SOC 8701 - Sociological Theory (4.0 cr)
- SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOC 8851 - Advanced Qualitative Research Methods: In-Depth Interviewing (3.0 cr)
- SOC 8852 - Advanced Qualitative Research Methods: Ethnographic Practicum (3.0 cr)
- SOC 8853 - Advanced Qualitative Research Methods: Historical & Comparative Sociology (3.0 cr)
- STAT 5101 - Theory of Statistics I (4.0 cr)
- STAT 5102 - Introduction to Statistical Learning (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5511 - Time Series Analysis (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)

**Subgroup**

- LAW 5026 - Intellectual Property and Technology Proseminar (1.0 cr)
- or LAW 6926 - Intellectual Property and Technology Proseminar (1.0 cr)

**Subgroup 1**

- LAW 5908 - Independent Research and Writing (1.0 - 2.0 cr)
- LAW 7606 - Independent Research and Writing (1.0 - 2.0 cr)
- LAW 7608 - Independent Research and Writing (1.0 - 2.0 cr)

**Thesis Credits**

Take 10 master's thesis credits.

- JOUR 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

**Joint- or Dual-degree Coursework:** JD/MA-Mass Communication Student may take a total of 12 credits in common among the academic programs.



### ***Twin Cities Campus***

## **Mass Communication Minor**

*School of Journalism & Mass Communication*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Hubbard School of Journalism and Mass Communication, 111 Murphy Hall, 206 Church Street SE, Minneapolis, MN 55455 (612-625-9824; fax: 612-625-9525).

Email: [sjmcgrad@umn.edu](mailto:sjmcgrad@umn.edu)

Website: <https://hsjmc.umn.edu/>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 14
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The mass communication program emphasizes the theoretical study of mass communication and analysis of media systems and effects. The program is not designed to provide professional skills training in journalism.

Areas of specialization include media processes, influences, and effects (including journalism, health communication, advertising, public relations, and political communication); media law, ethics, history; and media management. All programs are suffused with the study of new communication technologies.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Mass Communication director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Minor field coursework must be selected in consultation with the Mass Communication director of graduate studies.

#### **Coursework (9 to 14 credits)**

Masters students select 9 credits, and doctoral students select 14 credits in consultation with the Mass Communication director of graduate studies. At least 6 of the 14 credits applied to the doctoral minor must be from 8-level courses.

[JOUR 5501](#) - Communication, Public Opinion, and Social Media (3.0 cr)

[JOUR 5541](#) - Mass Communication and Public Health (3.0 cr)

[JOUR 5552](#) - Law of Internet Communication (3.0 cr)

[JOUR 5601W](#) - History of Journalism [WI] (3.0 cr)

[JOUR 5725](#) - Management of Media Organizations (3.0 cr)

[JOUR 5777](#) - Contemporary Problems in Freedom of Speech and Press (3.0 cr)

[JOUR 8001](#) - Studies and Theories of Mass Communication (3.0 cr)

[JOUR 8002](#) - Studies in Mass Communication II (3.0 cr)

[JOUR 8003](#) - Digital Media Issues and Theories (3.0 cr)

[JOUR 8501](#) - Seminar: The Process of Quantitative Mass Communication Research (3.0 cr)



- JOUR 8502 - Seminar: Multi-method research in Mass Communication (3.0 cr)
- JOUR 8503 - Seminar: Qualitative Methods in Mass Communication Research (3.0 cr)
- JOUR 8504 - Seminar: Analyzing Media Content (3.0 cr)
- JOUR 8513 - Seminar: Ethnographic Methods in Mass Communication Research (3.0 cr)
- JOUR 8514 - Seminar: Advanced Mass Communication Theories (3.0 cr)
- JOUR 8601 - Seminar: Methods in Mass Communication History Research (3.0 cr)
- JOUR 8602 - Seminar: History of Mass Communication (3.0 cr)
- JOUR 8603 - Seminar: Theories and Models in Mass Communication History Research (3.0 cr)
- JOUR 8620 - Seminar: Advertising Theory and Research (3.0 cr)
- JOUR 8621 - Seminar: Public Relations Theory and Research (3.0 cr)
- JOUR 8650 - Seminar: Psychology of Media Effects (3.0 cr)
- JOUR 8651 - Seminar: Mass Communication, Audiences, and Society (3.0 cr)
- JOUR 8661 - Seminar: Mediated Political Communication in the Digital Age (3.0 cr)
- JOUR 8673 - Seminar: Media Management (3.0 cr)
- JOUR 8675 - Seminar: Issues in Information Access and Communication (3.0 cr)
- JOUR 8678 - Seminar: Constitutional Law--Theories of Freedom of Expression (3.0 cr)
- JOUR 8679 - Seminar: Research Methods in Media Ethics and Law (3.0 cr)
- JOUR 8681 - Seminar: International Media Perspectives (3.0 cr)
- JOUR 8720 - Seminar: Mass Media and Health (3.0 cr)
- JOUR 8990 - Special Problems in Mass Communications (3.0 - 4.0 cr)
- JOUR 8993 - Directed Study (1.0 - 6.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Mass Communication Ph.D.**

*School of Journalism & Mass Communication*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Hubbard School of Journalism and Mass Communication, 111 Murphy Hall, 206 Church Street SE, Minneapolis, MN 55455 (612-625-1338; fax: 612-625-9525)

Email: [sjmcgrad@umn.edu](mailto:sjmcgrad@umn.edu)

Website: <https://hsjmc.umn.edu/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 70
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Mass Communication PhD offers training for academic careers primarily in mass communication instruction, research, or policy. Areas of specialization include media processes, influences, and effects (including journalism, health communication, advertising, public relations, and political communication); media law, ethics, history; and media management. The program is suffused with the study of new communication technologies.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

Students for whom English is a second language must meet the minimum acceptable level of spoken-English proficiency either by submitting TOEFL speaking test score of 18 or higher or SETTA test ELP rating of 4 or higher.

Admission is considered for fall semester only; the application deadline is January 15.

Applicants interested in the PhD in Mass Communication/JD degree must submit applications to Mass Communication and the Law School, which are reviewed separately. Applicants are asked to identify their intention to pursue the joint degree in their PhD statement of intent. For more information, contact [sjmcgrad@umn.edu](mailto:sjmcgrad@umn.edu).

#### **Special Application Requirements:**

Applicants must submit a department application; a clearly written statement of career interests, goals, and objectives; three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of transcripts; academic work samples in English; a resume or curriculum vita; and scores from the General Test of the GRE.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS
- MELAB

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

34 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.5 is required for students to remain in good standing.

All coursework offered on the A/F and S/N grade basis must be taken A/F.

### Mass Communication Theory Core Requirements (4 credits)

Take the following courses:

[JOUR 8001](#) - Studies and Theories of Mass Communication (3.0 cr)

[JOUR 8009](#) - Pro-seminar in Mass Communication (1.0 cr)

### Second Theory Requirement (3 credits)

Select 3 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

[JOUR 8002](#) - Studies in Mass Communication II (3.0 cr)

[JOUR 8003](#) - Digital Media Issues and Theories (3.0 cr)

[JOUR 8514](#) - Seminar: Advanced Mass Communication Theories (3.0 cr)

[JOUR 8602](#) - Seminar: History of Mass Communication (3.0 cr)

[JOUR 8620](#) - Seminar: Advertising Theory and Research (3.0 cr)

[JOUR 8621](#) - Seminar: Public Relations Theory and Research (3.0 cr)

[JOUR 8650](#) - Seminar: Psychology of Media Effects (3.0 cr)

[JOUR 8651](#) - Seminar: Mass Communication, Audiences, and Society (3.0 cr)

[JOUR 8661](#) - Seminar: Mediated Political Communication in the Digital Age (3.0 cr)

[JOUR 8675](#) - Seminar: Issues in Information Access and Communication (3.0 cr)

[JOUR 8678](#) - Seminar: Constitutional Law--Theories of Freedom of Expression (3.0 cr)

[JOUR 8681](#) - Seminar: International Media Perspectives (3.0 cr)

[JOUR 8720](#) - Seminar: Mass Media and Health (3.0 cr)

### Methodology Core Requirements (6 credits)

Take the following courses:

[JOUR 8501](#) - Seminar: The Process of Quantitative Mass Communication Research (3.0 cr)

[JOUR 8503](#) - Seminar: Qualitative Methods in Mass Communication Research (3.0 cr)

### Additional Method Requirement (3 credits)

Select 3 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

[EPSY 5244](#) - Survey Design, Sampling, and Implementation (3.0 cr)

[EPSY 5247](#) - Qualitative Methods in Educational Psychology (3.0 cr)

[EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)

[EPSY 5262](#) - Intermediate Statistical Methods (3.0 cr)

[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

[EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)

[EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)

[EPSY 8265](#) - Factor Analysis (3.0 cr)

[EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)

[EPSY 8267](#) - Applied Multivariate Analysis (3.0 cr)

[EPSY 8268](#) - Hierarchical Linear Modeling in Educational Research (3.0 cr)

[EPSY 8282](#) - Statistical Analysis of Longitudinal Data (3.0 cr)

[EPSY 8283](#) - Research Synthesis and Meta-Analysis (3.0 cr)

[HIST 8015](#) - Scope and Methods of Historical Studies (3.0 cr)

[HIST 8021](#) - History Research Seminar (3.0 cr)

[PSY 5862](#) - Psychological Measurement: Theory and Methods (3.0 cr)

[PSY 5865](#) - Advanced Psychological and Educational Measurement (4.0 cr)

[PSY 8209](#) - Research Methods in Social Psychology (3.0 cr)

[PSY 8815](#) - Analysis of Psychological Data (4.0 cr)



- SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOC 8851 - Advanced Qualitative Research Methods: In-Depth Interviewing (3.0 cr)
- SOC 8852 - Advanced Qualitative Research Methods: Ethnographic Practicum (3.0 cr)
- SOC 8853 - Advanced Qualitative Research Methods: Historical & Comparative Sociology (3.0 cr)

#### Electives (18 credits)

Select 18 credits in consultation with the advisor from the following. Other courses can be applied to this requirement with advisor approval.

- JOUR 5501 - Communication, Public Opinion, and Social Media (3.0 cr)
- JOUR 5541 - Mass Communication and Public Health (3.0 cr)
- JOUR 5552 - Law of Internet Communication (3.0 cr)
- JOUR 5601W - History of Journalism [WI] (3.0 cr)
- JOUR 5725 - Management of Media Organizations (3.0 cr)
- JOUR 5777 - Contemporary Problems in Freedom of Speech and Press (3.0 cr)
- JOUR 8002 - Studies in Mass Communication II (3.0 cr)
- JOUR 8003 - Digital Media Issues and Theories (3.0 cr)
- JOUR 8502 - Seminar: Multi-method research in Mass Communication (3.0 cr)
- JOUR 8504 - Seminar: Analyzing Media Content (3.0 cr)
- JOUR 8513 - Seminar: Ethnographic Methods in Mass Communication Research (3.0 cr)
- JOUR 8514 - Seminar: Advanced Mass Communication Theories (3.0 cr)
- JOUR 8601 - Seminar: Methods in Mass Communication History Research (3.0 cr)
- JOUR 8602 - Seminar: History of Mass Communication (3.0 cr)
- JOUR 8603 - Seminar: Theories and Models in Mass Communication History Research (3.0 cr)
- JOUR 8620 - Seminar: Advertising Theory and Research (3.0 cr)
- JOUR 8621 - Seminar: Public Relations Theory and Research (3.0 cr)
- JOUR 8650 - Seminar: Psychology of Media Effects (3.0 cr)
- JOUR 8651 - Seminar: Mass Communication, Audiences, and Society (3.0 cr)
- JOUR 8661 - Seminar: Mediated Political Communication in the Digital Age (3.0 cr)
- JOUR 8673 - Seminar: Media Management (3.0 cr)
- JOUR 8675 - Seminar: Issues in Information Access and Communication (3.0 cr)
- JOUR 8678 - Seminar: Constitutional Law--Theories of Freedom of Expression (3.0 cr)
- JOUR 8679 - Seminar: Research Methods in Media Ethics and Law (3.0 cr)
- JOUR 8681 - Seminar: International Media Perspectives (3.0 cr)
- JOUR 8720 - Seminar: Mass Media and Health (3.0 cr)
- JOUR 8721 - Seminar: Communication Agencies as Social Institutions (3.0 cr)
- JOUR 8801 - Seminar: Comparative Research in Mass Communication, a Cross-National Approach (3.0 cr)
- JOUR 8990 - Special Problems in Mass Communications (3.0 - 4.0 cr)
- JOUR 8993 - Directed Study (1.0 - 6.0 cr)

#### Outside Coursework (12 credits)

Select 12 credits of outside coursework, in consultation with the advisor, from the following. Other courses can be applied to this requirement with advisor approval.

- ANTH 8001 - Ethnography, Theory, History (3.0 cr)
- ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- COMM 8211 - Critical Communication Studies: History, Theory, Method (3.0 cr)
- COMM 8611 - Seminar: Rhetoric (3.0 cr)
- EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)
- EPSY 5245 - Advanced Survey Data Analysis for Categorical and Rating Scale Data (1.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8113 - The Psychology of Scientific Reasoning (3.0 cr)
- EPSY 8114 - Seminar: Cognition and Learning (3.0 cr)
- EPSY 8118 - Advanced Cognitive Psychology (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)





EPSY 8283 - Research Synthesis and Meta-Analysis (3.0 cr)  
HIST 8015 - Scope and Methods of Historical Studies (3.0 cr)  
HIST 8021 - History Research Seminar (3.0 cr)  
LAW 6007 - Constitutional Law (3.0 cr)  
LAW 6103 - Data Privacy Law (3.0 cr)  
LAW 6207 - Antitrust (3.0 cr)  
LAW 6650 - Advanced Administrative Law (3.0 cr)  
LAW 6804 - Government Secrecy (2.0 cr)  
LAW 6832 - Cybercrime and Cybersecurity (2.0 cr)  
MKTG 8809 - Consumer Behavior Research Methods (2.0 cr)  
MKTG 8810 - Consumer Behavior Special Topics (2.0 cr)  
MKTG 8811 - Consumer Attitudes and Persuasion I (2.0 cr)  
MKTG 8812 - Consumer Attitudes and Persuasion II (2.0 cr)  
MKTG 8813 - Consumer Judgment and Decision Making I (2.0 cr)  
MKTG 8814 - Consumer Judgment and Decision Making II (2.0 cr)  
MKTG 8831 - Seminar: Inter-Organizational Relations (4.0 cr)  
MKTG 8842 - Quantitative Modeling I (2.0 cr)  
MKTG 8843 - Quantitative Modeling II (2.0 cr)  
MKTG 8851 - Seminar: Marketing Management and Strategy I (2.0 cr)  
MKTG 8852 - Marketing Management & Strategy II (2.0 cr)  
MSBA 6310 - Programming for Data Science (3.0 cr)  
MSBA 6320 - Data Management, Databases, and Data Warehousing (3.0 cr)  
MSBA 6330 - Big Data Analytics (3.0 cr)  
MSBA 6410 - Exploratory Data Analytics and Visualization (3.0 cr)  
MSBA 6420 - Predictive Analytics (3.0 cr)  
POL 8360 - Topics in American Politics (3.0 cr)  
POL 8460 - Topics in International Relations (3.0 cr)  
PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)  
PSY 5015 - Cognition, Computation, and Brain (3.0 cr)  
PSY 5052 - Psychology of Attention (3.0 cr)  
PSY 5062 - Cognitive Neuropsychology (3.0 cr)  
PSY 5101 - Personality: Current Theory and Research (3.0 cr)  
PSY 5202 - Attitudes and Social Behavior (3.0 cr)  
PSY 5205 - Applied Social Psychology (3.0 cr)  
PSY 5206 - Social Psychology and Health Behavior (3.0 cr)  
PSY 5207 - Personality and Social Behavior (3.0 cr)  
PSY 5708 - Organizational Psychology (3.0 cr)  
PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)  
PSY 5865 - Advanced Psychological and Educational Measurement (4.0 cr)  
PSY 8201 - Social Cognition (3.0 cr)  
PSY 8205 - Principles of Social Psychology (3.0 cr)  
PSY 8208 - Social Psychology: The Self (3.0 cr)  
PSY 8209 - Research Methods in Social Psychology (3.0 cr)  
PSY 8815 - Analysis of Psychological Data (4.0 cr)  
PUBH 6250 - Foundations of Public Health (2.0 cr)  
PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)  
SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)  
SOC 8701 - Sociological Theory (4.0 cr)  
SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)  
SOC 8801 - Sociological Research Methods (4.0 cr)  
SOC 8811 - Advanced Social Statistics (4.0 cr)  
SOC 8851 - Advanced Qualitative Research Methods: In-Depth Interviewing (3.0 cr)  
SOC 8852 - Advanced Qualitative Research Methods: Ethnographic Practicum (3.0 cr)  
SOC 8853 - Advanced Qualitative Research Methods: Historical & Comparative Sociology (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Introduction to Statistical Learning (4.0 cr)  
STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5421 - Analysis of Categorical Data (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)



[STAT 5601](#) - Nonparametric Methods (3.0 cr)

[STAT 8051](#) - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)

[STAT 8052](#) - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)

[STAT 8053](#) - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)

**Subgroup**

[LAW 5026](#) - Intellectual Property and Technology Proseminar (1.0 cr)

or [LAW 6926](#) - Intellectual Property and Technology Proseminar (1.0 cr)

**Subgroup 1**

[LAW 5908](#) - Independent Research and Writing (1.0 - 2.0 cr)

or [LAW 7606](#) - Independent Research and Writing (1.0 - 2.0 cr)

or [LAW 7608](#) - Independent Research and Writing (1.0 - 2.0 cr)

**Thesis Credits**

Take 24 doctoral thesis credits.

[JOUR 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:**JD/ Mass Communications PhD



### *Twin Cities Campus*

## Medieval Studies Minor

*Medieval Studies, Center for*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Center for Medieval Studies, 1110 Heller Hall, 271 19th Avenue South, Minneapolis, MN 55455 (612-626-0805).

Email: [cmedst@umn.edu](mailto:cmedst@umn.edu)

Website: <http://cmedst.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate minor in Medieval Studies enables graduates to demonstrate their course preparation in the field to schools and employers. Furthermore, it identifies graduates as medievalists who are comfortable in a number of disciplines and who are interested in the broader questions of medieval studies. Students may declare the minor at either the masters or the doctoral level. Graduate students who declare the minor are placed in contact with professors in many different departments on campus who may serve on their committees. In fulfillment of the requirements, students take course work with professors from other departments at the U, as well as interact with distinguished visiting scholars, brought in regularly by the Center for events such as the distinguished speakers series, workshops, and conferences.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Medieval Studies director of graduate studies regarding feasibility and requirements.

Students must complete an application for the minor (available on the CMS website or in the office) and return it to the Medieval Studies director of graduate studies.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Use of 4xxx courses toward the minor is permitted only with the permission of the Medieval Studies director of graduate studies.

The minimum cumulative GPA for minor field coursework is 3.00.

#### **Latin/Medieval Vernacular Coursework (3 to 6 credits)**

Master's and doctoral students select 3 credits that demonstrate a command of Latin. LAT 5100 is recommended; however, another course can be substituted. Doctoral students select an additional 3 credits to meet this requirement.

All courses selected must be outside the students major field and must be approved by the Medieval Studies director of graduate



studies.

ARAB 4xxx

- CHN 5211 - Introductory Classical Chinese I (3.0 cr)
- CHN 5212 - Introductory Classical Chinese II (3.0 cr)
- DTCH 4001 - Beginning Dutch for Graduate Research (5.0 cr)
- DTCH 4003 - Intermediate Dutch for Graduate Research (5.0 cr)
- FREN 4001 - Beginning French for Graduate Student Research I (5.0 cr)
- FREN 4002 - Beginning French for Graduate Student Research II (5.0 cr)
- FREN 4004 - Intermediate French for Graduate Student Research II (5.0 cr)
- GER 4001 - Beginning German for Graduate Research (5.0 cr)
- GER 4002 - Beginning German for Graduate Research (5.0 cr)
- GER 4004 - Intermediate German for Graduate Research (5.0 cr)
- GRK 5003 - Intermediate Greek Prose for Graduate Student Research (4.0 cr)
- HEBR 4011 - Intermediate Hebrew I for Graduate Student Research (5.0 cr)
- HEBR 4104 - Beginning Biblical Hebrew I for Graduate Student Research (5.0 cr)
- JPN 5211 - Introductory Classical Chinese I (3.0 cr)
- JPN 5212 - Introductory Classical Chinese II (3.0 cr)
- KOR 5211 - Introductory Classical Chinese I (3.0 cr)
- KOR 5212 - Introductory Classical Chinese II (3.0 cr)
- LAT 5100 - Advanced Reading (3.0 cr)
- NOR 4001 - Beginning Norwegian for Graduate Research (5.0 cr)
- NOR 4003 - Intermediate Norwegian for Graduate Research (5.0 cr)
- PORT 4103 - Intermediate Portuguese for Graduate Student Research (5.0 cr)
- RUSS 4101 - Beginning Russian for Graduate Research I (5.0 cr)
- RUSS 4103 - Intermediate Russian for Graduate Research I (5.0 cr)
- SCAN 4011 - Readings in Scandinavian Languages (2.0 cr)
- SPAN 4001 - Beginning Spanish for Graduate Student Research (5.0 cr)
- SPAN 4003 - Intermediate Spanish for Graduate Student Research (5.0 cr)
- SWED 4001 - Beginning Swedish for Graduate Research (5.0 cr)
- SWED 4003 - Intermediate Swedish for Graduate Research (5.0 cr)

#### Medieval Studies/Medieval Topics Coursework (3 to 6 credits)

Master's students select 3 credits and doctoral students select 6 credits from the following list, or other courses in consultation with the Medieval Studies director of graduate studies. Courses must be outside the student's major field. All courses must be approved by the Medieval Studies director of graduate studies.

- AMES 5868 - Culture and Society of the Arabian Peninsula (3.0 cr)
- ANTH 5442 - Archaeology of the British Isles (3.0 cr)
- ARCH 5423 - Gothic Architecture (3.0 cr)
- ARTH 5765 - Early Chinese Art (3.0 cr)
- CNES 8513 - Scripture and Interpretation (3.0 cr)
- CNES 8570 - Readings in Religious Texts (3.0 cr)
- GRK 5003 - Intermediate Greek Prose for Graduate Student Research (4.0 cr)
- HIST 5111 - Proseminar in the History of Medieval Europe (3.0 cr)
- HIST 5115 - Medieval Latin Historians (3.0 cr)
- HIST 5271 - The Viking World: Story, History, and Archaeology (3.0 cr)
- HIST 5281 - European Intellectual History: The Early Modern Period, Antiquity to 1750 (3.0 cr)
- HIST 5469 - Historiographies of China, 1000-1700 (3.0 cr)
- HIST 5611 - New Directions in the Middle Ages, ca. 300-1100 (3.0 cr)
- HIST 5612 - New Directions in the Middle Ages, ca. 1100-1500 (3.0 cr)
- HIST 5614 - The Medieval Church (3.0 cr)
- HIST 8110 - Medieval History: Research Seminar (3.0 cr)
- LAT 5200 - Advanced Reading in Later Latin (3.0 cr)
- LAT 8263 - Survey of Latin Literature II (3.0 cr)
- LAT 8267 - Graduate Survey of Latin Literature of Late Antiquity (3.0 cr)
- MEST 5610 - Advanced Topics in Medieval Studies (3.0 - 4.0 cr)
- MEST 5993 - Directed Studies in Medieval Studies (1.0 - 3.0 cr)
- MEST 8010 - Medieval Studies Colloquium (3.0 cr)
- MEST 8110 - Seminar in Medieval Studies (3.0 - 4.0 cr)
- MUS 8631 - Seminar: Music in Medieval Europe (3.0 cr)
- PHIL 8080 - Seminar: History of Ancient and Medieval Philosophy (3.0 cr)
- POL 8251 - Ancient and Medieval Political Thought (3.0 cr)
- RELS 8190 - Comparative Seminar in Religions in Antiquity (3.0 cr)
- SCAN 5502 - The Icelandic Saga (3.0 cr)
- SCAN 5701 - Old Norse Language and Literature (3.0 cr)
- SCAN 5703 - Old Norse Poetry (3.0 cr)



[SCAN 8500](#) - Seminar in Medieval Scandinavian Languages and Literature (3.0 cr)

[SPAN 5160](#) - Medieval Iberian Literatures and Cultures (3.0 cr)

[SPAN 5701](#) - History of Ibero-Romance (3.0 cr)

[SPAN 8312](#) - Two Spanish Masterpieces: [Libro de Buen Amor] and [La Celestina] (3.0 cr)

**Old English I**

[ENGL 4612](#) - Old English I (3.0 cr)

or [MEST 4612](#) - Old English I (3.0 cr)

**Old English II**

[ENGL 4613](#) - Old English II (3.0 cr)

or [MEST 4613](#) - Old English II (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### ***Twin Cities Campus***

## **Moving Image Studies Minor**

*Cultural Studies & Comparative Literature*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Cultural Studies and Comparative Literature, 216 Pillsbury Dr SE, 235 Nicholson Hall, Minneapolis, MN 55455 (612-624-8099)

Email: [csclgrad@umn.edu](mailto:csclgrad@umn.edu)

Website: <http://movingimage.umn.edu/>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 15
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The moving image increasingly permeates the fabric of contemporary culture and society. From cinema theaters and home televisions to installation art, portable electronic devices, medical technologies, and science laboratories, and in public spaces from airport terminals to building façades, the moving image is nearly ubiquitous.

The graduate minor in moving image studies trains students from a variety of disciplinary fields in the critical analysis of the moving image in its disparate yet interrelated forms. Drawing from the faculty's extensive research interests and expertise, the curriculum brings together discourses ranging from film theory to media studies, from the philosophy of the image to the history of technology, and beyond.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Admission to the minor is by request, with the approval of the student's adviser and the director of Graduate Studies of the minor.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

The PhD minor (minimum 15 credits) requires two core courses (6 credits): MIMS 8001 - Theories of the Moving Image (3 credits), and MIMS 8003 - Historiography of the Moving Image (3 credits). The PhD minor also requires three electives (minimum 9 credits): one 8xxx Topics Course (3 credits) chosen from a list of courses offered in a given year by film/media faculty in various departments, and two additional 5xxx or 8xxx courses (6 credits) chosen from a list of courses offered in a given year by film/media faculty in various departments, including, as a recommended option, a production-based course. The master's minor (minimum 9 credits) requires two core courses (6 credits): MIMS 8001 - Theories of the Moving Image (3 credits), and MIMS 8003 - Historiography of the Moving Image (3 credits). The master's minor also requires one additional 5xxx or 8xxx course (3 credits) chosen from a list of courses offered by film/media faculty in various departments.

Students are advised to check the program website indicated above for updated information.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.



Students may not complete the program with more than one sub-plan.

#### Master's

##### Required Courses

[MIMS 8001](#) - Theories of the Moving Image (3.0 cr)

[MIMS 8003](#) - Historiography of the Moving Image (3.0 cr)

##### Electives

Take 3 or more credit(s) from the following:

- 5xxx or 8xxx courses (3.0 cr) chosen from a list of courses offered in a given year by film/media faculty in various departments.

#### Doctoral

##### Required

[MIMS 8001](#) - Theories of the Moving Image (3.0 cr)

[MIMS 8003](#) - Historiography of the Moving Image (3.0 cr)

##### Electives

Take 9 or more credit(s) from the following:

- 8xxx - Topics Course (3.0 cr) chosen from a list of courses offered in a given year by film/media faculty in various departments.
- 5xxx or 8xxx courses (6.0 cr) chosen from a list of courses offered in a given year by film/media faculty in various departments, including, as a recommended option, a production-based course.



**Twin Cities Campus**

**Music D.M.A.**

School of Music

College of Liberal Arts

Link to a [list of faculty](#) for this program.

**Contact Information:**

Department of School of Music, 100 Ferguson Hall, 2106 4th Street South, Minneapolis, MN 55455 (612- 624-5093; fax: 612-624-8001)

Email: [mnmusic@umn.edu](mailto:mnmusic@umn.edu)

Website: <http://www.music.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 85 to 97
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Musical Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Doctor of Musical Arts (DMA) offers emphases in instrumental performance, piano, organ, voice, guitar, collaborative piano, and conducting.

**Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Bachelor's degree or its equivalent with a major emphasis in one of the following areas of music: musicology/ethnomusicology, theory and/or composition, performance, or music education/therapy.

Master's degree in an appropriate field of study

**Special Application Requirements:**

Some emphases require additional application materials such as a preliminary DVD, audition, and/or interview. For more information, please refer to <https://cla.umn.edu/music/graduate/apply>.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.





## Program Requirements

81 to 93 credits are required in the major.  
4 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

All DMA students must complete at least one emphasis area.

With the exception of courses outside of the School of Music, all coursework offered on both the A/F and S/N grade basis must be taken A/F.

### Research Requirement (3 credits)

All students take the following course:

[MUS 5611](#) - Resources for Music Research (3.0 cr)

### Music Theory/Musicology Coursework (12 credits)

All students select 12 credits from the following in consultation with the advisor. If MUS 5950 is selected, it must be taken for 3 credits.

[MUS 5534](#) - Musical Minimalisms (3.0 cr)

[MUS 5541](#) ~~(Inactive)~~(3.0 cr)

[MUS 5550](#) - Class Composition for Performers (3.0 cr)

[MUS 5561](#) - Orchestration I (3.0 cr)

[MUS 5571](#) - Schenkerian Analysis for Performers (3.0 cr)

[MUS 5572](#) - Chromatic Harmony (3.0 cr)

[MUS 5574](#) ~~(Inactive)~~(3.0 cr)

[MUS 5591](#) - Introduction to Music Information Technology (3.0 cr)

[MUS 5592](#) - Music Informatics Seminar (3.0 cr)

[MUS 5597](#) - Music and Text (3.0 cr)

[MUS 5620](#) - Topics in Opera History (3.0 cr)

[MUS 5624](#) - Music of J. S. Bach (3.0 cr)

[MUS 5630](#) - Performance Practice: 1700 to the Present (3.0 cr)

[MUS 5631](#) - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)

[MUS 5647](#) - 20th-Century European/American Music (3.0 cr)

[MUS 5731](#) - Jazz and Modernism (3.0 cr)

[MUS 5805](#) - Worlds of Improvisation (3.0 cr)

[MUS 5950](#) - Topics in Music (1.0 - 4.0 cr)

[MUS 8501](#) - Music Theory Pedagogy (3.0 cr)

[MUS 8550](#) - Composition (3.0 cr)

[MUS 8560](#) - Theory and Analysis of Popular Music (3.0 cr)

[MUS 8570](#) - Seminar in Composition (2.0 cr)

[MUS 8571](#) - Composers' Laboratory (3.0 cr)

[MUS 8580](#) - Topics in Tonal Analysis (3.0 cr)

[MUS 8581](#) - Schenkerian Theory and Analysis I (3.0 cr)

[MUS 8582](#) - Schenkerian Theory and Analysis II (3.0 cr)

[MUS 8584](#) - Current Issues in the Analysis of 19th-Century Music (3.0 cr)

[MUS 8585](#) - Chromatic Harmony Seminar (3.0 cr)

[MUS 8590](#) - Topics in 20th-Century Analysis (3.0 cr)

[MUS 8631](#) - Seminar: Music in Medieval Europe (3.0 cr)

[MUS 8632](#) - Seminar: Music in Early Modern Europe (3.0 cr)

[MUS 8640](#) - Seminar in Musicology (3.0 cr)

[MUS 8644](#) - Seminar: Advanced Research in Historical Musicology (3.0 cr)

[MUS 8647](#) - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)

[MUS 8651](#) - Sonata Theory (3.0 cr)

[MUS 8864](#) - Current Issues in Ethnomusicology (3.0 cr)

### Electives (6 credits)

All students select at least 6 elective credits in consultation with the advisor. MUS and MUED courses applied to other DMA credit



requirements cannot also apply as an elective.

MUS 5xxx

MUS 8xxx

MUED 5xxx

MUED 8xxx

[ACL 5221](#) - Creative Entrepreneurship and Resource Development (3.0 cr)

[CSPH 5101](#) - Introduction to Integrative Healing Practices (3.0 cr)

[CSPH 5102](#) - Art of Healing: Self as Healer (1.0 cr)

[CSPH 5225](#) - Meditation: Integrating Body and Mind (2.0 cr)

[CSPH 5343](#) - Ayurveda Medicine: The Science of Self-healing (2.0 cr)

[CSPH 5503](#) - Aromatherapy Fundamentals (1.0 cr)

[CSPH 5535](#) - Reiki Healing (1.0 cr)

[CSPH 5605](#) - Movement and Music for Well-being and Healing (2.0 cr)

[CSPH 5708](#) - Mind-Body Science and the Art of Transformation (1.0 cr)

[EPSY 5101](#) - Intelligence and Creativity (3.0 cr)

[ESL 5302](#) - Academic Writing (4.0 cr)

[GRAD 5102](#) - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)

[GRAD 8101](#) - Teaching in Higher Education (3.0 cr)

[GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)

[WRIT 5051](#) - Graduate Research Writing for International Students (3.0 cr)

[WRIT 5052](#) - Graduate Research Presentations and Conference Writing for Non-Native Speakers of English (3.0 cr)

### Recital Credits (12 to 20 credits)

Students who choose to complete a secondary area take 12 recital credits; students who do not pursue a secondary area take 20 recital credits. Recital credits are taken in consultation with the advisor.

[MUS 8999](#) - Recital Credits: Doctoral (4.0 cr)

### Thesis Credits

All DMA students take 4 doctoral thesis credits.

[MUS 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

### Emphases

#### Instrumental Performance (40 credits)

The Instrumental Performance emphasis offers the following options: bassoon, cello, clarinet, double bass, flute, French horn, harp, oboe, percussion, saxophone, trombone, trumpet, tuba, viola, and violin.

#### Applied Lessons (32 credits)

Take 32 credits in consultation with the advisor.

[MUSA 8301](#) - Piano: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8304](#) - Voice: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8305](#) - Violin: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8306](#) - Viola: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8307](#) - Cello: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8308](#) - Double Bass: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8309](#) - Flute: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8311](#) - Oboe: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8312](#) - Clarinet: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8313](#) - Saxophone: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8314](#) - Bassoon: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8315](#) - French Horn: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8316](#) - Trumpet: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8317](#) - Trombone: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8318](#) - Euphonium: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8319](#) - Tuba: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8321](#) - Percussion: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8322](#) - Harp: Music Major (graduate) (2.0 - 4.0 cr)

[MUSA 8324](#) - Accompanying/Coaching: Music Major (graduate) (2.0 - 4.0 cr)

#### Emphasis Coursework (8 credits)

Select 8 credits from the following in consultation with the advisor:

[MUED 5750](#) - Topics in Music Education (1.0 - 4.0 cr)

[MUED 5991](#) - Independent Study (1.0 - 4.0 cr)

[MUED 8284](#) - Seminar: Research and Scholarly Issues (3.0 cr)

[MUED 8994](#) - Directed Research (1.0 - 8.0 cr)

[MUS 5331](#) - Jazz Improvisation I (2.0 cr)

[MUS 5340](#) - Jazz Ensemble (1.0 cr)



MUS 5410 - University Wind Bands (1.0 cr)  
MUS 5420 - Orchestra (1.0 cr)  
MUS 5427 - Violin Pedagogy I (2.0 cr)  
MUS 5440 - Chamber Ensemble (1.0 cr)  
MUS 5450 - Orchestral Repertoire (1.0 - 3.0 cr)  
MUS 5460 - World Music Ensemble (1.0 - 2.0 cr)  
MUS 5464 - Cello Pedagogy (2.0 cr)  
MUS 5485 - Transcription for Winds (2.0 cr)  
MUS 5490 - Percussion Ensemble (1.0 cr)  
MUS 5491 - Percussion Literature I (2.0 cr)  
MUS 5494 - West African Music Ensemble (1.0 cr)  
MUS 5561 - Orchestration I (3.0 cr)  
MUS 5993 - Directed Studies (1.0 - 4.0 cr)  
MUS 8994 - Directed Research (1.0 - 3.0 cr)

-OR-

#### **Organ (43 credits)**

##### **Applied Lessons (32 credits)**

Take 32 credits of the following in consultation with the advisor:

MUSA 8303 - Organ: Music Major (graduate) (2.0 - 4.0 cr)

##### **Emphasis Coursework (11 credits)**

Take the following courses:

MUS 5151 *{Inactive}*(3.0 cr)

MUS 5152 *{Inactive}*(3.0 cr)

MUS 8131 - Advanced Keyboard Skills (2.0 cr)

MUS 8133 - Seminar in Basso Continuo (3.0 cr)

-OR-

#### **Piano (44 credits)**

##### **Applied Lessons (32 credits)**

MUSA 8301 - Piano: Music Major (graduate) (2.0 - 4.0 cr)

##### **Required Coursework (6 credits)**

Take the following courses:

MUS 5181 - Advanced Piano Literature I (2.0 cr)

MUS 5182 - Advanced Piano Literature II (2.0 cr)

MUS 8131 - Advanced Keyboard Skills (2.0 cr)

##### **Emphasis Electives (6 credits)**

Select 6 credits from the following in consultation with the advisor:

MUS 5101 - Piano Pedagogy I (2.0 cr)

MUS 5331 - Jazz Improvisation I (2.0 cr)

MUS 5340 - Jazz Ensemble (1.0 cr)

MUS 5410 - University Wind Bands (1.0 cr)

MUS 5420 - Orchestra (1.0 cr)

MUS 5440 - Chamber Ensemble (1.0 cr)

MUS 5450 - Orchestral Repertoire (1.0 - 3.0 cr)

MUS 5460 - World Music Ensemble (1.0 - 2.0 cr)

MUS 5485 - Transcription for Winds (2.0 cr)

MUS 5494 - West African Music Ensemble (1.0 cr)

MUS 5561 - Orchestration I (3.0 cr)

MUS 5993 - Directed Studies (1.0 - 4.0 cr)

MUS 8994 - Directed Research (1.0 - 3.0 cr)

-OR-

#### **Guitar (40 credits)**

##### **Applied Lessons (32 credits)**

Take 32 credits of the following in consultation with the advisor:

MUSA 8323 - Guitar: Music Major (graduate) (2.0 - 4.0 cr)

##### **Emphasis Coursework (8 credits)**

Take the following courses and 4 additional credits in consultation with the advisor:

MUS 5461 - Guitar Literature (2.0 cr)

MUS 5466 - Guitar Pedagogy (2.0 cr)

-OR-

#### **Voice (44 credits)**



**Applied Lessons (32 credits)**

Take 32 credits of the following in consultation with the advisor:

[MUSA 8304](#) - Voice: Music Major (graduate) (2.0 - 4.0 cr)

**Emphasis Coursework (12 credits)**

Select 12 credits from the following in consultation with the advisor:

[MUS 5271](#) - Diction for Singers I (2.0 cr)

[MUS 5272](#) - Diction for Singers II (2.0 cr)

[MUS 5275](#) - Vocal Pedagogy I (3.0 cr)

[MUS 5276](#) - Vocal Pedagogy II (3.0 cr)

[MUS 5241](#) - Vocal Literature I (3.0 cr)

[MUS 8182](#) - Opera History in Context: Monteverdi and Mozart (3.0 cr)

[MUS 8183](#) - Opera History in Context: Verdi and Britten (3.0 cr)

-OR-

**Collaborative Piano (45 credits)**

**Applied Lessons (32 credits)**

Take 32 credits of the following in consultation with the advisor:

[MUSA 8324](#) - Accompanying/Coaching: Music Major (graduate) (2.0 - 4.0 cr)

**Emphasis Coursework (13 credits)**

Take the following courses:

[MUS 8110](#) - Sonata Seminar (2.0 cr)

[MUS 8112](#) - Instrumental Repertoire: Reduction and Realization (2.0 cr)

[MUS 8131](#) - Advanced Keyboard Skills (2.0 cr)

[MUS 8133](#) - Seminar in Basso Continuo (3.0 cr)

[MUS 8170](#) - Advanced Vocal Accompanying Skills and Repertoire (2.0 cr)

[MUS 8181](#) - Operatic Accompaniment Skills and Repertoire (2.0 cr)

-OR-

**Conducting (44 credits)**

**Required Coursework (32 credits)**

Take 32 credits of the following, in consultation with the advisor, as follows: 20 credits in the primary area; 8 credits in a secondary area; and 4 credits in a tertiary area.

[MUS 8450](#) - Graduate Seminar in Conducting (3.0 - 4.0 cr)

**Electives (12 credits)**

Select 12 elective credits in consultation with the advisor.

MUS 5xxx

-OR-

**Secondary Area - Musicology/Ethnomusicology (0 to 15 credits)**

Division approval to participate in a secondary area is required.

**Required Course (3 credits)**

Take the following course:

[MUS 8644](#) - Seminar: Advanced Research in Historical Musicology (3.0 cr)

**Musicology/Ethnomusicology Electives (12 credits)**

Select 12 credits of MUS 56xx- or 86xx-level courses in consultation with the advisor. At least 6 credits must be at the 8000-level. Other courses may be approved in consultation with your advisor.

-OR-

**Secondary Area - Music Theory (0 to 15 credits)**

Division approval to participate in a secondary area is required.

**Schenkerian Theory Course (3 credits)**

Select one of the following courses in consultation with the advisor:

[MUS 5571](#) - Schenkerian Analysis for Performers (3.0 cr)

[MUS 8581](#) - Schenkerian Theory and Analysis I (3.0 cr)

**Music Theory Coursework (12 credits)**

Select 12 credits of MUS 55xx- or 85xx-level courses in consultation with the advisor. At least 6 credits must be at the 8000-level. Other courses may be approved in consultation with your advisor.

-OR-

**Secondary Area - Music Composition (0 to 15 credits)**

Division approval to participate in a secondary area is required.

**Composition Courses (6 credits)**

Take the following twice for a total of 6 credits:

[MUS 8550](#) - Composition (3.0 cr)



**Emphasis Electives (9 credits)**

Select 9 credits from the following in consultation with the advisor:

[MUS 5591](#) - Introduction to Music Information Technology (3.0 cr)

[MUS 5950](#) - Topics in Music (1.0 - 4.0 cr)

[MUS 5993](#) - Directed Studies (1.0 - 4.0 cr)

[MUS 8994](#) - Directed Research (1.0 - 3.0 cr)

-OR-

**Secondary Area - Choral Conducting (0 to 15 credits)**

Division approval to participate in a secondary area is required. In addition to the following courses, Choral Conducting requires a conducting recital, lecture presentation, and concert program with detailed program notes.

**Required Coursework (15 credits)**

Take the following courses. Take MUS 8450 for 3 credits twice for a total of 6 credits.

[MUS 8237](#) - Score Study: Choral (3.0 cr)

[MUS 8255](#) - Choral Literature: Baroque Era to the Present (3.0 cr)

[MUS 8299](#) - Performance in Choral Conducting (3.0 cr)

[MUS 8450](#) - Graduate Seminar in Conducting (3.0 - 4.0 cr)

-OR-

**Secondary Area - Education/Pedagogy (0 to 15 credits)**

Division approval to participate in a secondary area is required. No courses applied to the Education/Pedagogy secondary area may also be used to complete the DMAs 6-credit elective requirement.

**Required Courses (6 credits)**

Take the following courses:

[MUED 8280](#) - Seminar: Current Trends in Music Education (3.0 cr)

[MUED 8284](#) - Seminar: Research and Scholarly Issues (3.0 cr)

**Education/Pedagogy Course (3 credits)**

Select 3 credits from the following in consultation with the advisor:

MUED 5xxx

MUED 8xxx

**Elective Courses (6 credits)**

Select 6 credits from the following in consultation with the advisor:

[MUS 5101](#) - Piano Pedagogy I (2.0 cr)

[MUS 5275](#) - Vocal Pedagogy I (3.0 cr)

[MUS 5427](#) - Violin Pedagogy I (2.0 cr)

[MUS 5464](#) - Cello Pedagogy (2.0 cr)

[MUS 5466](#) - Guitar Pedagogy (2.0 cr)

[MUS 5481](#) - Trumpet Pedagogy (2.0 cr)

[MUS 8501](#) - Music Theory Pedagogy (3.0 cr)



### *Twin Cities Campus*

## Music Education Post-Baccalaureate Licensure Certificate

School of Music

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Music Admissions  
200 Ferguson Hall  
2106 4th St S,  
Minneapolis, MN 55455  
Phone: 612-624-5740  
Email: [mnmusic@umn.edu](mailto:mnmusic@umn.edu)  
Website: <http://music.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 43 to 47
- This program does not require summer semesters for timely completion.
- Degree: Music Education Postbaccalaureate Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This post-baccalaureate certificate has two emphases that align with state teacher education requirements: K-12 Instrumental/General Music and K-12 Vocal/General Music. The certificate enables students with previous performance degrees to complete the required curriculum for licensure to teach music in K-12 settings in the state of Minnesota.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Eligibility requirements include a completed music degree from an accredited college or university with the following minima:

Music Theory and Aural Skills sequence--normally at least 4 semesters  
Music History--a full sequence of at least 2 semesters of Western Art Music History from Renaissance to the present AND at least one semester of music history that focuses on genres beyond Western Art Music

Applied Music--7 semesters of intensive applied study on an instrument

Ensembles--at least 7 semesters of ensemble experience, at least 4 of which should be large ensembles appropriate to the major:

- Wind Ensemble, Orchestra, or Symphonic band
- Basic Conducting, One semester of basic conducting
- Chorus or University Singers

Individual courses that are used to meet the above requirements must be passed with a grade of C- or better

Overall GPA must be at least 3.0

### **Special Application Requirements:**

2 letters of recommendation

30 hours of field experience in a K-12 setting

Performance DVD on primary instrument

Successful completion of the Proficiency Exam for Music Education

- Written Skills
- Oral Skills
- Accompanying Skills
- Song- Leading Skills
- Error- Detection Skills

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Prerequisite courses:

All students must complete the following prerequisite course, or its equivalent as determined by the certificate program:

MUED 1201 Intro to Music Ed 2 credits

Students pursuing the Instrumental Emphasis must complete the following prerequisite course, or its equivalent as determined by the certificate program:

MUS 1260 Voice Class 2 credits

OR

MUSA 1404 Voice: Music Major Secondary 2-4 credits

Students pursuing the Vocal (Piano or Voice) Emphasis must complete the following prerequisite course, or its equivalent as determined by the certificate program:

MUSA 1404 Voice: Music Major Secondary 2-4 credits

OR

MUSA 1401 Piano: Music Major Secondary 2-4 credits

## Professional Education Requirements

Take the following courses for a total of 11 credits. CI 5452 must be taken for 2 credits.

[CI 4602](#) - English Learners and Academic Language (1.0 cr)

[CI 5163](#) - Child and Adolescent Development for Teaching and Learning I (1.0 cr)

[CI 5164](#) - Child and Adolescent Development for Teaching and Learning II (2.0 cr)

[CI 5452](#) - Reading in the Content Areas for Initial Licensure Candidates (1.0 - 2.0 cr)

[EPSY 4001](#) - Teaching Students with Special Needs in Inclusive Settings (1.0 cr)

[OLPD 5005](#) - School and Society (2.0 cr)

[OLPD 5009](#) - Human Relations: Applied Skills for School and Society (1.0 cr)

[PUBH 6003](#) ~~(Inactive)~~(1.0 cr)

## Music Education Core Requirements

Take the following courses for a total of 15 credits. MUED 5350 is taken for 5 credits.

[MUED 5101](#) - Improvisation and Creativity in the Music Classroom (2.0 cr)

[MUED 5301](#) - General Music I (3.0 cr)

[MUED 5302](#) - General Music II (3.0 cr)

[MUED 5350](#) - Student Teaching in Classroom Music (4.0 - 8.0 cr)

[MUED 5650](#) - Student Teaching Seminar (2.0 cr)

## Emphasis Options

### Instrumental Emphasis

Take the following courses for a total of 21 credits. MUED 5550 is taken for 5 credits.

[MUED 4502](#) - String Techniques and Teaching (2.0 cr)

[MUED 4503](#) - Woodwind Techniques and Teaching (2.0 cr)

[MUED 4504](#) - Brass Techniques and Teaching (2.0 cr)

[MUED 4505](#) - Percussion Techniques and Teaching (2.0 cr)

[MUED 5516](#) - Instrumental Methods and Materials I (3.0 cr)

[MUED 5517](#) - Instrumental Methods and Materials II (3.0 cr)

[MUED 5550](#) - Student Teaching in Instrumental Music (4.0 - 8.0 cr)

[MUED 5519](#) - Advanced Conducting and Repertoire (Instrumental) (2.0 cr)

-OR-

### Vocal Emphasis (Piano or Voice)

Take the following courses for a total of 17 credits. MUED 5450 is taken for 5 credits.

[MUED 4417](#) - Style, Pedagogy, and Diction in the Choral Music Classroom I (2.0 cr)

[MUED 4418](#) - Style, Pedagogy, and Diction in the Choral Music Classroom II (2.0 cr)

[MUED 5415](#) - Choral/Vocal Methods and Materials I (3.0 cr)

[MUED 5416](#) - Choral/Vocal Methods and Materials II (3.0 cr)

[MUED 5419](#) - Advanced Conducting and Repertoire (Choral) (2.0 cr)



[MUED 5450](#) - Student Teaching in Vocal Music (4.0 - 8.0 cr)





### **Twin Cities Campus**

## **Music M.A.**

School of Music

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of School of Music, 100 Ferguson Hall, 2106 4th Street South, Minneapolis, MN 55455 (612-624-5093; fax: 612-624-8001)

Email: [mnmusic@umn.edu](mailto:mnmusic@umn.edu)

Website: <http://www.music.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 34
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The School of Music offers a Music MA degree with emphases in composition, music therapy, musicology/ethnomusicology, and theory.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

Applicants must hold a bachelor's degree or its equivalent with a major emphasis in one of the following areas of music: composition, music therapy, musicology/ethnomusicology, performance, or theory.

### **Special Application Requirements:**

Composition emphasis: submission of original scores and recordings (2-4 scores of varying genres)

Music Therapy emphasis: documentation of at least 3,500 hours of clinical experience, and completion of prerequisite coursework. Applicants without the following prerequisites must complete all of the following upon admission. Prerequisite coursework does not count toward the 30 credits required for the MA degree.

MUED 3802 - Guitar I for Music Education and Music Therapy Majors: Developing Group Songleading Skills (2.0 cr)

MUED 3803 - Guitar II for Music Education and Music Therapy Majors: Developing Group Songleading Skills (2.0 cr)

MUED 5803 - Therapeutic Management in Music Settings (4.0 cr)

MUED 5804 - Music Therapy Methods and Procedures I (4.0 cr)

MUED 5805 - Music Therapy Methods and Procedures II (4.0 cr)

MUED 5806 - Career Preparation (4.0 cr)

MUED 5855 - Music Therapy Internship (1.0-13.0 cr)

Musicology/ethnomusicology emphasis: submission of one or more original papers, at least one of which demonstrates ability in musical analysis

Theory emphasis: submission of one original paper on tonal analysis, and one original paper on post-tonal analysis

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5



- MELAB  
- Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 18 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 24 to 29 major credits and 3 to 6 credits outside the major. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Varies according to emphasis

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Language requirements: A reading knowledge of French, German, or Italian is required for all MA degree emphases except therapy. For the emphasis in composition, reading knowledge of a foreign language or, with approval, an equivalent research tool.

All coursework offered on both the A/F and S/N grade basis must be taken A/F.

### Concentrations

#### Composition (32 credits)

Students pursuing the Composition emphasis complete the Plan B option.

##### Required Course (3 credits)

Take the following course:

[MUS 5591](#) - Introduction to Music Information Technology (3.0 cr)

##### Composition Coursework (12 credits)

Take MUS 8550 4 times for a total of 12 credits.

[MUS 8550](#) - Composition (3.0 cr)

##### Theory and/or Analysis Coursework (3 credits)

Select 3 credits from the following in consultation with the advisor:

MUS 85xx

##### Musicology/Ethnomusicology Coursework (3 credits)

Select 3 credits from the following in consultation with the advisor:

MUS 56xx

MUS 86xx

MUS 58xx

MUS 88xx

##### Ensemble (2 credits)

Select 2 credits from the following in consultation with the advisor:

[MUS 5240](#) - University Singers (1.0 cr)

[MUS 5280](#) - Opera Theatre (2.0 cr)

[MUS 5340](#) - Jazz Ensemble (1.0 cr)

[MUS 5410](#) - University Wind Bands (1.0 cr)

[MUS 5420](#) - Orchestra (1.0 cr)

[MUS 5440](#) - Chamber Ensemble (1.0 cr)

[MUS 5460](#) - World Music Ensemble (1.0 - 2.0 cr)

[MUS 5490](#) - Percussion Ensemble (1.0 cr)

[MUS 5493](#) - Javanese Gamelan Music Ensemble (1.0 cr)

[MUS 5494](#) - West African Music Ensemble (1.0 cr)

##### Creative Studies and Media (6 credits)

Select 6 credits from the following in consultation with the advisor:



MUS 5xxx  
MUS 8xxx

**Outside Coursework (3 credits)**

Select 3 credits outside the major in consultation with the advisor. MUED and Music Therapy courses can be included with advisor approval.

MUED 5xxx  
MUED 8xxx

-OR-

**Music Therapy (30 credits)**

Students pursuing the Music Therapy emphasis complete the Plan B option.

**Music Therapy Coursework (7 credits)**

Take the following courses in consultation with the advisor. At least one of the courses must be taken for 4 credits.

[MUED 5807](#) - Psychiatric Music Therapy (3.0 - 4.0 cr)  
[MUED 5808](#) - Medical Music Therapy (3.0 - 4.0 cr)

**Research Core Coursework (6 credits)**

Select 6 credits from the following in consultation with the advisor:

[MUED 8112](#) - Introduction to Research Methods and Design in Arts Education (3.0 cr)  
[MUED 8115](#) - Assessment in Arts Education (3.0 cr)  
[MUED 8118](#) - Qualitative Research in Arts Education (3.0 cr)

**Electives (6 credits)**

Select 6 credits from the following in consultation with the advisor:

MUS 55xx  
MUS 56xx  
MUS 57xx  
MUS 58xx  
MUS 85xx  
MUS 86xx  
MUS 87xx  
MUS 88xx

**Research Project (5 credits)**

Take 5 credits of the following in consultation with the advisor:

[MUED 8880](#) - Master's Research Project (3.0 - 6.0 cr)

**Outside Coursework (6 credits)**

Take 6 credits outside the School of Music in consultation with the advisor. Up to 3 MUED credits may be applied to this requirement with advisor approval.

[ACL 5211](#) - Trends and Impacts in Arts and Cultural Leadership and Management (3.0 cr)  
[ACL 5221](#) - Creative Entrepreneurship and Resource Development (3.0 cr)  
[ARTH 5335](#) - Baroque Rome: Art and Politics in the Papal Capital (3.0 cr)  
[ARTH 5765](#) - Early Chinese Art (3.0 cr)  
[ARTS 8402](#) - Theoretical Constructions in Contemporary Art (3.0 cr)  
[BTHX 5000](#) - Topics in Bioethics (1.0 - 4.0 cr)  
[CI 8132](#) - Curriculum and Instruction Core: Teaching Theory and Research (3.0 cr)  
[CI 8400](#) - Special Topics in Children's and Young Adult Literature (1.0 - 6.0 cr)  
[CL 8910](#) - Advanced Topics in Comparative Literature (3.0 cr)  
[CSCL 5666](#) - Film Music: Theory, History, Practice (4.0 cr)  
[CSCL 5910](#) - Topics in Cultural Studies and Comparative Literature (3.0 - 4.0 cr)  
[EMS 8250](#) - Seminar in Early Modern Studies (3.0 cr)  
[ENGL 5090](#) - Readings in Special Subjects (1.0 - 4.0 cr)  
[ENGL 5121](#) - Readings in Early Modern Literature and Culture (3.0 cr)  
[ENGL 5150](#) - Readings in 19th-Century Literature and Culture (3.0 cr)  
[ENGL 5593](#) - The African-American Novel (3.0 cr)  
MUED 5xxx  
MUED 8xxx  
[MUS 5150](#) - Body Awareness in Activity: The Alexander Technique for Musicians (2.0 cr)  
[MUS 5240](#) - University Singers (1.0 cr)  
[MUS 5280](#) - Opera Theatre (2.0 cr)  
[MUS 5331](#) - Jazz Improvisation I (2.0 cr)  
[MUS 5340](#) - Jazz Ensemble (1.0 cr)  
[MUS 5410](#) - University Wind Bands (1.0 cr)  
[MUS 5420](#) - Orchestra (1.0 cr)  
[MUS 5440](#) - Chamber Ensemble (1.0 cr)  
[MUS 5460](#) - World Music Ensemble (1.0 - 2.0 cr)  
[MUS 5490](#) - Percussion Ensemble (1.0 cr)  
[MUS 5493](#) - Javanese Gamelan Music Ensemble (1.0 cr)



MUS 5494 - West African Music Ensemble (1.0 cr)  
MUS 5591 - Introduction to Music Information Technology (3.0 cr)  
MUS 5993 - Directed Studies (1.0 - 4.0 cr)  
MUS 8994 - Directed Research (1.0 - 3.0 cr)

-OR-

### Musicology/Ethnomusicology (30 to 34 credits)

Students pursuing the Musicology/Ethnomusicology emphasis can complete either the Plan A (34 credits) or Plan B (30 credits) option.

#### Required Coursework (9 credits)

Take the following courses. Select the additional MUS 86xx course in consultation with the advisor.

MUS 8644 - Seminar: Advanced Research in Historical Musicology (3.0 cr)  
MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)  
MUS 86xx - Musicology Course (3.0 cr)

#### Outside Coursework (6 credits)

Select 6 credits outside the major in consultation with the advisor. MUED and Music Therapy courses can be included with advisor approval.

MUED 5xxx  
MUED 8xxx

#### Plan Options

##### Plan A

#### Electives (9 credits)

Select 9 credits from the following in consultation with the advisor:

MUS 56xx  
MUS 86xx  
MUS 58xx  
MUS 88xx

#### Thesis Credits

Take 10 master's thesis credits.

MUS 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

or **Plan B**

#### Electives (15 credits)

Select 15 credits from the following in consultation with the advisor:

MUS 56xx  
MUS 86xx  
MUS 58xx  
MUS 88xx

-OR-

### Theory (30 credits)

Students pursuing the Theory emphasis must complete the Plan B option.

#### Music Theory/Analysis Coursework (18 credits)

Select 18 credit from the following in consultation with the advisor:

MUS 85xx

#### Musicology/Ethnomusicology (3 credits)

Select 3 credits from the following in consultation with the advisor:

MUS 86xx  
MUS 88xx

#### Electives (3 credits)

Select 3 credits from the following in consultation with the advisor:

MUS 5xxx  
MUS 8xxx  
MUSA 5xxx  
MUSA 8xxx

#### Outside Coursework (6 credits)

Select 6 credits outside the major in consultation with the advisor. MUED and Music Therapy courses can be included with advisor approval.

ACL 5221 - Creative Entrepreneurship and Resource Development (3.0 cr)  
CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)  
CSPH 5102 - Art of Healing: Self as Healer (1.0 cr)  
CSPH 5225 - Meditation: Integrating Body and Mind (2.0 cr)  
CSPH 5343 - Ayurveda Medicine: The Science of Self-healing (2.0 cr)  
CSPH 5503 - Aromatherapy Fundamentals (1.0 cr)  
CSPH 5535 - Reiki Healing (1.0 cr)  
CSPH 5605 - Movement and Music for Well-being and Healing (2.0 cr)



[CSPH 5708](#) - Mind-Body Science and the Art of Transformation (1.0 cr)

[EPSY 5101](#) - Intelligence and Creativity (3.0 cr)

[ESL 5302](#) - Academic Writing (4.0 cr)

[GRAD 5102](#) - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)

[GRAD 8101](#) - Teaching in Higher Education (3.0 cr)

[GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)

MUED 5xxx

MUED 8xxx

MUS 5xxx

MUS 8xxx

[WRIT 5051](#) - Graduate Research Writing for International Students (3.0 cr)

[WRIT 5052](#) - Graduate Research Presentations and Conference Writing for Non-Native Speakers of English (3.0 cr)



### **Twin Cities Campus**

## **Music M.M.**

School of Music

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of School of Music, 100 Ferguson Hall, 2106 4th Street South, Minneapolis, MN 55455 (612-624-5093; fax: 612-624-8001)

Email: [mnmusic@umn.edu](mailto:mnmusic@umn.edu)

Website: <http://www.music.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 33
- This program does not require summer semesters for timely completion.
- Degree: Master of Music

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of music degree offers emphases in piano, organ, voice, violin, viola, cello, double bass, flute, oboe, clarinet, saxophone, bassoon, French horn, trumpet, trombone, euphonium, tuba, percussion, harp, guitar, collaborative piano/coaching, orchestral conducting, wind ensemble/band conducting, and choral conducting.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

### **Special Application Requirements:**

Some emphases require additional application materials such as a preliminary DVD, audition, and/or interview. For more information, please refer to <https://cla.umn.edu/music/graduate/apply>.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan C:** Plan C requires 30 to 33 major credits and up to null credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.



A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

With the exception of coursework taken outside the School of Music, all courses offered on both the A/F and S/N grade basis must be taken A/F.

## Emphases

### Instrumental Performance (30 credits)

#### Applied Lessons (12 credits)

Take 12 credits in consultation with the advisor.

- MUSA 8301 - Piano: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8304 - Voice: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8305 - Violin: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8306 - Viola: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8307 - Cello: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8308 - Double Bass: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8309 - Flute: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8311 - Oboe: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8312 - Clarinet: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8313 - Saxophone: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8314 - Bassoon: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8315 - French Horn: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8316 - Trumpet: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8317 - Trombone: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8318 - Euphonium: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8319 - Tuba: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8321 - Percussion: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8322 - Harp: Music Major (graduate) (2.0 - 4.0 cr)
- MUSA 8324 - Accompanying/Coaching: Music Major (graduate) (2.0 - 4.0 cr)

#### Emphasis Coursework (4 credits)

Select 4 credits from the following in consultation with the advisor and director of graduate studies:

- MUED 5750 - Topics in Music Education (1.0 - 4.0 cr)
- MUED 5991 - Independent Study (1.0 - 4.0 cr)
- MUED 8284 - Seminar: Research and Scholarly Issues (3.0 cr)
- MUED 8994 - Directed Research (1.0 - 8.0 cr)
- MUS 5331 - Jazz Improvisation I (2.0 cr)
- MUS 5340 - Jazz Ensemble (1.0 cr)
- MUS 5427 - Violin Pedagogy I (2.0 cr)
- MUS 5440 - Chamber Ensemble (1.0 cr)
- MUS 5450 - Orchestral Repertoire (1.0 - 3.0 cr)
- MUS 5460 - World Music Ensemble (1.0 - 2.0 cr)
- MUS 5464 - Cello Pedagogy (2.0 cr)
- MUS 5485 - Transcription for Winds (2.0 cr)
- MUS 5490 - Percussion Ensemble (1.0 cr)
- MUS 5491 - Percussion Literature I (2.0 cr)
- MUS 5494 - West African Music Ensemble (1.0 cr)
- MUS 5561 - Orchestration I (3.0 cr)
- MUS 5993 - Directed Studies (1.0 - 4.0 cr)
- MUS 8994 - Directed Research (1.0 - 3.0 cr)

#### Ensemble (3 credits)

Take 3 credits of the following in consultation with the advisor:

- MUS 5410 - University Wind Bands (1.0 cr)
- MUS 5420 - Orchestra (1.0 cr)

#### Music Theory/Musicology Coursework (9 credits)

Select 9 credits from the following in consultation with the advisor. If MUS 5950 is selected, it must be taken for 3 credits.

- MUS 5534 - Musical Minimalisms (3.0 cr)
- MUS 5550 - Class Composition for Performers (3.0 cr)
- MUS 5571 - Schenkerian Analysis for Performers (3.0 cr)
- MUS 5572 - Chromatic Harmony (3.0 cr)
- MUS 5591 - Introduction to Music Information Technology (3.0 cr)
- MUS 5592 - Music Informatics Seminar (3.0 cr)
- MUS 5597 - Music and Text (3.0 cr)
- MUS 5620 - Topics in Opera History (3.0 cr)



MUS 5624 - Music of J. S. Bach (3.0 cr)  
MUS 5630 - Performance Practice: 1700 to the Present (3.0 cr)  
MUS 5631 - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)  
MUS 5647 - 20th-Century European/American Music (3.0 cr)  
MUS 5731 - Jazz and Modernism (3.0 cr)  
MUS 5805 - Worlds of Improvisation (3.0 cr)  
MUS 5950 - Topics in Music (1.0 - 4.0 cr)  
MUS 8501 - Music Theory Pedagogy (3.0 cr)  
MUS 8550 - Composition (3.0 cr)  
MUS 8560 - Theory and Analysis of Popular Music (3.0 cr)  
MUS 8570 - Seminar in Composition (2.0 cr)  
MUS 8571 - Composers' Laboratory (3.0 cr)  
MUS 8580 - Topics in Tonal Analysis (3.0 cr)  
MUS 8581 - Schenkerian Theory and Analysis I (3.0 cr)  
MUS 8582 - Schenkerian Theory and Analysis II (3.0 cr)  
MUS 8584 - Current Issues in the Analysis of 19th-Century Music (3.0 cr)  
MUS 8585 - Chromatic Harmony Seminar (3.0 cr)  
MUS 8590 - Topics in 20th-Century Analysis (3.0 cr)  
MUS 8631 - Seminar: Music in Medieval Europe (3.0 cr)  
MUS 8632 - Seminar: Music in Early Modern Europe (3.0 cr)  
MUS 8640 - Seminar in Musicology (3.0 cr)  
MUS 8644 - Seminar: Advanced Research in Historical Musicology (3.0 cr)  
MUS 8647 - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)  
MUS 8651 - Sonata Theory (3.0 cr)  
MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)

**Electives (2 credits)**

Select 2 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with approval of the advisor and director of graduate studies.

ACL 5211 - Trends and Impacts in Arts and Cultural Leadership and Management (3.0 cr)  
ACL 5221 - Creative Entrepreneurship and Resource Development (3.0 cr)  
CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)  
CSPH 5102 - Art of Healing: Self as Healer (1.0 cr)  
CSPH 5225 - Meditation: Integrating Body and Mind (2.0 cr)  
CSPH 5343 - Ayurveda Medicine: The Science of Self-healing (2.0 cr)  
CSPH 5503 - Aromatherapy Fundamentals (1.0 cr)  
CSPH 5535 - Reiki Healing (1.0 cr)  
CSPH 5605 - Movement and Music for Well-being and Healing (2.0 cr)  
CSPH 5708 - Mind-Body Science and the Art of Transformation (1.0 cr)  
EPSY 5101 - Intelligence and Creativity (3.0 cr)  
ESL 5302 - Academic Writing (4.0 cr)  
GRAD 5102 - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)  
GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)  
MUED 5xxx  
MUED 8xxx  
MUS 5xxx  
MUS 8xxx  
WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)

-OR-

**Organ (31 credits)****Applied Lessons (12 credits)**

Take 12 credits of the following in consultation with the advisor:

MUSA 8303 - Organ: Music Major (graduate) (2.0 - 4.0 cr)

**Emphasis Coursework (8 credits)**

Take the following courses, including MUS 5151 and MUS 5152:

MUS 8131 - Advanced Keyboard Skills (2.0 cr)

**Ensemble (2 credits)**

Take ensemble credits concurrently with applied lesson registration, and in consultation with the advisor.

MUS 5240 - University Singers (1.0 cr)  
MUS 5280 - Opera Theatre (2.0 cr)  
MUS 5340 - Jazz Ensemble (1.0 cr)  
MUS 5410 - University Wind Bands (1.0 cr)  
MUS 5420 - Orchestra (1.0 cr)  
MUS 5440 - Chamber Ensemble (1.0 cr)





- MUS 5460 - World Music Ensemble (1.0 - 2.0 cr)
- MUS 5490 - Percussion Ensemble (1.0 cr)
- MUS 5493 - Javanese Gamelan Music Ensemble (1.0 cr)
- MUS 5494 - West African Music Ensemble (1.0 cr)

**Music Theory/Musicology Coursework (9 credits)**

Select 9 credits from the following in consultation with the advisor. If MUS 5950 is selected, it must be taken for 3 credits.

- MUS 5534 - Musical Minimalisms (3.0 cr)
- MUS 5550 - Class Composition for Performers (3.0 cr)
- MUS 5561 - Orchestration I (3.0 cr)
- MUS 5571 - Schenkerian Analysis for Performers (3.0 cr)
- MUS 5572 - Chromatic Harmony (3.0 cr)
- MUS 5591 - Introduction to Music Information Technology (3.0 cr)
- MUS 5592 - Music Informatics Seminar (3.0 cr)
- MUS 5597 - Music and Text (3.0 cr)
- MUS 5620 - Topics in Opera History (3.0 cr)
- MUS 5624 - Music of J. S. Bach (3.0 cr)
- MUS 5630 - Performance Practice: 1700 to the Present (3.0 cr)
- MUS 5631 - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)
- MUS 5647 - 20th-Century European/American Music (3.0 cr)
- MUS 5731 - Jazz and Modernism (3.0 cr)
- MUS 5805 - Worlds of Improvisation (3.0 cr)
- MUS 5950 - Topics in Music (1.0 - 4.0 cr)
- MUS 8501 - Music Theory Pedagogy (3.0 cr)
- MUS 8550 - Composition (3.0 cr)
- MUS 8560 - Theory and Analysis of Popular Music (3.0 cr)
- MUS 8570 - Seminar in Composition (2.0 cr)
- MUS 8571 - Composers' Laboratory (3.0 cr)
- MUS 8580 - Topics in Tonal Analysis (3.0 cr)
- MUS 8581 - Schenkerian Theory and Analysis I (3.0 cr)
- MUS 8582 - Schenkerian Theory and Analysis II (3.0 cr)
- MUS 8584 - Current Issues in the Analysis of 19th-Century Music (3.0 cr)
- MUS 8585 - Chromatic Harmony Seminar (3.0 cr)
- MUS 8590 - Topics in 20th-Century Analysis (3.0 cr)
- MUS 8631 - Seminar: Music in Medieval Europe (3.0 cr)
- MUS 8632 - Seminar: Music in Early Modern Europe (3.0 cr)
- MUS 8640 - Seminar in Musicology (3.0 cr)
- MUS 8644 - Seminar: Advanced Research in Historical Musicology (3.0 cr)
- MUS 8647 - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)
- MUS 8651 - Sonata Theory (3.0 cr)
- MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)

-OR-

**Piano (30 Credits)****Applied Lessons (12 credits)**

Take 12 credits of the following in consultation with the advisor:

- MUSA 8301 - Piano: Music Major (graduate) (2.0 - 4.0 cr)

**Emphasis Coursework (4 credits)**

Take the following courses:

- MUS 5181 - Advanced Piano Literature I (2.0 cr)
- MUS 5182 - Advanced Piano Literature II (2.0 cr)

**Accompanying Skills (4 credits)**

Select 4 credits from the following in consultation with the advisor:

- MUS 5101 - Piano Pedagogy I (2.0 cr)
- MUS 8131 - Advanced Keyboard Skills (2.0 cr)
- MUSA 8324 - Accompanying/Coaching: Music Major (graduate) (2.0 - 4.0 cr)

**Ensemble (1 credit)**

Select from the following in consultation with the advisor:

- MUS 5240 - University Singers (1.0 cr)
- MUS 5280 - Opera Theatre (2.0 cr)
- MUS 5340 - Jazz Ensemble (1.0 cr)
- MUS 5410 - University Wind Bands (1.0 cr)
- MUS 5420 - Orchestra (1.0 cr)
- MUS 5440 - Chamber Ensemble (1.0 cr)
- MUS 5460 - World Music Ensemble (1.0 - 2.0 cr)
- MUS 5490 - Percussion Ensemble (1.0 cr)



MUS 5493 - Javanese Gamelan Music Ensemble (1.0 cr)

MUS 5494 - West African Music Ensemble (1.0 cr)

**Music Theory/Musicology Coursework (9 credits)**

Select 9 credits from the following in consultation with the advisor. If MUS 5950 is selected, it must be taken for 3 credits.

MUS 5534 - Musical Minimalisms (3.0 cr)

MUS 5550 - Class Composition for Performers (3.0 cr)

MUS 5561 - Orchestration I (3.0 cr)

MUS 5571 - Schenkerian Analysis for Performers (3.0 cr)

MUS 5572 - Chromatic Harmony (3.0 cr)

MUS 5591 - Introduction to Music Information Technology (3.0 cr)

MUS 5592 - Music Informatics Seminar (3.0 cr)

MUS 5597 - Music and Text (3.0 cr)

MUS 5620 - Topics in Opera History (3.0 cr)

MUS 5624 - Music of J. S. Bach (3.0 cr)

MUS 5630 - Performance Practice: 1700 to the Present (3.0 cr)

MUS 5631 - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)

MUS 5647 - 20th-Century European/American Music (3.0 cr)

MUS 5731 - Jazz and Modernism (3.0 cr)

MUS 5805 - Worlds of Improvisation (3.0 cr)

MUS 5950 - Topics in Music (1.0 - 4.0 cr)

MUS 8501 - Music Theory Pedagogy (3.0 cr)

MUS 8550 - Composition (3.0 cr)

MUS 8560 - Theory and Analysis of Popular Music (3.0 cr)

MUS 8570 - Seminar in Composition (2.0 cr)

MUS 8571 - Composers' Laboratory (3.0 cr)

MUS 8580 - Topics in Tonal Analysis (3.0 cr)

MUS 8581 - Schenkerian Theory and Analysis I (3.0 cr)

MUS 8582 - Schenkerian Theory and Analysis II (3.0 cr)

MUS 8584 - Current Issues in the Analysis of 19th-Century Music (3.0 cr)

MUS 8585 - Chromatic Harmony Seminar (3.0 cr)

MUS 8590 - Topics in 20th-Century Analysis (3.0 cr)

MUS 8631 - Seminar: Music in Medieval Europe (3.0 cr)

MUS 8632 - Seminar: Music in Early Modern Europe (3.0 cr)

MUS 8640 - Seminar in Musicology (3.0 cr)

MUS 8644 - Seminar: Advanced Research in Historical Musicology (3.0 cr)

MUS 8647 - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)

MUS 8651 - Sonata Theory (3.0 cr)

MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)

-OR-

**Guitar (31 credits)**

**Applied Lessons (12 credits)**

Take 12 credits of the following in consultation with the advisor:

MUSA 8323 - Guitar: Music Major (graduate) (2.0 - 4.0 cr)

**Emphasis Coursework (2 credits)**

Select one of the following courses in consultation with the advisor:

MUS 5461 - Guitar Literature (2.0 cr)

MUS 5466 - Guitar Pedagogy (2.0 cr)

**Ensemble (2 credits)**

Select credits in consultation with the advisor.

MUS 54xx (2.0 cr)

**Music Theory/Musicology (9 credits)**

Select 9 credits from the following in consultation with the advisor. If MUS 5950 is selected, it must be taken for 3 credits.

MUS 5534 - Musical Minimalisms (3.0 cr)

MUS 5550 - Class Composition for Performers (3.0 cr)

MUS 5561 - Orchestration I (3.0 cr)

MUS 5571 - Schenkerian Analysis for Performers (3.0 cr)

MUS 5572 - Chromatic Harmony (3.0 cr)

MUS 5591 - Introduction to Music Information Technology (3.0 cr)

MUS 5592 - Music Informatics Seminar (3.0 cr)

MUS 5597 - Music and Text (3.0 cr)

MUS 5620 - Topics in Opera History (3.0 cr)

MUS 5624 - Music of J. S. Bach (3.0 cr)

MUS 5630 - Performance Practice: 1700 to the Present (3.0 cr)

MUS 5631 - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)



- MUS 5647 - 20th-Century European/American Music (3.0 cr)
- MUS 5731 - Jazz and Modernism (3.0 cr)
- MUS 5805 - Worlds of Improvisation (3.0 cr)
- MUS 5950 - Topics in Music (1.0 - 4.0 cr)
- MUS 8501 - Music Theory Pedagogy (3.0 cr)
- MUS 8550 - Composition (3.0 cr)
- MUS 8560 - Theory and Analysis of Popular Music (3.0 cr)
- MUS 8570 - Seminar in Composition (2.0 cr)
- MUS 8571 - Composers' Laboratory (3.0 cr)
- MUS 8580 - Topics in Tonal Analysis (3.0 cr)
- MUS 8581 - Schenkerian Theory and Analysis I (3.0 cr)
- MUS 8582 - Schenkerian Theory and Analysis II (3.0 cr)
- MUS 8584 - Current Issues in the Analysis of 19th-Century Music (3.0 cr)
- MUS 8585 - Chromatic Harmony Seminar (3.0 cr)
- MUS 8590 - Topics in 20th-Century Analysis (3.0 cr)
- MUS 8631 - Seminar: Music in Medieval Europe (3.0 cr)
- MUS 8632 - Seminar: Music in Early Modern Europe (3.0 cr)
- MUS 8640 - Seminar in Musicology (3.0 cr)
- MUS 8644 - Seminar: Advanced Research in Historical Musicology (3.0 cr)
- MUS 8647 - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)
- MUS 8651 - Sonata Theory (3.0 cr)
- MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)

**Electives (6 credits)**

Select 6 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with approval of the advisor and director of graduate studies.

- ACL 5211 - Trends and Impacts in Arts and Cultural Leadership and Management (3.0 cr)
- ACL 5221 - Creative Entrepreneurship and Resource Development (3.0 cr)
- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- CSPH 5102 - Art of Healing: Self as Healer (1.0 cr)
- CSPH 5225 - Meditation: Integrating Body and Mind (2.0 cr)
- CSPH 5343 - Ayurveda Medicine: The Science of Self-healing (2.0 cr)
- CSPH 5503 - Aromatherapy Fundamentals (1.0 cr)
- CSPH 5535 - Reiki Healing (1.0 cr)
- CSPH 5605 - Movement and Music for Well-being and Healing (2.0 cr)
- CSPH 5708 - Mind-Body Science and the Art of Transformation (1.0 cr)
- EPSY 5101 - Intelligence and Creativity (3.0 cr)
- ESL 5302 - Academic Writing (4.0 cr)
- GRAD 5102 - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)
- MUED 5xxx
- MUED 8xxx
- MUS 5xxx
- MUS 8xxx
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)
- WRIT 5052 - Graduate Research Presentations and Conference Writing for Non-Native Speakers of English (3.0 cr)

-OR-

**Voice (33 credits)**

**Applied Lessons (12 credits)**

Take 12 credits of the following in consultation with the advisor.

- MUSA 8304 - Voice: Music Major (graduate) (2.0 - 4.0 cr)

**Emphasis Coursework (10 credits)**

Select 10 credits from the following in consultation with the advisor:

- MUS 5241 - Vocal Literature I (3.0 cr)
- MUS 5271 - Diction for Singers I (2.0 cr)
- MUS 5272 - Diction for Singers II (2.0 cr)
- MUS 5275 - Vocal Pedagogy I (3.0 cr)
- MUS 5276 - Vocal Pedagogy II (3.0 cr)
- MUS 8182 - Opera History in Context: Monteverdi and Mozart (3.0 cr)
- MUS 8183 - Opera History in Context: Verdi and Britten (3.0 cr)

**Ensemble (2 credits)**

Select from the following in consultation with the advisor:

- MUS 5230 - Chorus (1.0 - 2.0 cr)
- MUS 5240 - University Singers (1.0 cr)



MUS 5250 - Opera Workshop and Ensemble (2.0 cr)

MUS 5280 - Opera Theatre (2.0 cr)

**Music Theory/Musicology Coursework (9 credits)**

Select 9 credits from the following in consultation with the advisor. If MUS 5950 is selected, it must be taken for 3 credits.

MUS 5534 - Musical Minimalisms (3.0 cr)

MUS 5550 - Class Composition for Performers (3.0 cr)

MUS 5561 - Orchestration I (3.0 cr)

MUS 5571 - Schenkerian Analysis for Performers (3.0 cr)

MUS 5572 - Chromatic Harmony (3.0 cr)

MUS 5591 - Introduction to Music Information Technology (3.0 cr)

MUS 5592 - Music Informatics Seminar (3.0 cr)

MUS 5597 - Music and Text (3.0 cr)

MUS 5620 - Topics in Opera History (3.0 cr)

MUS 5624 - Music of J. S. Bach (3.0 cr)

MUS 5630 - Performance Practice: 1700 to the Present (3.0 cr)

MUS 5631 - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)

MUS 5647 - 20th-Century European/American Music (3.0 cr)

MUS 5731 - Jazz and Modernism (3.0 cr)

MUS 5805 - Worlds of Improvisation (3.0 cr)

MUS 5950 - Topics in Music (1.0 - 4.0 cr)

MUS 8501 - Music Theory Pedagogy (3.0 cr)

MUS 8550 - Composition (3.0 cr)

MUS 8560 - Theory and Analysis of Popular Music (3.0 cr)

MUS 8570 - Seminar in Composition (2.0 cr)

MUS 8571 - Composers' Laboratory (3.0 cr)

MUS 8580 - Topics in Tonal Analysis (3.0 cr)

MUS 8581 - Schenkerian Theory and Analysis I (3.0 cr)

MUS 8582 - Schenkerian Theory and Analysis II (3.0 cr)

MUS 8584 - Current Issues in the Analysis of 19th-Century Music (3.0 cr)

MUS 8585 - Chromatic Harmony Seminar (3.0 cr)

MUS 8590 - Topics in 20th-Century Analysis (3.0 cr)

MUS 8631 - Seminar: Music in Medieval Europe (3.0 cr)

MUS 8632 - Seminar: Music in Early Modern Europe (3.0 cr)

MUS 8640 - Seminar in Musicology (3.0 cr)

MUS 8644 - Seminar: Advanced Research in Historical Musicology (3.0 cr)

MUS 8647 - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)

MUS 8651 - Sonata Theory (3.0 cr)

MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)

-OR-

**Collaborative Piano (31 credits)**

**Applied Lessons (16 credits)**

Take 16 credits of the following in consultation with the advisor:

MUSA 8324 - Accompanying/Coaching: Music Major (graduate) (2.0 - 4.0 cr)

**Emphasis Coursework (6 credits)**

Take the following courses:

MUS 8110 - Sonata Seminar (2.0 cr)

MUS 8131 - Advanced Keyboard Skills (2.0 cr)

MUS 8170 - Advanced Vocal Accompanying Skills and Repertoire (2.0 cr)

**Music Theory/Musicology Coursework (9 credits)**

Select 9 credits from the following in consultation with the advisor. If MUS 5950 is selected, it must be taken for 3 credits.

MUS 5534 - Musical Minimalisms (3.0 cr)

MUS 5550 - Class Composition for Performers (3.0 cr)

MUS 5561 - Orchestration I (3.0 cr)

MUS 5571 - Schenkerian Analysis for Performers (3.0 cr)

MUS 5572 - Chromatic Harmony (3.0 cr)

MUS 5591 - Introduction to Music Information Technology (3.0 cr)

MUS 5592 - Music Informatics Seminar (3.0 cr)

MUS 5597 - Music and Text (3.0 cr)

MUS 5620 - Topics in Opera History (3.0 cr)

MUS 5624 - Music of J. S. Bach (3.0 cr)

MUS 5630 - Performance Practice: 1700 to the Present (3.0 cr)

MUS 5631 - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)

MUS 5647 - 20th-Century European/American Music (3.0 cr)

MUS 5731 - Jazz and Modernism (3.0 cr)



MUS 5950 - Topics in Music (1.0 - 4.0 cr)  
MUS 8501 - Music Theory Pedagogy (3.0 cr)  
MUS 8550 - Composition (3.0 cr)  
MUS 8560 - Theory and Analysis of Popular Music (3.0 cr)  
MUS 8570 - Seminar in Composition (2.0 cr)  
MUS 8571 - Composers' Laboratory (3.0 cr)  
MUS 8580 - Topics in Tonal Analysis (3.0 cr)  
MUS 8581 - Schenkerian Theory and Analysis I (3.0 cr)  
MUS 8582 - Schenkerian Theory and Analysis II (3.0 cr)  
MUS 8584 - Current Issues in the Analysis of 19th-Century Music (3.0 cr)  
MUS 8585 - Chromatic Harmony Seminar (3.0 cr)  
MUS 8590 - Topics in 20th-Century Analysis (3.0 cr)  
MUS 8631 - Seminar: Music in Medieval Europe (3.0 cr)  
MUS 8632 - Seminar: Music in Early Modern Europe (3.0 cr)  
MUS 8640 - Seminar in Musicology (3.0 cr)  
MUS 8644 - Seminar: Advanced Research in Historical Musicology (3.0 cr)  
MUS 8647 - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)  
MUS 8651 - Sonata Theory (3.0 cr)  
MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)

-OR-

### **Choral Conducting (30 credits)**

#### **Required Coursework (15 credits)**

Take the following courses. Take 6 credits of MUS 8450 in consultation with the advisor.

MUS 8237 - Score Study: Choral (3.0 cr)  
MUS 8255 - Choral Literature: Baroque Era to the Present (3.0 cr)  
MUS 8299 - Performance in Choral Conducting (3.0 cr)  
MUS 8450 - Graduate Seminar in Conducting (3.0 - 4.0 cr)

#### **Music Theory/Musicology Coursework (9 credits)**

Select 9 credits from the following in consultation with the advisor. If MUS 5950 is selected, it must be taken for 3 credits.

MUS 5534 - Musical Minimalisms (3.0 cr)  
MUS 5550 - Class Composition for Performers (3.0 cr)  
MUS 5561 - Orchestration I (3.0 cr)  
MUS 5571 - Schenkerian Analysis for Performers (3.0 cr)  
MUS 5572 - Chromatic Harmony (3.0 cr)  
MUS 5591 - Introduction to Music Information Technology (3.0 cr)  
MUS 5592 - Music Informatics Seminar (3.0 cr)  
MUS 5597 - Music and Text (3.0 cr)  
MUS 5620 - Topics in Opera History (3.0 cr)  
MUS 5624 - Music of J. S. Bach (3.0 cr)  
MUS 5630 - Performance Practice: 1700 to the Present (3.0 cr)  
MUS 5631 - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)  
MUS 5647 - 20th-Century European/American Music (3.0 cr)  
MUS 5731 - Jazz and Modernism (3.0 cr)  
MUS 5805 - Worlds of Improvisation (3.0 cr)  
MUS 5950 - Topics in Music (1.0 - 4.0 cr)  
MUS 8501 - Music Theory Pedagogy (3.0 cr)  
MUS 8550 - Composition (3.0 cr)  
MUS 8560 - Theory and Analysis of Popular Music (3.0 cr)  
MUS 8570 - Seminar in Composition (2.0 cr)  
MUS 8571 - Composers' Laboratory (3.0 cr)  
MUS 8580 - Topics in Tonal Analysis (3.0 cr)  
MUS 8581 - Schenkerian Theory and Analysis I (3.0 cr)  
MUS 8582 - Schenkerian Theory and Analysis II (3.0 cr)  
MUS 8584 - Current Issues in the Analysis of 19th-Century Music (3.0 cr)  
MUS 8585 - Chromatic Harmony Seminar (3.0 cr)  
MUS 8590 - Topics in 20th-Century Analysis (3.0 cr)  
MUS 8631 - Seminar: Music in Medieval Europe (3.0 cr)  
MUS 8632 - Seminar: Music in Early Modern Europe (3.0 cr)  
MUS 8640 - Seminar in Musicology (3.0 cr)  
MUS 8644 - Seminar: Advanced Research in Historical Musicology (3.0 cr)  
MUS 8647 - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)  
MUS 8651 - Sonata Theory (3.0 cr)  
MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)

#### **Electives (6 credits)**



Select 6 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with approval of the advisor and director of graduate studies.

- ACL 5211 - Trends and Impacts in Arts and Cultural Leadership and Management (3.0 cr)
- ACL 5221 - Creative Entrepreneurship and Resource Development (3.0 cr)
- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- CSPH 5102 - Art of Healing: Self as Healer (1.0 cr)
- CSPH 5225 - Meditation: Integrating Body and Mind (2.0 cr)
- CSPH 5343 - Ayurveda Medicine: The Science of Self-healing (2.0 cr)
- CSPH 5503 - Aromatherapy Fundamentals (1.0 cr)
- CSPH 5535 - Reiki Healing (1.0 cr)
- CSPH 5605 - Movement and Music for Well-being and Healing (2.0 cr)
- CSPH 5708 - Mind-Body Science and the Art of Transformation (1.0 cr)
- EPSY 5101 - Intelligence and Creativity (3.0 cr)
- ESL 5302 - Academic Writing (4.0 cr)
- GRAD 5102 - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)
- MUS 5xxx
- MUS 8xxx
- MUSA 5xxx
- MUSA 8xxx
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)
- WRIT 5052 - Graduate Research Presentations and Conference Writing for Non-Native Speakers of English (3.0 cr)

-OR-

### **Orchestral Conducting (30 credits)**

#### **Required Coursework (6 credits)**

Take 6 credits of the following:

- MUS 5561 - Orchestration I (3.0 cr)
- MUS 8489 - Performance and Document: Orchestral Conducting (3.0 cr)

#### **Emphasis Coursework (12 credits)**

Take 12 credits of the following in consultation with the advisor:

- MUS 8450 - Graduate Seminar in Conducting (3.0 - 4.0 cr)

#### **Music Theory/Musicology Coursework (9 credits)**

Select 9 credits from the following in consultation with the advisor. If MUS 5950 is selected, it must be taken for 3 credits.

- MUS 5534 - Musical Minimalisms (3.0 cr)
- MUS 5550 - Class Composition for Performers (3.0 cr)
- MUS 5571 - Schenkerian Analysis for Performers (3.0 cr)
- MUS 5572 - Chromatic Harmony (3.0 cr)
- MUS 5591 - Introduction to Music Information Technology (3.0 cr)
- MUS 5592 - Music Informatics Seminar (3.0 cr)
- MUS 5597 - Music and Text (3.0 cr)
- MUS 5620 - Topics in Opera History (3.0 cr)
- MUS 5624 - Music of J. S. Bach (3.0 cr)
- MUS 5630 - Performance Practice: 1700 to the Present (3.0 cr)
- MUS 5631 - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)
- MUS 5647 - 20th-Century European/American Music (3.0 cr)
- MUS 5731 - Jazz and Modernism (3.0 cr)
- MUS 5805 - Worlds of Improvisation (3.0 cr)
- MUS 5950 - Topics in Music (1.0 - 4.0 cr)
- MUS 8501 - Music Theory Pedagogy (3.0 cr)
- MUS 8550 - Composition (3.0 cr)
- MUS 8560 - Theory and Analysis of Popular Music (3.0 cr)
- MUS 8570 - Seminar in Composition (2.0 cr)
- MUS 8571 - Composers' Laboratory (3.0 cr)
- MUS 8580 - Topics in Tonal Analysis (3.0 cr)
- MUS 8581 - Schenkerian Theory and Analysis I (3.0 cr)
- MUS 8582 - Schenkerian Theory and Analysis II (3.0 cr)
- MUS 8584 - Current Issues in the Analysis of 19th-Century Music (3.0 cr)
- MUS 8585 - Chromatic Harmony Seminar (3.0 cr)
- MUS 8590 - Topics in 20th-Century Analysis (3.0 cr)
- MUS 8631 - Seminar: Music in Medieval Europe (3.0 cr)
- MUS 8632 - Seminar: Music in Early Modern Europe (3.0 cr)
- MUS 8640 - Seminar in Musicology (3.0 cr)
- MUS 8644 - Seminar: Advanced Research in Historical Musicology (3.0 cr)



- MUS 8647 - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)
- MUS 8651 - Sonata Theory (3.0 cr)
- MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)

**Electives (3 credits)**

Select 3 credits from the following in consultation with the advisor:

- MUS 5xxx
- MUS 8xxx

-OR-

**Wind Ensemble/Band Conducting (32 credits)**

**Emphasis Coursework (14 credits)**

Take the following courses. Take 9 credits of MUS 8450 in consultation with the advisor.

- MUS 5561 - Orchestration I (3.0 cr)
- MUS 8450 - Graduate Seminar in Conducting (3.0 - 4.0 cr)
- MUS 8479 - Performance and Document: Wind Ensemble/Band Conducting (2.0 cr)

**Music Theory/Musicology Coursework (6 credits)**

Select 6 credits from the following in consultation with the advisor. If MUS 5950 is selected, it must be taken for 3 credits.

- MUS 5534 - Musical Minimalisms (3.0 cr)
- MUS 5550 - Class Composition for Performers (3.0 cr)
- MUS 5571 - Schenkerian Analysis for Performers (3.0 cr)
- MUS 5572 - Chromatic Harmony (3.0 cr)
- MUS 5591 - Introduction to Music Information Technology (3.0 cr)
- MUS 5592 - Music Informatics Seminar (3.0 cr)
- MUS 5597 - Music and Text (3.0 cr)
- MUS 5620 - Topics in Opera History (3.0 cr)
- MUS 5624 - Music of J. S. Bach (3.0 cr)
- MUS 5630 - Performance Practice: 1700 to the Present (3.0 cr)
- MUS 5631 - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)
- MUS 5647 - 20th-Century European/American Music (3.0 cr)
- MUS 5731 - Jazz and Modernism (3.0 cr)
- MUS 5805 - Worlds of Improvisation (3.0 cr)
- MUS 5950 - Topics in Music (1.0 - 4.0 cr)
- MUS 8501 - Music Theory Pedagogy (3.0 cr)
- MUS 8550 - Composition (3.0 cr)
- MUS 8560 - Theory and Analysis of Popular Music (3.0 cr)
- MUS 8570 - Seminar in Composition (2.0 cr)
- MUS 8571 - Composers' Laboratory (3.0 cr)
- MUS 8580 - Topics in Tonal Analysis (3.0 cr)
- MUS 8581 - Schenkerian Theory and Analysis I (3.0 cr)
- MUS 8582 - Schenkerian Theory and Analysis II (3.0 cr)
- MUS 8584 - Current Issues in the Analysis of 19th-Century Music (3.0 cr)
- MUS 8585 - Chromatic Harmony Seminar (3.0 cr)
- MUS 8590 - Topics in 20th-Century Analysis (3.0 cr)
- MUS 8631 - Seminar: Music in Medieval Europe (3.0 cr)
- MUS 8632 - Seminar: Music in Early Modern Europe (3.0 cr)
- MUS 8640 - Seminar in Musicology (3.0 cr)
- MUS 8644 - Seminar: Advanced Research in Historical Musicology (3.0 cr)
- MUS 8647 - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)
- MUS 8651 - Sonata Theory (3.0 cr)
- MUS 8864 - Current Issues in Ethnomusicology (3.0 cr)

**Electives (12 credits)**

Select 12 elective credits in consultation with the advisor.

- MUSA 5xxx
- MUSA 8xxx

-OR-

**Music Education - Pedagogical Track (33 credits)**

**Foundations Coursework (9 credits)**

Take the following courses. Select 3 MUED 5xxx- or 8xxx-level credits in consultation with the advisor.

- MUED 8115 - Assessment in Arts Education (3.0 cr)
- MUED 8211 - Foundations of Music Education (3.0 cr)
- MUED 5xxx
- MUED 8xxx

**Pedagogical Concentration (12 credits)**

Take the following courses, plus 6 MUED credits selected in consultation with the advisor, for a total of 12 credits.



MUED 8210 - Advanced Music Teaching Seminar (3.0 cr)  
MUED 8212 - Curriculum Design in Music Education (3.0 cr)  
MUED 5xxx  
MUED 8xxx

**Supportive Studies in Music (9 credits)**

Select 9 credits from the following in consultation with the advisor. Up to 4 credits can be MUSA 5xxx-level coursework.

MUS 5xxx  
MUS 8xxx  
MUSA 5xxx

**Research Project (3 credits)**

Take 3 credits of the following in consultation with the advisor:

MUED 8880 - Master's Research Project (3.0 - 6.0 cr)

-OR-

**Music Education - Research Track (33 credits)**

**Foundations Coursework (12 credits)**

Take the following courses:

MUED 8112 - Introduction to Research Methods and Design in Arts Education (3.0 cr)  
MUED 8115 - Assessment in Arts Education (3.0 cr)  
MUED 8118 - Qualitative Research in Arts Education (3.0 cr)  
MUED 8211 - Foundations of Music Education (3.0 cr)

**Pedagogical Concentration (6 credits)**

Take the following course and 3 MUED credits selected in consultation with the advisor.

MUED 8212 - Curriculum Design in Music Education (3.0 cr)  
MUED 5xxx  
MUED 8xxx

**Supportive Studies in Music (9 credits)**

Select 9 credits from the following in consultation with the advisor:

MUS 5xxx  
MUS 8xxx

Up to 4 credits from the following can be applied to this 9-credit requirement with advisor approval:

MUSA 5xxx

**Research Project (6 credits)**

Take 6 credits from the following in consultation with the advisor:

MUED 8880 - Master's Research Project (3.0 - 6.0 cr)





### **Twin Cities Campus**

## **Music Minor**

School of Music

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of School of Music, 100 Ferguson Hall, 2106 4th St S, Minneapolis, MN 55455 (612-624-5093; fax: 612-624-8001)

Email: [mnmusic@umn.edu](mailto:mnmusic@umn.edu)

Website: <http://www.music.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Doctoral students interested in the theory and history of music are invited to pursue the Music minor.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Music director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

### **Coursework (12 credits)**

Select 12 credits from the following in consultation with the Music director of graduate studies. One 5xxx-level MUS course or one MUSA 83xx course may be applied to this requirement with prior approval of the director of graduate studies.

- [MUS 8501](#) - Music Theory Pedagogy (3.0 cr)
- [MUS 8550](#) - Composition (3.0 cr)
- [MUS 8560](#) - Theory and Analysis of Popular Music (3.0 cr)
- [MUS 8570](#) - Seminar in Composition (2.0 cr)
- [MUS 8571](#) - Composers' Laboratory (3.0 cr)
- [MUS 8580](#) - Topics in Tonal Analysis (3.0 cr)
- [MUS 8581](#) - Schenkerian Theory and Analysis I (3.0 cr)
- [MUS 8582](#) - Schenkerian Theory and Analysis II (3.0 cr)
- [MUS 8584](#) - Current Issues in the Analysis of 19th-Century Music (3.0 cr)
- [MUS 8585](#) - Chromatic Harmony Seminar (3.0 cr)
- [MUS 8590](#) - Topics in 20th-Century Analysis (3.0 cr)
- [MUS 8631](#) - Seminar: Music in Medieval Europe (3.0 cr)
- [MUS 8632](#) - Seminar: Music in Early Modern Europe (3.0 cr)
- [MUS 8640](#) - Seminar in Musicology (3.0 cr)
- [MUS 8644](#) - Seminar: Advanced Research in Historical Musicology (3.0 cr)
- [MUS 8647](#) - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)
- [MUS 8651](#) - Sonata Theory (3.0 cr)
- [MUS 8864](#) - Current Issues in Ethnomusicology (3.0 cr)



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Doctoral



### **Twin Cities Campus**

## **Music Ph.D.**

School of Music

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of School of Music, 100 Ferguson Hall, 2106 4th Street South, Minneapolis, MN 55455 (612-624-5093; fax: 612-624-8001)

Email: [mnmusic@umn.edu](mailto:mnmusic@umn.edu)

Website: <http://www.music.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 69 to 90
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Music PhD offers emphases in music theory, musicology/ethnomusicology, composition, and music education.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants must hold a masters degree in an appropriate field of study.

### **Special Application Requirements:**

Music Theory: Two original papers (one tonal and one post-tonal analysis)

Musicology/Ethnomusicology: Original papers

Composition: Original scores and recordings (2-4 scores of varying genres)

Music Education: One research or professional papers to demonstrate scholarly writing; documentation of at least 3 years of teaching experience or at least 3,500 hours of clinical experience; and an interview

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

33 to 58 credits are required in the major.  
6 to 15 credits are required outside the major.  
24 thesis credits are required.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

Language Requirement: See Other Requirements below

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Coursework offered on both the A/F and S/N grade basis must be taken A/F.

Language requirements

Music Theory: German and either French or Italian. The French or Italian requirement can be satisfied by a collateral field of knowledge or special research technique. When a different language is needed for the thesis, a substitution may be requested. Substitutions require advisor and director of graduate studies approval.

Musicology/Ethnomusicology: Two languages chosen from French, German, and Italian. When a different language is needed for the thesis, a substitution may be requested. Substitution requires advisor and director of graduate studies approval.

Composition: Reading knowledge of two foreign languages. An equivalent research tool may be substituted for a foreign language. Substitution requires advisor and director of graduate studies approval.

Music Education: No language requirement.

### Thesis Credits

Take 24 doctoral thesis credits.

[MUS 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

### Emphases

#### Music Theory (51 credits)

##### Music Theory/Analysis Coursework (30 credits)

Select 30 credits from the following in consultation with the advisor:

- [MUS 8501](#) - Music Theory Pedagogy (3.0 cr)
- [MUS 8560](#) - Theory and Analysis of Popular Music (3.0 cr)
- [MUS 8580](#) - Topics in Tonal Analysis (3.0 cr)
- [MUS 8581](#) - Schenkerian Theory and Analysis I (3.0 cr)
- [MUS 8582](#) - Schenkerian Theory and Analysis II (3.0 cr)
- [MUS 8584](#) - Current Issues in the Analysis of 19th-Century Music (3.0 cr)
- [MUS 8585](#) - Chromatic Harmony Seminar (3.0 cr)
- [MUS 8590](#) - Topics in 20th-Century Analysis (3.0 cr)
- [MUS 8994](#) - Directed Research (1.0 - 3.0 cr)

##### Musicology/Ethnomusicology Coursework (6 credits)

Select 6 credits from the following in consultation with the advisor. Topics courses, if selected, must be taught by a musicology faculty member and approved by the advisor.

- [MUS 5620](#) - Topics in Opera History (3.0 cr)
- [MUS 5624](#) - Music of J. S. Bach (3.0 cr)
- [MUS 5630](#) - Performance Practice: 1700 to the Present (3.0 cr)
- [MUS 5631](#) - Beethoven Sonatas for Solo Piano, Violin, & Cello (3.0 cr)
- [MUS 5647](#) - 20th-Century European/American Music (3.0 cr)
- [MUS 5950](#) - Topics in Music (1.0 - 4.0 cr)
- [MUS 8631](#) - Seminar: Music in Medieval Europe (3.0 cr)
- [MUS 8632](#) - Seminar: Music in Early Modern Europe (3.0 cr)
- [MUS 8640](#) - Seminar in Musicology (3.0 cr)



- [MUS 8644](#) - Seminar: Advanced Research in Historical Musicology (3.0 cr)  
[MUS 8647](#) - Seminar: The Critical Editing of Early Music--Method and Practice (3.0 cr)

**Electives (3 credits)**

Select 3 credits from the following list. Advisor approval is required.

- MUS 5xxx  
MUS 8xxx  
MUSA 5xxx  
MUSA 8xxx  
MUED 5xxx  
MUED 8xxx

**Outside Coursework (12 credits)**

Select 12 credits from the following in consultation with the advisor. MUED and Music Therapy courses can be applied to this requirement with advisor approval.

- [ACL 5221](#) - Creative Entrepreneurship and Resource Development (3.0 cr)  
[CSPH 5101](#) - Introduction to Integrative Healing Practices (3.0 cr)  
[CSPH 5102](#) - Art of Healing: Self as Healer (1.0 cr)  
[CSPH 5225](#) - Meditation: Integrating Body and Mind (2.0 cr)  
[CSPH 5343](#) - Ayurveda Medicine: The Science of Self-healing (2.0 cr)  
[CSPH 5503](#) - Aromatherapy Fundamentals (1.0 cr)  
[CSPH 5535](#) - Reiki Healing (1.0 cr)  
[CSPH 5605](#) - Movement and Music for Well-being and Healing (2.0 cr)  
[CSPH 5708](#) - Mind-Body Science and the Art of Transformation (1.0 cr)  
[EPSY 5101](#) - Intelligence and Creativity (3.0 cr)  
[ESL 5302](#) - Academic Writing (4.0 cr)  
[GRAD 5102](#) - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)  
[GRAD 8101](#) - Teaching in Higher Education (3.0 cr)  
[GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)  
[WRIT 5051](#) - Graduate Research Writing for International Students (3.0 cr)  
[WRIT 5052](#) - Graduate Research Presentations and Conference Writing for Non-Native Speakers of English (3.0 cr)

-OR-

**Musicology/Ethnomusicology (45 credits)**

**Required Courses (9 credits)**

Take the following courses. Select MUS 85xx seminar topics in consultation with the advisor.

- [MUS 8644](#) - Seminar: Advanced Research in Historical Musicology (3.0 cr)  
[MUS 8864](#) - Current Issues in Ethnomusicology (3.0 cr)  
MUS 85xx - Seminar in Music Theory (3.0 cr)

**Electives (24 credits)**

Select 24 credits from the following in consultation with the advisor.

- MUS 56xx  
MUS 58xx  
MUS 85xx  
MUS 86xx  
MUS 88xx

**Outside Coursework (12 credits)**

Select 12 credits outside the major in consultation with the advisor. MUED and Music Therapy courses can be included with advisor approval.

- MUED 5xxx  
MUED 8xxx

-OR-

**Composition (64 credits)**

**Required Coursework (6 credits)**

Take the following courses:

- [MUS 5591](#) - Introduction to Music Information Technology (3.0 cr)  
[MUS 5592](#) - Music Informatics Seminar (3.0 cr)

**Composition Coursework (24 credits)**

Take MUS 8550 8 times for a total of 24 credits.

- [MUS 8550](#) - Composition (3.0 cr)

**Theory/Analysis Coursework (6 credits)**

Select 6 credits from the following in consultation with the advisor:

- MUS 85xx

**Ensemble (4 credits)**

Select 4 credits from the following in consultation with the advisor:

- [MUS 5240](#) - University Singers (1.0 cr)



- MUS 5280 - Opera Theatre (2.0 cr)
- MUS 5340 - Jazz Ensemble (1.0 cr)
- MUS 5410 - University Wind Bands (1.0 cr)
- MUS 5420 - Orchestra (1.0 cr)
- MUS 5440 - Chamber Ensemble (1.0 cr)
- MUS 5460 - World Music Ensemble (1.0 - 2.0 cr)
- MUS 5490 - Percussion Ensemble (1.0 cr)
- MUS 5493 - Javanese Gamelan Music Ensemble (1.0 cr)
- MUS 5494 - West African Music Ensemble (1.0 cr)

**Musicology/Ethnomusicology Coursework (6 credits)**

Select 6 credits from the following in consultation with the advisor:

- MUS 56xx
- MUS 86xx
- MUS 58xx
- MUS 88xx

**Creative Studies and Media Coursework (12 credits)**

Select 12 credits from the following in consultation with the advisor:

- MUS 5xxx
- MUS 8xxx

**Outside Coursework (6 credits)**

Select 6 credits from the following in consultation with the advisor. MUED and Music Therapy courses can be included with advisor approval.

- MUED 5xxx
- MUED 8xxx

-OR-

**Music Education (66 credits)**

**Required Course (3 credits)**

Take the following course:

- MUED 8284 - Seminar: Research and Scholarly Issues (3.0 cr)

**Trends in Music Education Seminar (9 credits)**

Take the following course 3 times for a total of 9 credits.

- MUED 8280 - Seminar: Current Trends in Music Education (3.0 cr)

**Research Core (9 credits)**

All students take MUED 8119 and select 6 additional credits from the following in consultation with the advisor.

- MUED 8119 - Advanced Applications of Research Methods (3.0 cr)
- MUED 8112 - Introduction to Research Methods and Design in Arts Education (3.0 cr)
- MUED 8115 - Assessment in Arts Education (3.0 cr)
- MUED 8118 - Qualitative Research in Arts Education (3.0 cr)

**Musicology/Ethnomusicology, Theory, and Creative Studies and Media Coursework (18 credits)**

Select 18 credits from the following in consultation with the advisor. A minimum of 2 courses from 2 of the 3 disciplines of Musicology/Ethnomusicology, Theory, and Creative Studies and Media is required.

- MUS 55xx
- MUS 56xx
- MUS 85xx
- MUS 86xx

**Electives (12 credits)**

Select 12 credits from the following in consultation with the advisor:

- MUED 5xxx
- MUED 8xxx

**Outside Coursework (15 credits)**

Select 15 credits outside the major in consultation with the advisor.



### **Twin Cities Campus**

## **Philosophy M.A.**

*Philosophy Department*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Philosophy, 271 19th Avenue South, 831 Heller Hall, Minneapolis, MN 55455-0310 (612-625-6563; fax: 612-626-8380)

Email: [umphil@umn.edu](mailto:umphil@umn.edu)

Website: <http://www.philosophy.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Philosophy graduate program rarely accepts applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Philosophy PhD program. In rare instances, MA applications are considered for individuals with professional goals in other fields.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Preferred: Broad undergraduate background that includes some philosophy coursework.

### **Special Application Requirements:**

Note: The Philosophy graduate program rarely accepts applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Philosophy PhD program.

In rare instances, MA applications are considered for individuals with professional goals in other fields. Please refer to the Department of Philosophy website at [www.philosophy.umn.edu](http://www.philosophy.umn.edu) for information.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is written and oral.



**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The project comprises 3 Plan B papers completed in consultation with the advisor.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

The application of 4-level coursework to meet degree requirements is permitted only under specific conditions; e.g., in conjunction with an 8-level seminar. Advisor approval is required. See the Department of Philosophy website at [www.philosophy.umn.edu](http://www.philosophy.umn.edu) for more information.

Coursework offered on both the A/F and S/N grading basis must be taken A/F.

**Major Coursework (14 to 24 credits)**

Plan A students select 14 credits, and Plan B students select 24 credits from the following, in consultation with the advisor and director of graduate studies. Coursework should include one course in ancient and one course in modern philosophy. Non-PHIL courses may be applied to this requirement with advisor and director of graduate studies approval.

PHIL 5xxx  
PHIL 8xxx

**Outside Coursework (6 credits)**

Select 6 credits outside the major in consultation with the advisor and director of graduate studies.

**Plan Options**

**Plan A**

**Thesis Credits**

Take 10 masters thesis credits.

[PHIL 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan B**





### **Twin Cities Campus**

## **Philosophy Minor**

*Philosophy Department*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Philosophy, 271 19th Avenue South, 831 Heller Hall, Minneapolis, MN 55455-0310 (612-625-6563; fax: 612-626-8380)

Email: [umphil@umn.edu](mailto:umphil@umn.edu)

Website: <http://www.philosophy.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students pursuing the Philosophy minor have the opportunity to expand their knowledge, in consultation with the Philosophy director of graduate studies, in any of the following areas: history of philosophy, logic, ELMS (epistemology, philosophy of language, metaphysics or mathematics, philosophy of science), moral and political philosophy, and value theory.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Philosophy director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Coursework offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B earned for each course, to be applied to minor field requirements.

The minimum cumulative GPA for minor field coursework is 3.00.

Application of 4xxx-level toward the minor requires approval of the Philosophy director of graduate studies, and is permitted only when taken in conjunction with an appropriate 8xxx-level workshop. Workshop selection is based on the area of philosophy: 8010 (history of phil); 8100 (epistemology and metaphysics); 8200 (logic and philosophy of math, language); 8300 (moral and political) 8600 (philosophy of science).

### **Coursework (6 to 12 credits)**

Masters students select 6 credits, and doctoral students select 12 credits from the following in consultation with the Philosophy director of graduate studies:

PHIL 5xxx

PHIL 8xxx



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



**Twin Cities Campus**

**Philosophy Ph.D.**

*Philosophy Department*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

**Contact Information:**

Department of Philosophy, 271 19th Avenue South, 831 Heller Hall, Minneapolis, MN 55455-0310 (612-624-6563; fax: 612-626-8380)

Email: [umphil@umn.edu](mailto:umphil@umn.edu)

Website: <http://www.philosophy.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 62
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Philosophy PhD is noteworthy for its emphasis on the individual student's research interests. With the help of an advisor, students design their own program of study, which consists of the philosophy major and either a supporting program or a minor that complements the student's research focus. Students gain a broad base of knowledge in history of philosophy, logic, ELMS (epistemology, philosophy of language, metaphysics or mathematics, philosophy of science), moral and political philosophy, and value theory, which provides a firm foundation for research and teaching beyond the PhD program.

**Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**

Broad undergraduate background that includes substantial philosophy coursework.

**Special Application Requirements:**

Individuals apply to the University and the Department of Philosophy via the University's online admissions system. Application materials include the application form; personal statement; diversity statement; transcripts; three academic letters of recommendation; and a philosophical writing sample not to exceed 25 pages. For more information regarding application requirements and funding opportunities, refer to the Department of Philosophy website at [www.philosophy.umn.edu](http://www.philosophy.umn.edu).

Applications must be received by December 31 for the following fall semester.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

26 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 3 semesters must be completed before filing a Degree Program Form.

Coursework offered on both the A/F and S/N grading basis must be taken A/F.

Application of 4xxx-level coursework toward degree requirements requires advisor approval, and is permitted only when taken in conjunction with an appropriate 8xxx-level workshop. Workshop selection is based on the area of philosophy: 8010 (history of phil); 8100 (epistemology and metaphysics); 8200 (logic and philosophy of math, language); 8300 (moral and political) 8600 (philosophy of science). See the Department of Philosophy website at [www.philosophy.umn.edu](http://www.philosophy.umn.edu) for more information.

### Major Coursework (26 credits)

Select 26 credits from the following, in consultation with the advisor and director of graduate studies. Non-PHIL courses may be applied to this requirement with advisor and director of graduate studies approval.

PHIL 5xxx

PHIL 8xxx

### Outside Coursework (12 credits)

Select 12 credits outside the major in consultation with the advisor and director of graduate studies.

### Thesis Credits

Take a total of 24 doctoral thesis credits beginning the second semester of Year 1.

[PHIL 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Political Psychology Minor**

*School of Journalism & Mass Communication, Political Science Department, Psychology*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Political Science, 1414 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455-0410 (612-626-7489; fax: 612-626-7599)

Email: [eastm004@umn.edu](mailto:eastm004@umn.edu)

Website: <https://cla.umn.edu/political-psychology/academics/grad-minor-political-psychology>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 13
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: This minor is available to doctoral students only.

Political psychology is a rapidly advancing field of scientific inquiry concerned with psychological aspects of political behavior. It encompasses a variety of interdisciplinary research perspectives, drawing on the theories and methods of core disciplines such as psychology, political science, law, and sociology, as well as interdisciplinary fields such as mass communication and decision sciences. The minor's structured curriculum provides a foundation in basic areas of political psychology: social attitudes and cognition, judgment and decision making, group relations, personality and leadership, mass communication, public opinion, mass political behavior, and political socialization. In addition to providing a background in political psychology, the program trains students in the theory and methods useful to this field, such as content analysis, survey analysis, and experimental design. The faculty is drawn from across the University.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Doctoral**

##### **Core Courses**

With the approval of the minor DGS, students may substitute an alternative course of at least 3 credits for one of the three core courses listed below. This option may only be utilized if the student takes all three core courses listed below but wishes to count one of the three core courses towards their PhD major rather than their PhD minor.

[POL 8311](#) - Political Psychology and Socialization (3.0 cr)

[PSY 8201](#) - Social Cognition (3.0 cr)

[JOUR 8661](#) - Seminar: Mediated Political Communication in the Digital Age (3.0 cr)

##### **Political Psychology Proseminar**

Take at least two semesters of the proseminar.



[POL 8307](#) - Proseminar in Political Psychology I (2.0 cr)

[POL 8308](#) - Proseminar in Political Psychology II (2.0 cr)

or [PSY 8211](#) - Proseminar in Political Psychology I (2.0 cr)

[PSY 8212](#) - Proseminar in Political Psychology II (2.0 cr)

**Methodology Requirement**

Students are advised to do a sequence of methods courses appropriate for their own research plans in political psychology. Generally, this is the standard quantitative method sequence within their major field (e.g. PSY 8814/8815; POL 8107/8108), but may include other courses depending on the students research goals. Students should consult with the minor DGS, especially if they do not plan to complete the standard quantitative method sequence in their major field.



### **Twin Cities Campus**

## **Political Science M.A.**

*Political Science Department*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Political Science, 1414 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455 (612-624-4144; fax: 612-626-7599)

Email: [polisci@umn.edu](mailto:polisci@umn.edu)

Website: <http://www.polisci.umn.edu/grad>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 33
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Political Science graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Political Science PhD program.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Note: The Political Science graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Political Science PhD program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

**Plan B:** Plan B requires 27 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** Three research papers, usually written in connection with coursework, are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Students must select and complete requirements for 2 emphases.

#### **Major Elective (3 credits)**

Select 3 elective credits in consultation with the advisor.

POL 8xxx

#### **Outside Coursework (6 credits)**

Select 6 credits outside the major in consultation with the advisor.

[AFRO 8910](#) - Topics in Studies of Africa and the African Diaspora (3.0 cr)

[AMIN 8910](#) - Topics in American Indian and Indigenous Studies (1.0 - 3.0 cr)



AMST 8920 - Topics in American Studies (3.0 cr)  
ANTH 5021W - Anthropology of the Middle East [SOCS, GP, WI] (3.0 cr)  
ANTH 5980 - Topics in Anthropology (3.0 cr)  
ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)  
ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)  
ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)  
ANTH 8992 - Directed Reading (1.0 - 18.0 cr)  
APEC 5031 - Methods of Economic Data Analysis (3.0 cr)  
APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)  
APEC 5151 - Applied Microeconomics: Firm and Household (3.0 cr)  
APEC 5152 - Applied Macroeconomics: Income and Employment (3.0 cr)  
APEC 5451 - Food Marketing Economics (3.0 cr)  
APEC 5481 - Futures and Options Markets (3.0 cr)  
APEC 5721 - Economics of Science and Technology Policy (3.0 cr)  
APEC 5751 - Global Trade and Policy (3.0 cr)  
APEC 5831 - Food and Agribusiness Marketplace (2.0 cr)  
APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)  
APEC 8002 - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)  
APEC 8601 - Natural Resource Economics (3.0 cr)  
APEC 8793 - Master's Paper: Plan B Project (1.0 - 6.0 cr)  
APEC 8901 - Graduate Seminar: MS & PhD (1.0 cr)  
APEC 8902 - Graduate Research Development Seminar (1.0 cr)  
ARAB 5101 - Advanced Arabic I (4.0 cr)  
ARAB 5102 - Advanced Arabic II (4.0 cr)  
CHIC 5993 - Directed Studies (1.0 - 3.0 cr)  
CL 8910 - Advanced Topics in Comparative Literature (3.0 cr)  
CLA 8000 - Topics in Graduate Studies (1.0 - 3.0 cr)  
COMM 5221 - Media, Race, and Identity (3.0 cr)  
DSSC 8111 - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)  
DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)  
DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)  
DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)  
ENGL 5300 - Readings in American Minority Literature (3.0 cr)  
ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)  
EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)  
ESL 5008 - Speaking for Professional Settings (2.0 cr)  
FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)  
GER 5610 - German Literature in Translation (3.0 cr)  
GIS 5578 - GIS Programming (3.0 cr)  
GLOS 5403 - Human Rights Advocacy (3.0 cr)  
GRAD 5105 - Practicum in University Teaching for Nonnative English Speakers (1.0 - 2.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)  
GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)  
GWSS 5190 - Topics: Theory, Knowledge, and Power (3.0 cr)  
GWSS 5406 - Black Feminist Thought in the American and African Diasporas (3.0 cr)  
GWSS 8107 - Feminist Pedagogies (3.0 cr)  
GWSS 8109 - Feminist Knowledge Production (3.0 cr)  
GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)  
GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)  
GWSS 8993 - Directed Study (1.0 - 6.0 cr)  
GWSS 8995 - Directed Research (1.0 - 8.0 cr)  
GWSS 8996 - Feminist Studies Colloquium (1.0 cr)  
HIST 5264 - Imperial Russia: Formation and Expansion of the Russian Empire in the 18th and 19th Centuries (3.0 cr)  
HIST 5265 - 20th-Century Russia: The Collapse of Imperial Russia, the Revolutions, and the Soviet Regime (3.0 cr)  
HIST 5540 - Topics in Mediterranean Studies (1.0 - 4.0 cr)  
HIST 5932 - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)  
HIST 5960 - Topics in History (1.0 - 4.0 cr)  
HIST 8801 - Seminar in Early American History (3.0 cr)  
HIST 8802 - Readings in American History, 1848-Present (3.0 cr)  
HIST 8900 - Topics in European/Medieval History (1.0 - 4.0 cr)  
HIST 8910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 8920 - Topics in African History (1.0 - 4.0 cr)  
HIST 8960 - Topics in History (1.0 - 4.0 cr)  
HIST 8993 - Directed Study (1.0 - 16.0 cr)





JOUR 5251 - Strategic Communication Theory (3.0 cr)  
JOUR 8503 - Seminar: Qualitative Methods in Mass Communication Research (3.0 cr)  
JOUR 8504 - Seminar: Analyzing Media Content (3.0 cr)  
JOUR 8650 - Seminar: Psychology of Media Effects (3.0 cr)  
JOUR 8661 - Seminar: Mediated Political Communication in the Digital Age (3.0 cr)  
JOUR 8681 - Seminar: International Media Perspectives (3.0 cr)  
LAW 5000 - Introduction to American Law and Legal Reasoning (3.0 cr)  
LAW 6039 - U.S. Supreme Court and Great Cases that have Shaped the Nation (3.0 cr)  
LAW 6071 - International Law (3.0 cr)  
LAW 6081 - Constitutional Law II (3.0 cr)  
LAW 6084 - Equal Protection and Civil Rights Acts (3.0 cr)  
LAW 6846 - Philosophy of Punishment (3.0 cr)  
LAW 6886 - International Human Rights Law (3.0 cr)  
PA 5012 - The Politics of Public Affairs (3.0 cr)  
PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)  
PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)  
PA 5490 - Topics in Social Policy (1.0 - 4.0 cr)  
PA 5501 - Theories and Policies of Development (3.0 cr)  
PA 5561 - Gender and International Development (3.0 cr)  
PA 5711 - Science, Technology & Environmental Policy (3.0 cr)  
PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)  
PA 5801 - Global Public Policy (3.0 cr)  
PA 5890 - Topics in Foreign Policy and International Affairs (1.0 - 5.0 cr)  
PA 8081 - Capstone Workshop (3.0 cr)  
PA 8302 - Applied Policy Analysis (4.0 cr)  
PA 8690 - Advanced Topics in Women, Gender and Public Policy (1.0 - 3.0 cr)  
PA 8991 - Independent Study (0.5 - 4.0 cr)  
PHIL 8110 - Seminar: Metaphysics (3.0 cr)  
PSY 5202 - Attitudes and Social Behavior (3.0 cr)  
PSY 8201 - Social Cognition (3.0 cr)  
PSY 8204 - Social Psychology of Prejudice and Intergroup Relations (3.0 cr)  
PSY 8205 - Principles of Social Psychology (3.0 cr)  
PSY 8208 - Social Psychology: The Self (3.0 cr)  
PSY 8664 - Personality Assessment (3.0 cr)  
PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
SOC 8090 - Topics in Sociology (1.5 - 3.0 cr)  
SOC 8190 - Topics in Law, Crime, and Deviance (3.0 cr)  
SOC 8311 - Political Sociology (3.0 cr)  
SOC 8731 - Sociology of Knowledge (3.0 cr)  
SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)  
SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)  
WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)  
WRIT 5052 - Graduate Research Presentations and Conference Writing for Non-Native Speakers of English (3.0 cr)

## Emphases

### Political Theory

#### Required Course (3 Credits)

Students selecting the Political Theory emphasis must take the following course:

POL 8201 - Understanding Political Theory (3.0 cr)

#### Electives (9 credits)

Select 9 credits from the following, in consultation with the advisor, to complete the Political Theory emphasis.

POL 8235 - Democratic Theory (3.0 cr)

POL 8251 - Ancient and Medieval Political Thought (3.0 cr)

POL 8252 - Early Modern Political Thought (3.0 cr)

POL 8253 - Late Modern Political Thought (3.0 cr)

POL 8260 - Topics in Political Theory (3.0 cr)

-OR-

### American Politics

#### Required Course (3 credits)

Students selecting the American Politics emphasis must take the following course:

POL 8301 - American Politics (3.0 cr)



**Electives (9 credits)**

Select 9 credits from the following, in consultation with the advisor, to complete the American Politics emphasis.

- [POL 8302](#) - Public Opinion and Political Behavior (3.0 cr)
- [POL 8311](#) - Political Psychology and Socialization (3.0 cr)
- [POL 8312](#) - Legislative Process (3.0 cr)
- [POL 8337](#) - Welfare State Theories and American Social Policy (3.0 cr)
- [POL 8360](#) - Topics in American Politics (3.0 cr)

-OR-

**International Relations**

**Required Course (3 credits)**

Students selecting the International Relations emphasis must take the following course:

- [POL 8401](#) - International Relations (3.0 cr)

**Electives (9 credits)**

Select 9 credits from the following, in consultation with the advisor, to complete the International Relations emphasis.

- [POL 8402](#) - International Security (3.0 cr)
- [POL 8403](#) - International Norms and Institutions (3.0 cr)
- [POL 8405](#) - International Political Economy (3.0 cr)
- [POL 8460](#) - Topics in International Relations (3.0 cr)

-OR-

**Comparative Politics**

**Required Course (3 credits)**

Students selecting the Comparative Politics emphasis must take the following course:

- [POL 8601](#) - Introduction to Comparative Politics (3.0 cr)

**Electives (9 credits)**

Select 9 credits from the following, in consultation with the advisor, to complete the Comparative Politics emphasis.

- [POL 8637](#) - Comparative Political Economy (3.0 cr)
- [POL 8660](#) - Topics in Comparative Politics (3.0 cr)

-OR-

**Formal Models and Methodology**

**Required Course (3 credits)**

Students selecting the Political Models and Methodology emphasis must take the following course:

- [POL 8120](#) - Core Course in Political Methodology: Modeling Political Processes (3.0 cr)

**Electives (9 credits)**

Select 9 credits from the following, in consultation with the advisor, to complete the Formal Models and Methodology emphasis.

- [POL 8107](#) - Quantitative Political Science II (3.0 cr)
- [POL 8108](#) - Maximum Likelihood Estimation (3.0 cr)
- [POL 8124](#) - Game Theory (3.0 cr)
- [POL 8125](#) - Dynamic Analysis (3.0 cr)
- [POL 8126](#) - Qualitative Methods (3.0 cr)
- [POL 8160](#) - Topics in Models and Methods (3.0 cr)



### **Twin Cities Campus**

## **Political Science Ph.D.**

*Political Science Department*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Political Science, 1414 Social Sciences, 267 19th Avenue South, Minneapolis, MN 55455 (612-624-4144; fax: 612-626-7599)

Email: [polisci@umn.edu](mailto:polisci@umn.edu)

Website: <http://cla.umn.edu/polisci/graduate>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The political science curriculum is divided into five subfields: formal models and methodology, political theory, American politics, international relations, and comparative politics.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

### **Special Application Requirements:**

All students are admitted directly into the Ph.D. program. To apply, submit the following through the University's graduate online application: Unofficial transcripts, research and diversity statements, GRE scores, three letters of recommendation, curriculum vitae or resume, writing sample, TOEFL or IELTS for non-native English speakers.

The application deadline is December 15. For more information, see the Political Science Admissions website.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

30 credits are required in the major.

6 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.30 is required for students to remain in good standing.

Students must select and complete the requirements for 2 emphases.

### **Professional Development Coursework (3 credits)**

Take POL 8104 spring semester the first year of study, and POL 8105 fall semester the third year of study.

[POL 8104](#) - Professional Development I (2.0 cr)

[POL 8105](#) - Professional Development II (1.0 cr)

### **Additional Elective (3 credits)**



Select 3 elective credits in consultation with the advisor.

POL 8xxx

**Outside Coursework (6 credits)**

Select 6 credits outside the major in consultation with the advisor.

- AFRO 8910 - Topics in Studies of Africa and the African Diaspora (3.0 cr)
- AMIN 8910 - Topics in American Indian and Indigenous Studies (1.0 - 3.0 cr)
- AMST 8920 - Topics in American Studies (3.0 cr)
- ANTH 5021W - Anthropology of the Middle East [SOCS, GP, WI] (3.0 cr)
- ANTH 5980 - Topics in Anthropology (3.0 cr)
- ANTH 8002 - Ethnography: Contemporary Theory and Practice (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- ANTH 8810 - Topics in Sociocultural Anthropology (3.0 cr)
- ANTH 8992 - Directed Reading (1.0 - 18.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 5032 - Economic Data Analysis for Managerial and Policy Decisions (3.0 cr)
- APEC 5151 - Applied Microeconomics: Firm and Household (3.0 cr)
- APEC 5152 - Applied Macroeconomics: Income and Employment (3.0 cr)
- APEC 5451 - Food Marketing Economics (3.0 cr)
- APEC 5481 - Futures and Options Markets (3.0 cr)
- APEC 5721 - Economics of Science and Technology Policy (3.0 cr)
- APEC 5751 - Global Trade and Policy (3.0 cr)
- APEC 5831 - Food and Agribusiness Marketplace (2.0 cr)
- APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)
- APEC 8002 - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)
- APEC 8601 - Natural Resource Economics (3.0 cr)
- APEC 8793 - Master's Paper: Plan B Project (1.0 - 6.0 cr)
- APEC 8901 - Graduate Seminar: MS & PhD (1.0 cr)
- APEC 8902 - Graduate Research Development Seminar (1.0 cr)
- ARAB 5101 - Advanced Arabic I (4.0 cr)
- ARAB 5102 - Advanced Arabic II (4.0 cr)
- CHIC 5993 - Directed Studies (1.0 - 3.0 cr)
- CL 8910 - Advanced Topics in Comparative Literature (3.0 cr)
- CLA 8000 - Topics in Graduate Studies (1.0 - 3.0 cr)
- COMM 5221 - Media, Race, and Identity (3.0 cr)
- DSSC 8111 - Approaches to Knowledge and Truth: Ways of Knowing in Development Studies and Social Change (3.0 cr)
- DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)
- DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)
- DSSC 8310 - Topics in Development Studies and Social Change (1.0 - 3.0 cr)
- ENGL 5300 - Readings in American Minority Literature (3.0 cr)
- ENGL 8400 - Seminar in Post-Colonial Literature, Culture, and Theory (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- ESL 5008 - Speaking for Professional Settings (2.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)
- GER 5610 - German Literature in Translation (3.0 cr)
- GIS 5578 - GIS Programming (3.0 cr)
- GLOS 5403 - Human Rights Advocacy (3.0 cr)
- GRAD 5105 - Practicum in University Teaching for Nonnative English Speakers (1.0 - 2.0 cr)
- GRAD 8101 - Teaching in Higher Education (3.0 cr)
- GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)
- GWSS 5190 - Topics: Theory, Knowledge, and Power (3.0 cr)
- GWSS 5406 - Black Feminist Thought in the American and African Diasporas (3.0 cr)
- GWSS 8107 - Feminist Pedagogies (3.0 cr)
- GWSS 8109 - Feminist Knowledge Production (3.0 cr)
- GWSS 8220 - Seminar: Science, Technology & Environmental Justice (3.0 cr)
- GWSS 8490 - Seminar: Transnational, Postcolonial, Diaspora (3.0 cr)
- GWSS 8993 - Directed Study (1.0 - 6.0 cr)
- GWSS 8995 - Directed Research (1.0 - 8.0 cr)
- GWSS 8996 - Feminist Studies Colloquium (1.0 cr)
- HIST 5264 - Imperial Russia: Formation and Expansion of the Russian Empire in the 18th and 19th Centuries (3.0 cr)
- HIST 5265 - 20th-Century Russia: The Collapse of Imperial Russia, the Revolutions, and the Soviet Regime (3.0 cr)
- HIST 5540 - Topics in Mediterranean Studies (1.0 - 4.0 cr)
- HIST 5932 - The Production of Knowledge, Negotiating the Past, and the Writing of African Histories (3.0 cr)



HIST 5960 - Topics in History (1.0 - 4.0 cr)  
HIST 8801 - Seminar in Early American History (3.0 cr)  
HIST 8802 - Readings in American History, 1848-Present (3.0 cr)  
HIST 8900 - Topics in European/Medieval History (1.0 - 4.0 cr)  
HIST 8910 - Topics in U.S. History (1.0 - 4.0 cr)  
HIST 8920 - Topics in African History (1.0 - 4.0 cr)  
HIST 8960 - Topics in History (1.0 - 4.0 cr)  
HIST 8993 - Directed Study (1.0 - 16.0 cr)  
JOUR 5251 - Strategic Communication Theory (3.0 cr)  
JOUR 8503 - Seminar: Qualitative Methods in Mass Communication Research (3.0 cr)  
JOUR 8504 - Seminar: Analyzing Media Content (3.0 cr)  
JOUR 8650 - Seminar: Psychology of Media Effects (3.0 cr)  
JOUR 8661 - Seminar: Mediated Political Communication in the Digital Age (3.0 cr)  
JOUR 8681 - Seminar: International Media Perspectives (3.0 cr)  
LAW 5000 - Introduction to American Law and Legal Reasoning (3.0 cr)  
LAW 6039 - U.S. Supreme Court and Great Cases that have Shaped the Nation (3.0 cr)  
LAW 6071 - International Law (3.0 cr)  
LAW 6081 - Constitutional Law II (3.0 cr)  
LAW 6084 - Equal Protection and Civil Rights Acts (3.0 cr)  
LAW 6846 - Philosophy of Punishment (3.0 cr)  
LAW 6886 - International Human Rights Law (3.0 cr)  
PA 5012 - The Politics of Public Affairs (3.0 cr)  
PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)  
PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)  
PA 5490 - Topics in Social Policy (1.0 - 4.0 cr)  
PA 5501 - Theories and Policies of Development (3.0 cr)  
PA 5561 - Gender and International Development (3.0 cr)  
PA 5711 - Science, Technology & Environmental Policy (3.0 cr)  
PA 5790 - Topics in Science, Technology, and Environmental Policy (1.0 - 3.0 cr)  
PA 5801 - Global Public Policy (3.0 cr)  
PA 5890 - Topics in Foreign Policy and International Affairs (1.0 - 5.0 cr)  
PA 8081 - Capstone Workshop (3.0 cr)  
PA 8302 - Applied Policy Analysis (4.0 cr)  
PA 8690 - Advanced Topics in Women, Gender and Public Policy (1.0 - 3.0 cr)  
PA 8991 - Independent Study (0.5 - 4.0 cr)  
PHIL 8110 - Seminar: Metaphysics (3.0 cr)  
PSY 5202 - Attitudes and Social Behavior (3.0 cr)  
PSY 8201 - Social Cognition (3.0 cr)  
PSY 8204 - Social Psychology of Prejudice and Intergroup Relations (3.0 cr)  
PSY 8205 - Principles of Social Psychology (3.0 cr)  
PSY 8208 - Social Psychology: The Self (3.0 cr)  
PSY 8664 - Personality Assessment (3.0 cr)  
PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
SOC 8090 - Topics in Sociology (1.5 - 3.0 cr)  
SOC 8190 - Topics in Law, Crime, and Deviance (3.0 cr)  
SOC 8311 - Political Sociology (3.0 cr)  
SOC 8731 - Sociology of Knowledge (3.0 cr)  
SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)  
SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)  
WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)  
WRIT 5052 - Graduate Research Presentations and Conference Writing for Non-Native Speakers of English (3.0 cr)

#### Thesis Credits

Take 24 doctoral thesis credits.

POL 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

#### Emphases

Select 2 emphases in consultation with the advisor. Complete the 12 credits required for each for a total of 24 credits.

#### Political Theory

##### Required Course (3 credits)

Students selecting the Political Theory emphasis must take the following course:

POL 8201 - Understanding Political Theory (3.0 cr)

##### Electives (9 credits)



Select 9 credits from the following, in consultation with the advisor, to complete the Political Theory emphasis.

- POL 8235 - Democratic Theory (3.0 cr)
- POL 8251 - Ancient and Medieval Political Thought (3.0 cr)
- POL 8252 - Early Modern Political Thought (3.0 cr)
- POL 8253 - Late Modern Political Thought (3.0 cr)
- POL 8260 - Topics in Political Theory (3.0 cr)

-OR-

#### **American Politics**

##### **Required Course (3 Credits)**

Students selecting the American Politics emphasis must take the following course:

- POL 8301 - American Politics (3.0 cr)

##### **Electives (9 credits)**

Select 9 credits from the following, in consultation with the advisor, to complete the American Politics emphasis.

- POL 8302 - Public Opinion and Political Behavior (3.0 cr)
- POL 8311 - Political Psychology and Socialization (3.0 cr)
- POL 8312 - Legislative Process (3.0 cr)
- POL 8337 - Welfare State Theories and American Social Policy (3.0 cr)
- POL 8360 - Topics in American Politics (3.0 cr)

-OR-

#### **International Relations**

##### **Required Course (3 credits)**

Students selecting the International Relations emphasis must take the following course:

- POL 8401 - International Relations (3.0 cr)

##### **Electives (9 credits)**

Select 9 credits from the following, in consultation with the advisor, to complete the International Relations emphasis.

- POL 8402 - International Security (3.0 cr)
- POL 8403 - International Norms and Institutions (3.0 cr)
- POL 8405 - International Political Economy (3.0 cr)
- POL 8460 - Topics in International Relations (3.0 cr)

-OR-

#### **Comparative Politics**

##### **Required Course (3 credits)**

Students selecting the Comparative Politics emphasis must take the following course:

- POL 8601 - Introduction to Comparative Politics (3.0 cr)

##### **Electives (9 credits)**

Select 9 credits from the following, in consultation with the advisor, to complete the Comparative Politics emphasis.

- POL 8637 - Comparative Political Economy (3.0 cr)
- POL 8660 - Topics in Comparative Politics (3.0 cr)

-OR-

#### **Formal Models and Methodology**

##### **Required Course (3 credits)**

Students selecting the Political Models and Methodology emphasis must take the following course:

- POL 8120 - Core Course in Political Methodology: Modeling Political Processes (3.0 cr)

##### **Electives (9 credits)**

Select 9 credits from the following, in consultation with the advisor, to complete the Formal Models and Methodology emphasis.

- POL 8107 - Quantitative Political Science II (3.0 cr)
- POL 8108 - Maximum Likelihood Estimation (3.0 cr)
- POL 8124 - Game Theory (3.0 cr)
- POL 8125 - Dynamic Analysis (3.0 cr)
- POL 8126 - Qualitative Methods (3.0 cr)
- POL 8160 - Topics in Models and Methods (3.0 cr)



### *Twin Cities Campus*

## Population Studies Minor

Sociology

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### Contact Information:

Department of Sociology, 909 Social Sciences, 267 19th Ave S, Minneapolis, MN 55455 (612-624-4300; fax: 612-624-7020)

Email: [popminor@umn.edu](mailto:popminor@umn.edu)

Website: <https://pop.umn.edu/gradstudent-training/popminor>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Population studies is a multidisciplinary research area at the intersection of the mathematical sciences, the health and social sciences, and public policy. The curriculum provides a solid grounding in the theories and methods of demography, with additional specialized training across five interdisciplinary subject areas: historical demography, population geography, economic demography, public health demography, and family and life course demography.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

All courses should be from the same subject area and may not be in the student's major field. Courses must be taken A-F.

### Required Courses

[PA 5301](#) - Population Methods & Issues for the United States & Global South (3.0 cr)

### Electives

Master's students complete 3 credits and doctoral students complete 9 credits.

[FW 5051](#) - Analysis of Populations (4.0 cr)

[GERO 5103](#) - Aging and Society (2.0 cr)

[HIST 5797](#) - Methods of Population History (3.0 cr)

[HIST 5970](#) - Advanced Research in Quantitative History (4.0 cr)

[HIST 8970](#) - Advanced Research in Quantitative History (3.0 cr)

[PA 5022](#) - Applications of Economics for Policy Analysis (1.5 - 3.0 cr)

[PA 5204](#) - Urban Spatial and Social Dynamics (3.0 cr)

[PA 5281](#) - Immigrants, Urban Planning and Policymaking in the U.S. (3.0 cr)

[PA 5401](#) - Poverty, Inequality, and Public Policy (3.0 cr)

[PA 5451](#) - Immigration, Health and Public Policy (3.0 cr)

[PA 5490](#) - Topics in Social Policy (1.0 - 4.0 cr)

[PA 8312](#) - Analysis of Discrimination (4.0 cr)

[PA 8331](#) - Economic Demography (3.0 cr)



PA 8461 - Global and U.S. Perspectives on Health and Mortality (3.0 cr)  
PUBH 6370 - Social Epidemiology (2.0 cr)  
PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)  
PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)  
SOC 5246 - Disease, Disasters, and Other Killers [HIS, ENV] (3.0 cr)  
SOC 8090 - Topics in Sociology (1.5 - 3.0 cr)  
SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral





### **Twin Cities Campus**

## **Psychology M.A.**

Psychology

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Psychology, S253 Elliott Hall, 75 East River Road, Minneapolis, MN 55455 (612-626-3483)

Email: [psyapply@umn.edu](mailto:psyapply@umn.edu)

Website: <http://psych.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Psychology graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Psychology PhD program.

Doctoral program specialties are offered in biological psychopathology; clinical science and psychopathology research; cognitive and brain sciences; counseling psychology; industrial/organizational psychology; personality, individual differences, and behavior genetics; quantitative/psychometric methods; and social psychology.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

### **Special Application Requirements:**

Note: The Psychology graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Psychology PhD program.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The Plan B requires one to three review papers, and comprises the written component of the final examination.

This program may be completed with a minor.



Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Use of 4xxx courses toward program requirements requires approval of the Psychology director of graduate studies in addition to advisor.

**Required Courses (14 credits)**

Select at least 14 credits from the following in consultation with the advisor:

PSY 5xxx

PSY 8xxx

**Outside Coursework (6 credits)**

Select at least 6 credits outside the major in consultation with the advisor.

**Plan Options**

**Plan A**

**Thesis Credits**

Take at least 10 masters thesis credits.

[PSY 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan B**

**Additional Credits (10 credits)**

Select at least 10 additional credits in consultation with the advisor to complete the 30-credit minimum.

PSY 5xxx

PSY 8xxx



### *Twin Cities Campus*

## Psychology Minor

Psychology

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Psychology, S253 Elliott Hall, 75 East River Road, Minneapolis, MN 55455 (612-626-3483)

Email: [psyapply@umn.edu](mailto:psyapply@umn.edu)

Website: <http://psych.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Psychology minor provides doctoral students with the opportunity to select coursework from the wide range of Psychology courses offered to meet their unique academic and professional goals.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### **Special Application Requirements:**

Doctoral students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Psychology director of graduate studies, regarding feasibility and requirements. Approval of the Psychology director of graduate studies to complete the minor is required.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Application of 4xxx-level, minor coursework requires pre-approval of the Psychology director of graduate studies. The minimum cumulative GPA for coursework applied to the minor is 3.00.

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Doctoral**

#### **Required Coursework (12 credits)**

Select credits from the following to complete the minor field requirement. Approval of the Psychology director of graduate studies is required.

PSY 5xxx

PSY 8xxx



**Twin Cities Campus**

**Psychology Ph.D.**

Psychology

College of Liberal Arts

Link to a [list of faculty](#) for this program.

**Contact Information:**

Department of Psychology, S246 Elliott Hall, 75 East River Road, Minneapolis, MN 55455 (612-626-3483)

Email: [psyapply@umn.edu](mailto:psyapply@umn.edu)

Website: <http://psych.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 53 to 112
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students are admitted only for the Ph.D. degree. The doctoral program offers tracks in clinical science and psychopathology research; cognitive and brain sciences; counseling psychology; industrial/organizational psychology; personality, individual differences, and behavior genetics; quantitative/psychometric methods; and social psychology.

**Accreditation**

This program is accredited by Counseling accredited by APA. CSPR accredited by APA and PCSAS.

**Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**

Other requirements to be completed before admission:

Recommended academic preparation includes a minimum of 12 credits (three to four courses) of psychology coursework beyond introductory psychology, including one course in statistics or psychological measurement.

An undergraduate major in psychology is preferred, but not required.

**Special Application Requirements:**

Applications are accepted for fall admission only; the deadline is December 1.

Applicants identify their proposed track at the time of application.

A department application; a statement of career interests, goals, and objectives; three letters of recommendation from persons familiar with the applicant's scholarship and research potential; and scores from the GRE General Test are required. The GRE Subject Test in psychology is not required, but highly recommended. Applicants whose native language is not English must submit the results of the TOEFL iBT. Applications are submitted electronically through the online application system.

Clinical Science and Psychopathology track: Applicants must have completed a course in abnormal psychology. An earned master's in Psychology is preferred but not required. Students without the master's upon matriculation must complete the University's Psychology MA degree (thesis option).

Personality, Individual Differences and Behavior Genetics track: An earned master's in Psychology is preferred but not required. Students without the master's upon matriculation must complete the University's Psychology MA degree (thesis option).

For more information about the application procedures, see the psychology graduate website.

International applicants must submit score(s) from one of the following tests:



- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Internet Based - Speaking Score: 23

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

29 to 76 credits are required in the major.  
0 to 12 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 3 semesters must be completed before filing a Degree Program Form.

Approval of the director of graduate studies, in addition to that of the advisor, is required for use of 4xxx-level coursework.

### Outside Coursework (0 to 12 credits)

Students pursuing either the Cognitive and Brain Sciences track or the Industrial/Organizational track must select at least 12 outside credits in consultation with the advisor. Students pursuing the other tracks may take outside courses in addition to required coursework.

### Thesis Credits

Take 24 doctoral thesis credits.  
[PSY 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Clinical Science and Psychopathology Research

Students without the master's upon matriculation must complete the University's Psychology MA degree (thesis option).

### Core Clinical Coursework (36 credits)

#### Required Courses (32 credits)

Take the following courses:

- [PSY 8111](#) - Biological, Cognitive, Affective, Social, Developmental and Historical Aspects of Psychopathology (4.0 cr)
- [PSY 8542](#) - Professional Standards and Ethics in Clinical Psychology (3.0 cr)
- [PSY 8611](#) - Intellectual and Neuropsychological Assessment: Measurement, Methodology, and Development (5.0 cr)
- [PSY 8612](#) - Assessment of Personality and Psychopathology: Interviewing, Diagnosis, and Cultural Diversity (5.0 cr)
- [PSY 8613](#) - Clinical Seminar Series: Contemporary Directions In Clinical Psychology Research (1.0 cr)
- [PSY 8621](#) - Foundations in Therapeutic Intervention Applying Theory to Clinical Practice (3.0 cr)
- [PSY 8622](#) - Theories and Methods of Effective Intervention (3.0 cr)
- [PSY 8814](#) - Analysis of Psychological Data (4.0 cr)
- [PSY 8815](#) - Analysis of Psychological Data (4.0 cr)

#### Clinical Psychology Practicum (4 credits)

Take 1 credit of the following at least 4 times in consultation with the advisor:

- [PSY 8620](#) - Clinical Practicum: Consultation, Supervision, Professional Standards, and Lifelong Learning (1.0 - 6.0 cr)

#### Research Courses (12 credits)



Select at least 12 credits from the following in consultation with the advisor:

PSY 5993 - Research Laboratory in Psychology (3.0 cr)

PSY 8993 - Directed Studies: Special Areas of Psychology and Related Sciences (1.0 - 6.0 cr)

**Elective Breadth Courses (9 credits)**

Select credits from at least 2 of the following areas, in consultation with the advisor, for a minimum of 9 credits. Other courses can be applied to the requirement with advisor approval.

**Brain Science (0 to 6 credits)**

PSY 5062 - Cognitive Neuropsychology (3.0 cr)

PSY 5063 - Introduction to Functional MRI (3.0 cr)

PSY 5064 - Brain and Emotion (3.0 cr)

PSY 5065 - Functional Imaging: Hands-on Training (3.0 cr)

NSC 5561 - Systems Neuroscience (4.0 cr)

NSC 5661W - Behavioral Neuroscience [WI] (4.0 cr)

**Cognitive Science (0 to 6 credits)**

PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)

PSY 5015 - Cognition, Computation, and Brain (3.0 cr)

PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)

PSY 5054 - Psychology of Language (3.0 cr)

PSY 8042 - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

**Developmental (0 to 6 credits)**

CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)

CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)

**Differential/Behavior Genetics (0 to 6 credits)**

PSY 5135 - Psychology of Individual Differences (3.0 cr)

**Industrial/Organizational (0 to 6 credits)**

PSY 5701 - Employee Selection and Staffing (3.0 cr)

PSY 5703 - Psychology of Organizational Training and Development (3.0 cr)

PSY 5708 - Organizational Psychology (3.0 cr)

**Measurement (0 to 6 credits)**

Psy 5862 is required to satisfy the Measurement area. The additional courses below may be taken after 5862 is completed as a secondary Measurement fulfillment.

PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)

PSY 5865 - Advanced Psychological and Educational Measurement (4.0 cr)

EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)

**Personality (0 to 6 credits)**

PSY 5101 - Personality: Current Theory and Research (3.0 cr)

PSY 8664 - Personality Assessment (3.0 cr)

**Sensation and Perception (0 to 6 credits)**

PSY 5031W - Perception [WI] (3.0 cr)

PSY 5036W - Computational Vision [WI] (3.0 cr)

PSY 5037 - Psychology of Hearing (3.0 cr)

PSY 8041 - Proseminar in Perception (3.0 cr)

**Social (0 to 6 credits)**

PSY 5202 - Attitudes and Social Behavior (3.0 cr)

PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)

PSY 5205 - Applied Social Psychology (3.0 cr)

PSY 5206 - Social Psychology and Health Behavior (3.0 cr)

PSY 8201 - Social Cognition (3.0 cr)

PSY 8202 - Close Relationships (3.0 cr)

PSY 8203 - Impression Management (3.0 cr)

PSY 8204 - Social Psychology of Prejudice and Intergroup Relations (3.0 cr)

PSY 8205 - Principles of Social Psychology (3.0 cr)

PSY 8208 - Social Psychology: The Self (3.0 cr)

PSY 8209 - Research Methods in Social Psychology (3.0 cr)

**Statistics (0 to 6 credits)**

PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)

**Cognitive and Brain Sciences**

**Core Areas (12 credits)**

Select credits from each of the 3 following areas, plus an additional credits 3, for a minimum of 12 credits. Courses are selected in consultation with the advisor.

**Brain Science (3 to 6 credits)**

NSC 5561 - Systems Neuroscience (4.0 cr)

NSC 5661W - Behavioral Neuroscience [WI] (4.0 cr)

PSY 5062 - Cognitive Neuropsychology (3.0 cr)



- PSY 5063 - Introduction to Functional MRI (3.0 cr)
- PSY 5064 - Brain and Emotion (3.0 cr)
- PSY 5065 - Functional Imaging: Hands-on Training (3.0 cr)

**Cognitive Science (3 to 6 Credits)**

- PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)
- PSY 5015 - Cognition, Computation, and Brain (3.0 cr)
- PSY 5018H - Mathematical Models of Human Behavior (3.0 cr)
- PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)
- PSY 5054 - Psychology of Language (3.0 cr)
- PSY 8042 - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

**Sensation and Perception (3 to 6 credits)**

- PSY 5031W - Perception [WI] (3.0 cr)
- PSY 5036W - Computational Vision [WI] (3.0 cr)
- PSY 5037 - Psychology of Hearing (3.0 cr)
- PSY 8041 - Proseminar in Perception (3.0 cr)

**Research Courses (3 credits)**

Select at least 3 credits from the following in consultation with the advisor.

- PSY 5993 - Research Laboratory in Psychology (3.0 cr)
- PSY 8993 - Directed Studies: Special Areas of Psychology and Related Sciences (1.0 - 6.0 cr)

**Quantitative Methods or Research Methodology (6 credits)**

Select at least 6 credits from the following in consultation with the advisor.

- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)
- NSC 8111 - Quantitative Neuroscience (3.0 cr)
- PSY 5018H - Mathematical Models of Human Behavior (3.0 cr)
- PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)
- PSY 8814 - Analysis of Psychological Data (4.0 cr)
- PSY 8815 - Analysis of Psychological Data (4.0 cr)
- PSY 8882 - Seminar: Quantitative and Psychometric Methods (3.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5102 - Introduction to Statistical Learning (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)

**General Psychology/Neuroscience Courses (3 credits)**

Select 3 credits from the following in consultation with the advisor. PSY 50xx and PSY 80xx courses cannot be applied to this requirement.

- NSC 5xxx
- NSC 8xxx
- PSY 5xxx
- PSY 8xxx

**Outside Coursework (12 credits)**

Select at least 12 credits of outside coursework in consultation with the advisor.

**Counseling Psychology**

**Counseling Psychology**

**Required Courses (47 credits)**

Take the following courses. Take 4 credits of PSY 8514 and 4 credits of PSY 8515.

- PSY 5501 - Vocational and Occupational Health Psychology (3.0 cr)
- PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)
- PSY 5960 - Topics in Psychology (1.0 - 4.0 cr)
- PSY 8111 - Biological, Cognitive, Affective, Social, Developmental and Historical Aspects of Psychopathology (4.0 cr)
- PSY 8501 - Counseling Psychology: History and Theories (3.0 cr)
- PSY 8502 - Assessment in Counseling Psychology (3.0 cr)
- PSY 8503 - Interviewing and Intervention (3.0 cr)
- PSY 8514 - University Counseling Practicum I (4.0 - 6.0 cr)
- PSY 8515 - University Counseling Practicum II (4.0 - 6.0 cr)
- PSY 8541 - Multicultural Psychology (3.0 cr)
- PSY 8542 - Professional Standards and Ethics in Clinical Psychology (3.0 cr)
- PSY 8545 - Counseling Psychology Process and Outcome Research (3.0 cr)
- PSY 8814 - Analysis of Psychological Data (4.0 cr)
- PSY 8815 - Analysis of Psychological Data (4.0 cr)

**Advanced Practicum (8 credits)**

Take at least 1 credit of PSY 8560 the fall semester of years 3, 4, and 5 for a minimum total of 3 credits. Take 1 credit of PSY 8561 the spring semester of years 3, 4, and 5 for a minimum total of 3 credits. Take 1 credit of PSY 8565 (offered in the fall) and 1 credit of



PSY 8566 (offered in the spring) year 3 or year 4 for a total of 2 credits.

PSY 8560 - Counseling Psychology Advanced Practicum I: General (1.0 - 3.0 cr)

PSY 8561 - Counseling Psychology Advanced Practicum II: General (1.0 - 3.0 cr)

PSY 8565 - Counseling Psychology Advanced Practicum I: Career Counseling and Assessment Clinic (1.0 - 6.0 cr)

PSY 8566 - Counseling Psychology Advanced Practicum II: Career Counseling and Assessment Clinic (1.0 - 6.0 cr)

### General Psychology Electives (21 credits)

#### Affective and Biological Aspects of Behavior (9 credits)

Select courses from the following. Advisor approval is required.

PSY 5062 - Cognitive Neuropsychology (3.0 cr)

PSY 5064 - Brain and Emotion (3.0 cr)

PSY 5135 - Psychology of Individual Differences (3.0 cr)

PSY 5137 - Introduction to Behavioral Genetics (3.0 cr)

#### Cognitive Aspects of Behavior (3 credits)

Take the following course. Other 5-level courses on learning, memory, thought process, and decision-making can be applied to this requirement with advisor approval.

PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)

#### Social Aspects of Behavior (3 credits)

Take the following course. Another course can be applied to this requirement only with advisor and director of graduate studies approval.

PSY 5207 - Personality and Social Behavior (3.0 cr)

#### Developmental Aspects of Behavior (3 credits)

Select 3 credits from the following in consultation with the advisor:

CPSY 5301 - Advanced Developmental Psychology (3.0 cr)

CPSY 5302 - Cognitive and Biological Development (3.0 cr)

CPSY 5303 - Social and Emotional Development (3.0 cr)

CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)

CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)

#### Statistics (3 credits)

Select 3 credits from the following in consultation with the advisor. Another 5- or 8-level advanced statistics course can be applied to this requirement with advisor approval.

EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)

EPSY 8267 - Applied Multivariate Analysis (3.0 cr)

EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)

EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)

PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)

## Industrial/Organizational Psychology

### Course Requirements

#### Foundational Statistics and Measurement (11 Credits)

Take the following courses:

PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)

PSY 8814 - Analysis of Psychological Data (4.0 cr)

PSY 8815 - Analysis of Psychological Data (4.0 cr)

#### Industrial-Organizational Psychology (16 Credits)

Select at least 16 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with advisor approval.

PSY 5701 - Employee Selection and Staffing (3.0 cr)

PSY 5703 - Psychology of Organizational Training and Development (3.0 cr)

PSY 5708 - Organizational Psychology (3.0 cr)

PSY 8701 - Seminar in Industrial and Organizational Psychology I (3.0 cr)

PSY 8702 - Seminar in Industrial and Organizational Psychology II (3.0 cr)

PSY 8703 - Seminar in Industrial and Organizational Psychology III (3.0 cr)

#### Foundational Psychological Science (3 credits)

Select at least 3 credits, in consultation with the advisor, from one of the following 9 areas. Other courses can be applied to this requirement with advisor approval.

##### Brain Science (0 to 3)

PSY 5062 - Cognitive Neuropsychology (3.0 cr)

PSY 5063 - Introduction to Functional MRI (3.0 cr)

PSY 5064 - Brain and Emotion (3.0 cr)

PSY 5065 - Functional Imaging: Hands-on Training (3.0 cr)

NSC 5561 - Systems Neuroscience (4.0 cr)

NSC 5661W - Behavioral Neuroscience [WI] (4.0 cr)

##### Cognitive Science (0 to 3)

PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)

PSY 5015 - Cognition, Computation, and Brain (3.0 cr)





- PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)
- PSY 5054 - Psychology of Language (3.0 cr)
- PSY 8042 - Proseminar in Cognition, Brain, and Behavior (3.0 cr)

**Counseling (0 to 3 credits)**

- PSY 5501 - Vocational and Occupational Health Psychology (3.0 cr)
- PSY 8501 - Counseling Psychology: History and Theories (3.0 cr)
- PSY 8502 - Assessment in Counseling Psychology (3.0 cr)
- PSY 8503 - Interviewing and Intervention (3.0 cr)
- PSY 8541 - Multicultural Psychology (3.0 cr)

**Developmental (0 to 3 credits)**

- CPSY 8301 - Developmental Psychology: Cognitive Processes (4.0 cr)
- CPSY 8302 - Developmental Psychology: Social and Emotional Processes (4.0 cr)

**Differential/Behavior Genetics (0 to 3 credits)**

- PSY 5135 - Psychology of Individual Differences (3.0 cr)
- PSY 5136 - Human Abilities (3.0 cr)
- PSY 5137 - Introduction to Behavioral Genetics (3.0 cr)

**Personality (0 to 3 credits)**

- PSY 5101 - Personality: Current Theory and Research (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)
- PSY 8664 - Personality Assessment (3.0 cr)

**Psychopathology (0 to 3 credits)**

- CPSY 8606 - Advanced Developmental Psychopathology (3.0 cr)
- PSY 8111 - Biological, Cognitive, Affective, Social, Developmental and Historical Aspects of Psychopathology (4.0 cr)
- PSY 8542 - Professional Standards and Ethics in Clinical Psychology (3.0 cr)
- PSY 8611 - Intellectual and Neuropsychological Assessment: Measurement, Methodology, and Development (5.0 cr)
- PSY 8612 - Assessment of Personality and Psychopathology: Interviewing, Diagnosis, and Cultural Diversity (5.0 cr)
- PSY 8622 - Theories and Methods of Effective Intervention (3.0 cr)

**Sensation and Perception (0 to 3 credits)**

- PSY 5031W - Perception [WI] (3.0 cr)
- PSY 5036W - Computational Vision [WI] (3.0 cr)
- PSY 5037 - Psychology of Hearing (3.0 cr)
- PSY 8041 - Proseminar in Perception (3.0 cr)

**Social (0 to 3 credits)**

- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5206 - Social Psychology and Health Behavior (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8202 - Close Relationships (3.0 cr)
- PSY 8203 - Impression Management (3.0 cr)
- PSY 8204 - Social Psychology of Prejudice and Intergroup Relations (3.0 cr)
- PSY 8205 - Principles of Social Psychology (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- PSY 8209 - Research Methods in Social Psychology (3.0 cr)

**Electives (6 credits)**

Select at least 6 credits, in consultation with the advisor, from one or more of the following areas. Other courses may be applied to this requirement with advisor approval. PSY 8960, if selected, must be one of the identified topics sections.

**I-O Psychology (0 to 6 credits)**

- PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)
- Seminar in Psych - Meta-Analysis

- Seminar in Psych - Fairness and Bias
- Seminar in Psych - Personality at Work
- Seminar in Psych - Motivation at Work
- Seminar in Psych - Counterproductive Work Behaviors

**Psychology (0 to 6 credits)**

- PSY 5xxx
- PSY 8xxx

**Related Disciplines (0 to 6 credits)**

- EPSY 5xxx
- EPSY 8xxx
- STAT 5xxx
- STAT 8xxx
- APEC 5xxx



APEC 8xxx  
CSOM 5xxx  
CSOM 8xxx  
LAW 5xxx  
LAW 8xxx

**Outside Coursework (12 credits)**

**Quantitative Methods (9 credits)**

Take each of the following required PSY 8960 topics courses for 3 credits. Other courses may be substituted with advisor approval.

PSY 8960: Research Methods in I-O Psychology  
PSY 8960: Data Science  
PSY 8960: Multivariate

**Additional Coursework (3 credits)**

Select 3 credits from the following in consultation with the advisor. Other courses can be substituted with advisor approval.

[EPSY 8222](#) - Advanced Measurement: Theory and Application (4.0 cr)  
[EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)  
[EPSY 8265](#) - Factor Analysis (3.0 cr)  
[EPSY 8266](#) - Statistical Analysis Using Structural Equation Methods (3.0 cr)  
[EPSY 8268](#) - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
[EPSY 8282](#) - Statistical Analysis of Longitudinal Data (3.0 cr)  
[PSY 5018H](#) - Mathematical Models of Human Behavior (3.0 cr)  
[PSY 5865](#) - Advanced Psychological and Educational Measurement (4.0 cr)  
[PSY 8882](#) - Seminar: Quantitative and Psychometric Methods (3.0 cr)  
[PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)  
[PUBH 7440](#) - Introduction to Bayesian Analysis (3.0 cr)  
[PUBH 8442](#) - Bayesian Decision Theory and Data Analysis (3.0 cr)  
[PUBH 8452](#) - Advanced Longitudinal Data Analysis (3.0 cr)  
[STAT 5302](#) - Applied Regression Analysis (4.0 cr)  
[STAT 5303](#) - Designing Experiments (4.0 cr)  
[STAT 5401](#) - Applied Multivariate Methods (3.0 cr)

**Personality, Individual Differences and Behavior Genetics**

Students without the master's upon matriculation must complete the University's Psychology MA degree (thesis option) or equivalent master's degree with advisor and director of graduate studies approval.

**Required Courses (14 credits)**

Take the following courses:

[PSY 5862](#) - Psychological Measurement: Theory and Methods (3.0 cr)  
[PSY 5960](#) - Topics in Psychology (1.0 - 4.0 cr)  
[PSY 8814](#) - Analysis of Psychological Data (4.0 cr)  
[PSY 8815](#) - Analysis of Psychological Data (4.0 cr)

**Core Electives (6 credits)**

Select 6 credits from the following in consultation with the advisor:

[PSY 5101](#) - Personality: Current Theory and Research (3.0 cr)  
[PSY 5135](#) - Psychology of Individual Differences (3.0 cr)  
[PSY 5137](#) - Introduction to Behavioral Genetics (3.0 cr)  
[PSY 8664](#) - Personality Assessment (3.0 cr)

**Statistics Electives (3 credits)**

Select 3 credits from the following in consultation with the advisor:

[PSY 5865](#) - Advanced Psychological and Educational Measurement (4.0 cr)  
[PSY 8881](#) - Seminar: Quantitative and Psychometric Methods (3.0 cr)  
[PSY 8882](#) - Seminar: Quantitative and Psychometric Methods (3.0 cr)

**Electives (6 credits)**

Select 6 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

[PSY 5136](#) - Human Abilities (3.0 cr)  
[PSY 5207](#) - Personality and Social Behavior (3.0 cr)  
[PSY 8937](#) - Seminar in Human Behavioral Genetics (3.0 cr)

**Quantitative/Psychometric Methods**

**Required Courses (31 credits)**

Take the following courses. Take 21 total credits of PSY 8881 and 8882, in consultation with the advisor. Take 3 credits of PSY 8960 Seminar: Multivariate Statistics for Social Scientists.  
[PSY 5862](#) - Psychological Measurement: Theory and Methods (3.0 cr)



- PSY 5865 - Advanced Psychological and Educational Measurement (4.0 cr)
- PSY 8881 - Seminar: Quantitative and Psychometric Methods (3.0 cr)
- PSY 8882 - Seminar: Quantitative and Psychometric Methods (3.0 cr)
- PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)

**Statistics Courses (6 credits)**

Select one of the following course sequences in consultation with the advisor:

- PSY 8814 - Analysis of Psychological Data (4.0 cr)
- PSY 8815 - Analysis of Psychological Data (4.0 cr)
- or STAT 8101 - Theory of Statistics 1 (3.0 cr)
- STAT 8102 - Theory of Statistics 2 (3.0 cr)

**General Psychology Courses (3 credits)**

Select at least 3 credits from the following in consultation with the advisor:

- CPSY 5xxx
- CPSY 8xxx
- PSY 5xxx
- PSY 8xxx

**Electives (6 credits)**

Select 6 credits from the following in consultation with the advisor. Application of PSY 8960 credits to this requirement is strongly encouraged.

- PSY 8960: Computerized Adaptive Testing (3.0 cr)

- PSY 8960: Item Response Theory (3.0 cr)
- PSY 8960: Multilevel Modeling (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- MATH 5447 - Theoretical Neuroscience (4.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7460 - Advanced Statistical Computing (3.0 cr)
- PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)
- PUBH 8452 - Advanced Longitudinal Data Analysis (3.0 cr)
- PUBH 8475 - Statistical Learning and Data Mining (3.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 5701 - Statistical Computing (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)

**Social Psychology**

**Required Courses (17 credits)**

Take the following courses. Take Psy 8205 twice for a total of 6 credits. Take Psy 8206 at least 3 times for a total of 3 credits.

- PSY 8205 - Principles of Social Psychology (3.0 cr)
- PSY 8206 - Proseminar in Social Psychology (1.0 cr)
- PSY 8814 - Analysis of Psychological Data (4.0 cr)
- PSY 8815 - Analysis of Psychological Data (4.0 cr)

**Advanced Statistics Courses (3 credits)**

Select at least 3 credits from the following in consultation with the advisor.

- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)
- PSY 5865 - Advanced Psychological and Educational Measurement (4.0 cr)
- PSY 8882 - Seminar: Quantitative and Psychometric Methods (3.0 cr)



PUBH 7407 - Analysis of Categorical Data (3.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 8422 - Modern Nonparametrics (3.0 cr)  
PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)  
PUBH 8452 - Advanced Longitudinal Data Analysis (3.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5601 - Nonparametric Methods (3.0 cr)

**Electives (12 credits)**

Select at least 12 credits, at least 6 of which must be from 8-level courses, from the following in consultation with the advisor:

PSY 5202 - Attitudes and Social Behavior (3.0 cr)  
PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)  
PSY 5205 - Applied Social Psychology (3.0 cr)  
PSY 5206 - Social Psychology and Health Behavior (3.0 cr)  
PSY 5207 - Personality and Social Behavior (3.0 cr)  
PSY 8201 - Social Cognition (3.0 cr)  
PSY 8203 - Impression Management (3.0 cr)  
PSY 8204 - Social Psychology of Prejudice and Intergroup Relations (3.0 cr)  
PSY 8208 - Social Psychology: The Self (3.0 cr)  
PSY 8209 - Research Methods in Social Psychology (3.0 cr)

**Additional Psychology Course (3 credits)**

Select at least 3 credits from the following in consultation with the advisor. PSY 52xx and PSY 82xx coursework cannot be applied to this requirement.

PSY 5xxx  
PSY 8xxx



### *Twin Cities Campus*

## Race, Indigeneity, Gender, and Sexuality Minor

*Anthropology*

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Race, Indigeneity, Gender & Sexuality Studies Initiative  
310 Scott Hall  
72 Pleasant St SE  
Minneapolis, MN 55455  
612-626-1313  
Email: [rigs@umn.edu](mailto:rigs@umn.edu)  
Website: <https://cla.umn.edu/rigs>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The RIGS graduate minor is the critical and comparative study of race, ethnicity, and indigeneity, as well as the interrogation of significant social categories of power and inequality, namely race, ethnicity, indigeneity, gender, sexuality, class, sovereignty, and diaspora. This interdisciplinary minor foregrounds a transnational and comparative framework to analyze multiple forms of social difference and their interactions in relation to one another. While the focus is on the United States, given the minors attention to the making of social categories and borders, the analytical lens and purview of the minor will be transnational in scale and scope.

Grounded by a strong commitment to the analyses and understanding of power relations, structural inequality, and social justice through a relational and multidisciplinary approach, the RIGS graduate minor focuses on the various interlinked processes that constitute the categories and groups in the first place, instead of taking for granted the a priori existence of separate groups, communities, experiences, and identities. This approach is at the vanguard of comparative race, ethnicity, and indigeneity, which is moving away from juxtaposing discrete groups and toward theorizing mutual constitution. Accordingly, this graduate minor privileges intersectionality, interdisciplinary, transnationalism, comparison, and relationality. What distinguishes this graduate minor is its conceptual and theoretical approach, which not only makes this program complementary to existing graduate courses of study at UMN, but also propels us to the cutting-edge of comparable programs at other institutions.

Students receive foundational training in one core required proseminar on critical and comparative race, ethnicity, and indigeneity; an interdisciplinary methodology course, and two electives in a range of disciplines that engage with race, ethnicity, and indigeneity. The RIGS graduate minor strengthens student work in their major field of study as minors will learn how to best integrate critical and comparative race, ethnicity, and indigeneity into their existing work as well as how to complement their research to include multiple indigenous and critical race methodologies.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

#### **Required Coursework (6 credits)**

Take at least one proseminar and one interdisciplinary methodologies course, selected in consultation with the RIGS director of graduate studies, for a minimum of six credits.



### Proseminar (3 credits)

Included are courses on the histories, intellectual traditions, and epistemologies of comparative race, ethnicity, and indigeneity. Additional RIGS Proseminar will be offered some semesters (Variable credit courses must be taken for three credits)

Take 1 or more course(s) from the following:

- [AFRO 8202](#) - Seminar: Intellectual History of Race (3.0 cr)
- [HIST 8910](#) - Topics in U.S. History (1.0 - 4.0 cr)
- [SOC 8211](#) - The Sociology of Race & Racialization (3.0 cr)

### Interdisciplinary Methodologies (3 credits)

A graduate seminar on interdisciplinary methodologies that engages with the study of comparative race, ethnicity, and indigeneity.

Take 1 or more course(s) from the following:

- [AMST 8289](#) - Ethnographic Research Methods: Research Strategies in American Studies (3.0 cr)
- [ANTH 8203](#) - Research Methods in Social and Cultural Anthropology (3.0 cr)
- [COMM 8110](#) - Seminar: Communication Research Methods (3.0 cr)
- [GWSS 8201](#) - Feminist Theory and Methods in the Social Sciences (3.0 cr)

### Electives (6 credits)

Select at least two interdisciplinary courses in consultation with the RIGS director of graduate studies. Each course should come from a different program or unit related to critical race, ethnicity, and indigeneity, which when taken together, offer a comparative and intersectional framework.

Variable-credit courses must be taken for at least three credits.

Take 2 or more course(s) from the following:

- [AFRO 5866](#) - The Civil Rights and Black Power Movement, 1954-1984 (3.0 cr)
- [AFRO 8202](#) - Seminar: Intellectual History of Race (3.0 cr)
- [AMIN 5402](#) - American Indians and the Cinema [AH, DSJ] (3.0 cr)
- [AMIN 5409](#) - American Indian Women: Ethnographic and Ethnohistorical Perspectives [HIS, DSJ] (3.0 cr)
- [AMIN 5412](#) - Comparative Indigenous Feminisms [GP] (3.0 cr)
- [AMIN 5890](#) - Readings in American Indian and Indigenous History (3.0 cr)
- [AMIN 5920](#) - Topics in American Indian Studies (3.0 cr)
- [ANTH 8203](#) - Research Methods in Social and Cultural Anthropology (3.0 cr)
- [ANTH 8510](#) - Topics in Archaeology (3.0 cr)
- [ANTH 8810](#) - Topics in Sociocultural Anthropology (3.0 cr)
- [CHIC 5374](#) - Migrant Farmworkers in the United States: Families, Work, and Advocacy [CIV] (4.0 cr)
- [CI 8416](#) - Speculative Fiction, Radical Imagination, and Social Change (3.0 cr)
- [CI 8645](#) - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)
- [GWSS 5104](#) - Transnational Feminist Theory (3.0 cr)
- [GWSS 8260](#) - Seminar: Race, Representation and Resistance (3.0 cr)
- [HIST 5910](#) - Topics in U.S. History (1.0 - 4.0 cr)
- [HIST 8910](#) - Topics in U.S. History (1.0 - 4.0 cr)
- [HIST 8960](#) - Topics in History (1.0 - 4.0 cr)
- [HIST 8970](#) - Advanced Research in Quantitative History (3.0 cr)
- [AMST 5920](#) - Topics in American Studies (1.0 - 4.0 cr)
- [HIST 5890](#) - Readings in American Indian and Indigenous History (3.0 cr)
- [HSPH 8003](#) - Race and Indigeneity in Heritage Representation (3.0 cr)
- [PA 5690](#) - Topics in Women, Gender and Public Policy (0.5 - 3.0 cr)
- [PA 8690](#) - Advanced Topics in Women, Gender and Public Policy (1.0 - 3.0 cr)
- [POL 8260](#) - Topics in Political Theory (3.0 cr)
- [SOC 8090](#) - Topics in Sociology (1.5 - 3.0 cr)
- [SOC 8190](#) - Topics in Law, Crime, and Deviance (3.0 cr)
- [SOC 8211](#) - The Sociology of Race & Racialization (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### Doctoral



### **Twin Cities Campus**

## **Religious Studies Minor**

*Classical & Near Eastern Studies*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Religious Studies Program, 245 Nicholson Hall, 216 Pillsbury Avenue S.E., Minneapolis, MN 55455 (612-625-6393)

Email: [rels@umn.edu](mailto:rels@umn.edu)

Website: <https://cla.umn.edu/religious-studies/graduate>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The minor in Religious Studies is available to master's and doctoral students in relevant University of Minnesota departments, schools, and colleges, including but not limited to American Studies, Anthropology, Art History, Classical and Near Eastern Studies, English, History, Philosophy, Sociology, Hubbard School of Journalism and Mass Communication, School of Music, and the College of Education and Human Development.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Religious Studies director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

All coursework applied to the minor must be taken on the A/F grade basis.

#### **Required Course (3 credits)**

Take the following course:

[RELS 5001](#) - Theory and Method in the Study of Religion: Critical Approaches to the Study of Religion (3.0 cr)

#### **Electives (6 to 9 credits)**

Masters students select 6 credits, and doctoral students select 9 credits from the following in consultation with the Religious Studies director of graduate studies. Other courses can be applied to this requirement with approval of the Religious Studies director of graduate studies.

[RELS 5013W](#) - Biblical Law and Jewish Ethics [WI] (3.0 cr)

[RELS 5070](#) - Topics in Religious Studies (3.0 cr)

[RELS 5071](#) - Greek and Hellenistic Religions (3.0 cr)

[RELS 5072](#) - The Birth of Christianity [AH] (3.0 cr)

[RELS 5115](#) - Midrash: Reading and Retelling the Hebrew Bible (3.0 cr)

[RELS 5121](#) - Gender and Body in Early Christianity [AH] (3.0 cr)



- RELS 5204 - The Dead Sea Scrolls (3.0 cr)
- RELS 5254 - Archaeology of Ritual and Religion (3.0 cr)
- RELS 5504 - Development of Israelite Religion II (3.0 cr)
- RELS 5612 - Baroque Rome: Art and Politics in the Papal Capital (3.0 cr)
- RELS 5707W - Anthropology of the Middle East [SOCS, GP, WI] (3.0 cr)
- RELS 5721 - North Africa since 1500: Islam, Colonialism, and Independence (3.0 cr)
- RELS 5777 - The Diversity of Traditions: Indian Art 1200 to Present (3.0 cr)
- RELS 5781 - Age of Empire: The Mughals, Safavids, and Ottomans (3.0 cr)
- RELS 5993 - Directed Studies (1.0 - 4.0 cr)
- RELS 8070 - Readings in Religious Texts (3.0 cr)
- RELS 8190 - Comparative Seminar in Religions in Antiquity (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral





### ***Twin Cities Campus***

## **Rhetoric, Scientific and Technical Communication M.A.**

*Writing Studies Department*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Writing Studies, 214 Nolte Center, 315 Pillsbury Drive, SE, Minneapolis, MN 55455 (612-624-3445; fax: 612-624-3617)

Email: [writqpc@umn.edu](mailto:writqpc@umn.edu)

Website: <http://cla.umn.edu/writing-studies>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 33
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Writing Studies trains students to understand how people use written communication (textual, digital, and visual) to shape the world around them, with a particular emphasis on communication in scientific and technical areas. The MA program prepares students for doctoral-level research by training them in the areas of rhetorical theory and history; writing studies and pedagogy; and technical communication, technology, and culture. Students build a broad base of knowledge in these three areas while developing a speciality area and pursuing interdisciplinary study.

MA applicants should have a strong interest in language and rhetorical theory or communication theory. Students often benefit from entering the program with a background in a science, Internet studies, environmental studies, or pedagogy and technology. Students work in collaboration with faculty mentors and peers to develop the expertise required to make original contributions to the scholarship in their field. The curriculum, professional development training, and funding are structured to support students in making early and regular contributions to the published literature, and in teaching first-year writing and advanced writing courses at the college level.

Each student also develops a supporting field or minor by taking courses outside the department. Students often build expertise in such areas as communication studies; curriculum and instruction; history of science and technology; history of medicine; or gender, women's and sexuality studies.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Undergraduate degree in a related discipline such as rhetoric, technical and professional communication, English, or communication studies.

### **Special Application Requirements:**

Scores from the General Test of the GRE that are less than five years old are required of students with baccalaureate degrees from U.S. institutions. International students are encouraged to take the General Test of the GRE. Nonnative speakers of English are required to take an appropriate test with satisfactory scores. All applicants must submit a departmental supplemental application, personal statement, curriculum vitae or resume, three letters of recommendation and two writing samples. Applicants are also strongly encouraged to submit a diversity statement and, if appropriate, an extenuating circumstances statement. All MA applicants should apply by the January 5 application deadline; all admitted students begin in the fall semester.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL



- Internet Based - Total Score: 79
- Internet Based - Writing Score: 21
- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 24 to 27 major credits and 6 to 9 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project requires students to complete a publication-worthy research paper under their advisors supervision.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

Coursework offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B earned for each course.

### Required Core Area (12 credits)

Select a total of 12 credits from the following 3 categories:

#### Rhetorical Theory and History (3 to 6 credits)

Select at least 3 credits from the following in consultation with the advisor:

[WRIT 5775](#) - The Rhetorical Tradition: Classical Period (3.0 cr)

[WRIT 5776](#) - The Rhetorical Tradition: Modern Era (3.0 cr)

#### Writing Studies and Pedagogy (3 to 6 credits)

Select at least 3 credits from the following in consultation with the advisor:

[WRIT 5531](#) - Introduction to Writing Theory and Pedagogy (3.0 cr)

[WRIT 8540](#) - Seminar in Technical Communication and Composition Pedagogies (3.0 cr)

[WRIT 8560](#) - Seminar in Writing Studies (3.0 cr)

#### Technical Communication, Technology, and Culture (3 to 6 credits)

Select at least 3 credits from the following in consultation with the advisor:

[WRIT 8520](#) - Seminar in Scientific and Technical Communication (3.0 cr)

[WRIT 8550](#) - Seminar in Technology, Culture, and Communication (3.0 cr)

### Methods Coursework (3 credits)

Take the following course:

[WRIT 8011](#) - Research Methods in Writing Studies and Technical Communication (3.0 cr)

### Specialty Area/Concentration (6 credits)

Courses should be selected to develop a coherent specialty area/concentration. Specialties include areas such as rhetoric, literacies, professional and technical communication, internet studies, theories of writing, writing pedagogies, rhetorics of science, medicine, or law, and the environment.

[WRIT 5112](#) - Information Design: Theory and Practice (3.0 cr)

[WRIT 5531](#) - Introduction to Writing Theory and Pedagogy (3.0 cr)

[WRIT 5561](#) - Editing and Style for Technical Communicators (3.0 cr)

[WRIT 5662](#) - Writing With Digital Technologies (3.0 cr)

[WRIT 5671](#) - Visual Rhetoric (3.0 cr)

[WRIT 5775](#) - The Rhetorical Tradition: Classical Period (3.0 cr)

[WRIT 5776](#) - The Rhetorical Tradition: Modern Era (3.0 cr)

[WRIT 8505](#) - Professional Practice (3.0 cr)

[WRIT 8510](#) - Seminar in Rhetoric (3.0 cr)



- [WRIT 8520](#) - Seminar in Scientific and Technical Communication (3.0 cr)
- [WRIT 8540](#) - Seminar in Technical Communication and Composition Pedagogies (3.0 cr)
- [WRIT 8550](#) - Seminar in Technology, Culture, and Communication (3.0 cr)
- [WRIT 8560](#) - Seminar in Writing Studies (3.0 cr)
- [WRIT 8792](#) - Independent Study, Reading, and Research (1.0 - 4.0 cr)

**Outside Coursework (6 credits)**

Select 6 credits outside the Department of Writing Studies in consultation with the advisor. Other courses can be applied to this requirement with advisor approval.

[AMST 8202](#) - Theoretical Foundations and Current Practice in American Studies (3.0 cr)

[BTHX 5300](#) - Foundations of Bioethics (3.0 cr)

BTHX 8xxx

CI 5xxx

CI 8xxx

COMM 5xxx

COMM 8xxx

ENGL 5xxx

ENGL 8xxx

GWSS 5xxx

GWSS 8xxx

HMED 5xxx

HMED 8xxx

HSCI 5xxx

HSCI 8xxx

IDSC 6xxx

IDSC 8xxx

OLPD 5xxx

OLPD 8xxx

[PUBH 6101](#) - Environmental Health (2.0 cr)

[PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

[STAT 5021](#) - Statistical Analysis (4.0 cr)

**Electives (3 credits)**

Select 3 credits of graduate coursework in consultation with the advisor. Course(s) can be WRIT or non-WRIT.

**Plan B Project Credits (3 credits)**

Take 3 credits of the following in consultation with the advisor:

[WRIT 8794](#) - Directed Research (1.0 - 4.0 cr)



### **Twin Cities Campus**

## **Rhetoric, Scientific and Technical Communication Minor**

Writing Studies Department

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Writing Studies, 214 Nolte Center, 315 Pillsbury Dr SE, Minneapolis, MN 55455 (612-624-3445; fax: 612-624-3617)

Email: [writqpc@umn.edu](mailto:writqpc@umn.edu)

Website: <http://cla.umn.edu/writing-studies>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Graduate Minor in Rhetoric and Scientific & Technical Communication (RSTC) is available for masters and PhD-level students enrolled in other University graduate programs. Courses train students to understand how people use written communication (textual, digital, and visual) to shape the world around them, with a particular emphasis on communication in scientific and technical areas. The minor also offers students opportunities to pursue special interests in areas such as digital, textual, or visual literacies; theories of rhetoric; writing; composition; and writing pedagogies.

Tailored to students in research degree programs, the minor prepares students to integrate writing pedagogy into discipline-specific teaching practices, develop skills in rhetorical analysis, apply scientific and technical communication principles to the communication of scholarly work, and more. Students in graduate-level professional programs who are interested in applying basic theory and research-driven approaches to workplace contexts are encouraged to pursue the Scientific and Technical Communication Minor.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Rhetoric, Science and Technical Communication director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B earned for each course.

The minimum cumulative GPA for minor field coursework is 3.00.

#### **Coursework (6 to 12 credits)**

Masters students select 6 credits, and doctoral students select 12 credits from the following in consultation with the Rhetoric, Science and Technical Communication director of graduate studies. The 12 credits applied to the doctoral minor must include at least three credits in WRIT 5775, 5776, and/or 8510.

[WRIT 5112](#) - Information Design: Theory and Practice (3.0 cr)

[WRIT 5270](#) - Special Topics (3.0 cr)

[WRIT 5531](#) - Introduction to Writing Theory and Pedagogy (3.0 cr)



[WRIT 5532](#) - Writing Pedagogy Practicum (1.0 cr)  
[WRIT 5662](#) - Writing With Digital Technologies (3.0 cr)  
[WRIT 5671](#) - Visual Rhetoric (3.0 cr)  
[WRIT 5775](#) - The Rhetorical Tradition: Classical Period (3.0 cr)  
[WRIT 5776](#) - The Rhetorical Tradition: Modern Era (3.0 cr)  
[WRIT 8011](#) - Research Methods in Writing Studies and Technical Communication (3.0 cr)  
[WRIT 8510](#) - Seminar in Rhetoric (3.0 cr)  
[WRIT 8520](#) - Seminar in Scientific and Technical Communication (3.0 cr)  
[WRIT 8540](#) - Seminar in Technical Communication and Composition Pedagogies (3.0 cr)  
[WRIT 8550](#) - Seminar in Technology, Culture, and Communication (3.0 cr)  
[WRIT 8560](#) - Seminar in Writing Studies (3.0 cr)  
[WRIT 8792](#) - Independent Study, Reading, and Research (1.0 - 4.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Rhetoric, Scientific and Technical Communication Ph.D.**

*Writing Studies Department*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Writing Studies, 214 Nolte Center, 315 Pillsbury Drive, SE, Minneapolis, MN 55455 (612-624-3445; fax: 612-624-3617)

Email: [writqpc@umn.edu](mailto:writqpc@umn.edu)

Website: <http://cla.umn.edu/writing-studies>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 66
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Writing Studies trains students to understand how people use written communication (textual, digital, and visual) to shape the world around them, with a particular emphasis on communication in scientific and technical areas. The PhD program prepares students to become researchers and teachers with expertise in rhetoric, writing studies, and technical communication. Students in the RSTC program also pursue special interests in areas such as digital, textual, or visual literacies; rhetorics of science, health, medicine, law, and/or the environment; professional communication; internet studies; theories of writing; composition; and writing pedagogies.

Students work in collaboration with faculty mentors and peers to develop the expertise required to make original contributions to the scholarship in their fields. The curriculum, professional development training, and funding are structured to support students in making early and regular contributions to the published literature, and in teaching first-year writing and advanced writing courses at the college level. Most graduates of the program pursue careers teaching at the college level, although some have developed careers in industry or non-governmental organizations.

Each student also develops a supporting program of courses outside the department. Coursework outside the department is commonly pursued in fields such as communication studies; curriculum and instruction; history of medicine; or gender, women's and sexuality studies.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Master's in a related discipline, e.g., rhetoric, technical and professional communication, English, communication studies.

Other requirements to be completed before admission:

Individuals who do not yet have a masters degree in a related discipline are encouraged to apply to Writing Studies Rhetoric, Scientific and Technical Communication MA. Students in the MA program who are making satisfactory progress will, in their second year of study, have the opportunity to apply to the PhD program. For students who continue in the program, most MA courses transfer to the PhD. Continuing students must complete their MA no later than the end of the first semester in the PhD program.

### **Special Application Requirements:**

Scores from the General Test of the GRE that are less than five years old are required of students with baccalaureate degrees from U.S. institutions. International students are encouraged to take the General Test of the GRE. Nonnative speakers of English are required to take an appropriate test with satisfactory scores. All applicants must submit a departmental supplemental application, personal statement, curriculum vitae or resume, three letters of recommendation and two writing samples. Applicants are also strongly encouraged to submit a diversity statement and, if appropriate, an extenuating circumstances statement. All PhD applicants should apply by the January 5 application deadline; all admitted students begin in the fall semester.



Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#) (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

27 to 30 credits are required in the major.  
12 to 15 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

Up to 6 credits from a master's program, upon consultation with the advisor and approval of the director of graduate studies, can be applied to the PhD.

All coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of B earned for each.

Students must write a formal prospectus outlining the plan for their dissertation and present it to committee members within a year of passing the preliminary oral exam. Upon committee approval of the prospectus, the student must obtain their advisor's signature on the prospectus form and file it with the department's graduate studies office.

### Required Core Areas (15 credits)

Select a total of 15 credits from the following three categories:

#### Rhetoric Theory and History (6 to 9 credits)

Select at least 6 credits from the following in consultation with the advisor:

[WRIT 5775](#) - The Rhetorical Tradition: Classical Period (3.0 cr)

[WRIT 5776](#) - The Rhetorical Tradition: Modern Era (3.0 cr)

[WRIT 8510](#) - Seminar in Rhetoric (3.0 cr)

#### Writing Studies and Pedagogy (3 to 6 credits)

Select at least 3 credits from the following in consultation with the advisor:

[WRIT 5531](#) - Introduction to Writing Theory and Pedagogy (3.0 cr)

[WRIT 8540](#) - Seminar in Technical Communication and Composition Pedagogies (3.0 cr)

[WRIT 8560](#) - Seminar in Writing Studies (3.0 cr)

#### Technical Communication, Technology, and Culture (3 to 6 credits)

Select at least 3 credits from the following in consultation with the advisor:

[WRIT 8520](#) - Seminar in Scientific and Technical Communication (3.0 cr)

[WRIT 8550](#) - Seminar in Technology, Culture, and Communication (3.0 cr)

### Methods Course (3 credits)

Take the following course:

[WRIT 8011](#) - Research Methods in Writing Studies and Technical Communication (3.0 cr)



### Writing Studies Specialty Area/Concentration (9 credits)

Courses should be selected to develop a coherent specialty area/concentration. Specialties include areas such as rhetoric, literacies, professional and technical communication, internet studies, theories of writing, writing pedagogies, rhetorics of science, medicine, or law, and the environment.

#### Writing Studies Courses (9 credits)

Select at least 9 credits from the following in consultation with the advisor:

- [WRIT 5112](#) - Information Design: Theory and Practice (3.0 cr)
- [WRIT 5531](#) - Introduction to Writing Theory and Pedagogy (3.0 cr)
- [WRIT 5561](#) - Editing and Style for Technical Communicators (3.0 cr)
- [WRIT 5662](#) - Writing With Digital Technologies (3.0 cr)
- [WRIT 5671](#) - Visual Rhetoric (3.0 cr)
- [WRIT 5775](#) - The Rhetorical Tradition: Classical Period (3.0 cr)
- [WRIT 5776](#) - The Rhetorical Tradition: Modern Era (3.0 cr)
- [WRIT 8505](#) - Professional Practice (3.0 cr)
- [WRIT 8510](#) - Seminar in Rhetoric (3.0 cr)
- [WRIT 8520](#) - Seminar in Scientific and Technical Communication (3.0 cr)
- [WRIT 8540](#) - Seminar in Technical Communication and Composition Pedagogies (3.0 cr)
- [WRIT 8550](#) - Seminar in Technology, Culture, and Communication (3.0 cr)
- [WRIT 8560](#) - Seminar in Writing Studies (3.0 cr)
- [WRIT 8792](#) - Independent Study, Reading, and Research (1.0 - 4.0 cr)

### Outside Coursework (12 credits)

Select at least 12 credits of outside coursework from the following, in consultation with the advisor to form a coherent supporting program. Other courses may be applied to this requirement with advisor approval.

- [AMST 8202](#) - Theoretical Foundations and Current Practice in American Studies (3.0 cr)
- [BTHX 5300](#) - Foundations of Bioethics (3.0 cr)
- BTHX 8xxx
- CI 5xxx
- CI 8xxx
- COMM 5xxx
- COMM 8xxx
- ENGL 5xxx
- ENGL 8xxx
- GWSS 5xxx
- GWSS 8xxx
- HMED 5xxx
- HMED 8xxx
- HSCI 5xxx
- HSCI 8xxx
- IDSC 5xxx
- IDSC 8xxx
- OLPD 5xxx
- OLPD 8xxx
- [PUBH 6101](#) - Environmental Health (2.0 cr)
- [PUBH 6414](#) - Biostatistical Literacy (3.0 cr)
- [STAT 5021](#) - Statistical Analysis (4.0 cr)

### Electives (3 credits)

Select 3 credits of graduate coursework in consultation with the advisor. Course(s) can be WRIT or non-WRIT.

### Thesis Credits

Take 24 or more credit(s) from the following:

- [WRIT 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)





### *Twin Cities Campus*

## Scientific and Technical Communication M.S.

Writing Studies Department

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### Contact Information:

Department of Writing Studies, 214 Nolte Center, 315 Pillsbury Drive SE, Minneapolis, MN 55455 (612-624-3445; fax: 612-624-3617)

Email: [WRIT@umn.edu](mailto:WRIT@umn.edu)

Website: <http://cla.umn.edu/writing-studies>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Writing Studies trains students to understand how people use written communication (digital, visual, textual) to shape the world around them, with a particular emphasis on communication in scientific and technical areas. The MS in Scientific and Technical Communication focuses on applying basic theory and research-driven approaches to the creation and adaptation of content to solve complex problems in technical communication workplaces. Students connect with workplace professionals through client projects, virtual and global teamwork, mentorships, and emerging technologies. These experiences enable students to develop unique strengths in digital, usability, and science/health/medical communication.

### Program Delivery

This program is available:

- completely online (all program coursework can be completed online)

### Prerequisites for Admission

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan C:** Plan C requires 21 major credits and 9 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** WRIT 8505, the capstone course, provides a structured setting for students to complete a research project that will position them for applied work in technical communication.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.



A minimum GPA of 2.8 is required for students to remain in good standing.

All coursework must be taken for an A-F grade and completed with a minimum grade of B, unless the course is only offered for an S-N grade.

#### Core Coursework (15 credits)

Take the following courses for a total of 15 credits.

- [WRIT 4562](#) - International Professional Communication (3.0 cr)
- [WRIT 5001](#) - Introduction to Graduate Studies in Scientific and Technical Communication (3.0 cr)
- [WRIT 5112](#) - Information Design: Theory and Practice (3.0 cr)
- [WRIT 5561](#) - Editing and Style for Technical Communicators (3.0 cr)
- [WRIT 5662](#) - Writing With Digital Technologies (3.0 cr)

#### Capstone Course (3 credits)

Take the following course:

- [WRIT 8505](#) - Professional Practice (3.0 cr)

#### Electives (3 credits)

Take at least 3 credits of electives, selected in consultation with the advisor or director of graduate studies. Under some circumstances, 3 credits of independent study (WRIT 5291) or internship (WRIT 5196) may be substituted with the director of graduate studies approval. Note: WRIT 5671 Visual Rhetoric is not offered online.

- [WRIT 4501](#) - Usability and Human Factors in Technical Communication (3.0 cr)
- [WRIT 4573W](#) - Writing Proposals and Grant Management [WI] (3.0 cr)
- [WRIT 4664W](#) - Science, Medical, and Health Writing [WI] (3.0 cr)
- [WRIT 5671](#) - Visual Rhetoric (3.0 cr)

#### Outside Coursework (9 credits)

Select at least 9 credits outside the Department of Writing Studies, in consultation with the advisor or director of graduate studies.

Courses can be from the following list or others with approval of the advisor or director of graduate studies. Note: CI 5106, CI 5351, CI 5474, GDES 5372, MOT 5001, and MOT 5002 are not offered online.

- [CI 5106](#) - Multicultural Teaching and Learning in Diverse College Contexts (3.0 cr)
- [CI 5156](#) - Popular Culture, Teaching, and Learning (3.0 cr)
- [CI 5301](#) - Foundations of Computer Applications for Business and Education (3.0 cr)
- [CI 5307](#) - Technology for Teaching and Learning (1.5 cr)
- [CI 5323](#) - Online Learning Communities (3.0 cr)
- [CI 5325](#) - Designing and Developing Online Distance Learning (3.0 cr)
- [CI 5331](#) - Introduction to Learning Technologies (3.0 cr)
- [CI 5336](#) - Planning for Multimedia Design and Development (3.0 cr)
- [CI 5351](#) - Technology Tools for Educators (3.0 cr)
- [CI 5361](#) - Teaching and Learning with the Internet (2.0 - 3.0 cr)
- [CI 5362](#) - Foundations of Interactive Design for Web-based Learning (3.0 cr)
- [CI 5371](#) - Learning Analytics: Theory and Practice (3.0 cr)
- [CI 5472](#) - Teaching Critical Media Analysis in Schools (3.0 cr)
- [CI 5474](#) - New Literacies Frameworks and Instruction: Digital Texts and Digital Reading (3.0 cr)
- [CI 5475](#) - Teaching Digital Writing (3.0 cr)
- [COMM 5441](#) - Communication in Human Organizations (3.0 cr)
- [EPSY 5101](#) - Intelligence and Creativity (3.0 cr)
- [EPSY 5243](#) - Principles and Methods of Evaluation (3.0 cr)
- [EPSY 5261](#) - Introductory Statistical Methods (3.0 cr)
- [GDES 5372](#) - Data Visualization for Interactive Platforms (3.0 cr)
- [GDES 8361](#) - Color, Design, and Human Perception (3.0 cr)
- [HINF 5430](#) - Foundations of Health Informatics I (3.0 cr)
- [HINF 5502](#) - Python Programming Essentials for the Health Sciences (1.0 cr)
- [HINF 5510](#) - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)
- [HINF 5520](#) - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)
- [HINF 5531](#) - Health Data Analytics and Data Science (3.0 cr)
- [KIN 5202](#) - Current Issues in Health (2.0 cr)
- [MOT 5001](#) - Technological Business Fundamentals (2.0 cr)
- [MOT 5002](#) - Creating Technological Innovation (2.0 cr)
- [NURS 5115](#) - Interprofessional Health Care Informatics (3.0 cr)
- [NURS 5116](#) - Consumer Health Informatics (1.0 cr)
- [NURS 5925](#) - Grant Writing and Critique (1.0 cr)



- NURS 7118 - Human Factors and Human-Computer Interaction in Health Informatics (3.0 cr)
- OLPD 5201 - Strategies for Teaching Adults (3.0 cr)
- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)
- OLPD 5607 - Organization Development (3.0 cr)
- OLPD 5612 - International Human Resource Development (3.0 cr)
- OLPD 5616 - Training on the Internet (3.0 cr)
- PHAR 5201 - Applied Medical Terminology (2.0 cr)
- PHAR 5700 - Applied Fundamentals of Pharmacotherapy (3.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6735 - Principles of Health Policy (3.0 cr)
- PUBH 6741 - Ethics in Public Health: Professional Practice and Policy (1.0 cr)
- PUBH 7710 - Setting Priorities and Framing Public Health Issues (2.0 cr)



### *Twin Cities Campus*

## Scientific and Technical Communication Minor

Writing Studies Department

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Writing Studies, 215 Nolte Center, 315 Pillsbury Dr SE, Minneapolis, MN 55455; (612-624-3445; fax: 612-624-3617)

Email: [WRIT@umn.edu](mailto:WRIT@umn.edu)

Website: <https://cla.umn.edu/writing-studies>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Scientific and Technical Communication minor is available for masters-level students enrolled in other University graduate programs. Courses train students to apply basic theory and research-driven approaches to create and adapt content to solve complex problems in technical and scientific communication. The minor offers online courses in areas such as editing and style, writing with digital technologies, information design, and international professional communication. Coursework emphasizes collaboration with workplace professionals through client projects, virtual and global teamwork, mentorships, and emerging technologies and enables students to develop unique strengths in digital, usability, and/or science/health/medical communication.

### Program Delivery

This program is available:

- completely online (all program coursework can be completed online)

### Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Scientific and Technical Communication director of graduate studies, regarding feasibility and requirements.

Research master's and PhD students interested in rhetorical theory and history, technical communication, technology and culture, digital and new media studies, and writing pedagogy are encouraged to pursue the Rhetoric, Technical and Scientific Communication minor.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

At least a grade of B must be earned for each course applied to the minor. The minimum GPA is 3.00.

#### **Coursework (6 credits)**

##### **Core Course (3 credits)**

Take 3 credits of the following:

[WRIT 5112](#) - Information Design: Theory and Practice (3.0 cr)

##### **Electives (3 credits)**

Take 3 credits of electives. Courses can be from the following list or others with approval of the director of graduate studies

[WRIT 4501](#) - Usability and Human Factors in Technical Communication (3.0 cr)

[WRIT 4562](#) - International Professional Communication (3.0 cr)

[WRIT 4573W](#) - Writing Proposals and Grant Management [WI] (3.0 cr)

[WRIT 4664W](#) - Science, Medical, and Health Writing [WI] (3.0 cr)

[WRIT 5561](#) - Editing and Style for Technical Communicators (3.0 cr)



[WRIT 5662](#) - Writing With Digital Technologies (3.0 cr)

[WRIT 8505](#) - Professional Practice (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters



### *Twin Cities Campus*

## Sociology M.A.

Sociology

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Sociology, 909 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455 (612-624-4300; fax: 612-624-7020)

Email: [soc@umn.edu](mailto:soc@umn.edu)

Website: <http://cla.umn.edu/sociology/graduate>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 32 to 33
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Sociology graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Sociology PhD program.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

### **Special Application Requirements:**

Note: The Sociology graduate program does not accept applications directly to the MA; rather, the MA is an additional or alternative credential for students admitted to the Sociology PhD program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 17 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Coursework offered on both the A/F and S/N grade basis must be taken A/F with a minimum grade of B earned for each course.

### **Core Courses (14 Credits)**

Take the following courses. Take SOC 8001 twice for a total of 2 credits.

[SOC 8001](#) - Sociology as a Profession (1.0 cr)

[SOC 8701](#) - Sociological Theory (4.0 cr)

[SOC 8801](#) - Sociological Research Methods (4.0 cr)

[SOC 8811](#) - Advanced Social Statistics (4.0 cr)



### Qualitative Elective Coursework (3 credits)

Select one of the following courses.

- SOC 8851 - Advanced Qualitative Research Methods: In-Depth Interviewing (3.0 cr)
- SOC 8852 - Advanced Qualitative Research Methods: Ethnographic Practicum (3.0 cr)
- SOC 8853 - Advanced Qualitative Research Methods: Historical & Comparative Sociology (3.0 cr)

### Outside Coursework (6 credits)

Select 6 credits outside the major in consultation with the advisor.

- AFRO 8202 - Seminar: Intellectual History of Race (3.0 cr)
- AMST 8920 - Topics in American Studies (3.0 cr)
- ANTH 5041 - Ecological Anthropology (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)
- DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- GEOG 8230 - Theoretical Geography (3.0 cr)
- GEOG 8292 - Seminar in GIS: Spatial Analysis and Modeling (3.0 cr)
- GEOG 8294 - Spatiotemporal Modeling and Simulation (3.0 cr)
- GEOG 8970 - Directed Readings (1.0 - 5.0 cr)
- GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)
- GLOS 5403 - Human Rights Advocacy (3.0 cr)
- GLOS 5900 - Topics in Global Studies (1.0 - 4.0 cr)
- GRAD 8401 - Dissertation Proposal Development Seminar (3.0 cr)
- GWSS 5104 - Transnational Feminist Theory (3.0 cr)
- GWSS 8108 - Genealogies of Feminist Theory (3.0 cr)
- GWSS 8109 - Feminist Knowledge Production (3.0 cr)
- GWSS 8250 - Seminar: Nation, State, and Citizenship (1.0 - 3.0 cr)
- GWSS 8260 - Seminar: Race, Representation and Resistance (3.0 cr)
- GWSS 8270 - Seminar: Theories of Body (3.0 cr)
- GWSS 8995 - Directed Research (1.0 - 8.0 cr)
- HIST 5890 - Readings in American Indian and Indigenous History (3.0 cr)
- HIST 5902 - Latin America Proseminar: Modern (3.0 cr)
- HIST 5910 - Topics in U.S. History (1.0 - 4.0 cr)
- HIST 8900 - Topics in European/Medieval History (1.0 - 4.0 cr)
- HIST 8910 - Topics in U.S. History (1.0 - 4.0 cr)
- HIST 8920 - Topics in African History (1.0 - 4.0 cr)
- HIST 8960 - Topics in History (1.0 - 4.0 cr)
- HIST 8970 - Advanced Research in Quantitative History (3.0 cr)
- HIST 8993 - Directed Study (1.0 - 16.0 cr)
- JOUR 8503 - Seminar: Qualitative Methods in Mass Communication Research (3.0 cr)
- KIN 5126 - Social Psychology of Sport & Physical Activity (3.0 cr)
- LAW 6846 - Philosophy of Punishment (3.0 cr)
- LAW 6889 - Laws of War (3.0 cr)
- LING 5900 - Topics in Linguistics (1.0 - 4.0 cr)
- OLPD 5103 - Comparative Education (3.0 cr)
- OLPD 8095 - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)
- PA 5151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)
- PA 5281 - Immigrants, Urban Planning and Policymaking in the U.S. (3.0 cr)
- PA 5301 - Population Methods & Issues for the United States & Global South (3.0 cr)
- PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)
- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PA 5490 - Topics in Social Policy (1.0 - 4.0 cr)
- PA 5801 - Global Public Policy (3.0 cr)
- PA 5823 - Managing Humanitarian and Refugee Crises: Challenges for Policymakers & Practitioners (1.0 cr)
- PA 8151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- PA 8312 - Analysis of Discrimination (4.0 cr)
- PA 8331 - Economic Demography (3.0 cr)
- PA 8390 - Advanced Topics in Advanced Policy Analysis Methods (1.0 - 3.0 cr)
- PA 8461 - Global and U.S. Perspectives on Health and Mortality (3.0 cr)
- PA 8690 - Advanced Topics in Women, Gender and Public Policy (1.0 - 3.0 cr)
- PHIL 8310 - Seminar: Moral Philosophy (3.0 cr)
- POL 8160 - Topics in Models and Methods (3.0 cr)
- POL 8260 - Topics in Political Theory (3.0 cr)



POL 8660 - Topics in Comparative Politics (3.0 cr)  
PSY 8204 - Social Psychology of Prejudice and Intergroup Relations (3.0 cr)  
PSY 8205 - Principles of Social Psychology (3.0 cr)  
PSY 8208 - Social Psychology: The Self (3.0 cr)  
PUBH 6000 - Topics: Community Health Promotion (0.5 - 4.0 cr)  
PUBH 6370 - Social Epidemiology (2.0 cr)  
PUBH 6810 - Survey Research Methods (3.0 cr)  
PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)  
PUBH 6855 - Medical Sociology (3.0 cr)  
PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)  
PUBH 7462 - Advanced Programming and Data Analysis in R (2.0 cr)  
PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)  
PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)

### Plan Options

#### Plan A

Plan A students take 10 master's thesis credits.  
SOC 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

Plan B students select coursework from the following in consultation with the advisor:

SOC 5090 - Topics in Sociology (1.0 - 3.0 cr)  
SOC 5104 - Crime and Human Rights (3.0 cr)  
SOC 5246 - Disease, Disasters, and Other Killers [HIS, ENV] (3.0 cr)  
SOC 5315 - Never Again! Memory & Politics after Genocide [GP] (3.0 cr)  
SOC 5411 - Terrorist Networks & Counterterror Organizations (3.0 cr)  
SOC 5446 - Comparing Healthcare Systems [GP] (3.0 cr)  
SOC 5455 - Sociology of Education (3.0 cr)  
SOC 5511 - World Population Problems (3.0 cr)  
SOC 8090 - Topics in Sociology (1.5 - 3.0 cr)  
SOC 8093 - Directed Study (1.0 - 4.0 cr)  
SOC 8094 - Directed Research (1.0 - 4.0 cr)  
SOC 8101 - Sociology of Law (3.0 cr)  
SOC 8111 - Criminology (3.0 cr)  
SOC 8171 - Cross-Disciplinary Perspectives in Human Rights (3.0 cr)  
SOC 8190 - Topics in Law, Crime, and Deviance (3.0 cr)  
SOC 8211 - The Sociology of Race & Racialization (3.0 cr)  
SOC 8221 - Sociology of Gender (3.0 cr)  
SOC 8290 - Topics in Race, Class, Gender and other forms of Durable Inequality (3.0 cr)  
SOC 8311 - Political Sociology (3.0 cr)  
SOC 8390 - Topics in Political Sociology (3.0 cr)  
SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)  
SOC 8490 - Advanced Topics in Social Organization (3.0 cr)  
SOC 8501 - Sociology of the Family (3.0 cr)  
SOC 8540 - Topics in Family Sociology (3.0 cr)  
SOC 8551 - Life Course Inequality & Health (3.0 cr)  
SOC 8590 - Topics in Life Course Sociology (3.0 cr)  
SOC 8607 - Migration & Migrants in Demographic Perspective (3.0 cr)  
SOC 8701 - Sociological Theory (4.0 cr)  
SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)  
SOC 8731 - Sociology of Knowledge (3.0 cr)  
SOC 8735 - Sociology of Culture (3.0 cr)  
SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)  
SOC 8801 - Sociological Research Methods (4.0 cr)  
SOC 8811 - Advanced Social Statistics (4.0 cr)  
SOC 8851 - Advanced Qualitative Research Methods: In-Depth Interviewing (3.0 cr)  
SOC 8852 - Advanced Qualitative Research Methods: Ethnographic Practicum (3.0 cr)  
SOC 8853 - Advanced Qualitative Research Methods: Historical & Comparative Sociology (3.0 cr)  
SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)





### **Twin Cities Campus**

## **Sociology Minor**

Sociology

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Sociology, 909 Social Sciences Building, 267 19th Ave S, Minneapolis, MN 55455 (612-624-4300; fax: 612-624-7020)

Email: [soc@umn.edu](mailto:soc@umn.edu)

Website: <http://cla.umn.edu/sociology/graduate>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Through the exploration of social and individual dynamics, we prepare our students to enrich social scientific understandings of the complex problems societies face today. Research specialties include:

1. Demography, family, and life course
2. Global, transnational, and comparative sociology
3. Inequalities and culture
4. Law, crime, punishment, and human rights

Methodological training is available in historical and comparative research, survey research, network analysis, advanced statistical analysis, and qualitative research.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Sociology director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses applied to the minor must be approved by the Sociology director of graduate studies.

Courses applied to the minor that are offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of B earned for each.

The minimum cumulative GPA for minor field coursework is 3.00.

#### **Coursework (6 to 12 credits)**

Master's students select 6 credits, and doctoral students select 12 credits from the following in consultation with the Sociology director of graduate studies:

- [SOC 5090](#) - Topics in Sociology (1.0 - 3.0 cr)
- [SOC 5104](#) - Crime and Human Rights (3.0 cr)



- SOC 5246 - Disease, Disasters, and Other Killers [HIS, ENV] (3.0 cr)
- SOC 5315 - Never Again! Memory & Politics after Genocide [GP] (3.0 cr)
- SOC 5411 - Terrorist Networks & Counterterror Organizations (3.0 cr)
- SOC 5446 - Comparing Healthcare Systems [GP] (3.0 cr)
- SOC 5455 - Sociology of Education (3.0 cr)
- SOC 5511 - World Population Problems (3.0 cr)
- SOC 8090 - Topics in Sociology (1.5 - 3.0 cr)
- SOC 8093 - Directed Study (1.0 - 4.0 cr)
- SOC 8094 - Directed Research (1.0 - 4.0 cr)
- SOC 8101 - Sociology of Law (3.0 cr)
- SOC 8111 - Criminology (3.0 cr)
- SOC 8171 - Cross-Disciplinary Perspectives in Human Rights (3.0 cr)
- SOC 8190 - Topics in Law, Crime, and Deviance (3.0 cr)
- SOC 8211 - The Sociology of Race & Racialization (3.0 cr)
- SOC 8221 - Sociology of Gender (3.0 cr)
- SOC 8290 - Topics in Race, Class, Gender and other forms of Durable Inequality (3.0 cr)
- SOC 8311 - Political Sociology (3.0 cr)
- SOC 8390 - Topics in Political Sociology (3.0 cr)
- SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)
- SOC 8490 - Advanced Topics in Social Organization (3.0 cr)
- SOC 8501 - Sociology of the Family (3.0 cr)
- SOC 8540 - Topics in Family Sociology (3.0 cr)
- SOC 8551 - Life Course Inequality & Health (3.0 cr)
- SOC 8590 - Topics in Life Course Sociology (3.0 cr)
- SOC 8607 - Migration & Migrants in Demographic Perspective (3.0 cr)
- SOC 8701 - Sociological Theory (4.0 cr)
- SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)
- SOC 8731 - Sociology of Knowledge (3.0 cr)
- SOC 8735 - Sociology of Culture (3.0 cr)
- SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOC 8851 - Advanced Qualitative Research Methods: In-Depth Interviewing (3.0 cr)
- SOC 8852 - Advanced Qualitative Research Methods: Ethnographic Practicum (3.0 cr)
- SOC 8853 - Advanced Qualitative Research Methods: Historical & Comparative Sociology (3.0 cr)
- SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



**Twin Cities Campus**  
**Sociology Ph.D.**  
*Sociology*  
**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

**Contact Information:**

Department of Sociology, 909 Social Sciences Building, 267 19th Avenue South, Minneapolis, MN 55455 (612-624-4300; fax: 612-624-7020)

Email: [soc@umn.edu](mailto:soc@umn.edu)

Website: <http://cla.umn.edu/sociology/graduate>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 65
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Through the exploration of social and individual dynamics, students are prepared to enrich social scientific understandings of the complex problems societies face today. Research specialties include:

1. Demography, family, and life course
2. Global, transnational, and comparative sociology
3. Inequalities and culture
4. Law, crime, punishment, and human rights

Methodological training is available in historical and comparative research, survey research, network analysis, advanced statistical analysis, and qualitative research. The doctoral program is for students planning to do research or teach.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

An earned graduate or professional degree is not required for admission.

It is recommended that applicants have a background in basic sociology, usually consisting of the equivalent of 18 credits in undergraduate work (including 9 credits of social science statistical methods), or an MA degree in sociology or a closely related field. Individuals without sociology coursework are generally required to complete background coursework in theory and statistics during their first year of residence; such coursework cannot be applied to doctoral credit requirements.

### Special Application Requirements:

Applicants are evaluated on their academic potential, commitment to the field, creativity, and potential for contribution to the field. In addition to the University application form, and its required documents, applicants must submit the following: GRE scores; a sample of written work, usually a term paper, written in English; three letters of recommendation; and a personal statement of professional objectives. Non-native English speakers are required to take the TOEFL test, this includes students who have studied in the U.S. The department accepts new students for fall admission only. The application deadline is December 15.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95



- Internet Based - Listening Score: 22
- Internet Based - Writing Score: 24
- Internet Based - Reading Score: 22
- Internet Based - Speaking Score: 27

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

29 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 3 semesters must be completed before filing a Degree Program Form.

### Core Courses (14 Credits)

Take the following courses. Take SOC 8001 twice for a total of 2 credits.

[SOC 8001](#) - Sociology as a Profession (1.0 cr)

[SOC 8701](#) - Sociological Theory (4.0 cr)

[SOC 8801](#) - Sociological Research Methods (4.0 cr)

[SOC 8811](#) - Advanced Social Statistics (4.0 cr)

### Advanced Qualitative Research Methods (3 credits)

Take one of the following courses.

[SOC 8851](#) - Advanced Qualitative Research Methods: In-Depth Interviewing (3.0 cr)

[SOC 8852](#) - Advanced Qualitative Research Methods: Ethnographic Practicum (3.0 cr)

[SOC 8853](#) - Advanced Qualitative Research Methods: Historical & Comparative Sociology (3.0 cr)

### Sociology Electives (12 Credits)

Select elective coursework in consultation with the advisor.

[SOC 5090](#) - Topics in Sociology (1.0 - 3.0 cr)

[SOC 5104](#) - Crime and Human Rights (3.0 cr)

[SOC 5246](#) - Disease, Disasters, and Other Killers [HIS, ENV] (3.0 cr)

[SOC 5315](#) - Never Again! Memory & Politics after Genocide [GP] (3.0 cr)

[SOC 5411](#) - Terrorist Networks & Counterterror Organizations (3.0 cr)

[SOC 5446](#) - Comparing Healthcare Systems [GP] (3.0 cr)

[SOC 5455](#) - Sociology of Education (3.0 cr)

[SOC 5511](#) - World Population Problems (3.0 cr)

[SOC 8090](#) - Topics in Sociology (1.5 - 3.0 cr)

[SOC 8093](#) - Directed Study (1.0 - 4.0 cr)

[SOC 8094](#) - Directed Research (1.0 - 4.0 cr)

[SOC 8101](#) - Sociology of Law (3.0 cr)

[SOC 8111](#) - Criminology (3.0 cr)

[SOC 8171](#) - Cross-Disciplinary Perspectives in Human Rights (3.0 cr)

[SOC 8190](#) - Topics in Law, Crime, and Deviance (3.0 cr)

[SOC 8211](#) - The Sociology of Race & Racialization (3.0 cr)

[SOC 8221](#) - Sociology of Gender (3.0 cr)

[SOC 8290](#) - Topics in Race, Class, Gender and other forms of Durable Inequality (3.0 cr)

[SOC 8311](#) - Political Sociology (3.0 cr)

[SOC 8390](#) - Topics in Political Sociology (3.0 cr)

[SOC 8412](#) - Social Network Analysis: Theory and Methods (3.0 cr)

[SOC 8490](#) - Advanced Topics in Social Organization (3.0 cr)

[SOC 8501](#) - Sociology of the Family (3.0 cr)



- SOC 8540 - Topics in Family Sociology (3.0 cr)
- SOC 8551 - Life Course Inequality & Health (3.0 cr)
- SOC 8590 - Topics in Life Course Sociology (3.0 cr)
- SOC 8607 - Migration & Migrants in Demographic Perspective (3.0 cr)
- SOC 8701 - Sociological Theory (4.0 cr)
- SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)
- SOC 8731 - Sociology of Knowledge (3.0 cr)
- SOC 8735 - Sociology of Culture (3.0 cr)
- SOC 8790 - Advanced Topics in Sociological Theory (3.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOC 8851 - Advanced Qualitative Research Methods: In-Depth Interviewing (3.0 cr)
- SOC 8852 - Advanced Qualitative Research Methods: Ethnographic Practicum (3.0 cr)
- SOC 8853 - Advanced Qualitative Research Methods: Historical & Comparative Sociology (3.0 cr)
- SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)

#### Outside Coursework (12 credits)

Select 12 credits outside the major in consultation with the advisor.

- AFRO 8202 - Seminar: Intellectual History of Race (3.0 cr)
- AMST 8920 - Topics in American Studies (3.0 cr)
- ANTH 5041 - Ecological Anthropology (3.0 cr)
- ANTH 8203 - Research Methods in Social and Cultural Anthropology (3.0 cr)
- DSSC 8112 - Scholarship and Public Responsibility (1.0 cr)
- DSSC 8211 - Doctoral Research Workshop in Development Studies and Social Change (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- GEOG 8230 - Theoretical Geography (3.0 cr)
- GEOG 8292 - Seminar in GIS: Spatial Analysis and Modeling (3.0 cr)
- GEOG 8294 - Spatiotemporal Modeling and Simulation (3.0 cr)
- GEOG 8970 - Directed Readings (1.0 - 5.0 cr)
- GEOG 8980 - Topics: Geography (1.0 - 3.0 cr)
- GLOS 5403 - Human Rights Advocacy (3.0 cr)
- GLOS 5900 - Topics in Global Studies (1.0 - 4.0 cr)
- GRAD 8401 - Dissertation Proposal Development Seminar (3.0 cr)
- GWSS 5104 - Transnational Feminist Theory (3.0 cr)
- GWSS 8108 - Genealogies of Feminist Theory (3.0 cr)
- GWSS 8109 - Feminist Knowledge Production (3.0 cr)
- GWSS 8250 - Seminar: Nation, State, and Citizenship (1.0 - 3.0 cr)
- GWSS 8260 - Seminar: Race, Representation and Resistance (3.0 cr)
- GWSS 8270 - Seminar: Theories of Body (3.0 cr)
- GWSS 8995 - Directed Research (1.0 - 8.0 cr)
- HIST 5890 - Readings in American Indian and Indigenous History (3.0 cr)
- HIST 5902 - Latin America Proseminar: Modern (3.0 cr)
- HIST 5910 - Topics in U.S. History (1.0 - 4.0 cr)
- HIST 8900 - Topics in European/Medieval History (1.0 - 4.0 cr)
- HIST 8910 - Topics in U.S. History (1.0 - 4.0 cr)
- HIST 8920 - Topics in African History (1.0 - 4.0 cr)
- HIST 8960 - Topics in History (1.0 - 4.0 cr)
- HIST 8970 - Advanced Research in Quantitative History (3.0 cr)
- HIST 8993 - Directed Study (1.0 - 16.0 cr)
- JOUR 8503 - Seminar: Qualitative Methods in Mass Communication Research (3.0 cr)
- KIN 5126 - Social Psychology of Sport & Physical Activity (3.0 cr)
- LAW 6846 - Philosophy of Punishment (3.0 cr)
- LAW 6889 - Laws of War (3.0 cr)
- LING 5900 - Topics in Linguistics (1.0 - 4.0 cr)
- OLPD 5103 - Comparative Education (3.0 cr)
- OLPD 8095 - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)
- PA 5151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)
- PA 5281 - Immigrants, Urban Planning and Policymaking in the U.S. (3.0 cr)
- PA 5301 - Population Methods & Issues for the United States & Global South (3.0 cr)
- PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)
- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PA 5490 - Topics in Social Policy (1.0 - 4.0 cr)
- PA 5801 - Global Public Policy (3.0 cr)



- PA 5823 - Managing Humanitarian and Refugee Crises: Challenges for Policymakers & Practitioners (1.0 cr)
- PA 8151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- PA 8312 - Analysis of Discrimination (4.0 cr)
- PA 8331 - Economic Demography (3.0 cr)
- PA 8390 - Advanced Topics in Advanced Policy Analysis Methods (1.0 - 3.0 cr)
- PA 8461 - Global and U.S. Perspectives on Health and Mortality (3.0 cr)
- PA 8690 - Advanced Topics in Women, Gender and Public Policy (1.0 - 3.0 cr)
- PHIL 8310 - Seminar: Moral Philosophy (3.0 cr)
- POL 8160 - Topics in Models and Methods (3.0 cr)
- POL 8260 - Topics in Political Theory (3.0 cr)
- POL 8660 - Topics in Comparative Politics (3.0 cr)
- PSY 8204 - Social Psychology of Prejudice and Intergroup Relations (3.0 cr)
- PSY 8205 - Principles of Social Psychology (3.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- PUBH 6000 - Topics: Community Health Promotion (0.5 - 4.0 cr)
- PUBH 6370 - Social Epidemiology (2.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)
- PUBH 7462 - Advanced Programming and Data Analysis in R (2.0 cr)
- PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)
- PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)

**Thesis Credits**

Take 24 doctoral thesis credits.

- SOC 8888 - Thesis Credits: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Speech-Language-Hearing Science M.A.**

*Speech-Language-Hearing Sciences*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Speech-Language-Hearing-Sciences, 115 Shevlin Hall, 164 Pillsbury Drive SE, Minneapolis, MN 55455 (612-624-3322; fax: 612-624-7586)

Email: [slhsgrad@umn.edu](mailto:slhsgrad@umn.edu)

Website: <http://www.slhs.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36 to 60
- This program requires summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Speech-Language-Hearing Sciences offers an MA with three tracks: speech-language pathology, audiology, and speech-language-hearing sciences; however, the department only accepts MA applications for the speech-language pathology track. The speech-language pathology track focuses on meeting standards for certification as a speech-language pathologist by the American Speech-Language-Hearing Association. It emphasizes outcome-based learning activities that prepare graduates to interpret research findings and incorporate them into clinical practice. Coursework and clinical education focus on diagnostic, rehabilitative techniques, technology counseling approaches, and human development.

Individuals interested in pursuing an advanced degree in audiology should apply directly to the audiology AuD program. Students admitted to the AuD are eligible to apply for the MA with an audiology track.

The Speech-Language Pathology MA program at the University of Minnesota - Twin Cities is accredited by the Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) of the American Speech-Language-Hearing Association, 2200 Research Boulevard #310, Rockville, Maryland 20850, 800-498-2071 or 301-296-5700.

### **Accreditation**

This program is accredited by Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Prerequisite coursework includes undergraduate transcript credit in physical science, biological science, social/behavioral science, and statistics.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS



- Total Score: 6.5

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 44 to 50 major credits, 0 to 6 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 30 to 60 major credits and 0 to 6 credits outside the major. The final exam is written and oral.

**Plan C:** Plan C requires 48 to 54 major credits and 0 to 6 credits outside the major. The final exam is written.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

### Related Fields

Take 6 or more credit(s) from the following:

- ABUS 4022W** - Management in Organizations [WI] (3.0 cr)
- ABUS 4023W** - Communicating for Results [WI] (3.0 cr)
- ABUS 4041** - Dynamics of Leadership (3.0 cr)
- ABUS 4104** - Management and Human Resource Practices (3.0 cr)
- ADDS 5021** - Introduction to Evidence Based Practices and the Helping Relationship (3.0 cr)
- BTHX 5000** - Topics in Bioethics (1.0 - 4.0 cr)
- BTHX 5100** - Introduction to Clinical Ethics (3.0 cr)
- CGSC 8410** - Perspectives in Learning, Perception, and Cognition (2.0 cr)
- CI 5451** - Teaching Reading in Middle and Secondary Grades (3.0 cr)
- CI 5642** - Assessing English Learners (3.0 cr)
- CI 5653** - Methods in Teaching English as a Second Language (ESL) in Higher Education (3.0 cr)
- CPSY 4302** - Infant Development (3.0 cr)
- CPSY 4329** - Biological Foundations of Development (3.0 cr)
- CPSY 4341** - Perceptual Development (3.0 cr)
- CPSY 4343** - Cognitive Development (3.0 cr)
- CSPH 5101** - Introduction to Integrative Healing Practices (3.0 cr)
- CSPH 5111** - Ways of Thinking about Health (2.0 cr)
- CSPH 5708** - Mind-Body Science and the Art of Transformation (1.0 cr)
- CSPH 5806** - Wellbeing and Resiliency for Health Professionals (1.0 cr)
- CSPH 5807** - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)
- EPSY 5101** - Intelligence and Creativity (3.0 cr)
- EPSY 5135** - Human Relations Workshop (4.0 cr)
- EPSY 5400** - Special Topics in Counseling Psychology (1.0 - 4.0 cr)
- EPSY 5415** - Child and Adolescent Development and Counseling (4.0 cr)
- EPSY 5451** - College Students Today (3.0 cr)
- EPSY 5461** - Cross-Cultural Counseling (3.0 cr)
- EPSY 5609** - Family-centered Services (3.0 cr)
- EPSY 5616W** - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)
- EPSY 5625** - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)
- EPSY 5641** - Foundations of Deaf Education (3.0 cr)
- EPSY 5642** - Early Intervention for Infants, Toddlers and Families: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5643** - Seminar: Identity, Culture and Diversity in Deaf Education (2.0 cr)
- EPSY 5644** - Early Childhood Language and Literacy Development and Best Practices: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5645** - Deaf Plus: Educating and Understanding Deaf Students with Disabilities (1.0 cr)
- EPSY 5654** - Current Research, Issues Trends in Deaf Education (1.0 cr)
- EPSY 5657** - Interventions for Behavioral Problems in School Settings (3.0 cr)
- EPSY 5661** - Introduction to Autism Spectrum Disorder (3.0 cr)
- EPSY 5663** - Assessment and Intervention for Individuals with Autism Spectrum Disorder (3.0 cr)





- EPSY 5681** - Educating Preschoolers with Disabilities: Specialized Approaches and Interventions (3.0 cr)
- EPSY 5851** - Engaging Diverse Students and Families (3.0 cr)
- EPSY 8600** - Special Topics: Special Education Issues (1.0 - 3.0 cr)
- FSOS 4107** - Traumatic Stress and Resilience in Vulnerable Families Across the Lifespan (3.0 cr)
- FSOS 5937** - Parent-Child Interaction (3.0 cr)
- FSOS 5942** - Diverse Family Experiences (3.0 cr)
- FSOS 8101** - Family Stress, Coping, and Adaptation (3.0 cr)
- GCC 5022** - The Human Experience of Sensory Loss: Seeking Equitable and Effective Solutions [TS] (3.0 cr)
- GERO 5125** - Gerontology Service Learning (3.0 cr)
- HINF 5501** - US Health Care System: Information Challenges in Clinical Care (1.0 cr)
- HSM 4065** - Information Privacy and Security in Health Services Management [TS] (3.0 cr)
- HSM 4531** - Human Resources in Health Care Settings (3.0 cr)
- KIN 8211** - Seminar: Perception and Action (3.0 cr)
- LING 8921** - Seminar in Language and Cognition (3.0 cr)
- NSCI 5101** - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)
- NSCI 5111** - Medical Neuroscience for Graduate Students (5.0 cr)
- OLPD 5211** - Introduction to the Undereducated Adult (1.0 cr)
- OLPD 5356** - Disability Policy and Services (3.0 cr)
- OTOL 8234** - Anatomy of the Head and Neck and Temporal Bone Dissection (2.0 cr)
- OTOL 8247** - Anatomy and Physiology of Hearing and Balance (3.0 cr)
- PA 5451** - Immigration, Health and Public Policy (3.0 cr)
- PHAR 5201** - Applied Medical Terminology (2.0 cr)
- PSY 4036** - Perceptual Issues in Visual Impairment (3.0 cr)
- PSY 4960** - Seminar in Psychology (1.0 - 4.0 cr)
- PSY 5014** - Psychology of Human Learning and Memory (3.0 cr)
- PSY 5037** - Psychology of Hearing (3.0 cr)
- PSY 5054** - Psychology of Language (3.0 cr)
- PSY 5062** - Cognitive Neuropsychology (3.0 cr)
- PSY 5137** - Introduction to Behavioral Genetics (3.0 cr)
- PSY 5138** - Adult Development and Aging (3.0 cr)
- PSY 5205** - Applied Social Psychology (3.0 cr)
- PSY 5960** - Topics in Psychology (1.0 - 4.0 cr)
- PSY 8037** - Psychophysics and Audition (3.0 cr)
- PUBH 6055** - Social Inequalities in Health (2.0 cr)
- PUBH 6370** - Social Epidemiology (2.0 cr)
- PUBH 6751** - Principles of Management in Health Services Organizations (2.0 cr)
- PUBH 6904** - Nutrition and Aging (2.0 cr)
- PUBH 8805** - Sociological Theory in Health Services Research (3.0 cr)
- SLHS 5602** - Speech Sound Disorders: Assessment and Treatment across Languages (3.0 cr)
- SLHS 5603** - Assessment and Intervention of Language Disorders in Children (3.0 cr)
- SLHS 5609** - Child Language Disorders in Diverse Populations (3.0 cr)
- SLHS 5900** - Topic in Speech-Language-Hearing Sciences (2.0 cr)
- SLHS 5993** - Directed Study (1.0 - 12.0 cr)
- SLHS 8530** - Seminar: Speech (3.0 cr)
- SOC 4246** - Sociology of Health and Illness (3.0 cr)
- SPAN 5985** - Sociolinguistic Perspectives on Spanish in the United States (3.0 cr)

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Speech-Language Pathology

This sub-plan is limited to students completing the program under Plan A or Plan C.

The speech-language pathology program emphasizes outcome-based learning activities that prepare graduates to interpret research findings and incorporate them into clinical practice. Coursework and clinical education focus on diagnostic, rehabilitative techniques, technology counseling approaches, and human development. This sub-plan is accredited by the American Speech-Language-Hearing Association for certification in speech-language pathology.

Students in this sub-plan may elect the Plan A option (60-credit minimum) or the Plan C option (54-credit minimum).

### Speech Language Pathology: Required Courses



- SLHS 5401 - Counseling and Professional Issues (3.0 cr)
- SLHS 5502 - Voice and Cleft Palate (3.0 cr)
- SLHS 5503 - Fluency and Motor Speech Disorders (3.0 cr)
- SLHS 5504 - Evaluation and Management of Dysphagia (3.0 cr)
- SLHS 5602 - Speech Sound Disorders: Assessment and Treatment across Languages (3.0 cr)
- SLHS 5603 - Assessment and Intervention of Language Disorders in Children (3.0 cr)
- SLHS 5605 - Language and Cognitive Disorders in Adults (3.0 cr)
- SLHS 5606 - Introduction to Augmentative and Alternative Communication (3.0 cr)

**Clinical Education in Speech-Language Pathology**

Take exactly 17 credit(s) from the following:

- SLHS 8720 - Clinical Education in Speech-Language Pathology (1.0 - 8.0 cr)

**Clinical Education in Audiology**

Take exactly 1 credit(s) from the following:

- SLHS 8820 - Clinical Education in Audiology (1.0 - 8.0 cr)
- SLHS 5609 - Child Language Disorders in Diverse Populations (3.0 cr)

**Related Fields**

In addition to the other Related Fields options, SLP students can use the following course to fulfill their requirement

Take 0 or more course(s) from the following:

- SLHS 5804 - Cochlear Implants (3.0 cr)
- SLHS 5805 - Advanced Rehabilitative Audiology (3.0 cr)

**Plans Options for Speech-Language Pathology Track**

**Plan A**

Take exactly 10 credit(s) from the following:

- SLHS 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan C**

Take exactly 4 credit(s) from the following:

- SLHS 8994 - Directed Research (1.0 - 12.0 cr)

**Audiology**

This sub-plan is limited to students completing the program under Plan B.

The audiology program emphasizes outcome-based learning activities that prepare graduates to interpret research findings and incorporate them into clinical practice. Coursework and clinical education focus on diagnostic, rehabilitative techniques, technology counseling approaches, and human development.

The audiology sub-plan requires a total of 60 credits, and a Plan B comprehensive written exam and a final oral examination.

**Audiology Track: Required Courses**

- SLHS 5401 - Counseling and Professional Issues (3.0 cr)
- SLHS 5801 - Advanced Audiologic Assessment (3.0 cr)
- SLHS 5802 - Hearing Aids I (3.0 cr)
- SLHS 5803 - Pediatric Audiology (3.0 cr)
- SLHS 5804 - Cochlear Implants (3.0 cr)
- SLHS 5805 - Advanced Rehabilitative Audiology (3.0 cr)
- SLHS 5806 - Auditory Processing Disorders (3.0 cr)
- SLHS 5807 - Noise and Hearing Conservation (3.0 cr)
- SLHS 5808 - Pathophysiology of Hearing Disorders (3.0 cr)
- SLHS 8801 - Electrophysiologic Assessment of Auditory Function (3.0 cr)
- SLHS 8802 - Hearing Aids II (3.0 cr)
- SLHS 8803 - Signals and Systems in Audiology (3.0 cr)
- SLHS 8805 - Hearing Science Foundations of Audiology (3.0 cr)
- SLHS 8807 - Balance Assessment (3.0 cr)

**Laboratory Module in Audiology**

Take exactly 2 credit(s) from the following:

- SLHS 5810 - Laboratory Module in Audiology (1.0 - 2.0 cr)

**Clinical Research and Practice: Grand Rounds**

Take exactly 4 credit(s) from the following:

- SLHS 5820 - Clinical Research and Practice: Grand Rounds (1.0 - 6.0 cr)

**Clinical Foundations in Audiology**

Take exactly 2 credit(s) from the following:



- [SLHS 5830](#) - Clinical Foundations in Audiology (1.0 - 8.0 cr)
- [SLHS 5609](#) - Child Language Disorders in Diverse Populations (3.0 cr)

#### **Related Fields**

In addition to the other Related Fields course options, students in the AuD track can use the following courses to fulfill the Related Fields requirement

Take 0 or more course(s) from the following:

- [SLHS 5602](#) - Speech Sound Disorders: Assessment and Treatment across Languages (3.0 cr)
- [SLHS 5603](#) - Assessment and Intervention of Language Disorders in Children (3.0 cr)

#### **Plan B Audiology Track**

##### **Directed Research**

Take exactly 4 credit(s) from the following:

- [SLHS 8994](#) - Directed Research (1.0 - 12.0 cr)

##### **Speech-Language-Hearing Sciences (SLHS)**

This sub-plan is limited to students completing the program under Plan B.

##### **Speech-Language-Hearing Sciences Track: Required Courses**

- [SLHS 5401](#) - Counseling and Professional Issues (3.0 cr)
- [SLHS 5502](#) - Voice and Cleft Palate (3.0 cr)
- [SLHS 5503](#) - Fluency and Motor Speech Disorders (3.0 cr)
- [SLHS 5504](#) - Evaluation and Management of Dysphagia (3.0 cr)
- [SLHS 5602](#) - Speech Sound Disorders: Assessment and Treatment across Languages (3.0 cr)
- [SLHS 5603](#) - Assessment and Intervention of Language Disorders in Children (3.0 cr)
- [SLHS 5605](#) - Language and Cognitive Disorders in Adults (3.0 cr)
- [SLHS 5606](#) - Introduction to Augmentative and Alternative Communication (3.0 cr)
- [SLHS 5608](#) - Clinical Issues in Bilingualism and Cultural Diversity (3.0 cr)

#### **Plan B Speech-Language-Hearing Sciences Track**

##### **Directed Research**

Take exactly 4 credit(s) from the following:

- [SLHS 8994](#) - Directed Research (1.0 - 12.0 cr)



### **Twin Cities Campus**

## **Speech-Language-Hearing Sciences Minor**

*Speech-Language-Hearing Sciences*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Speech-Language-Hearing Sciences, 115 Shevlin Hall, 164 Pillsbury Drive SE, Minneapolis, MN 55455 (612-624-3322; fax: 612-624-7586)

Email: [slhs@umn.edu](mailto:slhs@umn.edu)

Website: <http://www.slhs.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 12
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Emphasis in the graduate program is speech-language pathology and audiology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

The approval of the SLHS director of graduate studies is required prior to registration for any 4xxx-level minor field coursework.

#### **Speech Language Pathology Focus**

Take 12 or more credit(s) from the following:

- [SLHS 5502](#) - Voice and Cleft Palate (3.0 cr)
- [SLHS 5503](#) - Fluency and Motor Speech Disorders (3.0 cr)
- [SLHS 5504](#) - Evaluation and Management of Dysphagia (3.0 cr)
- [SLHS 5602](#) - Speech Sound Disorders: Assessment and Treatment across Languages (3.0 cr)
- [SLHS 5603](#) - Assessment and Intervention of Language Disorders in Children (3.0 cr)
- [SLHS 5605](#) - Language and Cognitive Disorders in Adults (3.0 cr)
- [SLHS 5606](#) - Introduction to Augmentative and Alternative Communication (3.0 cr)
- [SLHS 5608](#) - Clinical Issues in Bilingualism and Cultural Diversity (3.0 cr)

#### **Audiology Focus**

Take 12 or more course(s) from the following:

- [SLHS 4801](#) - Hearing Measurement and Disorders (3.0 cr)
- [SLHS 4802](#) - Rehabilitative Audiology (3.0 cr)
- [SLHS 5801](#) - Advanced Audiologic Assessment (3.0 cr)
- [SLHS 5802](#) - Hearing Aids I (3.0 cr)
- [SLHS 5803](#) - Pediatric Audiology (3.0 cr)
- [SLHS 5804](#) - Cochlear Implants (3.0 cr)
- [SLHS 5805](#) - Advanced Rehabilitative Audiology (3.0 cr)
- [SLHS 5806](#) - Auditory Processing Disorders (3.0 cr)



- SLHS 5807 - Noise and Hearing Conservation (3.0 cr)
- SLHS 5808 - Pathophysiology of Hearing Disorders (3.0 cr)
- SLHS 5810 - Laboratory Module in Audiology (1.0 - 2.0 cr)
- SLHS 5820 - Clinical Research and Practice: Grand Rounds (1.0 - 6.0 cr)
- SLHS 5830 - Clinical Foundations in Audiology (1.0 - 8.0 cr)
- SLHS 8801 - Electrophysiologic Assessment of Auditory Function (3.0 cr)
- SLHS 8802 - Hearing Aids II (3.0 cr)
- SLHS 8803 - Signals and Systems in Audiology (3.0 cr)
- SLHS 8805 - Hearing Science Foundations of Audiology (3.0 cr)
- SLHS 8807 - Balance Assessment (3.0 cr)

#### **Combined Speech Language Pathology and Audiology Focus**

Take 12 or more credit(s) from the following:

- SLHS 4301 - Introduction to the Neuroscience of Human Communication (3.0 cr)
- SLHS 4402 - Assessment and Treatment in Speech-Language Pathology (3.0 cr)
- SLHS 5401 - Counseling and Professional Issues (3.0 cr)
- SLHS 5900 - Topic in Speech-Language-Hearing Sciences (2.0 cr)
- SLHS 5993 - Directed Study (1.0 - 12.0 cr)
- SLHS 8410 - Seminar: Research (3.0 cr)
- SLHS 8420 - Seminar: Teaching (3.0 cr)
- SLHS 8530 - Seminar: Speech (3.0 cr)

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### ***Twin Cities Campus***

## **Speech-Language-Hearing Sciences Ph.D.**

*Speech-Language-Hearing Sciences*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Speech-Language-Hearing Sciences, 115 Shevlin Hall, 164 Pillsbury Dr SE, Minneapolis, MN 55455 (612-624-3322; fax: 612-624-7586)

Email: [slhsgrad@umn.edu](mailto:slhsgrad@umn.edu)

Website: <http://www.slhs.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 65
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Emphases in the PhD program are speech-language pathology, audiology, speech science, language science, or hearing science. The program prepares students for careers in research, teaching, and advanced clinical applications. Most students entering the program have a master's degree in speech-language pathology, audiology, or a related area. The PhD degree usually requires three or more years of work beyond the master's degree. In general, a student's program is designed by the student in consultation with the advisor to satisfy the particular objectives of the student and program requirements.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

29 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.



A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

The PhD degree usually requires three years of work beyond the master's degree. In general, a student's program is designed by the student in consultation with the advisor to satisfy the particular objectives of the student, but there are also some department and University requirements that must be satisfied. These include coursework, research activities, teaching experience, and preliminary and final exams.

A minimum of 12 course credits in a minor or supporting program and registration for 24 thesis credits are required. Also required is a statistics sequence, for which students typically register during their first two years. The written and oral preliminary exams are taken at the end of the second year.

Each student completes a seminar (SLHS 8430) and a minimum of 4 credits of teaching experience that provide an opportunity for the student to develop and teach sections of department courses. Students also complete a seminar (SLHS 8410) and a minimum of 4 credits of research under the direction of one or more faculty members in the department other than the advisor.

## Required Courses

### Seminar Requirements

SLHS 8410 - Seminar: Research (3.0 cr)

SLHS 8420 - Seminar: Teaching (3.0 cr)

or GRAD 8101 - Teaching in Higher Education (3.0 cr)

Take 6 or more credit(s) from the following:

- SLHS 8430 - Proseminar in Speech-Language-Hearing Sciences (1.0 - 6.0 cr)

### Directed Research Requirement

Take 4 or more credit(s) from the following:

- SLHS 8994 - Directed Research (1.0 - 12.0 cr)

### Directed Teaching Requirement

Take 4 or more credit(s) from the following:

- SLHS 5993 - Directed Study (1.0 - 12.0 cr)

### Statistics

EPSY 5261 - Introductory Statistical Methods (3.0 cr)

or EPSY 8251 - Statistical Methods in Education I (3.0 cr)

EPSY 5262 - Intermediate Statistical Methods (3.0 cr)

or EPSY 8252 - Statistical Methods in Education II (3.0 cr)

### Statistics Electives

Take 3 or more credit(s) from the following:

- EPSY 8220 - Special Topics: Seminar in Quantitative Methods (1.0 - 6.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8222 - Advanced Measurement: Theory and Application (4.0 cr)
- EPSY 8224 - Performance Assessment Design and Analysis (3.0 cr)
- EPSY 8225 - Operational Measurement: Test Score Quality Assurance, Standard Setting, and Equating (3.0 cr)
- EPSY 8226 - Item Response Models: Theory and Applications (3.0 cr)
- STAT 4101 - Theory of Statistics I (4.0 cr)
- STAT 4102 - Theory of Statistics II (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5031 *{Inactive}*(4.0 cr)
- STAT 5101 - Theory of Statistics I (4.0 cr)
- STAT 5102 - Introduction to Statistical Learning (4.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 5701 - Statistical Computing (3.0 cr)
- STAT 5931 - Topics in Statistics (3.0 cr)
- STAT 5993 - Tutorial (1.0 - 6.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)



- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- STAT 8102 - Theory of Statistics 2 (3.0 cr)
- STAT 8111 - Mathematical Statistics I (3.0 cr)
- STAT 8112 - Mathematical Statistics II (3.0 cr)
- STAT 8311 - Linear Models (4.0 cr)
- STAT 8801 - Statistical Consulting (3.0 cr)
- STAT 8913 - Literature Seminar (1.0 cr)
- STAT 8931 - Advanced Topics in Statistics (3.0 cr)
- STAT 8932 - Advanced Topics in Statistics (3.0 cr)
- STAT 4893W - Consultation and Communication for Statisticians [WI] (3.0 cr)

#### Thesis Credits

Take at least 24 doctoral thesis credits.

SLHS 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

#### Electives in Related Fields

##### Electives in Related Fields

Take 12 or more credit(s) from the following:

- ADDS 5021 - Introduction to Evidence Based Practices and the Helping Relationship (3.0 cr)
- BMEN 5101 - Advanced Bioelectricity and Instrumentation (3.0 cr)
- BMEN 5411 - Neural Engineering (3.0 cr)
- BMEN 5412 - Neuromodulation (3.0 cr)
- BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)
- BMEN 8502 - Physiological Control Systems (3.0 cr)
- BTHX 5000 - Topics in Bioethics (1.0 - 4.0 cr)
- BTHX 5100 - Introduction to Clinical Ethics (3.0 cr)
- CGSC 8410 - Perspectives in Learning, Perception, and Cognition (2.0 cr)
- CI 5451 - Teaching Reading in Middle and Secondary Grades (3.0 cr)
- CI 5642 - Assessing English Learners (3.0 cr)
- CI 5653 - Methods in Teaching English as a Second Language (ESL) in Higher Education (3.0 cr)
- CPSY 4302 - Infant Development (3.0 cr)
- CPSY 4329 - Biological Foundations of Development (3.0 cr)
- CPSY 4341 - Perceptual Development (3.0 cr)
- CPSY 4343 - Cognitive Development (3.0 cr)
- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- CSPH 5111 - Ways of Thinking about Health (2.0 cr)
- CSPH 5708 - Mind-Body Science and the Art of Transformation (1.0 cr)
- CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)
- CSPH 5807 - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)
- EPSY 5101 - Intelligence and Creativity (3.0 cr)
- EPSY 5135 - Human Relations Workshop (4.0 cr)
- EPSY 5400 - Special Topics in Counseling Psychology (1.0 - 4.0 cr)
- EPSY 5415 - Child and Adolescent Development and Counseling (4.0 cr)
- EPSY 5451 - College Students Today (3.0 cr)
- EPSY 5461 - Cross-Cultural Counseling (3.0 cr)
- EPSY 5609 - Family-centered Services (3.0 cr)
- EPSY 5616W - Classroom Management and Behavior Analytic Problem Solving [WI] (3.0 cr)
- EPSY 5625 - Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction (2.0 cr)
- EPSY 5641 - Foundations of Deaf Education (3.0 cr)
- EPSY 5642 - Early Intervention for Infants, Toddlers and Families: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5644 - Early Childhood Language and Literacy Development and Best Practices: Deaf and Hard of Hearing (3.0 cr)
- EPSY 5657 - Interventions for Behavioral Problems in School Settings (3.0 cr)
- EPSY 5661 - Introduction to Autism Spectrum Disorder (3.0 cr)
- EPSY 5663 - Assessment and Intervention for Individuals with Autism Spectrum Disorder (3.0 cr)
- EPSY 5681 - Educating Preschoolers with Disabilities: Specialized Approaches and Interventions (3.0 cr)
- EPSY 8600 - Special Topics: Special Education Issues (1.0 - 3.0 cr)
- FSOS 5937 - Parent-Child Interaction (3.0 cr)
- FSOS 5942 - Diverse Family Experiences (3.0 cr)
- FSOS 8101 - Family Stress, Coping, and Adaptation (3.0 cr)
- GERO 5125 - Gerontology Service Learning (3.0 cr)
- HINF 5501 - US Health Care System: Information Challenges in Clinical Care (1.0 cr)
- KIN 8211 - Seminar: Perception and Action (3.0 cr)
- LING 8921 - Seminar in Language and Cognition (3.0 cr)
- NSC 5561 - Systems Neuroscience (4.0 cr)





- NSCI 5101 - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)
- NSCI 5111 - Medical Neuroscience for Graduate Students (5.0 cr)
- OLPD 5211 - Introduction to the Undereducated Adult (1.0 cr)
- OLPD 5356 - Disability Policy and Services (3.0 cr)
- OTOL 8234 - Anatomy of the Head and Neck and Temporal Bone Dissection (2.0 cr)
- OTOL 8247 - Anatomy and Physiology of Hearing and Balance (3.0 cr)
- PHAR 5201 - Applied Medical Terminology (2.0 cr)
- PSY 4036 - Perceptual Issues in Visual Impairment (3.0 cr)
- PSY 4960 - Seminar in Psychology (1.0 - 4.0 cr)
- PSY 5014 - Psychology of Human Learning and Memory (3.0 cr)
- PSY 5054 - Psychology of Language (3.0 cr)
- PSY 5062 - Cognitive Neuropsychology (3.0 cr)
- PSY 5137 - Introduction to Behavioral Genetics (3.0 cr)
- PSY 5138 - Adult Development and Aging (3.0 cr)
- PSY 5205 - Applied Social Psychology (3.0 cr)
- PSY 5960 - Topics in Psychology (1.0 - 4.0 cr)
- PSY 8037 - Psychophysics and Audition (3.0 cr)
- PUBH 6370 - Social Epidemiology (2.0 cr)
- PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)
- PUBH 6904 - Nutrition and Aging (2.0 cr)
- PUBH 8805 - Sociological Theory in Health Services Research (3.0 cr)
- SLHS 5900 - Topic in Speech-Language-Hearing Sciences (2.0 cr)
- SLHS 8530 - Seminar: Speech (3.0 cr)
- SOC 4246 - Sociology of Health and Illness (3.0 cr)
- SPAN 5985 - Sociolinguistic Perspectives on Spanish in the United States (3.0 cr)

**Joint- or Dual-degree Coursework:** AuD and PhD in Speech-Language-Hearing Sciences Student may take a total of 9 credits in common among the academic programs.



### **Twin Cities Campus**

## **Statistics M.S.**

*Statistics, School of*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

School of Statistics, 313 Ford Hall, 224 Church Street SE, Minneapolis, MN 55455 (612-624-8046; fax: 612-624-8868)

Email: [info@stat.umn.edu](mailto:info@stat.umn.edu)

Website: <http://www.stat.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The School of Statistics is the primary venue at the University for research, teaching, and dissemination of the theory, methodology, and applications of statistical procedures. Students may specialize in any area of statistics. The core program for all students has strong components of both theoretical and applied statistics.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

A maximum of 9.0 S/N credits can be applied to degree requirements.



## Required Coursework

### Core Courses (18 credits)

Take the following courses:

- STAT 5701 - Statistical Computing (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8101 - Theory of Statistics 1 (3.0 cr)
- STAT 8102 - Theory of Statistics 2 (3.0 cr)
- STAT 8801 - Statistical Consulting (3.0 cr)

### Statistics Electives (6 credits)

Select 6 credits from the following in consultation with the advisor. Other courses may be selected with advisor approval.

- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- PUBH 7450 - Survival Analysis (3.0 cr)
- PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)
- PUBH 8472 - Spatial Biostatistics (3.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- STAT 8111 - Mathematical Statistics I (3.0 cr)
- STAT 8112 - Mathematical Statistics II (3.0 cr)
- STAT 8931 - Advanced Topics in Statistics (3.0 cr)
- STAT 8932 - Advanced Topics in Statistics (3.0 cr)

### Outside Coursework (6 credits)

Select 6 credits outside the major in consultation with the advisor. Other courses may be selected with advisor approval.

- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)
- IE 8521 - Optimization (4.0 cr)
- MATH 5075 - Mathematics of Options, Futures, and Derivative Securities I (4.0 cr)
- MATH 5076 - Mathematics of Options, Futures, and Derivative Securities II (4.0 cr)
- MATH 5652 - Introduction to Stochastic Processes (4.0 cr)
- POL 8124 - Game Theory (3.0 cr)
- POL 8125 - Dynamic Analysis (3.0 cr)
- PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)



### *Twin Cities Campus*

## Statistics Minor

*Statistics, School of*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Statistics, 313 Ford Hall, 224 Church Street SE, Minneapolis, MN 55455 ( 612-625-8046; fax: 612-624-8868)

Email: [info@stat.umn.edu](mailto:info@stat.umn.edu)

Website: <http://www.catalogs.umn.edu/grad/programs/g164.html>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 14
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The School of Statistics is the primary venue at the University for research, teaching, and dissemination of the theory, methodology, and applications of statistical procedures. Students may specialize in any area of statistics. The core program for all students has strong components of both theoretical and applied statistics.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Statistics director of graduate studies regarding feasibility and requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B- earned for each, unless otherwise approved by the Statistics director of graduate studies.

Doctoral students cannot apply 4-level courses or STAT 5021 to the minor.

The minimum cumulative GPA for minor field coursework is 2.80.

#### **Coursework (9 to 14 credits)**

Masters students select 9 credits, and doctoral students select 14 credits from the following in consultation with their advisor and the Statistics director of graduate studies.

[STAT 4051](#) - Applied Statistics I (4.0 cr)



STAT 4052 - Introduction to Statistical Learning (4.0 cr)  
STAT 4101 - Theory of Statistics I (4.0 cr)  
STAT 4102 - Theory of Statistics II (4.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Introduction to Statistical Learning (4.0 cr)  
STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5421 - Analysis of Categorical Data (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 5601 - Nonparametric Methods (3.0 cr)  
STAT 5701 - Statistical Computing (3.0 cr)  
STAT 5931 - Topics in Statistics (3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)  
STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)  
STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)  
STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)  
STAT 8056 - Statistical Learning and Data Mining (3.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)  
STAT 8102 - Theory of Statistics 2 (3.0 cr)  
STAT 8111 - Mathematical Statistics I (3.0 cr)  
STAT 8112 - Mathematical Statistics II (3.0 cr)  
STAT 8201 - Topics in Sampling (3.0 cr)  
STAT 8311 - Linear Models (4.0 cr)  
STAT 8312 - Linear and Nonlinear Regression (3.0 cr)  
STAT 8313 - Topics in Experimental Design (3.0 cr)  
STAT 8321 - Regression Graphics (3.0 cr)  
STAT 8401 - Topics in Multivariate Methods (3.0 cr)  
STAT 8411 - Multivariate Analysis (3.0 cr)  
STAT 8421 - Theory of Categorical Data Analysis (3.0 cr)  
STAT 8501 - Introduction to Stochastic Processes with Applications (3.0 cr)  
STAT 8511 - Time Series Analysis (3.0 cr)  
STAT 8931 - Advanced Topics in Statistics (3.0 cr)  
STAT 8932 - Advanced Topics in Statistics (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Statistics Ph.D.**

*Statistics, School of*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

School of Statistics, 313 Ford Hall, 224 Church Street SE, Minneapolis, MN 55455 (612-625-8046; fax: 612-624-8868)

Email: [info@stat.umn.edu](mailto:info@stat.umn.edu)

Website: <http://www.stat.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 73
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The School of Statistics is the primary venue at the University for research, teaching, and dissemination of the theory, methodology, and applications of statistical procedures. Students may specialize in any area of statistics. The core program for all students has strong components of theoretical, computational, and applied statistics.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

37 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.



A maximum of 9.0 units of S-graded courses can apply to these requirements.

**Core Courses (25 credits)**

Take the following courses. Take STAT 8913 for a total of 4 credits.

- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8052 - Applied Statistical Methods 2: Design of Experiments and Mixed -Effects Modeling (3.0 cr)
- STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)
- STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)
- STAT 8111 - Mathematical Statistics I (3.0 cr)
- STAT 8112 - Mathematical Statistics II (3.0 cr)
- STAT 8801 - Statistical Consulting (3.0 cr)
- STAT 8913 - Literature Seminar (1.0 cr)

**Electives (12 credits)**

Select 12 credits from the following in consultation with the advisor. Other coursework can be applied to this requirement with approval of the advisor and director of graduate studies.

- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- PUBH 7450 - Survival Analysis (3.0 cr)
- PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)
- PUBH 8472 - Spatial Biostatistics (3.0 cr)
- STAT 8056 - Statistical Learning and Data Mining (3.0 cr)
- STAT 8511 - Time Series Analysis (3.0 cr)
- STAT 8931 - Advanced Topics in Statistics (3.0 cr)
- STAT 8932 - Advanced Topics in Statistics (3.0 cr)

**Outside Coursework (12 credits)**

**Required Math Courses (6 credits)**

Take the following courses. Comparable courses can be substituted with approval of the advisor and director of graduate studies.

- MATH 8651 - Theory of Probability Including Measure Theory (3.0 cr)
- MATH 8652 - Theory of Probability Including Measure Theory (3.0 cr)

**Additional Courses (6 credits)**

Select 6 credits in consultation with the advisor and director of graduate studies to complete the 12-credit minimum.

- CSCI 5525 - Machine Learning (3.0 cr)
- IE 8521 - Optimization (4.0 cr)
- MATH 5075 - Mathematics of Options, Futures, and Derivative Securities I (4.0 cr)
- MATH 5076 - Mathematics of Options, Futures, and Derivative Securities II (4.0 cr)
- MATH 8659 - Stochastic Processes (3.0 cr)
- POL 8124 - Game Theory (3.0 cr)
- POL 8125 - Dynamic Analysis (3.0 cr)

**Thesis Credits**

Take 24 doctoral thesis credits.

- STAT 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Strategic Communication M.A.**

*School of Journalism & Mass Communication*

**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Hubbard School of Journalism and Mass Communication, 111 Murphy Hall, 206 Church Street SE, Minneapolis, MN 55455 (612-625-4054; fax: 612-626-8251)

Email: [sjmcgrad@umn.edu](mailto:sjmcgrad@umn.edu)

Website: <https://hsjmc.umn.edu/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 33
- This program requires summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Strategic Communication MA is designed to serve working communications professionals in advertising, public relations, corporate communications, nonprofit organizations, and government. The 33-credit program, which can be completed in 24 calendar months, is conceptually and structurally distinct from the academic master's degree in mass communication in that it focuses on advanced professional study of communications strategy, media, planning, evaluation, and creative management. The MA in strategic communication curriculum is tailored to provide the best foundation for future communications leaders, recognizing that the communication industry is changing rapidly. With digital communication continuing to transform the industry, and massive organizational and global forces reshaping the U.S. economy, communications leaders face significant challenges and can prepare themselves through in-depth study of strategic process management.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A baccalaureate degree from an accredited U.S. institution or its foreign equivalent is required.

### **Special Application Requirements:**

In addition to the baccalaureate degree, professionals in strategic communication -- currently employed in advertising, public relations, or marketing firms, or in a communications or related function within a corporation or nonprofit organization -- should have at least two years of professional experience. This professional experience can be in any of the following areas: account planning, account management, advertising management, media planning or buying, media sales, promotion marketing, corporate communications, public affairs, public relations, investor relations, direct marketing, sales management, marketing management, brand management, broadcast or print journalism, market research, content creation, or event management.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the





catalog website.

## Program Requirements

**Plan C:** Plan C requires 27 major credits and 3 to 6 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The project requires completion of the capstone course (Jour 8206), in consultation with the advisor and academic director, that supports completion of the student's strategic communication campaign project.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Coursework offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B earned for each course.

Student progress is evaluated by the academic director, program coordinator, and program faculty.

Student must complete JOUR 8290 twice.

### Required Courses (18 credits)

Take the following courses:

- JOUR 8200 - Strategic Communication Research Methods (3.0 cr)
- JOUR 8201 - Factors Affecting Communication Strategy (3.0 cr)
- JOUR 8202 - Generation and Selection of Communication Strategies (3.0 cr)
- JOUR 8203 - Integration of Communication Strategies Across Media (3.0 cr)
- JOUR 8205 - Cases in Strategic Communication (3.0 cr)
- JOUR 8290 - Special Topics in Strategic Communication (3.0 cr)

### Major Electives (6-9 credits)

Select 6 to 9 elective credits from the following in consultation with the advisor and/or academic director.

- JOUR 5251 - Strategic Communication Theory (3.0 cr)
- JOUR 5252 - Issue Management Communication and Brand Advocacy (3.0 cr)
- JOUR 5501 - Communication, Public Opinion, and Social Media (3.0 cr)
- JOUR 5541 - Mass Communication and Public Health (3.0 cr)
- JOUR 8208 - Digital Strategy, Planning and Analytics (3.0 cr)
- JOUR 8290 - Special Topics in Strategic Communication (3.0 cr)

### Outside Coursework (3-6 credits)

Select 3 to 6 credits from the following in consultation with the advisor and/or academic director.

- COMM 5441 - Communication in Human Organizations (3.0 cr)
- ENTR 6020 - Business Formation (4.0 cr)
- ENTR 6041 - Initiating New Product Design and Business Development (2.0 - 4.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- MKTG 6082 - Brand Strategy (2.0 cr)
- WRIT 5112 - Information Design: Theory and Practice (3.0 cr)
- WRIT 5671 - Visual Rhetoric (3.0 cr)

### Individual Project (3 credits)

Complete the following:

- JOUR 8206 - Directed Study: Development of an Integrated Strategic Communication Campaign (3.0 cr)



### *Twin Cities Campus*

## Studies in Africa and African Diaspora Minor

*African-Amer & African Studies*

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of African American and African Studies, 810 Social Sciences Building, 267 19th Ave S, Minneapolis, MN 55455 (612-624-9847; fax: 612-624-8383)

Email: [www.aaas.umn.edu](http://www.aaas.umn.edu)

Website: <http://www.aaas.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 15
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This interdisciplinary graduate minor is administered through the Department of African American & African Studies. The minor program gives students from a variety of disciplines a structured graduate curriculum that offers a systematic understanding of the contemporary and historical experiences of peoples of Africa and of the African diaspora. It is organized around a group of core seminars and focuses on two broad areas: the humanities and the arts, and the social and behavioral sciences.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

Admission is contingent upon prior admission to a master's or doctoral degree-granting program.

### Special Application Requirements:

Students must complete an application form by the end of spring semester to be considered for acceptance for the following academic year. It is expected that no more than 15 students will be admitted to this minor each year. An undergraduate major or minor in African American and/or African studies is not required for admission to the program, but students are expected to have had sufficient background to begin graduate level study.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Students develop their program in consultation with the director of Graduate Studies in studies in Africa and the African diaspora and in their major. All courses must be outside the student's major field of study.

The master's minor requires a minimum of 9 graduate credits, including the seminar AFRO 5101 - Studies in Africa and the African Diaspora. Remaining courses are selected from one of the following two areas: humanities and the arts or behavioral and social sciences.

The doctoral minor requires a minimum of 15 graduate credits, including the seminar AFRO 5101 - Studies in Africa and the African Diaspora. Students take one additional seminar that focuses on the study of Africa and peoples of African descent. Remaining courses are selected from one of the two areas listed above.



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Masters

#### Required Course

[AFRO 5101](#) - Seminar: Introduction to Africa and the African Diaspora (3.0 cr)

#### Course Electives

All courses must be outside the student's major field of study.

Take 6 or more credit(s) from the following:

- AFRO 5xxx
- AFRO 8xxx

### Doctoral

#### Required Course

[AFRO 5101](#) - Seminar: Introduction to Africa and the African Diaspora (3.0 cr)

#### Course Electives

All courses must be outside the student's major field of study.

Take 12 or more credit(s) from the following:

- AFRO 5xxx
- AFRO 8xxx



### *Twin Cities Campus*

## Studies of Science and Technology Minor

*Philosophy Department*

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Studies of Science and Technology, 746 Heller Hall, 271 19th Ave S, Minneapolis, MN 55455; (612-625-6635; fax: 612-626-8380)

Email: [mcps@umn.edu](mailto:mcps@umn.edu)

Website: <https://cla.umn.edu/mcps/research/sst-graduate-minor>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 7
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Studies of science and technology (SST) deals with a rapidly expanding field that seeks to understand the conceptual foundations, historical development, and social dimensions and context of science and technology. SST faculty are drawn from a number of research and teaching units dedicated in whole or in part to the history, philosophy, and social studies of science and technology.

The SST graduate minor is for students from any major who want to gain a deeper understanding of the nature and development of science and technology. It can be particularly valuable for students who are planning teaching careers in science or engineering, or those majoring in philosophy or history of science and technology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Studies of Science and Technology director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B earned for each.

The minimum cumulative GPA for minor field coursework is 3.00.

#### **History Course (3 credits)**

Select 1 of the following courses in consultation with the SST director of graduate studies:

[HSCI 8112](#) - Historiography of Science, Technology, and Medicine (3.0 cr)

[HMED 8112](#) - Historiography of Science, Technology, and Medicine (3.0 cr)

#### **Philosophy Course (3 credits)**

Select 1 of the following courses in consultation with the SST director of graduate studies:

[PHIL 8602](#) - Scientific Representation and Explanation (3.0 cr)

[PHIL 8610](#) - Seminar: History of Modern Physical Sciences (3.0 cr)

[PHIL 8620](#) - Seminar: Philosophy of the Biological Sciences (3.0 cr)

[PHIL 8670](#) - Seminar: Philosophy of Science (3.0 cr)



### Colloquium (1 or 3 credits)

Masters students take the colloquium once; doctoral students take it twice.

[SST 8000](#) - Colloquium (1.5 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### Master's

#### Doctoral

#### Additional Coursework (3 credits)

Select 3 credits from the following, in consultation with the SST director of graduate studies, to complete the 12-credit minimum:

[SST 8000](#) - Colloquium (1.5 cr)

[SST 8100](#) - Seminar: Models, Theories, and Reality (3.0 cr)

[SST 8200](#) - Seminar: Philosophy of the Physical Sciences (3.0 cr)

[SST 8300](#) - Seminar: The Biological and Biomedical Sciences (3.0 cr)

[SST 8400](#) - Seminar: Science, Technology, and Society (3.0 cr)

[SST 8420](#) - Seminar: Social and Cultural Studies of Science (3.0 cr)



### *Twin Cities Campus*

## Technical Communication Postbaccalaureate Certificate

Writing Studies Department

College of Liberal Arts

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Writing Studies, 214 Nolte Center, 315 Pillsbury Drive SE, Minneapolis, MN 55455; (612-624-3445; fax: 612-624-3617)

Email: [writqpc@umn.edu](mailto:writqpc@umn.edu)

Website: <https://cla.umn.edu/writing-studies>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 15
- This program requires summer semesters for timely completion.
- Degree: Technical Communication PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Writing Studies trains students to understand how people use written communication (digital, visual, textual) to shape the world around them, with a particular emphasis on communication in scientific and technical areas. The Certificate in Technical Communication focuses on applying basic theory and research-driven approaches to create and adapt content to solve complex problems in technical communication workplaces. Students connect with workplace professionals through client projects, virtual and global teamwork, mentorships, and emerging technologies. These experiences enable students to develop unique strengths in digital, usability, and science/health/medical communication.

Certificate courses are taught by graduate faculty who themselves have active research agendas in these areas. Students also have the opportunity to work with the Technical Communication Advisory Board (TCAB), a group of business leaders who provide pathways to experiential learning opportunities including networking, mentoring, and internships.

This fully online program equips professionals for transition to the technical communication field and/or serves as the foundation for specialized study at the masters level that is tailored to career goals. All coursework from the Certificate can be applied to the MS in Scientific and Technical Communication upon admission to the MS and with program approval.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.



A minimum GPA of 2.80 is required for students to remain in good standing.

A minimum grade of B- is required for each course applied to the certificate.

**Fall Term Courses (6 credits)**

Take the following courses:

[WRIT 5001](#) - Introduction to Graduate Studies in Scientific and Technical Communication (3.0 cr)

[WRIT 5662](#) - Writing With Digital Technologies (3.0 cr)

**Spring Term Courses (6 credits)**

Take the following courses:

[WRIT 4562](#) - International Professional Communication (3.0 cr)

[WRIT 5112](#) - Information Design: Theory and Practice (3.0 cr)

**Summer Term Course (3 credits)**

Take the following course:

[WRIT 5561](#) - Editing and Style for Technical Communicators (3.0 cr)



**Twin Cities Campus**  
**Theatre Arts M.A.**  
*Theatre Arts & Dance Dept*  
**College of Liberal Arts**

Link to a [list of faculty](#) for this program.

**Contact Information:**

Department of Theatre Arts and Dance, 580 Rarig Center, 330 21st Ave S, Minneapolis, MN 55455 (612-625-6699; fax: 612-625-6334)

Email: [theatre@umn.edu](mailto:theatre@umn.edu)

Website: <http://theatre.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 40
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The University of Minnesota offers a unique graduate program drawing from the varied research expertise of its core faculty. Together, the faculty is committed to the study of theatre and performance as practices of social, cultural, and political consequence. The department's work in theatre historiography and performance criticism examines the stakes of acts of representation, movement, and meaning-production both within and without the discipline of theatre. The curriculum of this program trains students to be rigorous scholars and expert teachers of theatre and performance studies at the college level.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 24 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is written. A capstone project is required.

**Capstone Project:** The Plan B requirement comprises three Plan B papers completed in consultation with the advisor and director of graduate studies.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.





A minimum GPA of 2.80 is required for students to remain in good standing.

**Signature Seminars (6 credits)**

Take the following courses, or take TH 8120 twice to complete this 6-credit requirement.

[TH 8120](#) - Seminar (3.0 cr)

[TH 5117](#) - Performance and Social Change (3.0 cr)

**Field Seminars (6 credits)**

Select 6 credits from the following in consultation with the advisor:

[TH 8111](#) - History and Theory of Western Theatre: Ancient World and Early Medieval (3.0 cr)

[TH 8112](#) - History and Theory of Western Theatre: Medieval Through Renaissance (3.0 cr)

[TH 8113](#) - History and Theory of Western Theatre: National Theatres to the French Revolution (3.0 cr)

[TH 8114](#) - Theatre: Performance and Political Modernity (3.0 cr)

[TH 8115](#) - History and Theory of Western Theatre: 20th Century Through World War II (3.0 cr)

[TH 8116](#) - History and Theory of Western Theatre: 20th Century From 1945 to the Present (3.0 cr)

**Pedagogy and Professionalization Course (3 credits)**

Take TH 8950 for 3 credits.

[TH 8950](#) - Topics in Theatre (1.0 - 4.0 cr)

**Historiography Seminar (3 credits)**

Take the following course:

[TH 8102](#) - Theatre Historiography (3.0 cr)

**Electives (6 credits)**

Select 6 credits from within Theatre Arts in consultation with the advisor.

**Outside Coursework (6 credits)**

Select 6 credits from outside Theatre Arts in consultation with the advisor.

**Plan Options**

**Plan A**

**Thesis Credits**

Take 10 master's thesis credits.

[TH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### *Twin Cities Campus*

## Theatre Arts M.F.A.

*Theatre Arts & Dance Dept*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Theatre Arts and Dance, 580 Rarig Center, 330 21st Avenue South, Minneapolis, MN 55455 ( 612-625-6699; fax: 612-625-6334)

Email: [theatre@umn.edu](mailto:theatre@umn.edu)

Website: <http://cla.umn.edu/theatre>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 63
- This program does not require summer semesters for timely completion.
- Degree: Master of Fine Arts

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The three-year, performance-oriented, terminal MFA degree specializes in design and technical production. All areas of design are studied to increase understanding in specialization areas, and technology is studied as an essential part of design. Students are expected to achieve proficiency in at least two areas of any combination of design and technology (scenery/properties, costuming, lighting, sound) and a level of expertise in at least one of these areas.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Portfolio review by the Theatre Arts design/technology faculty

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 57 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** A realized design and technology project.



This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

Major field coursework offered on both the A/F and S/N grade basis must be taken A/F.

#### **Foundational Courses (6 credits)**

Take the following courses:

[TH 5510](#) - Drawing, Rendering, and Painting for the Theatre Designer I (3.0 cr)

[TH 5560](#) - Drawing, Rendering, and Painting for the Theatre Designer II (3.0 cr)

#### **Design Courses (9 credits)**

Select two of the following courses in consultation with the advisor. Repeat one of the two considered to be the primary design area.

[TH 5520](#) - Scene Design (3.0 cr)

[TH 5530](#) - Costume Design (3.0 cr)

[TH 5540](#) - Lighting Design for the Theatre (3.0 cr)

[TH 5559](#) - Sound Design for Performance (3.0 cr)

#### **Design/Technology Practicums (6 credits)**

Take 6 credits from the following, in any combination, in consultation with the advisor:

[TH 5500](#) - Theatre Design Practicum (1.0 - 3.0 cr)

[TH 5590](#) - Theatre Technology Practicum (1.0 - 3.0 cr)

[TH 8500](#) - Theatre Design Practicum (1.0 - 3.0 cr)

[TH 8590](#) - Theatre Technology Practicum (1.0 - 3.0 cr)

#### **Electives (12 credits)**

Select 12 credits from the following in consultation with the advisor:

[TH 4555](#) - Audio Technology (3.0 cr)

[TH 5355](#) - Puppetry: Techniques and Practice in Contemporary Theater (3.0 cr)

[TH 5520](#) - Scene Design (3.0 cr)

[TH 5530](#) - Costume Design (3.0 cr)

[TH 5540](#) - Lighting Design for the Theatre (3.0 cr)

[TH 5545](#) - Stage Lighting Technology (3.0 cr)

[TH 5554](#) - Multimedia Production for Live Performance (3.0 cr)

[TH 5556](#) - Audio Engineering (3.0 cr)

[TH 5559](#) - Sound Design for Performance (3.0 cr)

[TH 5570](#) - Properties/Scenery Technology (1.0 - 3.0 cr)

[TH 5580](#) - Costume Technology (3.0 cr)

[TH 5950](#) - Topics in Theatre (1.0 - 4.0 cr)

[TH 5993](#) - Directed Study (1.0 - 5.0 cr)

[TH 8950](#) - Topics in Theatre (1.0 - 4.0 cr)

[TH 8994](#) - Directed Research (1.0 - 5.0 cr)

#### **Professional Development Course (12 credits)**

Take 3 credits of TH 8510, in consultation with the advisor, 4 times within 3 years.

[TH 8510](#) - Professional Design Workshop (1.0 - 3.0 cr)

#### **Internship (3 credits)**

Take TH 8980 in consultation with the advisor.

[TH 8980](#) - Internship (1.0 - 5.0 cr)

#### **History of Literature within the Field (6 credits)**

Select 6 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with advisor approval.

[TH 4177W](#) - Survey of Dramatic Literature I: Strategic Interpretation [WI] (3.0 cr)

[TH 5103](#) - The Theatre Dramaturg (3.0 cr)

[TH 5117](#) - Performance and Social Change (3.0 cr)

[TH 5152W](#) - Global Avant-Gardes: Theatre, Music, Modernity [HIS, WI] (3.0 cr)

[TH 5179W](#) - Text and Performance [WI] (3.0 cr)

[TH 5182W](#) - Contemporary Black Theatre: 1960-Present [WI] (3.0 cr)

[TH 5183](#) - Critical Literacy, Storytelling, and Creative Drama (3.0 cr)



**MFA Creative Thesis (3 credits)**

Take 3 credits of the following in consultation with the advisor.

[TH 8990](#) - MFA Creative Thesis (3.0 - 4.0 cr)

**Outside Coursework (6 credits)**

Select at least 6 credits outside Theatre Arts in consultation with the advisor.



### *Twin Cities Campus*

## Theatre Arts Minor

*Theatre Arts & Dance Dept*

### College of Liberal Arts

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Theatre Arts and Dance, 580 Rarig Center, 330 21st Ave S, Minneapolis, MN 55455 (612-625-6699; fax: 612-625-6334)

Email: [theatre@umn.edu](mailto:theatre@umn.edu)

Website: <http://theatre.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The University of Minnesota offers a minor in Theatre Arts, drawing from the varied research and creative expertise of its MA/PhD and MFA faculty. Students create a customized program by selecting courses to support: scholarly research related to performance, theatre, drama, or dance; creative practice that involves performance, stage design or technology; or professional development in other fields, such as education or social work, in which expertise in performance theory or practice is an asset.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Theatre Arts director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

Coursework is chosen in consultation with the Theatre Arts director of graduate studies.

The minimum cumulative GPA for minor field coursework is 3.5.

#### **Required Coursework (9 to 12 credits)**

Master's students select 9 credits, and doctoral students select 12 credits in consultation with the Theatre Arts director of graduate studies.

TH 5xxx

TH 8xxx

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.



UNIVERSITY OF MINNESOTA

Driven to Discover<sup>SM</sup>

Masters

Doctoral



### **Twin Cities Campus**

## **Theatre Arts Ph.D.**

*Theatre Arts & Dance Dept*

### **College of Liberal Arts**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Theatre Arts and Dance, 580 Rarig Center, 330 21st Ave S, Minneapolis, MN 55455 (612-625-6699; fax: 612-625-6334)

Email: [theatre@umn.edu](mailto:theatre@umn.edu)

Website: <http://theatre.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 54
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The University of Minnesota offers a unique graduate program drawing from the varied research expertise of its core faculty. Together, the faculty is committed to the study of theatre and performance as practices of social, cultural, and political consequence. The department's work in theatre historiography and performance criticism examines the stakes of acts of representation, movement, and meaning-production both within and without the discipline of theatre. The curriculum of this program trains students to be rigorous scholars and expert teachers of theatre and performance studies at the college level.

### **Accreditation**

This program is accredited by National Association of Schools of Theatre (NAST).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Applicants must demonstrate working knowledge and reading proficiency of at least one foreign language or sign language.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**



18 credits are required in the major.  
12 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

Language Requirement: Proficiency in one foreign language.

A minimum GPA of 3.50 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

**Signature Seminars (6 credits)**

Take the following courses, or take TH 8120 twice to complete this 6-credit requirement.

[TH 8120](#) - Seminar (3.0 cr)

[TH 5117](#) - Performance and Social Change (3.0 cr)

**Field Seminars (6 credits)**

Select 6 credits from the following in consultation with the advisor:

[TH 8111](#) - History and Theory of Western Theatre: Ancient World and Early Medieval (3.0 cr)

[TH 8112](#) - History and Theory of Western Theatre: Medieval Through Renaissance (3.0 cr)

[TH 8113](#) - History and Theory of Western Theatre: National Theatres to the French Revolution (3.0 cr)

[TH 8114](#) - Theatre: Performance and Political Modernity (3.0 cr)

[TH 8115](#) - History and Theory of Western Theatre: 20th Century Through World War II (3.0 cr)

[TH 8116](#) - History and Theory of Western Theatre: 20th Century From 1945 to the Present (3.0 cr)

**Pedagogy and Professionalization Seminar (3 credits)**

Take TH 8950 for 3 credits.

[TH 8950](#) - Topics in Theatre (1.0 - 4.0 cr)

**Historiography Seminar (3 credits)**

Take the following course:

[TH 8102](#) - Theatre Historiography (3.0 cr)

**Outside Coursework (12 credits)**

Select 12 credits from outside the major in consultation with the advisor.

**Thesis Credits**

Take 24 doctoral thesis credits.

[TH 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)





**Twin Cities Campus**

## Translational Sensory Sciences Minor

Psychology

College of Liberal Arts

Link to a [list of faculty](#) for this program.

**Contact Information:**

Center for Applied & Translational Sensory Science  
S39 Elliott Hall  
75 East River Parkway  
Minneapolis, MN  
Email: [catss@umn.edu](mailto:catss@umn.edu)  
Website: <http://catss@umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The translational sensory sciences minor provides students with a focused, multidisciplinary educational background and research training opportunities to address critical challenges in the development of assistive technologies that meaningfully improve the lives of people with sensory disabilities.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

**Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Translational Sensory Sciences director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Coursework offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of C+ earned for each course.

**Required Courses (5 credits)**

Take the following courses:

- [GCC 5022](#) - The Human Experience of Sensory Loss: Seeking Equitable and Effective Solutions [TS] (3.0 cr)
- [CGSC 8410](#) - Perspectives in Learning, Perception, and Cognition (2.0 cr)

**Electives (7 credits)**

Select 7 credits from the following, in consultation with the Translational Sensory Sciences director of graduate studies, to complete the 12-credit minimum. Other courses may be applied to this requirement with approval of the Translational Sensory Sciences director of graduate studies.

- [BMEN 5413](#) - Neural Decoding and Interfacing (3.0 cr)
- [BMEN 8101](#) - Biomedical Digital Signal Processing (3.0 cr)
- [CSCI 5115](#) - User Interface Design, Implementation and Evaluation (3.0 cr)
- [CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)
- [CSCI 5525](#) - Machine Learning (3.0 cr)



CSCI 5561 - Computer Vision (3.0 cr)  
CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
KIN 5941 - Clinical Movement Neuroscience (3.0 cr)  
KIN 8211 - Seminar: Perception and Action (3.0 cr)  
OTOL 8234 - Anatomy of the Head and Neck and Temporal Bone Dissection (2.0 cr)  
PSY 5031W - Perception [WI] (3.0 cr)  
PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)  
PSY 5065 - Functional Imaging: Hands-on Training (3.0 cr)  
PSY 8041 - Proseminar in Perception (3.0 cr)  
SLHS 5804 - Cochlear Implants (3.0 cr)  
SLHS 5807 - Noise and Hearing Conservation (3.0 cr)  
SLHS 5808 - Pathophysiology of Hearing Disorders (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

#### Doctoral



### **Twin Cities Campus**

## **Juridical Science S.J.D.**

Law School

### **Law School**

Link to a [list of faculty](#) for this program.

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Juridical Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The SJD program at the University of Minnesota Law School is intended for those who wish to carry on advanced legal study and original research under faculty supervision. SJD students must present research which makes a significant, original contribution of long-term value to legal scholarship. The dissertation must be of publishable quality and provide lawyers, scholars, or governmental officials with a useful understanding, not previously available, of a particular area of the law.

### **Accreditation**

This program is accredited by acquiescence of the American Bar Association.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Applicants must have completed the first degree in law AND must have completed (or are in the process of completing) a US LLM degree at the University of Minnesota or another institution.

#### **Special Application Requirements:**

1) Submission of a preliminary dissertation proposal demonstrating that the dissertation will constitute an original and substantial contribution, of publishable quality, to legal scholarship, in a research field in which the Law School has experienced faculty available for advising, and 2) Submission of an extensive, high quality writing sample written in English to demonstrate the ability to engage in advanced research and writing.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

24 credits are required in the major.

24 thesis credits are required.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

#### **Coursework Requirements**

##### **Legal Research**

Take one of the following courses, or another research course approved by your faculty adviser or the director of graduate studies.

[LAW 6851](#) - Practice-Ready Legal Research (2.0 cr)

or [LAW 6867](#) - Practice Ready International Legal Research (2.0 cr)



**Elective Courses**

The remaining 22 credits are determined through consultation with your faculty advisor or the director of graduate studies.

**Thesis Credit Requirement**

24 Thesis Credits



### **Twin Cities Campus**

## **Law Minor**

Law School

### **Law School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Law School, Walter F. Mondale Hall, 229 19th Avenue South, Minneapolis, MN 55406 (612-625-1000; fax: 612-625-2011)

Email: [lawreg@umn.edu](mailto:lawreg@umn.edu)

Website: <http://www.law.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The law minor is available to both master's and doctoral students and is individually tailored to their academic interests.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Law director of graduate studies regarding feasibility and requirements. Requirements may include pre-approval to register for specific courses. Contact the Law Schools registrar at [lawreg@umn.edu](mailto:lawreg@umn.edu) for more information.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Masters**

#### **Required Courses (6 credits)**

Select at least 6 credits from the following, in consultation with the law minor's director of graduate studies.

LAW 5xxx

LAW 6xxx

### **Doctoral**

#### **Required Courses (12 credits)**

Select at least 12 credits from the following, in consultation with the law minor's director of graduate studies.

LAW 5xxx

LAW 6xxx



### *Twin Cities Campus*

## Master of Science Patent Law

Law School

### Law School

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

University of Minnesota Law School  
Master of Science in Patent Law Program  
411 Walter F. Mondale Hall  
229 19th Avenue South  
Minneapolis, MN 55455  
Email: [patlaw@umn.edu](mailto:patlaw@umn.edu)  
Website: <https://www.law.umn.edu/academics/degree-programs/mspl-program>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science Patent Law

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Master of Science in Patent Law is a professional master's degree for scientists and engineers interested in pursuing a career in the growing field of patent law. The program requirements may be completed in one year of full-time study or in two years (with an optional third year) on a part-time basis. This program is offered through the University of Minnesota Law School. Students in this program will learn practical patent drafting, patent research, portfolio management, and innovation skills. Many courses in this program will be taken jointly with JD students.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

Applicants with a degree in Science or Engineering are preferred.

Other requirements to be completed before admission:

GRE and LSAT scores are accepted but not required.

#### **Special Application Requirements:**

Personal statement, resume, letters of recommendation, interview, patent bar eligibility assessment.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan C:** Plan C requires 30 major credits and 0 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Patent Law CAPSTONE: Innovation (3 credits): Students select a technology of interest with the cooperation of their adviser. Using their knowledge of innovation, patent law, patent prosecution, patent research and strategy they will identify, articulate and present opportunities for innovation in their chosen technology.



This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

#### Patent Law: Core Curriculum

Take 20 credits of core coursework and the 3-credit capstone course for a total of 23 credits.

- [LAW 5001](#) - Introduction to the American Legal System (2.0 cr)
- [LAW 5002](#) - MSPL Legal Research and Writing (1.0 cr)
- [LAW 5025](#) - Patent Law Proseminar (1.0 cr)
- [LAW 5026](#) - Intellectual Property and Technology Proseminar (1.0 cr)
- [LAW 5075](#) - Ethics for Patent Agents (1.0 cr)
- [LAW 5224](#) - Patents (3.0 cr)
- [LAW 5231](#) - Patent Prosecution Practice I (2.0 cr)
- [LAW 5232](#) - Patent Prosecution Practice II (3.0 cr)
- [LAW 5243](#) - Patent Research and Writing (2.0 cr)
- [LAW 5250](#) - Patent Portfolio Management (2.0 cr)
- [LAW 5707](#) - Intellectual Property Transactions (2.0 cr)

#### Capstone Course

Students are required to take the 3 credit capstone course.

- [LAW 5290](#) - Patent Law Capstone: Innovation (3.0 cr)

#### Electives

Take at least 7 elective credits in consultation with the program director. Coursework can be from the following list or selected with approval from the program director.

Take 7 or more credit(s) from the following:

- [LAW 5062](#) - Energy Law (3.0 cr)
- [LAW 5076](#) - Essentials of Business for Lawyers (3.0 cr)
- [LAW 5103](#) - Data Privacy Law (3.0 cr)
- [LAW 5127](#) - Patent Drafting and Oral Advocacy Competition Team (1.0 cr)
- [LAW 5608](#) - Trademarks (3.0 cr)
- [LAW 5613](#) - Copyright (3.0 cr)
- [LAW 5629](#) - Patent Field Placement (1.0 - 3.0 cr)
- [LAW 5908](#) - Independent Research and Writing (1.0 - 2.0 cr)
- [LAW 5909](#) - Independent Field Placement (1.0 - 3.0 cr)
- [LAW 6037](#) - Emerging Sciences and Technologies: Law, Ethics and Policy (3.0 cr)
- [LAW 6133](#) - Data Compliance Practicum (1.0 cr)
- [LAW 6225](#) - Winning Patent Litigation (2.0 cr)
- [LAW 6241](#) - Patent Remedies (1.0 cr)
- [LAW 6402](#) - Food and Drug Law (3.0 cr)
- [LAW 6605](#) - Health Law (3.0 cr)
- [LAW 6609](#) - International Intellectual Property (3.0 cr)
- [LAW 6610](#) - Unfair Competition (2.0 cr)
- [LAW 6622](#) - International Business Operation and Negotiation (3.0 cr)
- [LAW 6705](#) - Information Governance (2.0 cr)
- [LAW 6709](#) - Agriculture and the Environment (2.0 cr)
- [LAW 6714](#) - E-Discovery (2.0 cr)
- [LAW 6832](#) - Cybercrime and Cybersecurity (2.0 cr)
- [LAW 6853](#) - Law, Biomedicine and Bioethics (3.0 cr)
- [LAW 6876](#) - Digital Evidence (2.0 cr)
- [LAW 6949](#) - Biotechnology & Patent Law (2.0 cr)



### *Twin Cities Campus*

## Accountancy M.Acc

Accounting

### Curtis L. Carlson School of Management

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Master Programs in Accounting, 3-110 Carlson School of Management, 321 19th Avenue S, Minneapolis, MN 55455 (612-624-7511; fax: 612-626-7795)

Email: [macct@umn.edu](mailto:macct@umn.edu)

Website: <http://www.carlsonschool.umn.edu/degrees/master-accountancy>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 44
- This program does not require summer semesters for timely completion.
- Degree: Master of Accountancy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Master of Accountancy (MAcc) program enables all students to understand technical accounting problems from an analytical approach, enhancing their critical thinking and management skills with graduate-level courses in accounting, data analytics, finance, taxation, information systems, management, and supply chain and operations. In addition, it provides non-accounting majors the opportunity to take the accounting courses required to sit for the CPA examination.

The MAcc program offers two tracks, a 30-credit track for students with a degree in accounting or finance. The 44-credit track is for students with a bachelor's degree in an academic discipline other than accounting or finance. The additional required core courses include the necessary accounting courses needed to sit for the CPA exam.

The curriculum has been designed and developed by Carlson School of Management faculty with extensive input and ongoing consultation with executives from the professional community. This ensures relevant, practical, and challenging courses that enhance the students' professional development. The program offers students the opportunity to delve more deeply into challenging financial reporting issues faced by organizations. Students develop complex computational analysis skills and analytical processes to better understand modern financial reporting issues.

The 30-credit track can be completed in one year if going full-time. The 44-credit track can be completed in 1.5 years if going full-time. Students may also choose to go part-time. Many of the courses are offered in the evenings (Monday-Thursday, 5:45-9:05 p.m.) or online.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

Other requirements to be completed before admission:

All applicants must have a bachelor's degree from an accredited college or university and a cumulative undergraduate grade point average of 3.0 (on a 4.0 scale) or higher.

Applicants with a bachelor's degree in accounting (or equivalent coursework) or finance are generally eligible for the 30-credit MAcc track.

Students who have a bachelor's degree in an academic discipline other than accounting or finance are eligible to apply for the MAcc program and take the 44-credit track. The following courses (or equivalents) are prerequisites to the MAcc courses: ACCT 2050 Financial Accounting, ACCT 3001 Management Accounting, ACCT 5101 Intermediate Accounting I, FINA 3001 Finance Fundamentals. If necessary, some of the prerequisite courses can be taken after being admitted to the MAcc program but credits would not apply to the 44-credit requirement. Coursework will be evaluated after applying.

#### **Special Application Requirements:**





Summer/Fall application deadline: February 1 priority, followed by rolling admission until program is full.  
Spring application deadline: October 1 priority, followed by rolling admission until program is full.

Applicants must submit all application materials through the University's admission system. Application materials include:

Three letters of recommendation from persons qualified to evaluate most recent work and potential for graduate study.

A GMAT score that is not more than five years old is required. The GMAT score must be sent directly from GMAT to be considered official. Admitted Carlson School of Management undergraduate students will have the GMAT requirement waived.

For international students, the results from one of the following English language tests are required: TOEFL, IELTS, MELAB. TOEFL scores must be received directly from TOEFL. IELTS and MELAB scores must be received directly from the testing center.

For additional application details, review the M.Acc. admissions webpages.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 to 44 major credits and up to null credits outside the major. There is no final exam.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

Students in the 30-credit MAcc track are required to have completed the following courses (or equivalent courses) in their undergraduate program or complete them in their MAcc program. If required to take any of these courses in the MAcc program, the number of elective credits is reduced by that number of credits.

ACCT 5102 Intermediate Accounting II, 4 cr  
ACCT 5125W Auditing, 4 cr  
ACCT 5135 Fundamentals of Federal Income Tax, 4 cr  
ACCT 6604 Advanced Management Accounting, 2 cr

### Required Courses (14 Credits)

All MAcc students must complete the following courses for 14 credits. If 5000 level course was taken in undergraduate program, replace with elective course.

[ACCT 5160](#) - Financial Statement Analysis (2.0 cr)  
[ACCT 5180](#) - Consolidations and Advanced Reporting (2.0 cr)  
[ACCT 5236](#) - Introduction to Taxation of Business (2.0 cr)  
[ACCT 6601](#) - Internal Control (2.0 cr)  
[ACCT 6602](#) - Securities and Exchange Commission (SEC) and Standard Setting (2.0 cr)  
[ACCT 6606](#) - Financial Data Analytics (2.0 cr)  
[IDSC 6003](#) - Accounting and Information Systems (2.0 cr)

### Additional Courses Required for the 44-Credit Track (14 Credits)

Students pursuing the 44-credit track must also complete the following courses for 14 credits:

[ACCT 5102](#) - Intermediate Accounting II (4.0 cr)  
[ACCT 5125W](#) - Auditing Principles and Procedures [WI] (4.0 cr)  
[ACCT 5135](#) - Fundamentals of Federal Income Tax (4.0 cr)  
[ACCT 6604](#) - Advanced Management Accounting (2.0 cr)

### Elective Courses (16 credits)

MAcc students must complete at least 16 elective credits, selected in consultation with the advisor, from the following list. In some cases, other graduate-level courses may be taken with prior approval from the MAcc Director.

[ACCT 5126](#) - Internal Auditing (2.0 cr)  
[ACCT 5310](#) - International Accounting (2.0 cr)  
[ACCT 6603](#) - Advanced Auditing (2.0 cr)  
[ACCT 6604](#) - Advanced Management Accounting (2.0 cr)  
[BLAW 6158](#) - The study of laws affecting private business and publicly-traded companies. (2.0 cr)  
[FINA 6121](#) - Debt Markets, Interest Rates, and Hedging (2.0 cr)



FINA 6123 - Financial Services Industry (2.0 cr)  
FINA 6222 - Mergers and Acquisitions (2.0 cr)  
FINA 6241 - Corporate Financial Decisions and Analysis (4.0 cr)  
FINA 6242 - Advanced Corporate Finance Analysis and Decisions (4.0 cr)  
FINA 6322 - Financial Modeling (2.0 cr)  
FINA 6341 - World Economy (4.0 cr)  
FINA 6522 - Introduction to Derivatives and Financial Risk Management (2.0 cr)  
FINA 6621 - International Financial Management (2.0 cr)  
IDSC 6423 - Enterprise Systems (2.0 cr)  
IDSC 6444 - Business Analytics for Managers I (2.0 cr)  
IDSC 6471 - Knowledge Management (2.0 cr)  
MBA 6120 - Data Analysis and Statistics for Managers (3.0 cr)  
MBA 6300 - Strategic Management (3.0 cr)  
MBA 6315 - The Ethical Environment of Business (2.0 cr)  
MBT 5200 - Tax Accounting Methods I (2.0 cr)  
MBT 5201 - Tax Accounting Methods II (2.0 cr)  
MBT 5220 - Tax Research, Communication, and Practice (4.0 cr)  
MBT 5230 - Corporate Taxation I (2.0 cr)  
MBT 5346 - ASC 740 Computations and Analysis (2.0 cr)  
MBT 5347 - Tax Technology and Analytics Fundamentals (2.0 cr)  
MBT 5370 - Taxation of Property Transactions (2.0 cr)  
MBT 5382 - Transfer Pricing (2.0 cr)  
MGMT 6004 - Negotiation Strategies (2.0 cr)  
MGMT 6031 - Industry Analysis and Competitive Strategy (4.0 cr)  
MGMT 6085 - Corporate Strategy (4.0 cr)  
MGMT 6305 - The International Environment of Business (4.0 cr)  
MGMT 6310 - Cross-Cultural Management: Developing Intercultural Competence (2.0 cr)  
MGMT 6410 - Corporate Responsibility (2.0 cr)  
SCO 6041 - Project Management (2.0 cr)



### **Twin Cities Campus**

## **Applied Business Analytics M.A.B.A.**

*Information & Decision Sciences*

**Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Carlson School of Management (CarlSMgmt  
7041Z)  
Carlson MBA & MS Programs  
321 19th Ave S, Room 1-110  
Minneapolis, MN 55455

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 32
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Applied Business Analytics program provides a strong foundation in business analytics by combining technical know-how that includes machine learning, artificial intelligence, applied statistics, optimization, econometrics, experimentation, data visualization, data engineering and big data with an understanding on how they may be applied in domains such as marketing, consumer behavior, operations, financial and risk management, information management, and strategic management in both public and private sectors. Students who graduate from this part-time, two-year, 32-credit program will have the substantial quantitative capabilities and technical expertise to create business and social value by extracting useful insights from data and providing data-driven solutions to business problems for a variety of career settings.

### **Accreditation**

This program is accredited by AACSB International.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Applicants must have a bachelor's degree from an accredited college or university.

Other requirements to be completed before admission:

- Demonstrated proficiency in computer programming is required. The following programming languages satisfy the requirement: Python, R, C, C++, C#, VB, Java, Pascal, and Fortran.
- Applicants must have completed at least one semester college-level Math course (e.g. Calculus, Linear Algebra) with a grade of "C" or better (or grade equivalent).

### **Special Application Requirements:**

Applicants must submit all application materials through the University's admissions system. Application materials include:

- Transcripts from all colleges/universities previously attended. Non-English transcripts must be accompanied by an English translation.
- A GMAT or GRE General Test that is not more than five years old, with an acceptable score. A GMAT/GRE waiver is available for qualified candidates.
- For international students, an acceptable score on the Test of English as a Foreign Language (TOEFL) International Language Testing System (IELTS).
- Two letters of recommendations need to be submitted through the online application.
- A personal statement of career goals, and objectives for pursuing the MABA degree. The personal statement questions are the following:

Briefly describe your short-term and long-term career goals. Why are you choosing to pursue MABA degree at this time in your career, and what are you hoping to accomplish by doing so? Why are you interested in pursuing MABA degree at the Carlson School of Management? What do you feel makes you a strong candidate for the program? How will you contribute to the MABA program overall?



Applicants must submit a current resume that includes job responsibilities and accomplishments in the online application.

- Video essay
- Applicants may choose to submit an essay to comment on any item(s) in their application they consider worthy of further explanation.
- Applicants may be required to complete an admissions interview, which are by invitation only.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 32 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Students complete MABA 6511, in which they engage in an experiential-learning application of the analytics methodologies, techniques, and tools learned throughout the program to a real-world problem. The final project consists of the development and presentation of results, interpretations, insights, and recommendations.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

### Required Courses (24 credits)

Take the following courses:

- IDSC 6490 - Advanced Topics in MIS (2.0 cr)
- MABA 6121 - Practical Statistics for Business Applications (2.0 cr)
- MABA 6251 - AI for Competitive Advantage (2.0 cr)
- MABA 6311 - Programming for Business Analytics (2.0 cr)
- MABA 6321 - Data Management and Big Data (2.0 cr)
- MABA 6341 - Data Visualization (2.0 cr)
- MABA 6411 - Exploratory Data Analytics (2.0 cr)
- MABA 6421 - Predictive Analytics (2.0 cr)
- MABA 6431 - Advanced Topics on Business Analytics (2.0 cr)
- MABA 6441 - Causal Inference via Econometrics and Experimentation (2.0 cr)
- MABA 6451 - Prescriptive Analytics (2.0 cr)

### Capstone Course (4 credits)

Take the following course:

- MABA 6511 - Experiential Learning (4.0 cr)

### Electives (4 credits)

Select at least 4 credits from the following:

- ENTR 6020 - Business Formation (4.0 cr)
- ENTR 6036 - Managing the Growing Business (2.0 cr)
- FINA 6322 - Financial Modeling (2.0 cr)
- IDSC 6040 - Information Technology Management (2.0 cr)
- MBA 6030 - Financial Accounting (3.0 cr)
- MBA 6110 - Leading Others (2.0 cr)
- MBA 6210 - Marketing Management (3.0 cr)
- MBA 6300 - Strategic Management (3.0 cr)
- MGMT 6004 - Negotiation Strategies (2.0 cr)
- MGMT 6032 - Strategic Alliances (2.0 cr)
- MGMT 6033 - Managing the Strategy Process (2.0 cr)
- MGMT 6084 - Management of Teams (2.0 cr)
- MKTG 6084 - Persuasion and Influence (2.0 cr)



### *Twin Cities Campus*

## Asset Management Postbaccalaureate Certificate

Finance

### Curtis L. Carlson School of Management

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

1-110 Carlson School of Management  
321 19th Ave S, Minneapolis, MN 55455  
612.625.5555

Email: [carlsoncert@umn.edu](mailto:carlsoncert@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-business-administration>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Asset Management Postbaccalaureate Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Minnesota has a broad and deep asset management community, ranging from large national firms to smaller boutique investment firms. Not all who serve this market seek a full graduate degree. The Asset Management certificate focuses on coursework focuses on the most relevant topics for those seeking to advance in their firms or pivot into asset management.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### Prerequisites for Admission

Applicants must have a bachelors degree from an accredited institution.

Other requirements to be completed before admission:

Please review the Admissions Checklist online for detailed admissions requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

#### **Required Coursework (6 credits)**

Take the following courses:

[MBA 6030](#) - Financial Accounting (3.0 cr)

[MBA 6230](#) - Financial Management (3.0 cr)



**Electives (6 credits)**

Select 6 credits from the following:

[FINA 6121](#) - Debt Markets, Interest Rates, and Hedging (2.0 cr)

[FINA 6321](#) - Portfolio Analysis and Management (2.0 cr)

[FINA 6324](#) - Securitization Markets (2.0 cr)

[FINA 6522](#) - Introduction to Derivatives and Financial Risk Management (2.0 cr)

[FINA 6621](#) - International Financial Management (2.0 cr)



### **Twin Cities Campus**

## **Business Administration M.B.A.**

*Graduate Business Career Center*

### **Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

M.B.A. Programs Office, 1-110 Carlson School of Management, 321 19th Avenue South, Minneapolis, MN 55455 (612-625-5555)

Email: [mba@umn.edu](mailto:mba@umn.edu)

Website: <http://www.carlsonschool.umn.edu/MBA>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48 to 64
- This program does not require summer semesters for timely completion.
- Degree: Master of Business Administration

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

At the Carlson School, students tailor their education to meet their career objectives. Supported by outstanding faculty, cutting-edge coursework, and extensive networking opportunities, students compile an impressive record of professional achievements even before they graduate.

The Carlson School offers several pathways to the master of business administration degree: the full-time MBA, the part-time MBA, the online MBA, and the executive MBA. Dual degree programs are only available through the full-time MBA program. Please visit our website at <http://www.carlsonschool.umn.edu/mba/> for more information.

The Carlson School's China Executive MBA program is offered through a partnership between the Carlson School and Lingnan (University) College of Sun Yat-sen University. The Carlson School's Vienna Executive MBA program is offered jointly with the Vienna University of Economics and Business (WU). For additional information on these two programs, please contact [cgi@umn.edu](mailto:cgi@umn.edu).

## **Accreditation**

This program is accredited by AACSB International.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

## **Prerequisites for Admission**

Applicants must have a bachelor's degree from an accredited college or university.

Other requirements to be completed before admission:

Please review the Admissions Checklist online for detailed admissions requirements.

#### **Special Application Requirements:**

Applicants must have an acceptable score on the GMAT or GRE. In addition, international students must have an acceptable score on the Test of English as a Foreign Language (TOEFL), the International English Language Testing System (IELTS), or the Pearson Test of English Academic (PTE).

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 48 to 64 major credits and up to null credits outside the major. There is no final exam.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

**Joint- or Dual-degree Coursework:** The Full-Time MBA program offers the following dual degree program options: MS-Applied Economics/MBA: up to 12 credits in common allowed; MS-Business Analytics/MBA: up to 12 credits in common allowed; MA-HRIR/MBA: up to 12 credits in common allowed; MHA/MBA: up to 12 credits in common allowed; MPP/MBA: up to 12 credits in common allowed; JD/MBA: up to 12 credits in common allowed; MD/MBA: up to 12 credits in common allowed; and PharmD/MBA: up to 12 credits in common allowed. For complete Dual Degree information, visit <http://carlsonschool.umn.edu/degrees/master-business-administration/dual-degrees> Student may take a total of 12 credits in common among the academic programs.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Full-Time Master of Business Administration

The Carlson full-time MBA program offers an intense curriculum that gives students a distinct edge. They start by taking coordinated core courses that provide a sound foundation in essential managerial disciplines, while at the same time, customizing their education to fit their career paths. The full-time program involves a rigorous time commitment. While the amount of time spent on campus varies from 30-50 hours per week, all students are expected to complete the degree in two years with a minimum of 64 credits.

#### Financial Accounting

Take 1 or more course(s) from the following:

- MBA 6030 - Financial Accounting (3.0 cr)

#### Data Analysis & Statistics

Take 1 or more course(s) from the following:

- MBA 6120 - Data Analysis and Statistics for Managers (3.0 cr)

#### Managerial Economics

Take 1 or more course(s) from the following:

- MBA 6140 - Managerial Economics (2.0 cr)

#### Marketing

Take 1 or more course(s) from the following:

- MBA 6210 - Marketing Management (3.0 cr)

#### Supply Chain & Operations

Take 1 or more course(s) from the following:

- MBA 6220 - Supply Chain & Operations (3.0 cr)

#### Financial Management

Take 1 or more course(s) from the following:

- MBA 6230 - Financial Management (3.0 cr)

#### IT Management

Take 1 or more course(s) from the following:

- MBA 6240 - Competing in a Data-Driven Digital Age (2.0 cr)

#### Strategic Management

Take 1 or more course(s) from the following:

- MBA 6300 - Strategic Management (3.0 cr)

#### Business Ethics

Take 1 or more course(s) from the following:

- MBA 6315 - The Ethical Environment of Business (2.0 cr)

#### Leadership Requirement

The total leadership credit requirement is 4 credits. MBA 6110 is completed in spring of the first year for a total of 2 credits.

Additionally, students must complete HRIR 6465 for 2 credits prior to degree completion.

Take exactly 2 course(s) totaling exactly 4 credit(s) from the following:

- MBA 6110 - Leading Others (2.0 cr)





- MGMT 6465 - Leadership and Personal Development (2.0 cr)

#### Enterprise Requirement

All full-time MBA students are required to participate in one Enterprise program throughout their time in the program.

Take exactly 8 credit(s) from the following:

- MBA 6501 - Carlson Funds Enterprise: Growth (1.0 - 4.0 cr)
- MBA 6502 - Carlson Funds Enterprise: Fixed Income (1.0 - 4.0 cr)
- MBA 6503 - Carlson Ventures Enterprise (2.0 - 4.0 cr)
- MBA 6504 - Carlson Consulting Enterprise (2.0 - 4.0 cr)
- MBA 6505 - Carlson Brand Enterprise (2.0 - 4.0 cr)

#### International Experience

All full-time MBA students must participate in an international study abroad program or complete a course on campus that has been designated to meet this requirement. A minimum of 4 credits is required to fulfill this requirement.

Take 1 or more course(s) totaling 4 or more credit(s) from the following:

- IBUS 5140 - Vienna Summer Program in International Business (Graduate) (0.0 - 18.0 cr)
- IBUS 5150 - IBUS 5150: Building on Frugal Innovations to Complete in a Global Environment (4.0 cr)
- IBUS 5260 - Sustainability: The New Management Paradigm (4.0 cr)
- IBUS 5300 - International Business: Graduate Exchange BLOCK (0.0 - 18.0 cr)
- IBUS 5301 - Graduate Exchange in International Business - BLOCK (0.0 - 18.0 cr)
- IBUS 5302 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5303 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5304 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5305 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5306 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5307 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5308 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5400 - Global Business Practicum (4.0 cr)
- IBUS 5605 - Shanghai Summer Program in International Business (Graduate) (0.0 - 18.0 cr)
- IBUS 6401 - Marketing in the Mayhem: Why Chile Thrives and How Argentina Tries (4.0 cr)
- IBUS 6402 - Economic Diversification: Moving Beyond Oil in UAE and Oman (4.0 cr)
- IBUS 6997 - MILI Global Valuation Lab (4.0 cr)
- IDSC 6465 - Global Sourcing of IT and IT Enabled Services (4.0 cr)
- MGMT 6305 - The International Environment of Business (4.0 cr)
- MKTG 6072 - International Marketing (4.0 cr)
- SCO 6081 - Global Operations Strategy (4.0 cr)
- MILI 6997 - MILI Global Valuation Lab (4.0 cr)

#### Full-Time MBA Electives

Electives not on this list must be approved by MBA Programs Office in order to count for degree requirements.

Take 24 or more credit(s) from the following:

- ACCT 5180 - Consolidations and Advanced Reporting (2.0 cr)
- ACCT 6100 - Financial Statement Analysis (2.0 cr)
- APEC 5831 - Food and Agribusiness Marketplace (2.0 cr)
- BLAW 6158 - The study of laws affecting private business and publicly-traded companies. (2.0 cr)
- ENTR 6020 - Business Formation (4.0 cr)
- ENTR 6021 - Preparing and Implementing the Business Plan (2.0 cr)
- ENTR 6036 - Managing the Growing Business (2.0 cr)
- ENTR 6037 - Corporate Venturing (2.0 cr)
- ENTR 6041 - Initiating New Product Design and Business Development (2.0 - 4.0 cr)
- ENTR 6042 - Implementing New Product Design and Business Development (4.0 cr)
- ENTR 6090 - Topics in Entrepreneurship (2.0 - 4.0 cr)
- FINA 6121 - Debt Markets, Interest Rates, and Hedging (2.0 cr)
- FINA 6122 - Financial Management of Depository Institutions (2.0 cr)
- FINA 6123 - Financial Services Industry (2.0 cr)
- FINA 6222 - Mergers and Acquisitions (2.0 cr)
- FINA 6241 - Corporate Finance Analysis and Decisions (4.0 cr)
- FINA 6242 - Advanced Corporate Finance Analysis and Decisions (4.0 cr)
- FINA 6321 - Portfolio Analysis and Management (2.0 cr)
- FINA 6322 - Financial Modeling (2.0 cr)
- FINA 6323 - Advanced Financial Modeling (2.0 cr)
- FINA 6324 - Securitization Markets (2.0 cr)
- FINA 6325 - Behavioral Finance (2.0 cr)
- FINA 6341 - World Economy (4.0 cr)
- FINA 6522 - Introduction to Derivatives and Financial Risk Management (2.0 cr)
- FINA 6529 - Advanced Topics in Fixed Income and Derivatives (2.0 cr)
- FINA 6621 - International Financial Management (2.0 cr)
- FINA 6801 - Finance Independent Study (1.0 - 6.0 cr)



- IDSC 6050 - Information Technologies and Solutions (2.0 cr)
- IDSC 6423 - Enterprise Systems (2.0 cr)
- IDSC 6442 - E-Sourcing and E-Auctions (2.0 cr)
- IDSC 6444 - Business Analytics for Managers I (2.0 cr)
- IDSC 6446 - Business Analytics for Managers II (2.0 cr)
- IDSC 6455 - Web 2.0: The Business of Social Media (2.0 cr)
- IDSC 6465 - Global Sourcing of IT and IT Enabled Services (4.0 cr)
- IDSC 6471 - Knowledge Management (2.0 cr)
- IDSC 6481 - Managerial Decision Making (2.0 cr)
- MBA 6235 - Managerial Accounting (2.0 cr)
- MBA 6403 - Energy Industry (2.0 cr)
- MBA 6990 - MBA Topics (2.0 cr)
- MCOM 5500 - Enhancing Your Executive Image in Business Communications (2.0 cr)
- MCOM 5510 - Persuasive Writing in Business (2.0 cr)
- MCOM 5530 - Strategies and Skills for Managerial Presentations (2.0 cr)
- MGMT 5102 - StartUp: Customer Development and Testing (2.0 cr)
- MGMT 6004 - Negotiation Strategies (2.0 cr)
- MGMT 6031 - Industry Analysis and Competitive Strategy (4.0 cr)
- MGMT 6032 - Strategic Alliances (2.0 cr)
- MGMT 6033 - Managing the Strategy Process (2.0 cr)
- MGMT 6034 - Strategic Leadership (2.0 cr)
- MGMT 6035 - Complex and Cross-Cultural Negotiations (2.0 cr)
- MGMT 6040 - Competing Globally (2.0 cr)
- MGMT 6050 - Management of Innovation and Change (2.0 cr)
- MGMT 6070 - Technology Strategy (2.0 cr)
- MGMT 6084 - Management of Teams (2.0 cr)
- MGMT 6085 - Corporate Strategy (4.0 cr)
- MGMT 6100 - Topics in Management (1.0 - 4.0 cr)
- MGMT 6305 - The International Environment of Business (4.0 cr)
- MGMT 6310 - Cross-Cultural Management: Developing Intercultural Competence (2.0 cr)
- MGMT 6402 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- MGMT 6410 - Corporate Responsibility (2.0 cr)
- MILI 6235 - Pharmaceutical Industry: Business and Policy (2.0 cr)
- MILI 6421 - Healthcare Law: Strategic and Business Implications (2.0 cr)
- MILI 6562 - Information Technology in Health Care (2.0 cr)
- MILI 6589 - Medical Technology Evaluation and Market Research (2.0 cr)
- MILI 6726 - Medical Device Industry: Business and Public Policy (2.0 cr)
- MILI 6920 - MILI Topic Course (2.0 cr)
- MILI 6963 - Healthcare Analytics (2.0 cr)
- MILI 6990 - The Health Care Marketplace (2.0 cr)
- MILI 6991 - Anatomy and Physiology for Managers (2.0 cr)
- MILI 6992 - Healthcare Delivery Innovations: Optimizing Cost and Quality (2.0 cr)
- MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)
- MILI 6997 - MILI Global Valuation Lab (4.0 cr)
- MILI 6998 - MILI Fellows (0.0 - 2.0 cr)
- MILI 6999 - Independent Study (0.0 - 8.0 cr)
- MKTG 6050 - Marketing Analytics: Managerial Decisions (2.0 cr)
- MKTG 6051 - Marketing Research - Rapid Insights (2.0 cr)
- MKTG 6055 - Buyer Behavior (2.0 cr)
- MKTG 6060 - Marketing Channels (2.0 cr)
- MKTG 6072 - International Marketing (4.0 cr)
- MKTG 6073 - Marketing in High Tech Settings (2.0 cr)
- MKTG 6075 - Pricing Strategy (4.0 cr)
- MKTG 6078 - Advertising & Promotion (4.0 cr)
- MKTG 6082 - Brand Strategy (2.0 cr)
- MKTG 6083 - Customer Analytics (2.0 cr)
- MKTG 6084 - Persuasion and Influence (2.0 cr)
- MKTG 6085 - Nudge: Improving Decisions about Health, Wealth and Happiness (2.0 cr)
- MKTG 6086 - Digital Marketing (2.0 cr)
- MKTG 6087 - Power of Story (1.0 cr)
- MKTG 6088 - Strategic Marketing (2.0 cr)
- MKTG 6090 - Marketing Topics (1.0 - 4.0 cr)
- SCO 6041 - Project Management (2.0 cr)
- SCO 6045 - Strategic Sourcing (2.0 cr)
- SCO 6048 - Logistics and Transportation (2.0 cr)



- SCO 6051 - Service Management (2.0 cr)
- SCO 6056 - Managing Supply Chain Operations (4.0 cr)
- SCO 6059 - Quality Management and Lean Six Sigma (4.0 cr)
- SCO 6072 - Managing Technologies in the Supply Chain (2.0 cr)
- SCO 6081 - Global Operations Strategy (4.0 cr)
- SCO 6090 - Sales, Inventory, and Operations Planning (2.0 cr)
- SCO 6091 - Process Improvement Methods (2.0 cr)
- SCO 6092 - Supply Chain Risk and Security (2.0 cr)
- SCO 6094 - Responsible Supply Chain Management (2.0 cr)
- SCO 6095 - Supply Chain Management in the Food and Agribusiness Sector (2.0 cr)
- SCO 6096 - Supply Chain Management in the Health Care and Medical Devices Sector (2.0 cr)
- SCO 6097 - Supply Chain Management in the Retail Sector (2.0 cr)
- SCO 6098 - Operations Excellence via Lean Thinking (2.0 cr)
- SCO 6191 - Big Data Analytics in Supply Chains (2.0 cr)
- SCO 6192 - Supply Chain Finance (2.0 cr)
- SCO 6850 - Topics in Operations and Management Science (2.0 - 4.0 cr)

#### Part-Time Master of Business Administration

The Carlson part-time MBA curriculum, which can be completed online, includes core courses that offer an in-depth study of the foundational and functional areas of business. Advanced electives, international study options, and specializations allow students to tailor a program that meets their long-term career goals. To graduate, students must earn 52 credits. Students may be waived as determined at the time of admission based on prior coursework and/or waiver exams taken prior to the end of the first semester of enrollment.

#### Strategic Management

Recommended to be taken in first semester of MBA program

Take exactly 1 course(s) from the following:

- MBA 6300 - Strategic Management (3.0 cr)

#### Data Analysis & Statistics

Take exactly 1 course(s) from the following:

- MBA 6120 - Data Analysis and Statistics for Managers (3.0 cr)

#### Financial Accounting

Take exactly 1 course(s) from the following:

- MBA 6030 - Financial Accounting (3.0 cr)

#### Operations

Take exactly 1 course(s) from the following:

- MBA 6220 - Supply Chain & Operations (3.0 cr)

#### Finance

Take exactly 1 course(s) from the following:

- MBA 6230 - Financial Management (3.0 cr)

#### Marketing

Take exactly 1 course(s) from the following:

- MBA 6210 - Marketing Management (3.0 cr)

#### Managerial Accounting

Take exactly 1 course(s) from the following:

- MBA 6035 - Managerial Accounting (3.0 cr)

#### Leading Others/Org Behavior

Take exactly 1 course(s) from the following:

- MBA 6110 - Leading Others (2.0 cr)

#### Business Ethics

Take exactly 1 course(s) from the following:

- MBA 6315 - The Ethical Environment of Business (2.0 cr)

#### IT Requirement

Choose 1 of the following (if both taken, 1 will count as elective)

Take 1 or more course(s) from the following:

- IDSC 6040 - Information Technology Management (2.0 cr)
- IDSC 6050 - Information Technologies and Solutions (2.0 cr)

#### Economics Requirement

Choose 1 of the following (if both taken, 1 will count as elective). If choosing MBA 6140, it must be taken for 2 credits.

Take 1 or more course(s) from the following:

- MBA 6140 - Managerial Economics (2.0 cr)
- FINA 6341 - World Economy (4.0 cr)

#### International Experience

Choose 1 of the following (if more than 1 course completed, remainder will count as elective credit(s)):

Take 4 or more credit(s) from the following:



- MGMT 6305 - The International Environment of Business (4.0 cr)
- IDSC 6465 - Global Sourcing of IT and IT Enabled Services (4.0 cr)
- SCO 6081 - Global Operations Strategy (4.0 cr)
- MKTG 6072 - International Marketing (4.0 cr)
- MILI 6997 - MILI Global Valuation Lab (4.0 cr)
- IBUS 5140 - Vienna Summer Program in International Business (Graduate) (0.0 - 18.0 cr)
- IBUS 5150 - IBUS 5150: Building on Frugal Innovations to Complete in a Global Environment (4.0 cr)
- IBUS 5260 - Sustainability: The New Management Paradigm (4.0 cr)
- IBUS 5400 - Global Business Practicum (4.0 cr)
- IBUS 5605 - Shanghai Summer Program in International Business (Graduate) (0.0 - 18.0 cr)
- IBUS 6997 - MILI Global Valuation Lab (4.0 cr)
- IBUS 6402 - Economic Diversification: Moving Beyond Oil in UAE and Oman (4.0 cr)
- IBUS 5300 - International Business: Graduate Exchange BLOCK (0.0 - 18.0 cr)
- IBUS 5301 - Graduate Exchange in International Business - BLOCK (0.0 - 18.0 cr)
- IBUS 5302 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5303 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5304 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5305 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5306 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5307 - International Business: Graduate Exchange (0.0 - 18.0 cr)
- IBUS 5308 - International Business: Graduate Exchange (0.0 - 18.0 cr)

#### Electives

Electives not on this list must be approved by MBA Programs Office to count towards degree requirements.

Take 19 or more credit(s) from the following:

- ACCT 5180 - Consolidations and Advanced Reporting (2.0 cr)
- ACCT 6100 - Financial Statement Analysis (2.0 cr)
- APEC 5831 - Food and Agribusiness Marketplace (2.0 cr)
- BLAW 6158 - The study of laws affecting private business and publicly-traded companies. (2.0 cr)
- ENTR 6020 - Business Formation (4.0 cr)
- ENTR 6021 - Preparing and Implementing the Business Plan (2.0 cr)
- ENTR 6036 - Managing the Growing Business (2.0 cr)
- ENTR 6037 - Corporate Venturing (2.0 cr)
- ENTR 6041 - Initiating New Product Design and Business Development (2.0 - 4.0 cr)
- ENTR 6042 - Implementing New Product Design and Business Development (4.0 cr)
- ENTR 6090 - Topics in Entrepreneurship (2.0 - 4.0 cr)
- FINA 6121 - Debt Markets, Interest Rates, and Hedging (2.0 cr)
- FINA 6122 - Financial Management of Depository Institutions (2.0 cr)
- FINA 6123 - Financial Services Industry (2.0 cr)
- FINA 6222 - Mergers and Acquisitions (2.0 cr)
- FINA 6241 - Corporate Finance Analysis and Decisions (4.0 cr)
- FINA 6242 - Advanced Corporate Finance Analysis and Decisions (4.0 cr)
- FINA 6321 - Portfolio Analysis and Management (2.0 cr)
- FINA 6322 - Financial Modeling (2.0 cr)
- FINA 6323 - Advanced Financial Modeling (2.0 cr)
- FINA 6324 - Securitization Markets (2.0 cr)
- FINA 6325 - Behavioral Finance (2.0 cr)
- FINA 6341 - World Economy (4.0 cr)
- FINA 6522 - Introduction to Derivatives and Financial Risk Management (2.0 cr)
- FINA 6529 - Advanced Topics in Fixed Income and Derivatives (2.0 cr)
- FINA 6621 - International Financial Management (2.0 cr)
- FINA 6801 - Finance Independent Study (1.0 - 6.0 cr)
- IDSC 6040 - Information Technology Management (2.0 cr)
- IDSC 6050 - Information Technologies and Solutions (2.0 cr)
- IDSC 6423 - Enterprise Systems (2.0 cr)
- IDSC 6442 - E-Sourcing and E-Auctions (2.0 cr)
- IDSC 6444 - Business Analytics for Managers I (2.0 cr)
- IDSC 6446 - Business Analytics for Managers II (2.0 cr)
- IDSC 6455 - Web 2.0: The Business of Social Media (2.0 cr)
- IDSC 6465 - Global Sourcing of IT and IT Enabled Services (4.0 cr)
- IDSC 6471 - Knowledge Management (2.0 cr)
- IDSC 6481 - Managerial Decision Making (2.0 cr)
- MBA 6403 - Energy Industry (2.0 cr)
- MBA 6990 - MBA Topics (2.0 cr)
- MCOM 5500 - Enhancing Your Executive Image in Business Communications (2.0 cr)
- MCOM 5510 - Persuasive Writing in Business (2.0 cr)



- MCOM 5530 - Strategies and Skills for Managerial Presentations (2.0 cr)
- MGMT 5102 - StartUp: Customer Development and Testing (2.0 cr)
- MGMT 6004 - Negotiation Strategies (2.0 cr)
- MGMT 6031 - Industry Analysis and Competitive Strategy (4.0 cr)
- MGMT 6032 - Strategic Alliances (2.0 cr)
- MGMT 6033 - Managing the Strategy Process (2.0 cr)
- MGMT 6034 - Strategic Leadership (2.0 cr)
- MGMT 6035 - Complex and Cross-Cultural Negotiations (2.0 cr)
- MGMT 6040 - Competing Globally (2.0 cr)
- MGMT 6050 - Management of Innovation and Change (2.0 cr)
- MGMT 6070 - Technology Strategy (2.0 cr)
- MGMT 6084 - Management of Teams (2.0 cr)
- MGMT 6085 - Corporate Strategy (4.0 cr)
- MGMT 6100 - Topics in Management (1.0 - 4.0 cr)
- MGMT 6305 - The International Environment of Business (4.0 cr)
- MGMT 6310 - Cross-Cultural Management: Developing Intercultural Competence (2.0 cr)
- MGMT 6402 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- MGMT 6410 - Corporate Responsibility (2.0 cr)
- MGMT 6465 - Leadership and Personal Development (2.0 cr)
- MILI 6235 - Pharmaceutical Industry: Business and Policy (2.0 cr)
- MILI 6421 - Healthcare Law: Strategic and Business Implications (2.0 cr)
- MILI 6562 - Information Technology in Health Care (2.0 cr)
- MILI 6589 - Medical Technology Evaluation and Market Research (2.0 cr)
- MILI 6726 - Medical Device Industry: Business and Public Policy (2.0 cr)
- MILI 6963 - Healthcare Analytics (2.0 cr)
- MILI 6990 - The Health Care Marketplace (2.0 cr)
- MILI 6991 - Anatomy and Physiology for Managers (2.0 cr)
- MILI 6992 - Healthcare Delivery Innovations: Optimizing Cost and Quality (2.0 cr)
- MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)
- MILI 6997 - MILI Global Valuation Lab (4.0 cr)
- MILI 6998 - MILI Fellows (0.0 - 2.0 cr)
- MILI 6999 - Independent Study (0.0 - 8.0 cr)
- MKTG 6050 - Marketing Analytics: Managerial Decisions (2.0 cr)
- MKTG 6051 - Marketing Research - Rapid Insights (2.0 cr)
- MKTG 6055 - Buyer Behavior (2.0 cr)
- MKTG 6060 - Marketing Channels (2.0 cr)
- MKTG 6072 - International Marketing (4.0 cr)
- MKTG 6073 - Marketing in High Tech Settings (2.0 cr)
- MKTG 6075 - Pricing Strategy (4.0 cr)
- MKTG 6078 - Advertising & Promotion (4.0 cr)
- MKTG 6082 - Brand Strategy (2.0 cr)
- MKTG 6084 - Persuasion and Influence (2.0 cr)
- MKTG 6085 - Nudge: Improving Decisions about Health, Wealth and Happiness (2.0 cr)
- MKTG 6086 - Digital Marketing (2.0 cr)
- MKTG 6087 - Power of Story (1.0 cr)
- MKTG 6088 - Strategic Marketing (2.0 cr)
- MKTG 6090 - Marketing Topics (1.0 - 4.0 cr)
- SCO 6041 - Project Management (2.0 cr)
- SCO 6045 - Strategic Sourcing (2.0 cr)
- SCO 6048 - Logistics and Transportation (2.0 cr)
- SCO 6051 - Service Management (2.0 cr)
- SCO 6056 - Managing Supply Chain Operations (4.0 cr)
- SCO 6072 - Managing Technologies in the Supply Chain (2.0 cr)
- SCO 6081 - Global Operations Strategy (4.0 cr)
- SCO 6090 - Sales, Inventory, and Operations Planning (2.0 cr)
- SCO 6091 - Process Improvement Methods (2.0 cr)
- SCO 6092 - Supply Chain Risk and Security (2.0 cr)
- SCO 6094 - Responsible Supply Chain Management (2.0 cr)
- SCO 6095 - Supply Chain Management in the Food and Agribusiness Sector (2.0 cr)
- SCO 6096 - Supply Chain Management in the Health Care and Medical Devices Sector (2.0 cr)
- SCO 6097 - Supply Chain Management in the Retail Sector (2.0 cr)
- SCO 6098 - Operations Excellence via Lean Thinking (2.0 cr)
- SCO 6191 - Big Data Analytics in Supply Chains (2.0 cr)
- SCO 6192 - Supply Chain Finance (2.0 cr)
- SCO 6850 - Topics in Operations and Management Science (2.0 - 4.0 cr)



### Carlson Executive Master of Business Administration

The Carlson executive MBA is built on a foundation of time-tested business principles. By emphasizing a global perspective, the rigorous curriculum helps students develop a deeper understanding of theory and practice. Each class moves through the program together as a cohort, following set schedules. From orientation to graduation, it takes about 21 months to complete the program. Classes are held Fridays and Saturdays, predominantly on alternate weekends, 7:30 a.m. to 4:30 p.m., and do not meet during the summer.

### CEMBA Program Requirements

The CEMBA program has a 49.5 credit program requirement.

- CMBA 5810 - Introduction to Statistics and Business Analytics (3.0 cr)
- CMBA 5811 - Financial Accounting (3.0 cr)
- CMBA 5812 - Organizational Behavior (3.0 cr)
- CMBA 5813 - Competing In The Digital Age (1.5 cr)
- CMBA 5814 - Economics (1.5 cr)
- CMBA 5815 - Marketing Management (3.0 cr)
- CMBA 5816 - Strategic Management (3.0 cr)
- CMBA 5817 - Financial Management (3.0 cr)
- CMBA 5818 - Supply Chain and Operations (3.0 cr)
- CMBA 5820 - Negotiation Strategies: Creative Solutions for Difficult Problems (3.0 cr)
- CMBA 5821 - Managerial Accounting (3.0 cr)
- CMBA 5822 - Applied Leadership (1.5 cr)
- CMBA 5823 - Competing Globally (3.0 cr)
- CMBA 5824 - Corporate Responsibility & Ethics (1.5 cr)
- CMBA 5825 - Strategic Marketing (3.0 cr)
- CMBA 5826 - Corporate Strategy (1.5 cr)
- CMBA 5827 - Advanced Financial Management (3.0 cr)
- CMBA 5828 - International Residency - Study Abroad (1.5 cr)
- CMBA 5829 - International Residency – Global Team Project (1.5 cr)

Choose 2 courses from the following:

Take exactly 2 course(s) from the following:

- CMBA 5830 - Advanced Management Topic Elective: Power & Influence (1.5 cr)
- CMBA 5831 - Advanced Management Topic Elective: Entrepreneurship & Innovation (1.5 cr)
- CMBA 5832 - Advanced Management Topic Elective: Business Analytics for Competitive Advantage (1.5 cr)
- CMBA 5833 - Advanced Management Topics Elective - Healthcare Innovations (1.5 cr)

### Industry Master of Business Administration

The industry MBA is a one-year, predominantly online program designed for working professionals to obtain the fundamental business knowledge crucial for leading careers in the complex, rapidly evolving, and highly regulated healthcare, energy, technology, and finance industries. Courses will be taught by our nationally renowned expert faculty and executive-level professionals. Targeting the Washington DC area, this 48 credit program will deliver sophisticated management and leadership education for students immersed in legislative and policy matters.

### Industry MBA Course Requirements

Take exactly 48 credit(s) from the following:

- IMBA 6004 - Negotiations (2.0 cr)
- IMBA 6030 - Financial Accounting (3.0 cr)
- IMBA 6110 - Leading Others (2.0 cr)
- IMBA 6120 - Data Analysis & Statistics (3.0 cr)
- IMBA 6140 - Managerial Economics (3.0 cr)
- IMBA 6210 - Marketing Management (3.0 cr)
- IMBA 6220 - Supply Chain Management (3.0 cr)
- IMBA 6230 - Financial Management (3.0 cr)
- IMBA 6240 - Data Analytics (3.0 cr)
- IMBA 6300 - Strategic Management (3.0 cr)
- IMBA 6315 - The Ethical Environment of Business (2.0 cr)
- IMBA 6401 - Industry Overview & Business Law (2.0 cr)
- IMBA 6402 - Industry Vertical: Technology (2.0 cr)
- IMBA 6403 - Industry Vertical: Energy (2.0 cr)
- IMBA 6404 - Industry Vertical: Finance (2.0 cr)
- IMBA 6405 - Industry Vertical: Health (2.0 cr)
- IMBA 6500 - Virtual Team Project (4.0 cr)
- IMBA 6501 - Industry MBA Capstone (4.0 cr)

### China Executive M.B.A.



### China Executive MBA Courses

51 credits required.

- CHMB 5800 - Organizational Behavior (3.0 cr)
- CHMB 5801 - Financial Accounting (3.0 cr)
- CHMB 5802 - Statistics and Decision Making (3.0 cr)
- CHMB 5803 - Operations Management (3.0 cr)
- CHMB 5804 - Managerial Accounting (3.0 cr)
- CHMB 5805 - Financial Management (3.0 cr)
- CHMB 5806 - Marketing Management (3.0 cr)
- CHMB 5807 - Business Strategy (3.0 cr)
- CHMB 5808 - Strategic Marketing (3.0 cr)
- CHMB 5809 - Advanced Financial Management (3.0 cr)
- CHMB 5810 - International Environment (1.5 cr)
- CHMB 5811 - Information Technology Management (3.0 cr)
- CHMB 5813 - Ethics and Leadership (3.0 cr)
- CHMB 5815 - International Human Resources Management (3.0 cr)
- CHMB 5816 - International Residency (6.0 cr)
- CHMB 5817 - China's Economy (1.5 cr)
- CHMB 5818 - Law and Business (3.0 cr)

### Vienna Masters of Business Administration

#### Vienna MBA Coursework Requirements

58 credits required

- VMBA 5700 - Managerial Accounting (4.0 cr)
- VMBA 5701 - Data Analysis and Decision Making (4.0 cr)
- VMBA 5702 - Financial Management (4.0 cr)
- VMBA 5703 - Marketing Management (4.0 cr)
- VMBA 5704 - Managing People and Organizations (4.0 cr)
- VMBA 5705 - Operations Management (4.0 cr)
- VMBA 5706 - Business, Government, and Macroeconomics (4.0 cr)
- VMBA 5707 - Economics in Transition (4.0 cr)
- VMBA 5709 - Info Tech Mgmt (4.0 cr)
- VMBA 5711 - Managing Globalization (Guangzhou) (4.0 cr)
- VMBA 5712 - Strategies for a Global Company: an Integrative Perspective (6.0 cr)
- VMBA 5713 - Negotiations and Conflict Management (4.0 cr)
- VMBA 5714 - Financial Accounting (4.0 cr)
- VMBA 5715 - Corporate and Entrepreneurial Strategy (4.0 cr)

### India

#### Online Master of Business Administration

The online MBA is a 2-3 year, 52-credit, fully online program designed for working professionals to obtain the fundamental business knowledge crucial for leading careers in a complex, rapidly evolving business environment. Courses are taught by our nationally renowned expert faculty and executive-level professionals.

Online MBA students will be required to complete at least one in-person residency.

#### Strategic Management

- MBA 6300 - Strategic Management (3.0 cr)

#### Financial Accounting

- MBA 6030 - Financial Accounting (3.0 cr)

#### Financial Management

- MBA 6230 - Financial Management (3.0 cr)

#### Data Analysis & Statistics

- MBA 6120 - Data Analysis and Statistics for Managers (3.0 cr)

#### Supply Chain & Operations

- MBA 6220 - Supply Chain & Operations (3.0 cr)

#### Economics

- MBA 6140 - Managerial Economics (2.0 cr)

#### Organizational Behavior

- MBA 6110 - Leading Others (2.0 cr)

#### Marketing

- MBA 6210 - Marketing Management (3.0 cr)



### Business Ethics

[MBA 6315](#) - The Ethical Environment of Business (2.0 cr)

### Information Technology Management

[MBA 6240](#) - Competing in a Data-Driven Digital Age (2.0 cr)

### International Experience

Choose 1 of the following (if more than 1 course completed, remainder will count as elective credit(s)):

Take 4 or more credit(s) from the following:

- [MGMT 6305](#) - The International Environment of Business (4.0 cr)
- [IDSC 6465](#) - Global Sourcing of IT and IT Enabled Services (4.0 cr)
- [SCO 6081](#) - Global Operations Strategy (4.0 cr)
- [MKTG 6072](#) - International Marketing (4.0 cr)
- [MILI 6997](#) - MILI Global Valuation Lab (4.0 cr)
- [IBUS 5140](#) - Vienna Summer Program in International Business (Graduate) (0.0 - 18.0 cr)
- [IBUS 5150](#) - IBUS 5150: Building on Frugal Innovations to Complete in a Global Environment (4.0 cr)
- [IBUS 5260](#) - Sustainability: The New Management Paradigm (4.0 cr)
- [IBUS 5400](#) - Global Business Practicum (4.0 cr)
- [IBUS 5605](#) - Shanghai Summer Program in International Business (Graduate) (0.0 - 18.0 cr)
- [IBUS 6997](#) - MILI Global Valuation Lab (4.0 cr)
- [IBUS 6402](#) - Economic Diversification: Moving Beyond Oil in UAE and Oman (4.0 cr)
- [IBUS 5300](#) - International Business: Graduate Exchange BLOCK (0.0 - 18.0 cr)
- [IBUS 5301](#) - Graduate Exchange in International Business - BLOCK (0.0 - 18.0 cr)
- [IBUS 5302](#) - International Business: Graduate Exchange (0.0 - 18.0 cr)
- [IBUS 5303](#) - International Business: Graduate Exchange (0.0 - 18.0 cr)
- [IBUS 5304](#) - International Business: Graduate Exchange (0.0 - 18.0 cr)
- [IBUS 5305](#) - International Business: Graduate Exchange (0.0 - 18.0 cr)
- [IBUS 5306](#) - International Business: Graduate Exchange (0.0 - 18.0 cr)
- [IBUS 5307](#) - International Business: Graduate Exchange (0.0 - 18.0 cr)
- [IBUS 5308](#) - International Business: Graduate Exchange (0.0 - 18.0 cr)

### Electives

Additional courses may be available - check with your MBA program adviser for more details.

Take 22 or more credit(s) from the following:

- [ACCT 6100](#) - Financial Statement Analysis (2.0 cr)
- [ENTR 6020](#) - Business Formation (4.0 cr)
- [ENTR 6021](#) - Preparing and Implementing the Business Plan (2.0 cr)
- [ENTR 6037](#) - Corporate Venturing (2.0 cr)
- [FINA 6123](#) - Financial Services Industry (2.0 cr)
- [FINA 6241](#) - Corporate Finance Analysis and Decisions (4.0 cr)
- [FINA 6322](#) - Financial Modeling (2.0 cr)
- [IDSC 6050](#) - Information Technologies and Solutions (2.0 cr)
- [MBA 6035](#) - Managerial Accounting (3.0 cr)
- [MBA 6403](#) - Energy Industry (2.0 cr)
- [MCOM 5500](#) - Enhancing Your Executive Image in Business Communications (2.0 cr)
- [MCOM 5510](#) - Persuasive Writing in Business (2.0 cr)
- [MCOM 5530](#) - Strategies and Skills for Managerial Presentations (2.0 cr)
- [MGMT 6004](#) - Negotiation Strategies (2.0 cr)
- [MGMT 6033](#) - Managing the Strategy Process (2.0 cr)
- [MGMT 6040](#) - Competing Globally (2.0 cr)
- [MGMT 6050](#) - Management of Innovation and Change (2.0 cr)
- [MGMT 6070](#) - Technology Strategy (2.0 cr)
- [MGMT 6084](#) - Management of Teams (2.0 cr)
- [MGMT 6100](#) - Topics in Management (1.0 - 4.0 cr)
- [MGMT 6402](#) - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- [MILI 6562](#) - Information Technology in Health Care (2.0 cr)
- [MILI 6589](#) - Medical Technology Evaluation and Market Research (2.0 cr)
- [MILI 6963](#) - Healthcare Analytics (2.0 cr)
- [MILI 6990](#) - The Health Care Marketplace (2.0 cr)
- [MKTG 6087](#) - Power of Story (1.0 cr)
- [SCO 6048](#) - Logistics and Transportation (2.0 cr)
- [SCO 6090](#) - Sales, Inventory, and Operations Planning (2.0 cr)
- [SCO 6192](#) - Supply Chain Finance (2.0 cr)





### **Twin Cities Campus**

## **Business Administration Minor**

*Curtis L. Carlson School of Management - Adm*

### **Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

PhD Program in Business Administration, Carlson School of Management, Suite 4-205, 321 19th Avenue South, Minneapolis, MN 55455 (612-624-0875 or 612-624-5065; fax 612-624-8221)

Email: [csom-phd@umn.edu](mailto:csom-phd@umn.edu)

Website: <http://carlsonschool.umn.edu/degrees/phd>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 16
- This program does not require summer semesters for timely completion.
- None.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The PhD program in business administration offers full-time advanced graduate education for students seeking academic placement at leading universities or research-oriented positions in business or government. The program is for individuals who have the intellectual capacity for advanced study, enjoy independent research and analytical thinking, and who wish to master a discipline within business administration.

Non-business administration doctoral students working toward a minor within the business administration program must complete a cohesive program of study in one of seven areas of specialization: accounting; finance; information and decision sciences; marketing; supply chain and operations; strategic management and entrepreneurship, and work and organizations.

### **Accreditation**

This program is accredited by AACSB International

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

University of Minnesota PhD student in a field other than business administration.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

For each of the seven areas of concentration, a minimum of 16 credits is required. Coursework is selected in consultation with the PhD program office or the PhD coordinator of the student's chosen concentration area. Courses should be 8xxx-level, although up to 8 credits of 5xxx- and 7xxx-level coursework can be taken with the approval of the PhD and master's program offices.

#### **Areas of Concentration**

##### **Accounting**

Take 16 or more credit(s) from the following:

- **ACCT 8801** - Topics in Empirical Research I (2.0 cr)
- **ACCT 8802** - Topics in Empirical Research II (2.0 cr)



- ACCT 8803 - Topics in Empirical Research III (2.0 cr)
- ACCT 8811 - Information Economics I (2.0 cr)
- ACCT 8812 - Information Economics II (2.0 cr)
- ACCT 8813 - Information Economics III (2.0 cr)
- ACCT 8821 - Capital Markets I (2.0 cr)
- ACCT 8822 - Capital Markets II (2.0 cr)
- ACCT 8823 - Capital Markets III (2.0 cr)
- ACCT 8831 - Analytical Research Topics I (2.0 cr)
- ACCT 8832 - Analytical Research Topics II (2.0 cr)
- ACCT 8833 - Topics in Analytical Research III (2.0 cr)

-OR-

#### Finance

Take 16 or more credit(s) from the following:

- FINA 8802 - Theory of Capital Markets I: Discrete Time (2.0 cr)
- FINA 8803 - Theory of Capital Markets II: Continuous Time (2.0 cr)
- FINA 8804 - Advanced Continuous Time Finance (2.0 cr)
- FINA 8810 - Topics in Asset Pricing (2.0 cr)
- FINA 8812 - Corporate Finance I (2.0 cr)
- FINA 8813 - Corporate Finance II (2.0 cr)
- FINA 8820 - Topics in Corporate Finance (2.0 cr)
- FINA 8822 - Empirical Methods in Finance (2.0 cr)
- FINA 8823 - Empirical Corporate Finance (2.0 cr)
- FINA 8890 - Seminar: Finance Topics (2.0 - 4.0 cr)

-OR-

#### Information and Decision Sciences

Take 16 or more credit(s) from the following:

- IDSC 8511 - Conceptual Topics and Research Methods in Information and Decision Sciences (3.0 cr)
- IDSC 8521 - System Development (3.0 cr)
- IDSC 8531 - Organizational Theory and Research in Information Systems (3.0 cr)
- IDSC 8541 - Introduction to Economics of Information Systems (3.0 cr)
- IDSC 8620 - Data Mining and Personalization (3.0 cr)
- IDSC 8630 - Social Media and Online Communities (3.0 cr)
- IDSC 8721 - Behavioral Decision Theory (3.0 cr)
- IDSC 8801 - Research Seminar in Information and Decision Sciences (2.0 cr)

-OR-

#### Marketing

Take 16 or more credit(s) from the following:

- MKTG 8809 - Consumer Behavior Research Methods (2.0 cr)
- MKTG 8810 - Consumer Behavior Special Topics (2.0 cr)
- MKTG 8811 - Consumer Attitudes and Persuasion I (2.0 cr)
- MKTG 8812 - Consumer Attitudes and Persuasion II (2.0 cr)
- MKTG 8813 - Consumer Judgment and Decision Making I (2.0 cr)
- MKTG 8814 - Consumer Judgment and Decision Making II (2.0 cr)
- MKTG 8831 - Seminar: Inter-Organizational Relations (4.0 cr)
- MKTG 8842 - Quantitative Modeling I (2.0 cr)
- MKTG 8843 - Quantitative Modeling II (2.0 cr)
- MKTG 8851 - Seminar: Marketing Management and Strategy I (2.0 cr)
- MKTG 8852 - Marketing Management & Strategy II (2.0 cr)
- MKTG 8890 - Seminar: Marketing Topics (1.0 - 4.0 cr)

-OR-

#### Strategic Management and Entrepreneurship

Take 16 or more credit(s) from the following:

- MGMT 8101 - Theory Building and Research Design (4.0 cr)
- MGMT 8102 - Research Methods I - Applied Empirical Methods (2.0 cr)
- MGMT 8104 - PhD Seminar: Research Design (2.0 cr)
- MGMT 8202 - Seminar in International Management (2.0 cr)
- MGMT 8302 - Seminar in Organizations Theory (4.0 cr)
- MGMT 8401 - Seminar in Strategy Content (2.0 - 4.0 cr)
- MGMT 8402 - Seminar in Behavioral Strategy (2.0 cr)
- MGMT 8403 - Strategy Seminar (4.0 cr)



- MGMT 8404 - Topics in Strategy 1 (2.0 - 4.0 cr)
- MGMT 8405 - Seminar in Technology Strategy (2.0 cr)
- MGMT 8501 - Seminar in Entrepreneurship (2.0 - 4.0 cr)

-OR-

#### Supply Chain and Operations

Take 16 or more credit(s) from the following:

- SCO 8651 - Experimental Design (3.0 cr)
- SCO 8652 - Regression Analysis (3.0 cr)
- SCO 8711 - Research in Operations Strategy (3.0 cr)
- SCO 8721 - Management of Technological Operations (3.0 cr)
- SCO 8735 - Supply Chain Management (3.0 cr)
- SCO 8745 - Research on Quality Management (3.0 cr)
- SCO 8755 - Behavioral Operations (3.0 cr)

-OR-

#### Work and Organizations

Take 16 or more credit(s) from the following:

- HRIR 8801 - Core Seminar: Fundamentals of Economic Analysis for Work and Organizations (4.0 cr)
- HRIR 8802 - Core Seminar: Organizational Behavior (4.0 cr)
- HRIR 8803 - Core Seminar: Fundamentals of HR Research (4.0 cr)
- HRIR 8812 - Core Seminar: Research Methods in Work and Organizations (4.0 cr)
- HRIR 8820 - Seminar: Special Topics in Work and Organizations Research (2.0 cr)
- HRIR 8825 - Research Practicum/Workshop (1.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### Doctoral



### **Twin Cities Campus**

## **Business Administration Ph.D.**

*Curtis L. Carlson School of Management - Adm*

### **Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Carlson School of Management, Business Administration PhD Program, Suite 4-205, 321 19th Avenue South, Minneapolis, MN 55455  
(612-624-0875; fax: 612-624-8221)

Email: [csom-phd@umn.edu](mailto:csom-phd@umn.edu)

Website: <http://carlsonschool.umn.edu/degrees/phd>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 64 to 68
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Business Administration PhD program offers full-time advanced graduate education for students seeking academic placement at leading universities or research-oriented positions in business or government. The program is for individuals who have the intellectual capacity for advanced study, enjoy independent research and analytical thinking, and who wish to master a discipline within business administration.

Students choose to concentrate in one of seven areas of specialization: accounting; finance; information and decision sciences; marketing; supply chain and operations; strategic management and entrepreneurship; and work and organizations.

## **Accreditation**

This program is accredited by Association to Advance Collegiate Schools of Business (AACSB)

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must have completed a four-year undergraduate degree in any relevant field of study.

Other requirements to be completed before admission:

Admission depends on the applicant's grades, test scores (GMAT or GRE), and strength of the letters of recommendation and the statement of purpose.

Preferred minimum test scores are 650 total on the GMAT or 320 total on the GRE general test.

#### **Special Application Requirements:**

Submit the following items via the University's online application system: 1) complete application; 2) official copy of the GMAT or GRE scores taken within the last five years; 3) official TOEFL or IELTS scores (international applicants only) from a test taken within the last two years; 4) statement of purpose; 5) resume/CV; 6) three letters of recommendation; and 7) transcripts from all undergraduate and graduate institutions attended. The application deadline for all areas of concentration is December 15 each year for fall admission consideration. Applications are evaluated on a rolling basis beginning in mid-January. Admission decisions continue until available positions are filled.

Applicants must submit their test score(s) from the following:

- GRE
- GMAT
- Total score: 650



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Internet Based - Speaking Score: 25
- IELTS
  - Total Score: 7

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, GMAT, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 to 28 credits are required in the major.  
16 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.30 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

Coursework is selected in consultation with the advisor and varies across areas of concentration.

### Thesis Credits

Take 24 doctoral thesis credits.

[BA 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

### Areas of Concentration

#### Accounting

The accounting concentration requires 40 credits. Students pursue either an analytic or empirical research paradigm, in consultation with the advisor.

##### Required Coursework (24 credits)

Take the following courses:

- [ACCT 8801](#) - Topics in Empirical Research I (2.0 cr)
- [ACCT 8802](#) - Topics in Empirical Research II (2.0 cr)
- [ACCT 8803](#) - Topics in Empirical Research III (2.0 cr)
- [ACCT 8811](#) - Information Economics I (2.0 cr)
- [ACCT 8812](#) - Information Economics II (2.0 cr)
- [ACCT 8813](#) - Information Economics III (2.0 cr)
- [ACCT 8821](#) - Capital Markets I (2.0 cr)
- [ACCT 8822](#) - Capital Markets II (2.0 cr)
- [ACCT 8823](#) - Capital Markets III (2.0 cr)
- [ACCT 8831](#) - Analytical Research Topics I (2.0 cr)
- [ACCT 8832](#) - Analytical Research Topics II (2.0 cr)
- [ACCT 8833](#) - Topics in Analytical Research III (2.0 cr)

##### Supporting/Methodology Coursework (16 credits)

Select 16 credits from the following in consultation with the advisor:

- [APEC 8001](#) - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)
- [APEC 8002](#) - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)
- [APEC 8003](#) - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)
- [APEC 8004](#) - Applied Microeconomic Analysis of Social Choice and Welfare (2.0 cr)
- [APEC 8211](#) - Econometric Analysis I (2.0 cr)
- [APEC 8212](#) - Econometric Analysis II (2.0 cr)
- [CSOM 8101](#) - Methods and Topics in Applied Economics (2.0 - 4.0 cr)



ECON 8003 - Microeconomic Analysis (2.0 cr)  
ECON 8004 - Microeconomic Analysis (2.0 cr)  
ECON 8205 - Applied Econometrics (2.0 cr)  
FINA 8802 - Theory of Capital Markets I: Discrete Time (2.0 cr)  
FINA 8812 - Corporate Finance I (2.0 cr)  
FINA 8813 - Corporate Finance II (2.0 cr)  
FINA 8822 - Empirical Methods in Finance (2.0 cr)  
FINA 8823 - Empirical Corporate Finance (2.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)  
ACCT 8892 - Readings in Accounting (1.0 - 8.0 cr)  
ACCT 8894 - Research in Accounting (1.0 - 8.0 cr)

-OR-

### Finance

The 44-credit finance concentration provides a strong foundation in economic theory and empirical methods.

#### Required Coursework (20 credits)

Select 20 credits from the following, in consultation with the advisor. FINA 8810, 8820, and 8890 may be repeated with advisor approval.

FINA 8802 - Theory of Capital Markets I: Discrete Time (2.0 cr)  
FINA 8803 - Theory of Capital Markets II: Continuous Time (2.0 cr)  
FINA 8804 - Advanced Continuous Time Finance (2.0 cr)  
FINA 8810 - Topics in Asset Pricing (2.0 cr)  
FINA 8812 - Corporate Finance I (2.0 cr)  
FINA 8813 - Corporate Finance II (2.0 cr)  
FINA 8820 - Topics in Corporate Finance (2.0 cr)  
FINA 8822 - Empirical Methods in Finance (2.0 cr)  
FINA 8823 - Empirical Corporate Finance (2.0 cr)  
FINA 8890 - Seminar: Finance Topics (2.0 - 4.0 cr)

#### Additional Finance Courses (8 credits)

Take the following courses:

ECON 8101 - Microeconomic Theory (2.0 cr)  
ECON 8102 - Microeconomic Theory (2.0 cr)  
ECON 8103 - Microeconomic Theory (2.0 cr)  
ECON 8104 - Microeconomic Theory (2.0 cr)

#### Supporting/Methodology Coursework (16 credits)

Select 16 credits from the following in consultation with the advisor:

ACCT 8812 - Information Economics II (2.0 cr)  
ACCT 8831 - Analytical Research Topics I (2.0 cr)  
ACCT 8832 - Analytical Research Topics II (2.0 cr)  
APEC 8211 - Econometric Analysis I (2.0 cr)  
APEC 8212 - Econometric Analysis II (2.0 cr)  
ECON 8003 - Microeconomic Analysis (2.0 cr)  
ECON 8004 - Microeconomic Analysis (2.0 cr)  
ECON 8105 - Macroeconomic Theory (2.0 cr)  
ECON 8106 - Macroeconomic Theory (2.0 cr)  
ECON 8107 - Macroeconomic Theory (2.0 cr)  
ECON 8108 - Macroeconomic Theory (2.0 cr)  
ECON 8181 - Advanced Topics in Microeconomics (2.0 cr)  
ECON 8182 - Advanced Topics in Microeconomics (2.0 cr)  
ECON 8185 - Advanced Topics in Macroeconomics (2.0 cr)  
ECON 8191 - Workshop in Mathematical Economics (1.0 cr)  
ECON 8201 - Econometric Analysis (2.0 cr)  
ECON 8205 - Applied Econometrics (2.0 cr)  
ECON 8206 - Applied Econometrics (2.0 cr)  
ECON 8207 - Applied Econometrics (2.0 cr)  
ECON 8208 - Applied Econometrics (2.0 cr)  
ECON 8211 - Econometrics (2.0 cr)  
ECON 8212 - Econometrics (2.0 cr)  
ECON 8501 - Wages and Employment (2.0 cr)  
ECON 8601 - Industrial Organization and Government Regulation (2.0 cr)  
ECON 8602 - Industrial Organization and Government Regulation (2.0 cr)  
ECON 8701 - Monetary Economics (2.0 cr)



ECON 8702 - Monetary Economics (2.0 cr)  
ECON 8704 - Financial Economics (2.0 cr)  
ECON 8705 - Financial Economics (2.0 cr)  
MATH 8601 - Real Analysis (3.0 cr)  
FINA 8892 - Independent Study in Finance (1.0 - 8.0 cr)  
FINA 8894 - Directed Research in Finance (1.0 - 8.0 cr)

-OR-

### Information and Decision Sciences

The information and decision sciences (IDSc) concentration requires 41 credits.

#### Required Coursework (15 credits)

Take the following courses:

IDSC 8511 - Conceptual Topics and Research Methods in Information and Decision Sciences (3.0 cr)  
IDSC 8521 - System Development (3.0 cr)  
IDSC 8531 - Organizational Theory and Research in Information Systems (3.0 cr)  
IDSC 8541 - Introduction to Economics of Information Systems (3.0 cr)  
IDSC 8721 - Behavioral Decision Theory (3.0 cr)

#### Additional IDSc Courses (2 credits)

Select at least 2 credits of the following in consultation with the advisor. IDSC 8801 may be repeated.

IDSC 8620 - Data Mining and Personalization (3.0 cr)  
IDSC 8630 - Social Media and Online Communities (3.0 cr)  
IDSC 8801 - Research Seminar in Information and Decision Sciences (2.0 cr)

#### Methodology Coursework (8 credits)

Take at least 8 credits in research methodology from the following:

APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)  
APEC 8002 - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)  
APEC 8003 - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)  
APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)  
APEC 8211 - Econometric Analysis I (2.0 cr)  
APEC 8212 - Econometric Analysis II (2.0 cr)  
CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)  
ECON 8581 - Advanced Topics in Labor Economics (2.0 cr)  
EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)  
EPSY 8252 - Statistical Methods in Education II (3.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
EPSY 8267 - Applied Multivariate Analysis (3.0 cr)  
EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
MKTG 8842 - Quantitative Modeling I (2.0 cr)  
PA 8302 - Applied Policy Analysis (4.0 cr)  
PSY 5018H - Mathematical Models of Human Behavior (3.0 cr)  
PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)  
PSY 5993 - Research Laboratory in Psychology (3.0 cr)  
PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 8432 - Probability Models for Biostatistics (3.0 cr)  
PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)  
PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)  
SCO 8652 - Regression Analysis (3.0 cr)  
SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)  
SOC 8811 - Advanced Social Statistics (4.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)

#### Supporting/ Methodology Coursework (16 credits)

Select 16 credits from the following in consultation with the advisor:

Take 16 or more credit(s) from the following:

- APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)
- APEC 8002 - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)
- APEC 8003 - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)
- APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)
- CSCI 8551 - Intelligent Agents (3.0 cr)
- CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)
- CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)



- ECON 8581 - Advanced Topics in Labor Economics (2.0 cr)
- ECON 8601 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8602 - Industrial Organization and Government Regulation (2.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- IDSC 8892 - Readings in Information and Decision Sciences (1.0 - 8.0 cr)
- IDSC 8894 - Graduate Research in Information and Decision Sciences (1.0 - 8.0 cr)
- MGMT 8101 - Theory Building and Research Design (4.0 cr)
- MGMT 8104 - PhD Seminar: Research Design (2.0 cr)
- MGMT 8302 - Seminar in Organizations Theory (4.0 cr)
- MKTG 8842 - Quantitative Modeling I (2.0 cr)
- PA 8302 - Applied Policy Analysis (4.0 cr)
- PSY 5018H - Mathematical Models of Human Behavior (3.0 cr)
- PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)
- PSY 5993 - Research Laboratory in Psychology (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)
- PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
- PUBH 8432 - Probability Models for Biostatistics (3.0 cr)
- PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)
- PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)
- SCO 8652 - Regression Analysis (3.0 cr)
- SCO 8721 - Management of Technological Operations (3.0 cr)
- SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)
- STAT 8101 - Theory of Statistics 1 (3.0 cr)

-OR-

### Marketing

The marketing concentration requires 40 credits. Students pursue either a consumer behavior focus or quantitative/marketing strategy focus.

#### Consumer Behavior Focus (24 credits)

Students pursuing the consumer behavior focus select 16 credits from the following list, plus 8 credits from the quantitative/marketing strategy course list, in consultation with the advisor. MKTG 8810 may be repeated.

- MKTG 8809 - Consumer Behavior Research Methods (2.0 cr)
- MKTG 8810 - Consumer Behavior Special Topics (2.0 cr)
- MKTG 8811 - Consumer Attitudes and Persuasion I (2.0 cr)
- MKTG 8812 - Consumer Attitudes and Persuasion II (2.0 cr)
- MKTG 8813 - Consumer Judgment and Decision Making I (2.0 cr)
- MKTG 8814 - Consumer Judgment and Decision Making II (2.0 cr)

#### or Quantitative/Marketing Strategy Focus (24 credits)

Students pursuing the quantitative/marketing strategy focus select 14 credits from the following list, plus 10 credits from the consumer behavior course list, in consultation with the advisor. MKTG 8890 can be repeated

- MKTG 8831 - Seminar: Inter-Organizational Relations (4.0 cr)
- MKTG 8842 - Quantitative Modeling I (2.0 cr)
- MKTG 8843 - Quantitative Modeling II (2.0 cr)
- MKTG 8851 - Seminar: Marketing Management and Strategy I (2.0 cr)
- MKTG 8852 - Marketing Management & Strategy II (2.0 cr)
- MKTG 8890 - Seminar: Marketing Topics (1.0 - 4.0 cr)

#### Supporting/Methodology Coursework (16 credits)

Select 16 credits from the following in consultation with the advisor:

- ACCT 8811 - Information Economics I (2.0 cr)
- ACCT 8831 - Analytical Research Topics I (2.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)
- ECON 8003 - Microeconomic Analysis (2.0 cr)
- ECON 8004 - Microeconomic Analysis (2.0 cr)
- ECON 8101 - Microeconomic Theory (2.0 cr)
- ECON 8102 - Microeconomic Theory (2.0 cr)
- ECON 8103 - Microeconomic Theory (2.0 cr)
- ECON 8104 - Microeconomic Theory (2.0 cr)





ECON 8118 - Noncooperative Game Theory (2.0 cr)  
ECON 8119 - Cooperative Game Theory (2.0 cr)  
ECON 8191 - Workshop in Mathematical Economics (1.0 cr)  
ECON 8205 - Applied Econometrics (2.0 cr)  
ECON 8206 - Applied Econometrics (2.0 cr)  
ECON 8207 - Applied Econometrics (2.0 cr)  
ECON 8208 - Applied Econometrics (2.0 cr)  
ECON 8211 - Econometrics (2.0 cr)  
ECON 8212 - Econometrics (2.0 cr)  
ECON 8601 - Industrial Organization and Government Regulation (2.0 cr)  
ECON 8602 - Industrial Organization and Government Regulation (2.0 cr)  
ECON 8603 - Industrial Organization and Government Regulation (2.0 cr)  
EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)  
EPSY 5245 - Advanced Survey Data Analysis for Categorical and Rating Scale Data (1.0 cr)  
EPSY 5261 - Introductory Statistical Methods (3.0 cr)  
EPSY 5262 - Intermediate Statistical Methods (3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
EPSY 8252 - Statistical Methods in Education II (3.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
EPSY 8267 - Applied Multivariate Analysis (3.0 cr)  
IDSC 8721 - Behavioral Decision Theory (3.0 cr)  
MKTG 8892 - Readings in Marketing (1.0 - 8.0 cr)  
MKTG 8894 - Graduate Research in Marketing (1.0 - 8.0 cr)  
MSBA 6440 - Causal Inference via Econometrics and Experimentation (3.0 cr)  
PSY 5202 - Attitudes and Social Behavior (3.0 cr)  
PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)  
PSY 5207 - Personality and Social Behavior (3.0 cr)  
PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)  
PSY 8203 - Impression Management (3.0 cr)  
PSY 8208 - Social Psychology: The Self (3.0 cr)  
PSY 8209 - Research Methods in Social Psychology (3.0 cr)  
PSY 8935 - Readings in Behavioral Genetics and Individual Differences Psychology (1.0 cr)  
PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)

-OR-

### Supply Chain and Operations

The supply chain and operations (SCO) concentration requires 41 credits.

#### Required Coursework (25 credits)

Take the following courses:

SCO 8651 - Experimental Design (3.0 cr)  
SCO 8652 - Regression Analysis (3.0 cr)  
SCO 8711 - Research in Operations Strategy (3.0 cr)  
SCO 8721 - Management of Technological Operations (3.0 cr)  
SCO 8735 - Supply Chain Management (3.0 cr)  
SCO 8745 - Research on Quality Management (3.0 cr)  
SCO 8755 - Behavioral Operations (3.0 cr)  
MGMT 8101 - Theory Building and Research Design (4.0 cr)  
MGMT 8104 - PhD Seminar: Research Design (2.0 cr)

#### Supporting Field/Methodology Coursework (16 credits)

##### Required Course (3 credits)

Take the following course:

GRAD 8101 - Teaching in Higher Education (3.0 cr)

##### Supporting/Methodology Courses (13 credits)

Select 13 credits from the following in consultation with the advisor:

APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)  
APEC 8211 - Econometric Analysis I (2.0 cr)  
APEC 8212 - Econometric Analysis II (2.0 cr)  
APEC 8602 - Economics of the Environment (3.0 cr)  
EPSY 8252 - Statistical Methods in Education II (3.0 cr)  
EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)  
EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
HRIR 8802 - Core Seminar: Organizational Behavior (4.0 cr)  
MGMT 8302 - Seminar in Organizations Theory (4.0 cr)



MKTG 8842 - Quantitative Modeling I (2.0 cr)  
MKTG 8843 - Quantitative Modeling II (2.0 cr)  
PA 5032 - Applied Regression (2.0 cr)  
PA 5033 - Multivariate Techniques (2.0 cr)  
PUBH 7405 - Biostatistics: Regression (4.0 cr)  
PUBH 7406 - Advanced Regression and Design (4.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 8475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)  
SCO 8892 - Readings in Operations and Management Science (1.0 - 8.0 cr)  
SCO 8894 - Graduate Research in Operations and Management Science (1.0 - 8.0 cr)  
SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5421 - Analysis of Categorical Data (3.0 cr)  
STAT 5701 - Statistical Computing (3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)  
STAT 8311 - Linear Models (4.0 cr)

-OR-

### Strategic Management and Entrepreneurship

The Strategic Management and Entrepreneurship (SME) concentration requires 40 credits.

#### Required Coursework (16 credits)

Take the following courses:

CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)  
MGMT 8102 - Research Methods I - Applied Empirical Methods (2.0 cr)  
MGMT 8302 - Seminar in Organizations Theory (4.0 cr)  
MGMT 8401 - Seminar in Strategy Content (2.0 - 4.0 cr)  
MGMT 8403 - Strategy Seminar (4.0 cr)  
MGMT 8501 - Seminar in Entrepreneurship (2.0 - 4.0 cr)

#### SME Elective Coursework (8 credits)

Take at least 8 credits of SME electives from the list below:

MGMT 8101 - Theory Building and Research Design (4.0 cr)  
MGMT 8104 - PhD Seminar: Research Design (2.0 cr)  
MGMT 8202 - Seminar in International Management (2.0 cr)  
MGMT 8402 - Seminar in Behavioral Strategy (2.0 cr)  
MGMT 8404 - Topics in Strategy 1 (2.0 - 4.0 cr)  
MGMT 8405 - Seminar in Technology Strategy (2.0 cr)

#### Supporting/Methodology Coursework (16 credits)

##### Required Courses (7 credits)

Take the following courses:

APEC 8211 - Econometric Analysis I (2.0 cr)  
APEC 8212 - Econometric Analysis II (2.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)

##### Additional Supporting/Methodology Courses (9 credits)

Select 9 credits from the following in consultation with the advisor:

APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)  
APEC 8003 - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)  
APEC 8004 - Applied Microeconomic Analysis of Social Choice and Welfare (2.0 cr)  
CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
EPSY 8252 - Statistical Methods in Education II (3.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)  
FINA 8823 - Empirical Corporate Finance (2.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MGMT 8892 - Readings in Management Theory and Administration (1.0 - 8.0 cr)  
MGMT 8894 - Graduate Research in Management Theory and Administration (1.0 - 8.0 cr)  
MKTG 8831 - Seminar: Inter-Organizational Relations (4.0 cr)  
PA 8302 - Applied Policy Analysis (4.0 cr)



POL 8106 - Quantitative Political Science I (3.0 cr)  
PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)  
PUBH 8811 - Research Methods in Health Care (3.0 cr)  
SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)  
SOC 8701 - Sociological Theory (4.0 cr)  
SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)  
SOC 8735 - Sociology of Culture (3.0 cr)  
SOC 8801 - Sociological Research Methods (4.0 cr)  
SOC 8811 - Advanced Social Statistics (4.0 cr)  
SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)

-OR-

### Work and Organizations

The Work and Organizations (WOrg) concentration requires 44 credits. The multidisciplinary curriculum covers organizational behavior, human resource management, organizational economics and related areas.

#### Required WOrg Coursework (28 credits)

Take the following courses. HRIR 8820 must be taken 4 times for a total of 8 credits; HRIR must be taken 8825 4 times for a total of 4 credits.

HRIR 8801 - Core Seminar: Fundamentals of Economic Analysis for Work and Organizations (4.0 cr)  
HRIR 8802 - Core Seminar: Organizational Behavior (4.0 cr)  
HRIR 8803 - Core Seminar: Fundamentals of HR Research (4.0 cr)  
HRIR 8812 - Core Seminar: Research Methods in Work and Organizations (4.0 cr)  
HRIR 8820 - Seminar: Special Topics in Work and Organizations Research (2.0 cr)  
HRIR 8825 - Research Practicum/Workshop (1.0 cr)

#### Supporting/Methodology Coursework (16 credits)

##### Required Courses (6 credits)

Take the following courses:

EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)

##### Required APEC Courses (3 credits)

Select APEC 5031 (3 credits) or APEC 8211 and 8212 (total of 4 credits).

APEC 5031 - Methods of Economic Data Analysis (3.0 cr)  
APEC 8211 - Econometric Analysis I (2.0 cr)  
APEC 8212 - Econometric Analysis II (2.0 cr)

##### Additional Supporting/Methodology Courses (7 credits)

Select 7 credits from the following in consultation with the advisor:

APEC 8003 - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)  
APEC 8501 - Labor Economics I (2.0 cr)  
APEC 8502 - Labor Economics II (2.0 cr)  
CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)  
ECON 8205 - Applied Econometrics (2.0 cr)  
ECON 8206 - Applied Econometrics (2.0 cr)  
EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)  
EPSY 5261 - Introductory Statistical Methods (3.0 cr)  
EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)  
EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)  
HRIR 8991 - Independent Study in Human Resources and Industrial Relations (1.0 - 8.0 cr)  
MGMT 8101 - Theory Building and Research Design (4.0 cr)  
MGMT 8104 - PhD Seminar: Research Design (2.0 cr)  
MGMT 8301 - Seminar in Organizational Behavior (4.0 cr)  
PSY 8208 - Social Psychology: The Self (3.0 cr)  
PSY 8664 - Personality Assessment (3.0 cr)  
PSY 8701 - Seminar in Industrial and Organizational Psychology I (3.0 cr)  
PSY 8702 - Seminar in Industrial and Organizational Psychology II (3.0 cr)  
PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)  
PUBH 6724 - The Health Care System and Public Health (3.0 cr)  
PUBH 6832 - Economics of the Health Care System (3.0 cr)  
PUBH 6861 - Health Insurance (2.0 cr)  
SOC 8590 - Topics in Life Course Sociology (3.0 cr)



### *Twin Cities Campus*

## **Business Analytics M.S.**

*Information & Decision Sciences*

**Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Phone: 612-625-5555

Email: [msba@umn.edu](mailto:msba@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-science-in-business-analytics>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 45
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MS in Business Analytics (MSBA) program provides a strong foundation in data analytics by bringing together a diverse body of knowledge from consumer behavior, risk management, operations research, optimization, information systems, computer science, applied statistics, and decision theory for the purpose of data-driven business decision making in both public and private sectors.

Students who graduate from this 45-credit program will have the deep quantitative capabilities and technical expertise to create business and social value by extracting useful insights and applying them in a variety of career settings. The Business Analytics MS can be completed in one year of full-time study or in two years part-time.

## **Accreditation**

This program is accredited by AACSB International. The M.S. program in Business Analytics is STEM designated.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Applicants must have a bachelor's degree from an accredited college or university.

Other requirements to be completed before admission:

- Demonstrated proficiency in computer programming is required. The following programming languages satisfy the requirement: Python, R, C, C++, C#, VB, Java, Pascal, and Fortran.
- Applicants must have completed at least one semester college-level Calculus course with a grade of "C" or better (or grade equivalent).
- Work experience is not required, but preferred.

### **Special Application Requirements:**

MSBA Application Requirements:

Applicants must submit all application materials through the University's admissions system. Application materials include:

- A GMAT or GRE General Test that is not more than five years old, with an acceptable score. PT MSBA applicants: A GMAT/GRE waiver is available for qualified candidates.
- For international students, an acceptable score on the Test of English as a Foreign Language (TOEFL) International Language Testing System (IELTS).
- Two letters of recommendations need to be submitted through the online application.
- A personal statement of career goals, and objectives for pursuing a Business Analytics MS degree. The personal statement questions are the following:

Briefly describe your short-term and long-term career goals. Why are you choosing to pursue a Business Analytics MS degree at this time in your career, and what are you hoping to accomplish by doing so? Why are you interested in pursuing a Business Analytics MS degree at the Carlson School of Management? What do you feel makes you a strong candidate for the program? How will you



contribute to the Business Analytics MS Program overall? Applicants must submit a current resume that includes job responsibilities and accomplishments in the online application.

- Applicants may choose to submit an essay to comment on any item(s) in their application they consider worthy of further explanation.
- Applicants may be required to complete an admissions interview, which are by invitation only.
- Video essay.

Applicants must submit their test score(s) from the following:

- GRE
- GMAT

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(GRE, GMAT, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 45 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Students engage in an experiential learning application of the analytics methodologies, techniques, and tools learned throughout the program to a real-world problem. The final project consists of the development and presentation of results, interpretations, insights, and recommendations.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

Some business/basic technical requirements can be waived for students with degrees in related business areas/computer science.

### Business/Management Fundamentals (13 credits)

Take the following courses. Take MSBA 6355 for 1.5 credits.

- [MSBA 6110](#) - Business Essentials (3.0 cr)
- [MSBA 6120](#) - Introduction to Statistics for Data Scientists (3.0 cr)
- [MSBA 6130](#) - Introduction to Business Analytics in R (3.0 cr)
- [MSBA 6140](#) - Ethics and Data Privacy (1.0 cr)
- [MSBA 6345](#) - Agile Management of Analytics Projects (1.5 cr)
- [MSBA 6355](#) - Building and Managing Teams (0.0 - 1.5 cr)

### Elective (2 credits)

Select at least 2 elective credits in consultation with the advisor.

- [APEC 5831](#) - Food and Agribusiness Marketplace (2.0 cr)
- [BLAW 6158](#) - The study of laws affecting private business and publicly-traded companies. (2.0 cr)
- [ENTR 6036](#) - Managing the Growing Business (2.0 cr)
- [FINA 6123](#) - Financial Services Industry (2.0 cr)
- [FINA 6325](#) - Behavioral Finance (2.0 cr)
- [IDSC 6003](#) - Accounting and Information Systems (2.0 cr)
- [IDSC 6040](#) - Information Technology Management (2.0 cr)
- [IDSC 6050](#) - Information Technologies and Solutions (2.0 cr)
- [IDSC 6423](#) - Enterprise Systems (2.0 cr)
- [INS 6100](#) - Corporate Risk Management (2.0 cr)
- [INS 6101](#) - Employee Benefits (2.0 cr)
- [INS 6200](#) - Insurance Theory and Practice (2.0 cr)
- [MBA 6110](#) - Leading Others (2.0 cr)
- [MBA 6140](#) - Managerial Economics (2.0 cr)
- [MBA 6235](#) - Managerial Accounting (2.0 cr)
- [MBA 6315](#) - The Ethical Environment of Business (2.0 cr)
- [MCOM 5510](#) - Persuasive Writing in Business (2.0 cr)



[MCOM 5530](#) - Strategies and Skills for Managerial Presentations (2.0 cr)  
[MGMT 6004](#) - Negotiation Strategies (2.0 cr)  
[MGMT 6032](#) - Strategic Alliances (2.0 cr)  
[MGMT 6033](#) - Managing the Strategy Process (2.0 cr)  
[MGMT 6040](#) - Competing Globally (2.0 cr)  
[MGMT 6050](#) - Management of Innovation and Change (2.0 cr)  
[MGMT 6084](#) - Management of Teams (2.0 cr)  
[MGMT 6310](#) - Cross-Cultural Management: Developing Intercultural Competence (2.0 cr)  
[MGMT 6465](#) - Leadership and Personal Development (2.0 cr)  
[MILI 6235](#) - Pharmaceutical Industry: Business and Policy (2.0 cr)  
[MILI 6589](#) - Medical Technology Evaluation and Market Research (2.0 cr)  
[MILI 6990](#) - The Health Care Marketplace (2.0 cr)  
[MILI 6991](#) - Anatomy and Physiology for Managers (2.0 cr)  
[MILI 6995](#) - Medical Industry Valuation Laboratory (2.0 cr)  
[MKTG 6050](#) - Marketing Analytics: Managerial Decisions (2.0 cr)  
[MKTG 6086](#) - Digital Marketing (2.0 cr)  
[MSBA 6460](#) - Advanced AI for Business Applications (2.0 cr)

**Technical Fundamentals (9 credits)**

Take the following courses:

[MSBA 6310](#) - Programming for Data Science (3.0 cr)  
[MSBA 6320](#) - Data Management, Databases, and Data Warehousing (3.0 cr)  
[MSBA 6330](#) - Big Data Analytics (3.0 cr)

**Specialty Courses (15 credits)**

Take the following courses:

[MSBA 6410](#) - Exploratory Data Analytics (3.0 cr)  
[MSBA 6420](#) - Predictive Analytics (3.0 cr)  
[MSBA 6430](#) - Advanced Issues in Business Analytics (3.0 cr)  
[MSBA 6440](#) - Causal Inference via Econometrics and Experimentation (3.0 cr)  
[MSBA 6450](#) - Optimization and Simulation for Decision Making (3.0 cr)

**Capstone Experience (6 credits)**

Take the following course:

[MSBA 6510](#) - Business Analytics Experiential Learning (6.0 cr)

**Joint- or Dual-degree Coursework:** MS-Business Analytics/MBAMS-Business Analytics/MS-Finance Student may take a total of 22 credits in common among the academic programs.



### **Twin Cities Campus**

## **Business Analytics Postbaccalaureate Certificate**

*CSOM MS Business Analytics*

### **Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

1-110 Carlson School of Management  
321 19th Ave S, Minneapolis, MN 55455  
612.625.5555

Email: [carlsoncert@umn.edu](mailto:carlsoncert@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-business-administration>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Business analytics and data science is one of the most sought after skill sets in modern industry. The Business Analytics certificate offers candidates the skills to extract insights with creative data analysis, and then apply the results in real business settings.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

Applicants must have a bachelors degree from an accredited institution.

Other requirements to be completed before admission:

Please review the Admissions Checklist online for detailed admissions requirements.

#### **Special Application Requirements:**

Business Analytics certificate requires math and stats prerequisites.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

#### **Required Coursework (12 credits)**

Take the following courses:

[IDSC 6490](#) - Advanced Topics in MIS (2.0 cr)



- [MABA 6121](#) - Practical Statistics for Business Applications (2.0 cr)
- [MABA 6251](#) - AI for Competitive Advantage (2.0 cr)
- [MABA 6311](#) - Programming for Business Analytics (2.0 cr)
- [MABA 6321](#) - Data Management and Big Data (2.0 cr)
- [MABA 6341](#) - Data Visualization (2.0 cr)





### *Twin Cities Campus*

## **Business Management Minor**

*CSOM Financial Services Office*

**Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

MBA & MS Programs Office

Carlson School of Management

321 19th Ave S Suite 1-110

Minneapolis, MN 55455

Email: [mbasa@umn.edu](mailto:mbasa@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/business-management-minor>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.
- Coursework is delivered through the Carlson School of Management via the following delivery methods: in-person courses on the Twin Cities campus, courses utilizing a hybrid of in-person meetings and online content delivery, or coursework delivered completely online.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The free-standing graduate-level minor in business management will enhance the preparation of graduate students to enter into organizations with a solid foundation of knowledge in key business disciplines. The business management minor program is flexible and designed to suit the particular needs and interests of the student through completion of a broad range of business core (foundation) and elective courses.

Note: Students enrolled in the master of business administration program or the business administration PhD program are not eligible for this minor.

## **Accreditation**

This program is accredited by AACSB International

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

Prior admission into an established master's or doctoral degree program at the University of Minnesota Twin Cities is required. Students must be in good academic standing within their own program to be admitted to the business minor. Students enrolled in the master of business administration program or the business administration PhD program are not eligible for this minor.

Students should first consult with their major program advisor about the advisability of a business minor and whether it is permitted by their program. They may then contact graduate program coordinator, Molly Bendzick ([mollyb@umn.edu](mailto:mollyb@umn.edu) or (612) 625-7582) for more information on the minor.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Masters

#### Master's Business Minor

Take 8 or more credit(s) from the following:

- ACCT 5180 - Consolidations and Advanced Reporting (2.0 cr)
- ACCT 6100 - Financial Statement Analysis (2.0 cr)
- BLAW 6158 - The study of laws affecting private business and publicly-traded companies. (2.0 cr)
- ENTR 6020 - Business Formation (4.0 cr)
- ENTR 6021 - Preparing and Implementing the Business Plan (2.0 cr)
- ENTR 6036 - Managing the Growing Business (2.0 cr)
- ENTR 6037 - Corporate Venturing (2.0 cr)
- ENTR 6041 - Initiating New Product Design and Business Development (2.0 - 4.0 cr)
- ENTR 6042 - Implementing New Product Design and Business Development (4.0 cr)
- FINA 6121 - Debt Markets, Interest Rates, and Hedging (2.0 cr)
- FINA 6122 - Financial Management of Depository Institutions (2.0 cr)
- FINA 6123 - Financial Services Industry (2.0 cr)
- FINA 6222 - Mergers and Acquisitions (2.0 cr)
- FINA 6241 - Corporate Financial Decisions and Analysis (4.0 cr)
- FINA 6242 - Advanced Corporate Finance Analysis and Decisions (4.0 cr)
- FINA 6321 - Portfolio Analysis and Management (2.0 cr)
- FINA 6322 - Financial Modeling (2.0 cr)
- FINA 6323 - Advanced Financial Modeling (2.0 cr)
- FINA 6324 - Securitization Markets (2.0 cr)
- FINA 6325 - Behavioral Finance (2.0 cr)
- FINA 6341 - World Economy (4.0 cr)
- FINA 6522 - Introduction to Derivatives and Financial Risk Management (2.0 cr)
- FINA 6529 - Advanced Topics in Fixed Income and Derivatives (2.0 cr)
- FINA 6621 - International Financial Management (2.0 cr)
- FINA 6801 - Finance Independent Study (1.0 - 6.0 cr)
- MGMT 6465 - Leadership and Personal Development (2.0 cr)
- IDSC 6040 - Information Technology Management (2.0 cr)
- IDSC 6050 - Information Technologies and Solutions (2.0 cr)
- IDSC 6423 - Enterprise Systems (2.0 cr)
- IDSC 6442 - E-Sourcing and E-Auctions (2.0 cr)
- IDSC 6444 - Business Analytics for Managers I (2.0 cr)
- IDSC 6446 - Business Analytics for Managers II (2.0 cr)
- IDSC 6455 - Web 2.0: The Business of Social Media (2.0 cr)
- IDSC 6465 - Global Sourcing of IT and IT Enabled Services (4.0 cr)
- IDSC 6471 - Knowledge Management (2.0 cr)
- IDSC 6481 - Managerial Decision Making (2.0 cr)
- MBA 6030 - Financial Accounting (3.0 cr)
- MBA 6035 - Managerial Accounting (3.0 cr)
- MBA 6110 - Leading Others (2.0 cr)
- MBA 6120 - Data Analysis and Statistics for Managers (3.0 cr)
- MBA 6140 - Managerial Economics (2.0 cr)
- MBA 6210 - Marketing Management (3.0 cr)
- MBA 6220 - Supply Chain & Operations (3.0 cr)
- MBA 6230 - Financial Management (3.0 cr)
- MBA 6300 - Strategic Management (3.0 cr)
- MBA 6403 - Energy Industry (2.0 cr)
- MBA 6990 - MBA Topics (2.0 cr)
- MCOM 5500 - Enhancing Your Executive Image in Business Communications (2.0 cr)
- MCOM 5510 - Persuasive Writing in Business (2.0 cr)
- MCOM 5530 - Strategies and Skills for Managerial Presentations (2.0 cr)
- MGMT 5102 - StartUp: Customer Development and Testing (2.0 cr)
- MGMT 6004 - Negotiation Strategies (2.0 cr)



- MGMT 6031 - Industry Analysis and Competitive Strategy (4.0 cr)
- MGMT 6032 - Strategic Alliances (2.0 cr)
- MGMT 6033 - Managing the Strategy Process (2.0 cr)
- MGMT 6034 - Strategic Leadership (2.0 cr)
- MGMT 6035 - Complex and Cross-Cultural Negotiations (2.0 cr)
- MGMT 6040 - Competing Globally (2.0 cr)
- MGMT 6050 - Management of Innovation and Change (2.0 cr)
- MGMT 6084 - Management of Teams (2.0 cr)
- MGMT 6085 - Corporate Strategy (4.0 cr)
- MGMT 6100 - Topics in Management (1.0 - 4.0 cr)
- MGMT 6305 - The International Environment of Business (4.0 cr)
- MGMT 6310 - Cross-Cultural Management: Developing Intercultural Competence (2.0 cr)
- MGMT 6402 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- MGMT 6410 - Corporate Responsibility (2.0 cr)
- MILI 6235 - Pharmaceutical Industry: Business and Policy (2.0 cr)
- MILI 6421 - Healthcare Law: Strategic and Business Implications (2.0 cr)
- MILI 6562 - Information Technology in Health Care (2.0 cr)
- MILI 6589 - Medical Technology Evaluation and Market Research (2.0 cr)
- MILI 6726 - Medical Device Industry: Business and Public Policy (2.0 cr)
- MILI 6963 - Healthcare Analytics (2.0 cr)
- MILI 6990 - The Health Care Marketplace (2.0 cr)
- MILI 6991 - Anatomy and Physiology for Managers (2.0 cr)
- MILI 6992 - Healthcare Delivery Innovations: Optimizing Cost and Quality (2.0 cr)
- MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)
- MILI 6997 - MILI Global Valuation Lab (4.0 cr)
- MILI 6998 - MILI Fellows (0.0 - 2.0 cr)
- MILI 6999 - Independent Study (0.0 - 8.0 cr)
- MKTG 6050 - Marketing Analytics: Managerial Decisions (2.0 cr)
- MKTG 6051 - Marketing Research - Rapid Insights (2.0 cr)
- MKTG 6055 - Buyer Behavior (2.0 cr)
- MKTG 6060 - Marketing Channels (2.0 cr)
- MKTG 6072 - International Marketing (4.0 cr)
- MKTG 6073 - Marketing in High Tech Settings (2.0 cr)
- MKTG 6075 - Pricing Strategy (4.0 cr)
- MKTG 6078 - Advertising & Promotion (4.0 cr)
- MKTG 6082 - Brand Strategy (2.0 cr)
- MKTG 6084 - Persuasion and Influence (2.0 cr)
- MKTG 6085 - Nudge: Improving Decisions about Health, Wealth and Happiness (2.0 cr)
- MKTG 6086 - Digital Marketing (2.0 cr)
- MKTG 6088 - Strategic Marketing (2.0 cr)
- MKTG 6090 - Marketing Topics (1.0 - 4.0 cr)
- SCO 6041 - Project Management (2.0 cr)
- SCO 6045 - Strategic Sourcing (2.0 cr)
- SCO 6048 - Logistics and Transportation (2.0 cr)
- SCO 6051 - Service Management (2.0 cr)
- SCO 6056 - Managing Supply Chain Operations (4.0 cr)
- SCO 6072 - Managing Technologies in the Supply Chain (2.0 cr)
- SCO 6081 - Global Operations Strategy (4.0 cr)
- SCO 6090 - Sales, Inventory, and Operations Planning (2.0 cr)
- SCO 6091 - Process Improvement Methods (2.0 cr)
- SCO 6092 - Supply Chain Risk and Security (2.0 cr)
- SCO 6094 - Responsible Supply Chain Management (2.0 cr)
- SCO 6095 - Supply Chain Management in the Food and Agribusiness Sector (2.0 cr)
- SCO 6096 - Supply Chain Management in the Health Care and Medical Devices Sector (2.0 cr)
- SCO 6097 - Supply Chain Management in the Retail Sector (2.0 cr)
- SCO 6098 - Operations Excellence via Lean Thinking (2.0 cr)
- SCO 6191 - Big Data Analytics in Supply Chains (2.0 cr)
- SCO 6192 - Supply Chain Finance (2.0 cr)
- SCO 6850 - Topics in Operations and Management Science (2.0 - 4.0 cr)

#### Doctoral

##### Doctoral Business Minor

Take 12 or more credit(s) from the following:

- ACCT 5180 - Consolidations and Advanced Reporting (2.0 cr)
- ACCT 6100 - Financial Statement Analysis (2.0 cr)



- BLAW 6158 - The study of laws affecting private business and publicly-traded companies. (2.0 cr)
- ENTR 6020 - Business Formation (4.0 cr)
- ENTR 6021 - Preparing and Implementing the Business Plan (2.0 cr)
- ENTR 6036 - Managing the Growing Business (2.0 cr)
- ENTR 6037 - Corporate Venturing (2.0 cr)
- ENTR 6041 - Initiating New Product Design and Business Development (2.0 - 4.0 cr)
- ENTR 6042 - Implementing New Product Design and Business Development (4.0 cr)
- FINA 6121 - Debt Markets, Interest Rates, and Hedging (2.0 cr)
- FINA 6122 - Financial Management of Depository Institutions (2.0 cr)
- FINA 6123 - Financial Services Industry (2.0 cr)
- FINA 6222 - Mergers and Acquisitions (2.0 cr)
- FINA 6241 - Corporate Financial Decisions and Analysis (4.0 cr)
- FINA 6242 - Advanced Corporate Finance Analysis and Decisions (4.0 cr)
- FINA 6321 - Portfolio Analysis and Management (2.0 cr)
- FINA 6322 - Financial Modeling (2.0 cr)
- FINA 6323 - Advanced Financial Modeling (2.0 cr)
- FINA 6324 - Securitization Markets (2.0 cr)
- FINA 6325 - Behavioral Finance (2.0 cr)
- FINA 6341 - World Economy (4.0 cr)
- FINA 6522 - Introduction to Derivatives and Financial Risk Management (2.0 cr)
- FINA 6529 - Advanced Topics in Fixed Income and Derivatives (2.0 cr)
- FINA 6621 - International Financial Management (2.0 cr)
- FINA 6801 - Finance Independent Study (1.0 - 6.0 cr)
- MGMT 6465 - Leadership and Personal Development (2.0 cr)
- IDSC 6040 - Information Technology Management (2.0 cr)
- IDSC 6050 - Information Technologies and Solutions (2.0 cr)
- IDSC 6423 - Enterprise Systems (2.0 cr)
- IDSC 6442 - E-Sourcing and E-Auctions (2.0 cr)
- IDSC 6444 - Business Analytics for Managers I (2.0 cr)
- IDSC 6446 - Business Analytics for Managers II (2.0 cr)
- IDSC 6455 - Web 2.0: The Business of Social Media (2.0 cr)
- IDSC 6465 - Global Sourcing of IT and IT Enabled Services (4.0 cr)
- IDSC 6471 - Knowledge Management (2.0 cr)
- IDSC 6481 - Managerial Decision Making (2.0 cr)
- MBA 6030 - Financial Accounting (3.0 cr)
- MBA 6035 - Managerial Accounting (3.0 cr)
- MBA 6110 - Leading Others (2.0 cr)
- MBA 6120 - Data Analysis and Statistics for Managers (3.0 cr)
- MBA 6140 - Managerial Economics (2.0 cr)
- MBA 6210 - Marketing Management (3.0 cr)
- MBA 6220 - Supply Chain & Operations (3.0 cr)
- MBA 6230 - Financial Management (3.0 cr)
- MBA 6300 - Strategic Management (3.0 cr)
- MBA 6403 - Energy Industry (2.0 cr)
- MBA 6990 - MBA Topics (2.0 cr)
- MCOM 5500 - Enhancing Your Executive Image in Business Communications (2.0 cr)
- MCOM 5510 - Persuasive Writing in Business (2.0 cr)
- MCOM 5530 - Strategies and Skills for Managerial Presentations (2.0 cr)
- MGMT 5102 - StartUp: Customer Development and Testing (2.0 cr)
- MGMT 6004 - Negotiation Strategies (2.0 cr)
- MGMT 6031 - Industry Analysis and Competitive Strategy (4.0 cr)
- MGMT 6032 - Strategic Alliances (2.0 cr)
- MGMT 6033 - Managing the Strategy Process (2.0 cr)
- MGMT 6034 - Strategic Leadership (2.0 cr)
- MGMT 6035 - Complex and Cross-Cultural Negotiations (2.0 cr)
- MGMT 6040 - Competing Globally (2.0 cr)
- MGMT 6050 - Management of Innovation and Change (2.0 cr)
- MGMT 6084 - Management of Teams (2.0 cr)
- MGMT 6085 - Corporate Strategy (4.0 cr)
- MGMT 6100 - Topics in Management (1.0 - 4.0 cr)
- MGMT 6305 - The International Environment of Business (4.0 cr)
- MGMT 6310 - Cross-Cultural Management: Developing Intercultural Competence (2.0 cr)
- MGMT 6402 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- MGMT 6410 - Corporate Responsibility (2.0 cr)
- MILI 6235 - Pharmaceutical Industry: Business and Policy (2.0 cr)



- MILI 6421 - Healthcare Law: Strategic and Business Implications (2.0 cr)
- MILI 6562 - Information Technology in Health Care (2.0 cr)
- MILI 6589 - Medical Technology Evaluation and Market Research (2.0 cr)
- MILI 6726 - Medical Device Industry: Business and Public Policy (2.0 cr)
- MILI 6963 - Healthcare Analytics (2.0 cr)
- MILI 6990 - The Health Care Marketplace (2.0 cr)
- MILI 6991 - Anatomy and Physiology for Managers (2.0 cr)
- MILI 6992 - Healthcare Delivery Innovations: Optimizing Cost and Quality (2.0 cr)
- MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)
- MILI 6997 - MILI Global Valuation Lab (4.0 cr)
- MILI 6998 - MILI Fellows (0.0 - 2.0 cr)
- MILI 6999 - Independent Study (0.0 - 8.0 cr)
- MKTG 6050 - Marketing Analytics: Managerial Decisions (2.0 cr)
- MKTG 6051 - Marketing Research - Rapid Insights (2.0 cr)
- MKTG 6055 - Buyer Behavior (2.0 cr)
- MKTG 6060 - Marketing Channels (2.0 cr)
- MKTG 6072 - International Marketing (4.0 cr)
- MKTG 6073 - Marketing in High Tech Settings (2.0 cr)
- MKTG 6075 - Pricing Strategy (4.0 cr)
- MKTG 6078 - Advertising & Promotion (4.0 cr)
- MKTG 6082 - Brand Strategy (2.0 cr)
- MKTG 6084 - Persuasion and Influence (2.0 cr)
- MKTG 6085 - Nudge: Improving Decisions about Health, Wealth and Happiness (2.0 cr)
- MKTG 6086 - Digital Marketing (2.0 cr)
- MKTG 6088 - Strategic Marketing (2.0 cr)
- MKTG 6090 - Marketing Topics (1.0 - 4.0 cr)
- SCO 6041 - Project Management (2.0 cr)
- SCO 6045 - Strategic Sourcing (2.0 cr)
- SCO 6048 - Logistics and Transportation (2.0 cr)
- SCO 6051 - Service Management (2.0 cr)
- SCO 6056 - Managing Supply Chain Operations (4.0 cr)
- SCO 6072 - Managing Technologies in the Supply Chain (2.0 cr)
- SCO 6081 - Global Operations Strategy (4.0 cr)
- SCO 6090 - Sales, Inventory, and Operations Planning (2.0 cr)
- SCO 6091 - Process Improvement Methods (2.0 cr)
- SCO 6092 - Supply Chain Risk and Security (2.0 cr)
- SCO 6094 - Responsible Supply Chain Management (2.0 cr)
- SCO 6095 - Supply Chain Management in the Food and Agribusiness Sector (2.0 cr)
- SCO 6096 - Supply Chain Management in the Health Care and Medical Devices Sector (2.0 cr)
- SCO 6097 - Supply Chain Management in the Retail Sector (2.0 cr)
- SCO 6098 - Operations Excellence via Lean Thinking (2.0 cr)
- SCO 6191 - Big Data Analytics in Supply Chains (2.0 cr)
- SCO 6192 - Supply Chain Finance (2.0 cr)
- SCO 6850 - Topics in Operations and Management Science (2.0 - 4.0 cr)



### ***Twin Cities Campus***

## **Business Research M.S.**

*Curtis L. Carlson School of Management - Adm*

### **Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Business Administration PhD Program, Suite 4-205, 321-19th Avenue South, Minneapolis, MN 55455 (Phone: 612-624-0875; Fax: 612-624-8221)

Email: [csom-phd@umn.edu](mailto:csom-phd@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/phd>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 40 to 44
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The business research MS is a terminal master's degree option restricted to eligible business administration PhD students who do not complete the doctoral degree. Applications to the business research MS are not otherwise considered.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants must be current business administration PhD students who have completed all required core, concentration, and supporting coursework for the doctoral degree. The preliminary written examination must have been passed at the master's level, based on a set of criteria approved by the Carlson School PhD Committee comprising members from all seven areas of concentration.

Applicants must submit their test score(s) from the following:

- GRE
- GMAT
  - Total score: 650

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(GRE, GMAT, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan C:** Plan C requires 24 to 28 major credits and 16 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.



A minimum GPA of 3.3 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

### Areas of Concentration

Students select one of seven areas of concentration. Concentration areas may require a first-year examination/presentation in addition to other program requirements.

### Accounting

Students pursuing the accounting concentration must work under one of two accounting research paradigms: analytic or empirical.

#### Required Accounting Coursework (24 credits)

Take the following 24 credits:

- ACCT 8801 - Topics in Empirical Research I (2.0 cr)
- ACCT 8802 - Topics in Empirical Research II (2.0 cr)
- ACCT 8803 - Topics in Empirical Research III (2.0 cr)
- ACCT 8811 - Information Economics I (2.0 cr)
- ACCT 8812 - Information Economics II (2.0 cr)
- ACCT 8813 - Information Economics III (2.0 cr)
- ACCT 8821 - Capital Markets I (2.0 cr)
- ACCT 8822 - Capital Markets II (2.0 cr)
- ACCT 8823 - Capital Markets III (2.0 cr)
- ACCT 8831 - Analytical Research Topics I (2.0 cr)
- ACCT 8832 - Analytical Research Topics II (2.0 cr)
- ACCT 8833 - Topics in Analytical Research III (2.0 cr)

#### Supporting/Methodology Coursework (16 credits)

Courses must be chosen in consultation with the advisor or PhD coordinator. Suggested coursework is listed below.

- APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)
- APEC 8002 - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)
- APEC 8003 - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)
- APEC 8004 - Applied Microeconomic Analysis of Social Choice and Welfare (2.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)
- ECON 8003 - Microeconomic Analysis (2.0 cr)
- ECON 8004 - Microeconomic Analysis (2.0 cr)
- ECON 8205 - Applied Econometrics (2.0 cr)
- FINA 8802 - Theory of Capital Markets I: Discrete Time (2.0 cr)
- FINA 8812 - Corporate Finance I (2.0 cr)
- FINA 8813 - Corporate Finance II (2.0 cr)
- FINA 8822 - Empirical Methods in Finance (2.0 cr)
- FINA 8823 - Empirical Corporate Finance (2.0 cr)
- MATH 4603 - Advanced Calculus I (4.0 cr)
- MATH 4604 - Advanced Calculus II (4.0 cr)
- MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)
- PUBH 6325 - Data Processing with PC-SAS (1.0 cr)
- STAT 5102 - Theory of Statistics II (4.0 cr)
- STAT 8101 - Theory of Statistics 1 (3.0 cr)
- ACCT 8892 - Readings in Accounting (1.0 - 8.0 cr)
- ACCT 8894 - Research in Accounting (1.0 - 8.0 cr)

-OR-

### Finance

Finance is viewed as a subfield of economics. Students achieve a strong foundation in economic theory and empirical methods.

#### Required Finance Coursework (20 credits)

Take at least 20 credits from the following list. FINA 8810, 8820, and 8890 may be taken more than once.

- FINA 8802 - Theory of Capital Markets I: Discrete Time (2.0 cr)
- FINA 8803 - Theory of Capital Markets II: Continuous Time (2.0 cr)
- FINA 8804 - Advanced Continuous Time Finance (2.0 cr)
- FINA 8810 - Topics in Asset Pricing (2.0 cr)
- FINA 8812 - Corporate Finance I (2.0 cr)
- FINA 8813 - Corporate Finance II (2.0 cr)
- FINA 8820 - Topics in Corporate Finance (2.0 cr)
- FINA 8822 - Empirical Methods in Finance (2.0 cr)
- FINA 8823 - Empirical Corporate Finance (2.0 cr)



FINA 8890 - Seminar: Finance Topics (2.0 - 4.0 cr)

**Additional Required Finance Coursework (8 credits)**

Take the following sequence of economics courses:

ECON 8101 - Microeconomic Theory (2.0 cr)

ECON 8102 - Microeconomic Theory (2.0 cr)

ECON 8103 - Microeconomic Theory (2.0 cr)

ECON 8104 - Microeconomic Theory (2.0 cr)

**Supporting/Methodology Coursework (16 credits)**

Courses must be chosen in consultation with the advisor or PhD coordinator. Other courses may be selected with advisor or PhD coordinator approval.

ACCT 8812 - Information Economics II (2.0 cr)

ACCT 8831 - Analytical Research Topics I (2.0 cr)

ACCT 8832 - Analytical Research Topics II (2.0 cr)

APEC 8211 - Econometric Analysis I (2.0 cr)

APEC 8212 - Econometric Analysis II (2.0 cr)

ECON 8003 - Microeconomic Analysis (2.0 cr)

ECON 8004 - Microeconomic Analysis (2.0 cr)

ECON 8105 - Macroeconomic Theory (2.0 cr)

ECON 8106 - Macroeconomic Theory (2.0 cr)

ECON 8107 - Macroeconomic Theory (2.0 cr)

ECON 8108 - Macroeconomic Theory (2.0 cr)

ECON 8181 - Advanced Topics in Microeconomics (2.0 cr)

ECON 8182 - Advanced Topics in Microeconomics (2.0 cr)

ECON 8185 - Advanced Topics in Macroeconomics (2.0 cr)

ECON 8191 - Workshop in Mathematical Economics (1.0 cr)

ECON 8201 - Econometric Analysis (2.0 cr)

ECON 8205 - Applied Econometrics (2.0 cr)

ECON 8206 - Applied Econometrics (2.0 cr)

ECON 8207 - Applied Econometrics (2.0 cr)

ECON 8208 - Applied Econometrics (2.0 cr)

ECON 8211 - Econometrics (2.0 cr)

ECON 8212 - Econometrics (2.0 cr)

ECON 8501 - Wages and Employment (2.0 cr)

ECON 8601 - Industrial Organization and Government Regulation (2.0 cr)

ECON 8602 - Industrial Organization and Government Regulation (2.0 cr)

ECON 8701 - Monetary Economics (2.0 cr)

ECON 8702 - Monetary Economics (2.0 cr)

ECON 8704 - Financial Economics (2.0 cr)

ECON 8705 - Financial Economics (2.0 cr)

MATH 8601 - Real Analysis (3.0 cr)

FINA 8892 - Independent Study in Finance (1.0 - 8.0 cr)

FINA 8894 - Directed Research in Finance (1.0 - 8.0 cr)

-OR-

**Information and Decision Sciences****Required IDSc Coursework (15 credits)**

Take all of the following courses:

IDSC 8511 - Conceptual Topics and Research Methods in Information and Decision Sciences (3.0 cr)

IDSC 8521 - System Development (3.0 cr)

IDSC 8531 - Organizational Theory and Research in Information Systems (3.0 cr)

IDSC 8541 - Introduction to Economics of Information Systems (3.0 cr)

IDSC 8721 - Behavioral Decision Theory (3.0 cr)

**Additional IDSC Required Coursework (2 credits)**

Take a minimum of 2 credits from the following. 8801 may be repeated.

IDSC 8620 - Data Mining and Personalization (3.0 cr)

IDSC 8630 - Social Media and Online Communities (3.0 cr)

IDSC 8801 - Research Seminar in Information and Decision Sciences (2.0 cr)

**Methodology Coursework (8 credits)**

Take at least 8 credits in research methodology from the following:

APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)

APEC 8002 - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)

APEC 8003 - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)

APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)

APEC 8211 - Econometric Analysis I (2.0 cr)

APEC 8212 - Econometric Analysis II (2.0 cr)





CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)  
ECON 8581 - Advanced Topics in Labor Economics (2.0 cr)  
EPSY 5244 - Survey Design, Sampling, and Implementation (3.0 cr)  
EPSY 8252 - Statistical Methods in Education II (3.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
EPSY 8267 - Applied Multivariate Analysis (3.0 cr)  
EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
MKTG 8842 - Quantitative Modeling I (2.0 cr)  
PA 8302 - Applied Policy Analysis (4.0 cr)  
PSY 5018H - Mathematical Models of Human Behavior (3.0 cr)  
PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)  
PSY 5993 - Research Laboratory in Psychology (3.0 cr)  
PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 8432 - Probability Models for Biostatistics (3.0 cr)  
PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)  
PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)  
SCO 8652 - Regression Analysis (3.0 cr)  
SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)  
SOC 8811 - Advanced Social Statistics (4.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)

**Supporting Field Coursework (16 credits)**

Courses must be chosen in consultation with the advisor or PhD coordinator.

Take 16 or more credit(s) from the following:

- APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)
- APEC 8002 - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)
- APEC 8003 - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)
- APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)
- CSCI 8551 - Intelligent Agents (3.0 cr)
- CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)
- CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)
- ECON 8581 - Advanced Topics in Labor Economics (2.0 cr)
- ECON 8601 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8602 - Industrial Organization and Government Regulation (2.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- IDSC 8892 - Readings in Information and Decision Sciences (1.0 - 8.0 cr)
- IDSC 8894 - Graduate Research in Information and Decision Sciences (1.0 - 8.0 cr)
- MGMT 8101 - Theory Building and Research Design (4.0 cr)
- MGMT 8104 - PhD Seminar: Research Design (2.0 cr)
- MGMT 8302 - Seminar in Organizations Theory (4.0 cr)
- MKTG 8842 - Quantitative Modeling I (2.0 cr)
- PA 8302 - Applied Policy Analysis (4.0 cr)
- PSY 5018H - Mathematical Models of Human Behavior (3.0 cr)
- PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)
- PSY 5993 - Research Laboratory in Psychology (3.0 cr)
- PSY 8201 - Social Cognition (3.0 cr)
- PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)
- PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
- PUBH 8432 - Probability Models for Biostatistics (3.0 cr)
- PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)
- PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)
- SCO 8652 - Regression Analysis (3.0 cr)
- SCO 8721 - Management of Technological Operations (3.0 cr)
- SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- STAT 8101 - Theory of Statistics 1 (3.0 cr)



-OR-

## Marketing

Students pursuing the marketing concentration choose one of two focus areas: consumer behavior or quantitative/ marketing strategy.

### Consumer Behavior Concentration (24 credits)

Take at least 16 credits of consumer behavior seminars from the list below. Mktg 8810 can be repeated. In addition, take at least 8 credits from the quantitative/marketing strategy concentration course list.

Take 16 or more credit(s) from the following:

- MKTG 8809 - Consumer Behavior Research Methods (2.0 cr)
- MKTG 8810 - Consumer Behavior Special Topics (2.0 cr)
- MKTG 8811 - Consumer Attitudes and Persuasion I (2.0 cr)
- MKTG 8812 - Consumer Attitudes and Persuasion II (2.0 cr)
- MKTG 8813 - Consumer Judgment and Decision Making I (2.0 cr)
- MKTG 8814 - Consumer Judgment and Decision Making II (2.0 cr)

### or Quantitative/Marketing Strategy Concentration (24 credits)

Take at least 14 credits of quantitative/marketing strategy seminars from the list below. Mktg 8890 can be repeated. In addition, take at least 10 credits from the consumer behavior concentration course list.

Take 14 or more credit(s) from the following:

- MKTG 8831 - Seminar: Inter-Organizational Relations (4.0 cr)
- MKTG 8842 - Quantitative Modeling I (2.0 cr)
- MKTG 8843 - Quantitative Modeling II (2.0 cr)
- MKTG 8851 - Seminar: Marketing Management and Strategy I (2.0 cr)
- MKTG 8852 - Marketing Management & Strategy II (2.0 cr)
- MKTG 8890 - Seminar: Marketing Topics (1.0 - 4.0 cr)

### Supporting/Methodology Coursework (16 credits)

Courses must be chosen in consultation with the advisor or PhD coordinator. Suggested courses are listed below.

- ACCT 8811 - Information Economics I (2.0 cr)
- ACCT 8831 - Analytical Research Topics I (2.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)
- ECON 8003 - Microeconomic Analysis (2.0 cr)
- ECON 8004 - Microeconomic Analysis (2.0 cr)
- ECON 8101 - Microeconomic Theory (2.0 cr)
- ECON 8102 - Microeconomic Theory (2.0 cr)
- ECON 8103 - Microeconomic Theory (2.0 cr)
- ECON 8104 - Microeconomic Theory (2.0 cr)
- ECON 8118 - Noncooperative Game Theory (2.0 cr)
- ECON 8119 - Cooperative Game Theory (2.0 cr)
- ECON 8191 - Workshop in Mathematical Economics (1.0 cr)
- ECON 8205 - Applied Econometrics (2.0 cr)
- ECON 8206 - Applied Econometrics (2.0 cr)
- ECON 8207 - Applied Econometrics (2.0 cr)
- ECON 8208 - Applied Econometrics (2.0 cr)
- ECON 8211 - Econometrics (2.0 cr)
- ECON 8212 - Econometrics (2.0 cr)
- ECON 8601 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8602 - Industrial Organization and Government Regulation (2.0 cr)
- ECON 8603 - Industrial Organization and Government Regulation (2.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5245 - Advanced Survey Data Analysis for Categorical and Rating Scale Data (1.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 5262 - Intermediate Statistical Methods (3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8267 - Applied Multivariate Analysis (3.0 cr)
- IDSC 8721 - Behavioral Decision Theory (3.0 cr)
- MKTG 8892 - Readings in Marketing (1.0 - 8.0 cr)
- MKTG 8894 - Graduate Research in Marketing (1.0 - 8.0 cr)
- MSBA 6440 - Causal Inference via Econometrics and Experimentation (3.0 cr)
- PSY 5202 - Attitudes and Social Behavior (3.0 cr)
- PSY 5204 - Psychology of Interpersonal Relationships (3.0 cr)
- PSY 5207 - Personality and Social Behavior (3.0 cr)
- PSY 5862 - Psychological Measurement: Theory and Methods (3.0 cr)



PSY 8203 - Impression Management (3.0 cr)  
PSY 8208 - Social Psychology: The Self (3.0 cr)  
PSY 8209 - Research Methods in Social Psychology (3.0 cr)  
PSY 8935 - Readings in Behavioral Genetics and Individual Differences Psychology (1.0 cr)  
PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)

-OR-

### Supply Chain and Operations

Students complete coursework in the areas of operations and supply chain management.

#### Required SCO Coursework (25 credits)

Take the following courses:

SCO 8651 - Experimental Design (3.0 cr)  
SCO 8652 - Regression Analysis (3.0 cr)  
SCO 8711 - Research in Operations Strategy (3.0 cr)  
SCO 8721 - Management of Technological Operations (3.0 cr)  
SCO 8735 - Supply Chain Management (3.0 cr)  
SCO 8745 - Research on Quality Management (3.0 cr)  
SCO 8755 - Behavioral Operations (3.0 cr)  
MGMT 8101 - Theory Building and Research Design (4.0 cr)  
MGMT 8104 - PhD Seminar: Research Design (2.0 cr)

#### Supporting Field/Methodology Coursework (16 credits)

Take GRAD 8101 (3 cr) and at least 13 additional credits from the following list of courses. Courses must be chosen in consultation with the advisor or PhD coordinator.

GRAD 8101 - Teaching in Higher Education (3.0 cr)

Take 13 or more credit(s) from the following:

- APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)
- APEC 8602 - Economics of the Environment (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- HRIR 8802 - Core Seminar: Organizational Behavior (4.0 cr)
- MGMT 8302 - Seminar in Organizations Theory (4.0 cr)
- MKTG 8842 - Quantitative Modeling I (2.0 cr)
- MKTG 8843 - Quantitative Modeling II (2.0 cr)
- PA 5032 - Applied Regression (2.0 cr)
- PA 5033 - Multivariate Techniques (2.0 cr)
- PUBH 7405 - Biostatistics: Regression (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 8475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)
- SCO 8892 - Readings in Operations and Management Science (1.0 - 8.0 cr)
- SCO 8894 - Graduate Research in Operations and Management Science (1.0 - 8.0 cr)
- SOC 5811 - Social Statistics for Graduate Students [MATH] (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5101 - Theory of Statistics I (4.0 cr)
- STAT 5102 - Theory of Statistics II (4.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5701 - Statistical Computing (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- STAT 8311 - Linear Models (4.0 cr)

-OR-

### Strategic Management and Entrepreneurship

Students focus on leadership, strategy, and entrepreneurship connecting the external worlds of competition and collaboration.

#### Required SME Coursework (16 credits)

Take the following courses:

CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)  
MGMT 8102 - Research Methods I - Applied Empirical Methods (2.0 cr)



MGMT 8302 - Seminar in Organizations Theory (4.0 cr)  
MGMT 8401 - Seminar in Strategy Content (2.0 - 4.0 cr)  
MGMT 8403 - Strategy Seminar (4.0 cr)  
MGMT 8501 - Seminar in Entrepreneurship (2.0 - 4.0 cr)

**SME Elective Coursework (8 credits)**

Take at least 8 credits of SME electives from the list below.

MGMT 8101 - Theory Building and Research Design (4.0 cr)  
MGMT 8104 - PhD Seminar: Research Design (2.0 cr)  
MGMT 8202 - Seminar in International Management (2.0 cr)  
MGMT 8402 - Seminar in Behavioral Strategy (2.0 cr)  
MGMT 8404 - Topics in Strategy 1 (2.0 - 4.0 cr)  
MGMT 8405 - Seminar in Technology Strategy (2.0 cr)

**Supporting /Methodology Coursework (16 credits)**

Take a minimum of 16 credits of supporting field/methodology coursework. APEC 8211 (2 cr), APEC 8212 (2 cr) and GRAD 8101 (3 cr) are required. Take an additional 9 credits minimum from the list below.

APEC 8211 - Econometric Analysis I (2.0 cr)  
APEC 8212 - Econometric Analysis II (2.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)

**Additional Supporting/Methodology Coursework**

Take 9 or more credit(s) from the following:

- APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)
- APEC 8003 - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)
- APEC 8004 - Applied Microeconomic Analysis of Social Choice and Welfare (2.0 cr)
- CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- FINA 8823 - Empirical Corporate Finance (2.0 cr)
- HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)
- MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)
- MGMT 8892 - Readings in Management Theory and Administration (1.0 - 8.0 cr)
- MGMT 8894 - Graduate Research in Management Theory and Administration (1.0 - 8.0 cr)
- MKTG 8831 - Seminar: Inter-Organizational Relations (4.0 cr)
- PA 8302 - Applied Policy Analysis (4.0 cr)
- POL 8106 - Quantitative Political Science I (3.0 cr)
- PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)
- PUBH 8811 - Research Methods in Health Care (3.0 cr)
- SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)
- SOC 8701 - Sociological Theory (4.0 cr)
- SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)
- SOC 8735 - Sociology of Culture (3.0 cr)
- SOC 8801 - Sociological Research Methods (4.0 cr)
- SOC 8811 - Advanced Social Statistics (4.0 cr)
- SOC 8890 - Advanced Topics in Research Methods (2.0 - 3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)

-OR-

**Work and Organizations**

Students complete multidisciplinary coursework covering organizational behavior, human resource management, organizational economics, personnel economics, labor relations, and related areas.

**Required WOrg Coursework (28 credits)**

Take HRIR 8820 4 times for a total of 8 credits. Take HRIR 8825 4 times for a total of 4 credits.

Take 28 or more credit(s) from the following:

- HRIR 8801 - Core Seminar: Fundamentals of Economic Analysis for Work and Organizations (4.0 cr)
- HRIR 8802 - Core Seminar: Organizational Behavior (4.0 cr)
- HRIR 8803 - Core Seminar: Fundamentals of HR Research (4.0 cr)
- HRIR 8812 - Core Seminar: Research Methods in Work and Organizations (4.0 cr)
- HRIR 8820 - Seminar: Special Topics in Work and Organizations Research (2.0 cr)
- HRIR 8825 - Research Practicum/Workshop (1.0 cr)

**Supporting/Methodology Coursework (16 credits)**

Take a minimum of 16 credits of supporting field/methodology coursework which must include: EPsy 8264 (3 cr); Psy 5862 (3 cr); APEC 5031 (3 cr) or, APEC 8211 and APEC 8212 (2 cr each); and 7 additional credits of supporting field coursework from the list below.

EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)



**PSY 5862** - Psychological Measurement: Theory and Methods (3.0 cr)

**Required Supporting/Methodology course**

Take either APEC 5031 (3 cr) or, APEC 8211 and APEC 8212 (2 cr each).

Take 3 or more credit(s) from the following:

- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- APEC 8212 - Econometric Analysis II (2.0 cr)

**Additional supporting/methodology coursework**

Take 7 or more credit(s) from the following:

- APEC 8003 - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)
- APEC 8501 - Labor Economics I (2.0 cr)
- APEC 8502 - Labor Economics II (2.0 cr)
- CSOM 8101 - Methods and Topics in Applied Economics (2.0 - 4.0 cr)
- ECON 8205 - Applied Econometrics (2.0 cr)
- ECON 8206 - Applied Econometrics (2.0 cr)
- EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)
- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)
- EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)
- EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)
- HRIR 8991 - Independent Study in Human Resources and Industrial Relations (1.0 - 8.0 cr)
- MGMT 8101 - Theory Building and Research Design (4.0 cr)
- MGMT 8104 - PhD Seminar: Research Design (2.0 cr)
- PSY 8208 - Social Psychology: The Self (3.0 cr)
- PSY 8664 - Personality Assessment (3.0 cr)
- PSY 8701 - Seminar in Industrial and Organizational Psychology I (3.0 cr)
- PSY 8702 - Seminar in Industrial and Organizational Psychology II (3.0 cr)
- PSY 8960 - Graduate Seminar in Psychology (1.0 - 4.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6861 - Health Insurance (2.0 cr)
- SOC 8590 - Topics in Life Course Sociology (3.0 cr)



### *Twin Cities Campus*

## **Business Taxation M.B.T.**

Accounting

**Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Masters Programs in Accounting, 3-110 Carlson School of Management, 321 19th Avenue South, Minneapolis, MN 55455 (612-624-7511; fax: 612-626-7795).

Email: [mbt@umn.edu](mailto:mbt@umn.edu)

Website: <http://www.carlsonschool.umn.edu/degrees/master-business-taxation>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Business Taxation

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

As one of the premier graduate tax programs in the nation, the Carlson School Master of Business Taxation (MBT) program helps students acquire a conceptual understanding of taxation, and develop technical competence in the practical application of the rules of taxation in business. In addition, courses in government and economic tax policy, tax negotiations, and tax technology and analytics provide breadth to complement the technical tax courses. Courses are also designed to develop a students analytical, problem solving, writing and communication skills to enable them to more quickly advance their careers.

The program gives students a chance to learn from world-class faculty who are distinguished professionals with extensive real-life experience. The faculty have in-depth knowledge of the tax industry and work closely with the Twin Cities business community. Combining rigorous coursework and top faculty from the tax community brings a broad perspective into the relationship between tax and business issues, which helps prepare graduates for greater responsibilities in business management and consulting.

Historically, more than 80 percent of students are employed in the business community and take courses on a part-time basis. Students are able to complete their degree requirements completely online if they choose. The MBT's online courses are asynchronous, divided into weekly modules. They are designed by online learning experts and employ the latest technologies. In addition, the program continues to offer a limited number of in-person courses in the evenings, Monday-Thursday, 5:45-9:05 p.m. or on a compressed schedule. To free tax professionals from coursework responsibilities during the busiest part of tax season, no courses are offered during the spring semester from early March through April 15. Students enrolled part-time can expect to complete the program in approximately three years. Students enrolled full-time can complete the program in one year.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- partially online (between 50% to 80% of instruction is online)

## **Prerequisites for Admission**

### **Required prerequisites**

#### **Introduction to Accounting**

[ACCT 2050](#) - Introduction to Financial Reporting (4.0 cr)  
or equivalent course taken at another institution

#### **Introduction to Federal Income Tax**

[ACCT 5135](#) - Fundamentals of Federal Income Tax (4.0 cr)  
or equivalent course at another institution

Other requirements to be completed before admission:

Applicants must have a bachelor's degree from an accredited college or university.

The following required prerequisite courses may be taken after being admitted to the MBT program, but must be taken before being



eligible to take any MBT courses: ACCT 2050 and ACCT 5135. Equivalent courses may be substituted with approval of the director of graduate studies.

**Special Application Requirements:**

Fall application deadline: June 15  
Spring application deadline: October 15  
Summer application deadline: March 15

Applicants must submit all application materials through the University's admission system.

A GMAT or LSAT (Law School Admission Test) score that is not more than five years old is required. The GMAT score must be sent directly from GMAT to be considered official. The GMAT requirement will be waived for domestic students in the following cases: 1) applicant has a CPA license (either active or inactive), 2) applicant has at least two years of relevant U.S. based tax-related work experience within the prior five years, or 3) applicant is a Carlson School accounting graduate within the prior five years. In order for the waiver to apply, the applicant must have a minimum 3.0 undergraduate GPA from an accredited university.

Applicants may submit their copy of their LSAT score to the MBT office.

For international applicants, the results from one of the following English language tests are required: TOEFL, IELTS, MELAB. TOEFL scores must be received directly from TOEFL. IELTS and MELAB scores must be received directly from the testing center.

For additional application details, review the M.B.T. admissions webpages.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Courses (20 credits)

Take the following courses:

- MBT 5200 - Tax Accounting Methods I (2.0 cr)
- MBT 5201 - Tax Accounting Methods II (2.0 cr)
- MBT 5220 - Tax Research, Communication, and Practice (4.0 cr)
- MBT 5230 - Corporate Taxation I (2.0 cr)
- MBT 5323 - Corporate Taxation II (2.0 cr)
- MBT 5340 - Taxation of Partners and Partnerships (2.0 cr)
- MBT 5347 - Tax Technology and Analytics Fundamentals (2.0 cr)
- MBT 5360 - State and Local Taxation (2.0 cr)
- MBT 5380 - Tax Aspects of International Business I (2.0 cr)

### Elective Courses (10 credits)

Select 10 credits from the following list. Other courses may be applied to this requirement with prior approval from the MBT director of graduate studies.

- MBT 5226 - Negotiation Techniques in Taxation (2.0 cr)
- MBT 5333 - Tax Aspects of Consolidated Returns (2.0 cr)
- MBT 5335 - Taxation of the Small Business Corporation (2.0 cr)
- MBT 5346 - ASC 740 Computations and Analysis (2.0 cr)
- MBT 5348 - Advanced ASC 740 Concepts (2.0 cr)
- MBT 5350 - Wealth Transfer I (Estates and Gifts) (2.0 cr)
- MBT 5353 - Trusts and Estates (2.0 cr)
- MBT 5363 - Compensation and Benefits (2.0 cr)
- MBT 5370 - Taxation of Property Transactions (2.0 cr)
- MBT 5381 - Tax Aspects of International Business II (2.0 cr)
- MBT 5382 - Transfer Pricing (2.0 cr)
- MBT 5500 - Business, Government, and Economic Tax Policy (2.0 cr)



## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.





### **Twin Cities Campus**

## **Closely-Held Business Taxation Postbaccalaureate Certificate**

Accounting

**Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Masters Programs in Accounting, 3-110 Carlson School of Management, 321 19th Avenue South, Minneapolis, MN 55455. Phone: 612-624-7511.

Email: [mbt@umn.edu](mailto:mbt@umn.edu)

Website: <http://www.carlsonschool.umn.edu/degrees/master-business-taxation>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program requires summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Closely-Held Business Taxation certificate is designed for tax professionals seeking a credential that identifies them as a tax expert in the field while preparing graduates for greater responsibilities in business management and consulting. A rigorous curriculum, taught online by top faculty in the tax community, focuses on the analytical, problem solving, writing, and communication skills that foster career advancement. The certificate can be completed in 12 to 24 months, with breaks from early March through April 15 to accommodate schedules during peak tax season.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

#### **Required prerequisites**

#### **Introduction to Financial Reporting**

[ACCT 2050](#) - Introduction to Financial Reporting (4.0 cr)  
or equivalent course taken at another institution

#### **Introduction to Federal Income Tax**

[ACCT 5135](#) - Fundamentals of Federal Income Tax (4.0 cr)  
or equivalent course taken at another institution

Other requirements to be completed before admission:

Applicants must have a bachelor's degree from an accredited college or university.

#### **Special Application Requirements:**

Fall application deadline: June 15

Spring application deadline: October 15

Summer application deadline: March 15

Applicants must submit all application materials through the University's admission system.

A GMAT or LSAT (Law School Admission Test) score that is not more than five years old is required. The GMAT score must be sent directly from GMAT to be considered official. The GMAT requirement will be waived for domestic students in the following cases: 1) applicant has a CPA license (either active or inactive), 2) applicant has at least two years of relevant U.S. based tax-related work experience within the prior five years, or 3) applicant is a Carlson School accounting graduate within the prior five years. In order for the waiver to apply, the applicant must have a minimum 3.0 undergraduate GPA from an accredited university.

Applicants may submit their copy of their LSAT score to the MBT office.



For additional application details, review the MBT admissions webpages.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Required Courses (10 credits)

Take the following courses:

- [MBT 5335](#) - Taxation of the Small Business Corporation (2.0 cr)
- [MBT 5340](#) - Taxation of Partners and Partnerships (2.0 cr)
- [MBT 5350](#) - Wealth Transfer I (Estates and Gifts) (2.0 cr)
- [MBT 5363](#) - Compensation and Benefits (2.0 cr)
- [MBT 5370](#) - Taxation of Property Transactions (2.0 cr)

### Elective Course (2 credits)

Select one of the following courses to meet the 12-credit requirement:

- [MBT 5200](#) - Tax Accounting Methods I (2.0 cr)
- [MBT 5220](#) - Tax Research, Communication, and Practice (4.0 cr)
- [MBT 5226](#) - Negotiation Techniques in Taxation (2.0 cr)
- [MBT 5230](#) - Corporate Taxation I (2.0 cr)
- [MBT 5333](#) - Tax Aspects of Consolidated Returns (2.0 cr)
- [MBT 5346](#) - ASC 740 Computations and Analysis (2.0 cr)
- [MBT 5347](#) - Tax Technology and Analytics Fundamentals (2.0 cr)
- [MBT 5353](#) - Trusts and Estates (2.0 cr)
- [MBT 5360](#) - State and Local Taxation (2.0 cr)
- [MBT 5380](#) - Tax Aspects of International Business I (2.0 cr)
- [MBT 5382](#) - Transfer Pricing (2.0 cr)
- [MBT 5500](#) - Business, Government, and Economic Tax Policy (2.0 cr)



### *Twin Cities Campus*

## Corporate Financial Management Postbaccalaureate Certificate

Finance

### Curtis L. Carlson School of Management

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

1-110 Carlson School of Management  
321 19th Ave S, Minneapolis, MN 55455  
phone 612.625.5555

Email: [carlsoncert@umn.edu](mailto:carlsoncert@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-business-administration>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Corporate Financial Management PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Corporate Finance certificate is a curated introductory credential that lays out the foundations of the discipline for those seeking to enter or advance. It is designed to convey a basic understanding of financial management principles as well as more advanced concepts and techniques for measuring and tracking value creation.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### Prerequisites for Admission

Applicants must have a bachelors degree from an accredited institution.

Other requirements to be completed before admission:

Please review the Admissions Checklist online for detailed admissions requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

#### **Required Coursework (10 credits)**

Take the following courses:

[FINA 6241](#) - Corporate Financial Decisions and Analysis (4.0 cr)

[MBA 6030](#) - Financial Accounting (3.0 cr)



[MBA 6230](#) - Financial Management (3.0 cr)

**Electives (2 credits)**

Select 2 credits from the following:

[FINA 6123](#) - Financial Services Industry (2.0 cr)

[FINA 6222](#) - Mergers and Acquisitions (2.0 cr)

[FINA 6242](#) - Advanced Corporate Finance Analysis and Decisions (4.0 cr)

[FINA 6322](#) - Financial Modeling (2.0 cr)

[FINA 6621](#) - International Financial Management (2.0 cr)



### **Twin Cities Campus**

## **Doctor of Business Administration D.B.A.**

*CSOM Financial Services Office*

### **Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Carlson Global Institute  
Carlson School of Management  
321-19th Ave S

Minneapolis, MN 55455

612-625-9361

Email: [cgi@umn.edu](mailto:cgi@umn.edu)

Website: <http://carlsonschool.umn.edu/faculty-research/carlson-global-institute>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 56
- This program requires summer semesters for timely completion.
- The program will be taught by faculty members from Tsinghua SEM in Beijing, China and the Carlson School in equal proportions with each school responsible for delivering 50% of the curriculum. The program will be offered in modular format. A total of 16 modules will be required with 2 modules back-to-back in the middle of the program at the Carlson School. All overseas modules will occur in Beijing. Instruction will occur in hotels and on campus at Tsinghua University.
- Degree: Doctor of Business Administration

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The proposed 56-credit, cohort-based DBA program is an applied, professional doctoral program directed at high-level executives working in China and the surrounding region. The DBA will go beyond the MBA to prepare participants to better face challenges and pursue opportunities in a complex, global business environment. The program will focus on the application rather than the creation of knowledge. A required thesis will involve an applied perspective that yields case studies or comparative studies of corporate actions. The program is a part-time, cohort-based program for fully-employed individuals. Course instruction for the DBA program will be provided by faculty members from both the Carlson School and Tsinghua SEM.

### **Accreditation**

This program is accredited by AACSB International

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

An appropriate baccalaureate degree or higher is required for admission.

Other requirements to be completed before admission:

15 years of high-level management experience.

#### **Special Application Requirements:**

Admission is handled through Tsinghua University, who will recruit and make recommendations on candidates. The Carlson School will either accept or reject recommended candidates. Approved students will be admitted to the University of Minnesota.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**



32 credits are required in the major.  
24 thesis credits are required.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

#### **CORE COURSES**

Students must complete all of the following courses:

Take exactly 32 credit(s) from the following:

- GDBA 7101 - Critical Thinking and Leadership (2.0 cr)
- GDBA 7102 - Exploration of Tsinghua University (2.0 cr)
- GDBA 7103 - Financial Market and Investment Decision Making (2.0 cr)
- GDBA 7104 - International Environment and National Strategy (2.0 cr)
- GDBA 7105 - Management Psychology (2.0 cr)
- GDBA 7106 - Management Wisdom Learned from History (2.0 cr)
- GDBA 7107 - Sinology Wisdom and Management Innovation (2.0 cr)
- GDBA 7108 - The Macroeconomic Situation and Policy (2.0 cr)
- GDBA 7201 - Global Strategic Alliances (2.0 cr)
- GDBA 7202 - Innovation through Emerging Technologies (2.0 cr)
- GDBA 7203 - Marketing Strategies for Firms in the Era of Globalization (1.0 cr)
- GDBA 7204 - Qualitative Research Methods (1.0 cr)
- GDBA 7205 - Global Accounting (1.0 cr)
- GDBA 7206 - Mergers and Acquisitions (1.0 cr)
- GDBA 7207 - Family Wealth Management (1.0 cr)
- GDBA 7208 - Management of Headquarters (1.0 cr)
- GDBA 7209 - Service Operations Management (1.0 cr)
- GDBA 7210 - Fundamental Data Analysis (1.0 cr)
- GDBA 7211 - Global Branding (2.0 cr)
- GDBA 7212 - Global Talent Management (2.0 cr)

#### **Thesis Credits**

Take exactly 24 credit(s) from the following:

- GDBA 7888 - Thesis (12.0 cr)



### *Twin Cities Campus*

## Finance M.S.

Finance

### Curtis L. Carlson School of Management

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Phone: 612-625-5555

Email: [msf@umn.edu](mailto:msf@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-science-in-finance>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 39
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The 39-credit master of science program in finance provides students with an advanced understanding of the tools and methods used in businesses and in financial markets. The program focuses on combining financial theory with quantitative and computational methods and real-world applications. Students can complete this full-time graduate program in 12 or 16 months. Graduates will be able to analyze and interpret complex financial data and communicate its implications. Successful applicants begin their MS studies in summer (July).

## Accreditation

This program is accredited by AACSB International. The M.S. in Finance is STEM designated.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

Applicants must have a bachelor's degree from accredited college or university.

Other requirements to be completed before admission:

- University level courses in calculus and statistics are required.
- Linear algebra is recommended, but not required.
- Work experience is not required, but preferred.

#### **Special Application Requirements:**

Applicants must submit all application materials through the University's admissions system. Application materials include:

- A GMAT or GRE General Test that is not more than five years old, with an acceptable score. A GMAT/GRE waiver is available for qualified candidates.
- For international students, an acceptable score on the Test of English as a Foreign Language (TOEFL) International Language Testing System (IELTS).
- Two letters of recommendations need to be submitted through the online application.
- A personal statement of career goals, and objectives for pursuing a MS Finance degree. The personal statement questions are the following: Briefly describe your short-term and long-term career goals. Why are you choosing to pursue an MS in Finance at this time in your career, and what are you hoping to accomplish by doing so? Why are you interested in pursuing an MS degree in Finance at the Carlson School of Management? What do you feel makes you a strong candidate for the program? How will you contribute to the MS in Finance program overall? Applicants must submit a current resume that includes job responsibilities and accomplishments in the online application.
- Applicants may choose to submit an essay to comment on any item(s) in their application they consider worthy of further explanation.
- Video Essay
- Applicants may be required to complete an admissions interview, which are by invitation only.



Applicants must submit their test score(s) from the following:

- GRE
- GMAT

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(GRE, GMAT, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 39 major credits and up to null credits outside the major. There is no final exam.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

### Required Courses: Summer (9 credits)

Take the following courses:

- [MSF 6421](#) - Computing for Finance: Excel/VBA I & II (2.0 cr)
- [MSF 6221](#) - Fundamentals of Finance I (2.0 cr)
- [MSF 6031](#) - Financial Accounting (3.0 cr)
- [MSF 6920](#) - Introduction to Python (2.0 cr)

### Required Courses: Fall (16 credits)

Take the following courses:

- [MSF 6422](#) - Financial Econometrics and Computational Methods I (2.0 cr)
- [MSF 6223](#) - Fundamentals of Finance III (2.0 cr)
- [MSF 6021](#) - Communications for Finance (2.0 cr)
- [MSF 6423](#) - Financial Econometrics and Computational Methods II (2.0 cr)
- [MSF 6322](#) - Corporate Valuation and Modeling (2.0 cr)
- [MSF 6222](#) - Fundamentals of Finance II (2.0 cr)
- [MSF 6121](#) - Fixed Income and Securities (2.0 cr)
- [MSF 6321](#) - Quantitative Portfolio Analysis (2.0 cr)

### Required Courses: Spring (10 credits)

Take the following courses:

- [MSF 6821](#) - Experiential Learning (4.0 cr)
- [MSF 6522](#) - Derivatives and Risk Management (2.0 cr)
- [MSF 6424](#) - Introduction to Machine Learning for Finance (2.0 cr)
- [MSF 6621](#) - Finance within the Macroeconomy (2.0 cr)

### Electives (4 credits)

Select 4 elective credits from the following, or graduate courses offered by other departments in the business school upon approval.

- [FINA 6325](#) - Behavioral Finance (2.0 cr)
- [FINA 6621](#) - International Financial Management (2.0 cr)
- [FINA 6222](#) - Mergers and Acquisitions (2.0 cr)
- [FINA 6324](#) - Securitization Markets (2.0 cr)
- [FINA 6341](#) - World Economy (4.0 cr)

### Non-Credit Courses

Noncredit 1: On occasion, external speakers will be brought in to enhance the experiential learning component of the MS finance program. Students are required to attend such meetings, and their participation will be assessed on a pass/fail basis.

Noncredit 2: Students will be required to pass the online ethics module from the Chartered Financial Analyst Institute by the end of the summer. Successful completion will be a requirement of the Fundamentals of Finance II course.





**Joint- or Dual-degree Coursework:**MS-Finance/MS-Business Analytics Student may take a total of 22 credits in common among the academic programs.



### **Twin Cities Campus**

## **High Net-Worth Individual Taxation Postbaccalaureate Certificate**

Accounting

**Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Masters Programs in Accounting, 3-110 Carlson School of Management, 321 19th Avenue South, Minneapolis, MN 55455. Phone: 612-624-7511.

Email: [mbt@umn.edu](mailto:mbt@umn.edu)

Website: <http://carlsonschool.umn.edu/degrees/master-business-taxation>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program requires summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The High Net-Worth Individual Taxation certificate is designed for tax professionals seeking a credential that identifies them as a tax expert in the field while preparing graduates for greater responsibilities in financial consulting. A rigorous curriculum, taught online by top faculty in the tax community, focuses on the analytical, problem solving, writing, and communication skills that foster career advancement. The certificate can be completed in 12 to 24 months, with breaks from early March through April 15 to accommodate schedules during peak tax season.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

#### **Required prerequisites**

#### **Introduction to Financial Reporting**

[ACCT 2050](#) - Introduction to Financial Reporting (4.0 cr)  
or equivalent course taken at another institution

#### **Introduction to Federal Income Tax**

[ACCT 5135](#) - Fundamentals of Federal Income Tax (4.0 cr)  
or equivalent course taken at another institution

Other requirements to be completed before admission:

Applicants must have a bachelor's degree from an accredited college or university.

#### **Special Application Requirements:**

Fall application deadline: June 15

Spring application deadline: October 15

Summer application deadline: March 15

Applicants must submit all application materials through the University's admission system.

A GMAT or LSAT (Law School Admission Test) score that is not more than five years old is required. The GMAT score must be sent directly from GMAT to be considered official. The GMAT requirement will be waived for domestic students in the following cases: 1) applicant has a CPA license (either active or inactive), 2) applicant has at least two years of relevant U.S. based tax-related work experience within the prior five years, or 3) applicant is a Carlson School accounting graduate within the prior five years. In order for the waiver to apply, the applicant must have a minimum 3.0 undergraduate GPA from an accredited university.

Applicants may submit their copy of their LSAT score to the MBT office.



For additional application details, review the MBT admissions webpages.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Required Courses (12 credits)

Take the following courses:

[MBT 5220](#) - Tax Research, Communication, and Practice (4.0 cr)

[MBT 5350](#) - Wealth Transfer I (Estates and Gifts) (2.0 cr)

[MBT 5353](#) - Trusts and Estates (2.0 cr)

[MBT 5363](#) - Compensation and Benefits (2.0 cr)

[MBT 5370](#) - Taxation of Property Transactions (2.0 cr)



### **Twin Cities Campus**

## **Human Resources and Industrial Relations M.H.R.I.R.**

*CSOM Work & Organizations*

### **Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Center for Human Resources and Labor Studies, Suite 3-300 Carlson School of Management, 321 19th Avenue South, Minneapolis, MN 55455 (612-624-2500; fax: 612-624-8360) 55455

Email: [hrirgrad@umn.edu](mailto:hrirgrad@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-arts-human-resources-industrial-relations>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48 to 49
- This program does not require summer semesters for timely completion.
- Degree: Masters Human Resources and Industrial Relations

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Human resources and industrial relations (HRIR) students study the employment relationship. Teaching and research are guided by the belief that the employment relationship must be investigated through the lenses of different disciplines using systems thinking. The professional master of arts degree is for individuals interested in private and public sector careers in human resource management, labor relations, and related fields.

The curriculum is structured around the core HRIR areas of staffing, training, and development; compensation and benefits; and labor relations and collective bargaining. It is rooted in key concepts from the social and behavioral sciences and business, such as organizational behavior and theory, labor market analysis, leadership, and strategy. Quantitative analysis of employment problems and issues are also included. Master's candidates are encouraged to choose electives to support a generalist orientation with key business knowledge.

MHRIR offers both full and part-time options.

### **Accreditation**

This program is accredited by Association to Advance Collegiate Schools of Business (AACSB).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Entering students have undergraduate degrees in many subjects ranging from the fine arts to engineering. The most common undergraduate majors of incoming students are in the areas of psychology, business, economics, human resources management, human resource development, and speech communication. An undergraduate course in microeconomics must be completed with a grade of at least C before matriculating.

#### **Special Application Requirements:**

Applicants must submit three letters of recommendation, a complete set of transcripts, a résumé, personal statements, and GRE or GMAT scores. Applicants whose native language is not English must also submit score results from the TOEFL or IELTS. Students may enter the full-time MHRIR program in the fall and the part-time MHRIR program in either the fall or spring semesters. The application deadlines are June 15 for fall admission and October 15 for spring admission. The MHRIR financial aid deadline for fall semester is February 1. Applicants are encouraged to apply by the deadlines, however applications are accepted after the deadlines have passed if space allows.

Applicants must submit their test score(s) from the following:

- GRE
- GMAT



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5

Key to [test abbreviations](#)(GRE, GMAT, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 40 to 41 major credits and 8 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

The MHRIR is offered as a coursework-only program with day (full-time) and evening (part-time) options. Commonly selected related fields include accounting, finance, operations management, managerial communications, economics, human resource development, law, psychology, public affairs, sociology, and research methods.

### Core Courses (24 credits)

Take the following courses.

- [HRIR 6001](#) - Business Principles for the HRIR Professional (4.0 cr)
- [HRIR 6111](#) - Using Data and Metrics in Human Resources and Industrial Relations (4.0 cr)
- [HRIR 6301](#) - Staffing, Training, and Development (4.0 cr)
- [HRIR 6401](#) - Organizational Theory Foundations of High-Impact HRIR (2.0 cr)
- [HRIR 6441](#) - Organizational Behavior Foundations of High-Impact HRIR (2.0 cr)
- [HRIR 6501](#) - Compensation and Benefits (4.0 cr)
- [HRIR 6701](#) - Labor Relations and Collective Bargaining (4.0 cr)

### HRIR Leadership Practicum (0-1 credit)

All full-time students must take HRIR 6805 twice for a total of one credit. Part-time students are exempt from this requirement.

- [HRIR 6805](#) - HRIR Leadership Practicum (0.5 cr)

### Economic Issues Analysis (2-3 credits)

Select one of the following courses.

- [HRIR 5655](#) - Public Policies on Work and Pay (3.0 cr)
- or [HRIR 5662](#) - Personnel Economics (2.0 cr)

### Capstone (2 credits)

Take the following course.

- [HRIR 6801](#) - HRIR in Practice: Strategy, Execution, and Ethics (2.0 cr)

### Electives (20 credits)

Complete at least 12 credits of HRIR electives and at least 8 credits of related field electives.

Take 20 or more credit(s) including 2 or more sub-requirements(s) from the following:

#### HRIR Electives

Take 12 or more credit(s) from the following:

- [HRIR 5000](#) - Topics in HRIR (2.0 cr)
- [HRIR 5222](#) - Creating and Managing Diversity and Inclusion (2.0 cr)



- HRIR 5252 - Employment and Labor Law for the HRIR Professional (2.0 cr)
- HRIR 5442 - Employee Performance Management: Strategies, Systems, and Skills (2.0 cr)
- HRIR 5443 - Principles of Effective Coaching (2.0 cr)
- HRIR 5992 - Independent Study in Human Resources and Industrial Relations (1.0 - 8.0 cr)
- HRIR 6000 - Graduate Topics in Human Resources and Industrial Relations (1.0 - 8.0 cr)
- HRIR 6114 - Human Resource Information Systems (2.0 cr)
- HRIR 6302 - Staffing and Selection: Strategic and Operational Concerns (2.0 cr)
- HRIR 6303 - Employee Training: Creating a Learning Organization (2.0 cr)
- HRIR 6304 - Employee Development: Creating a Competitive Advantage (2.0 cr)
- HRIR 6444 - Employee Motivation, Engagement, and Well-being (2.0 cr)
- HRIR 6484 - Management of Teams (2.0 cr)
- HRIR 6502 - Rewards Management Strategies (2.0 cr)
- HRIR 6503 - Employer-Sponsored Employee Benefit Programs (2.0 cr)
- MGMT 6465 - Leadership and Personal Development (2.0 cr)

•**Related Field**

Take 8 or more credit(s) from the following:

- CSPH 5807 - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)
- IBUS 5xxx
- IBUS 6xxx
- IDSC 6040 - Information Technology Management (2.0 cr)
- IDSC 6471 - Knowledge Management (2.0 cr)
- IDSC 6481 - Managerial Decision Making (2.0 cr)
- LAW 6203 - Labor Law (2.0 cr)
- LAW 6631 - Employment Discrimination (3.0 cr)
- LAW 6632 - Employment Law (3.0 cr)
- LAW 6833 - Alternative Dispute Resolution (2.0 cr)
- MBA 6030 - Financial Accounting (3.0 cr)
- MBA 6210 - Marketing Management (3.0 cr)
- MBA 6220 - Supply Chain & Operations (3.0 cr)
- MBA 6230 - Financial Management (3.0 cr)
- MBA 6300 - Strategic Management (3.0 cr)
- MBA 6315 - The Ethical Environment of Business (2.0 cr)
- MCOM 5400 - Managerial Communications for the HR Professional (2.0 cr)
- MCOM 5510 - Persuasive Writing in Business (2.0 cr)
- MCOM 5530 - Strategies and Skills for Managerial Presentations (2.0 cr)
- MGMT 6004 - Negotiation Strategies (2.0 cr)
- MGMT 6033 - Managing the Strategy Process (2.0 cr)
- MGMT 6035 - Complex and Cross-Cultural Negotiations (2.0 cr)
- MGMT 6040 - Competing Globally (2.0 cr)
- MGMT 6050 - Management of Innovation and Change (2.0 cr)
- MILI 6992 - Healthcare Delivery Innovations:Optimizing Cost and Quality (2.0 cr)
- MSBA 6250 - Analytics for Competitive Advantage (3.0 cr)
- OLPD 5033 - Foundations of Individual/Organizational Career Development (3.0 cr)
- OLPD 5048 - Cross-Cultural Perspectives on Leadership (3.0 cr)
- OLPD 5201 - Strategies for Teaching Adults (3.0 cr)
- OLPD 5202 - Perspectives of Adult Learning and Development (3.0 cr)
- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)
- OLPD 5611 - Facilitation and Meeting Skills (1.0 cr)
- OLPD 5616 - Training on the Internet (3.0 cr)
- OLPD 5619 - Planning and Decision-Making Skills (1.0 cr)
- OLPD 5816 - Distance Learning in Adult Education and Training (3.0 cr)
- OLPD 5829 - Course Development for Business and Industry (2.0 cr)
- PA 5251 - Strategic Planning and Management (3.0 cr)
- PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)
- PUBH 6102 - Issues in Environmental Health (2.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6542 - Management of Health Care Organizations (3.0 cr)
- SCO 6041 - Project Management (2.0 cr)
- CSPH 5805 - Wellbeing in the Workplace (3.0 cr)

**Joint- or Dual-degree Coursework:**MBA/MHRIRStudent may take a total of 24 credits in common among the academic programs.



## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Part-Time MHRIR

This sub-plan is limited to students completing the program under Plan C.

### Integrated BS-Business/Master in HRIR

The Carlson School offers an integrated Bachelor of Science in Business (BSB) and Master of Human Resources and Industrial Relations (MHRIR). The integrated degree program (IDP) offers students the opportunity to earn a bachelor's degree and a master's degree in five years. This program offers several benefits: streamlined admissions from the undergraduate to the graduate program; flexibility in fulfilling required courses for both degrees during the senior year (up to 13 credits can be applied to the graduate program); and a quicker move to more strategic HR positions in the job market. The fourth year of an IDP student's undergraduate degree will be taken as part of the first-year cohort for the MHRIR program. Coursework cannot be applied to both degree requirements. 12 of the credits taken as part of that first-year cohort will be counted towards the BSB degree and the remaining 13 will be applied to the MHRIR degree. The student must be awarded their BSB degree before finishing the MHRIR program in the fifth year of their IDP. Application to the BSB/MHRIR IDP is open to any Carlson School undergraduate student in the fall of their third (junior) year. Any student applying for the IDP program must complete all the requirements for the MHRIR application and go through the application process in its entirety.



### *Twin Cities Campus*

## International Taxation Postbaccalaureate Certificate

Accounting

Curtis L. Carlson School of Management

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Masters Programs in Accounting, 3-110 Carlson School of Management, 321 19th Avenue South, Minneapolis, MN 55455. Phone: 612-624-7511.

Email: [mbt@umn.edu](mailto:mbt@umn.edu)

Website: <http://www.carlsonschool.umn.edu/degrees/master-business-taxation>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: International Taxation Postbaccalaureate Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The International Taxation certificate is designed for tax professionals seeking a credential that identifies them as an expert in the field while preparing graduates for greater responsibilities in business management and consulting. A rigorous curriculum, taught online by top faculty in the tax community, focuses on the analytical, problem solving, writing, and communication skills that foster career advancement. The certificate can be completed in 12 to 24 months, with breaks from early March through April 15 to accommodate schedules during peak tax season.

### Program Delivery

This program is available:

- completely online (all program coursework can be completed online)
- partially online (between 50% to 80% of instruction is online)

### Prerequisites for Admission

#### Required prerequisites

#### Introduction to Financial Reporting

[ACCT 2050](#) - Introduction to Financial Reporting (4.0 cr)  
or equivalent course taken at another institution

#### Introduction to Federal Income Tax

[ACCT 5135](#) - Fundamentals of Federal Income Tax (4.0 cr)  
or equivalent course taken at another institution

Other requirements to be completed before admission:

Applicants must have a bachelor's degree from an accredited college or university.

#### Special Application Requirements:

Fall application deadline: June 15

Spring application deadline: October 15

Summer application deadline: March 15

Applicants must submit all application materials through the University's admission system.

A GMAT or LSAT (Law School Admission Test) score that is not more than five years old is required. The GMAT score must be sent directly from GMAT to be considered official. The GMAT requirement will be waived for domestic students in the following cases: 1) applicant has a CPA license (either active or inactive), 2) applicant has at least two years of relevant U.S. based tax-related work experience within the prior five years, or 3) applicant is a Carlson School accounting graduate within the prior five years. In order for the waiver to apply, the applicant must have a minimum 3.0 undergraduate GPA from an accredited university.





Applicants may submit their copy of their LSAT score to the MBT office.

For additional application details, review the MBT admissions webpages.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Required Courses (10 credits)

Take the following courses:

- MBT 5230 - Corporate Taxation I (2.0 cr)
- MBT 5323 - Corporate Taxation II (2.0 cr)
- MBT 5380 - Tax Aspects of International Business I (2.0 cr)
- MBT 5381 - Tax Aspects of International Business II (2.0 cr)
- MBT 5382 - Transfer Pricing (2.0 cr)

### Elective Course (2 credits)

Select one of the following courses to meet the 12-credit requirement:

- MBT 5200 - Tax Accounting Methods I (2.0 cr)
- MBT 5220 - Tax Research, Communication, and Practice (4.0 cr)
- MBT 5226 - Negotiation Techniques in Taxation (2.0 cr)
- MBT 5333 - Tax Aspects of Consolidated Returns (2.0 cr)
- MBT 5335 - Taxation of the Small Business Corporation (2.0 cr)
- MBT 5340 - Taxation of Partners and Partnerships (2.0 cr)
- MBT 5346 - ASC 740 Computations and Analysis (2.0 cr)
- MBT 5347 - Tax Technology and Analytics Fundamentals (2.0 cr)
- MBT 5350 - Wealth Transfer I (Estates and Gifts) (2.0 cr)
- MBT 5353 - Trusts and Estates (2.0 cr)
- MBT 5360 - State and Local Taxation (2.0 cr)
- MBT 5363 - Compensation and Benefits (2.0 cr)
- MBT 5370 - Taxation of Property Transactions (2.0 cr)
- MBT 5500 - Business, Government, and Economic Tax Policy (2.0 cr)



**Twin Cities Campus**

## Leadership for Managers Postbaccalaureate Certificate

CSOM Work & Organizations

**Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

**Contact Information:**

321 19th Ave S

1-110 Carlson School

Minneapolis, MN 55455

612.625.5555

Email: [carlsoncert@umn.edu](mailto:carlsoncert@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-business-administration>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Leadership for Managers Postbaccalaureate Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Leadership for Managers Certificate offers candidates a challenging academic curriculum that teaches critical management, team leadership, and problem-solving skills. Candidates will apply real world knowledge through hands-on opportunities and develop a culture of teamwork and collaboration to meet organizational goals.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### Prerequisites for Admission

Applicants must have a bachelors degree from an accredited institution.

Other requirements to be completed before admission:

Please review the Admissions Checklist online for detailed admissions requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

**Required Coursework (12 credits)**

Take the following courses:

[HRIR 5000](#) - Topics in HRIR (2.0 cr)



[MBA 6110](#) - Leading Others (2.0 cr)

[MGMT 6004](#) - Negotiation Strategies (2.0 cr)

[MGMT 6084](#) - Management of Teams (2.0 cr)

[MGMT 6310](#) - Cross-Cultural Management: Developing Intercultural Competence (2.0 cr)

[MGMT 6465](#) - Leadership and Personal Development (2.0 cr)



### *Twin Cities Campus*

## Medical Industry Postbaccalaureate Certificate

Finance

### Curtis L. Carlson School of Management

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

1-110 Carlson School of Management  
321 19th Ave S, Minneapolis, MN 55455  
612.625.5555

Email: [carlsoncert@umn.edu](mailto:carlsoncert@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-business-administration>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Medical Industry Postbaccalaureate Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Medical Industry certificate provides a curriculum that uses an interdisciplinary and intercollegiate approach to provide market analysis of promising medical technologies and services. Candidates will learn from industry experts on the healthcare marketplace, institutions, regulations, reimbursement, payment, and healthcare analytics.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### Prerequisites for Admission

Applicants must have a bachelors degree from an accredited institution.

Other requirements to be completed before admission:

Please review the Admissions Checklist online for detailed admissions requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

#### **Required Coursework (6 credits)**

Take the following courses:

[MILI 6589](#) - Medical Technology Evaluation and Market Research (2.0 cr)



[MILI 6963](#) - Healthcare Analytics (2.0 cr)

[MILI 6990](#) - The Health Care Marketplace (2.0 cr)

**Electives (6 credits)**

Select 6 credits from the following:

[MILI 6235](#) - Pharmaceutical Industry: Business and Policy (2.0 cr)

[MILI 6421](#) - Healthcare Law: Strategic and Business Implications (2.0 cr)

[MILI 6562](#) - Information Technology in Health Care (2.0 cr)

[MILI 6726](#) - Medical Device Industry: Business and Public Policy (2.0 cr)

[MILI 6920](#) - MILI Topic Course (2.0 cr)

[MILI 6991](#) - Anatomy and Physiology for Managers (2.0 cr)

[MILI 6992](#) - Healthcare Delivery Innovations: Optimizing Cost and Quality (2.0 cr)

[MILI 6997](#) - MILI Global Valuation Lab (4.0 cr)

[SCO 6096](#) - Supply Chain Management in the Health Care and Medical Devices Sector (2.0 cr)



### *Twin Cities Campus*

## Strategic Management Postbaccalaureate Certificate

CSOM Strategic Mgmt & Entrep

Curtis L. Carlson School of Management

Link to a [list of faculty](#) for this program.

### Contact Information:

1-110 Carlson School of Management  
321 19th Ave S, Minneapolis, MN 55455  
612.625.5555

Email: [carlsoncert@umn.edu](mailto:carlsoncert@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-business-administration>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Strategic Management Postbaccalaureate Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Strategic Management certificate draws on insights of strategic decisions that drive success or failure within an organization. Candidates will study cases, complete group projects, and dive deeply into curriculum that exposes them to the difficult landscape of organizational decision making.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### Prerequisites for Admission

Applicants must have a bachelors degree from an accredited institution.

Other requirements to be completed before admission:

Please review the Admissions Checklist online for detailed admissions requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

### Required Coursework (6 credits)

Take the following courses:

[MBA 6030](#) - Financial Accounting (3.0 cr)



[MBA 6300](#) - Strategic Management (3.0 cr)

**Electives (6 credits)**

Select 6 credits from the following:

[MGMT 6031](#) - Industry Analysis and Competitive Strategy (4.0 cr)

[MGMT 6032](#) - Strategic Alliances (2.0 cr)

[MGMT 6033](#) - Managing the Strategy Process (2.0 cr)

[MGMT 6040](#) - Competing Globally (2.0 cr)

[MGMT 6050](#) - Management of Innovation and Change (2.0 cr)

[MGMT 6070](#) - Technology Strategy (2.0 cr)

[MGMT 6085](#) - Corporate Strategy (4.0 cr)



### *Twin Cities Campus*

## Strategic Marketing Postbaccalaureate Certificate

Marketing

Curtis L. Carlson School of Management

Link to a [list of faculty](#) for this program.

### Contact Information:

1-110 Carlson School of Management  
321 19th Ave S, Minneapolis, MN 55455  
612.625.5555

Email: [carlsoncert@umn.edu](mailto:carlsoncert@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-business-administration>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 13
- This program does not require summer semesters for timely completion.
- Degree: Strategic Marketing Postbaccalaureate Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Strategic Marketing certificate explores the most current practices in digital, social media, and traditional marketing. The curriculum covers strategic decisions and creates a better understanding of the marketing needs of the firm, while leveraging the power of marketing techniques used in business today.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### Prerequisites for Admission

Applicants must have a bachelors degree from an accredited institution.

Other requirements to be completed before admission:

Please review the Admissions Checklist online for detailed admissions requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

### Required Coursework (5 credits)

Take the following courses:

[MBA 6210](#) - Marketing Management (3.0 cr)





[MKTG 6088](#) - Strategic Marketing (2.0 cr)

**Electives (8 credits)**

Select 8 credits from the following:

[MKTG 6055](#) - Buyer Behavior (2.0 cr)

[MKTG 6060](#) - Marketing Channels (2.0 cr)

[MKTG 6072](#) - International Marketing (4.0 cr)

[MKTG 6075](#) - Pricing Strategy (4.0 cr)

[MKTG 6082](#) - Brand Strategy (2.0 cr)

[MKTG 6086](#) - Digital Marketing (2.0 cr)



### **Twin Cities Campus**

## **Supply Chain Management for the Medical and Health Sector Postbaccalaureate Certificate**

*Supply Chain & Operations*

**Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

1-110 Carlson School of Management  
321 19th Ave S, Minneapolis, MN 55455  
612.625.5555

Email: [carlsoncert@umn.edu](mailto:carlsoncert@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-business-administration>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 13
- This program does not require summer semesters for timely completion.
- Degree: Supply Chain Medical & Health PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Supply Chain Management for the Medical & Health Sector certificate offers a foundation for supply chain operations in the medical industry and beyond. Curriculum focuses on an understanding of inputs to outputs, analysis of industrial resources and management of complex logistics, and supply chain found within the medical and healthcare sectors.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

Applicants must have a bachelors degree from an accredited institution.

Other requirements to be completed before admission:

Please review the Admissions Checklist online for detailed admissions requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

### **Required Coursework (7 credits)**



Take the following courses:

[MBA 6220](#) - Supply Chain & Operations (3.0 cr)

[SCO 6051](#) - Service Management (2.0 cr)

[SCO 6096](#) - Supply Chain Management in the Health Care and Medical Devices Sector (2.0 cr)

**Electives (6 credits)**

Select 6 credits from the following:

[MBA 6120](#) - Data Analysis and Statistics for Managers (3.0 cr)

[SCO 6041](#) - Project Management (2.0 cr)

[SCO 6045](#) - Strategic Sourcing (2.0 cr)

[SCO 6048](#) - Logistics and Transportation (2.0 cr)

[SCO 6072](#) - Managing Technologies in the Supply Chain (2.0 cr)

[SCO 6091](#) - Process Improvement Methods (2.0 cr)

[SCO 6092](#) - Supply Chain Risk and Security (2.0 cr)

[SCO 6094](#) - Responsible Supply Chain Management (2.0 cr)

[SCO 6098](#) - Operations Excellence via Lean Thinking (2.0 cr)

[SCO 6191](#) - Big Data Analytics in Supply Chains (2.0 cr)

[SCO 6192](#) - Supply Chain Finance (2.0 cr)



### **Twin Cities Campus**

## **Supply Chain Management M.S.**

*Supply Chain & Operations*

### **Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Phone: 612-625-5555

Email: [msscm@umn.edu](mailto:msscm@umn.edu)

Website: <https://carlsonschool.umn.edu/degrees/master-science-in-supply-chain-management>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 32
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The one-year, 32-credit MS degree in supply chain management will provide students with an end-to-end view of supply chain and will develop both their strategic and analytical capabilities needed to manage supply chains. The hallmarks of this MS degree will include leadership development as a programmatic theme, global immersion, corporate social responsibility and the flexibility to focus on supply chain management in specific industry sectors that are foundational to the economy of the State of Minnesota such as health care and medical devices, food and agribusiness, and retail.

### **Accreditation**

This program is accredited by AACSB International. The M.S. in Supply Chain Management is STEM designated.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Applicants must have a bachelor's degree from an accredited college or university.

Other requirements to be completed before admission:

A minimum of 3 years of work experience is required.

#### **Special Application Requirements:**

Applicants must submit all application materials through the University's admissions system. Application materials include:

- A GMAT or GRE General Test that is not more than five years old, with an acceptable score. A GMAT/GRE waiver is available for qualified candidates.
- For international students, an acceptable score on the Test of English as a Foreign Language (TOEFL) International Language Testing System (IELTS).
- Two letters of recommendations need to be submitted through the online application.
- A personal statement of career goals, and objectives for pursuing a M.S. degree in Supply Chain Management. The personal statement questions are the following: Briefly describe your short-term and long-term career goals. Why are you choosing to pursue an M.S. in Supply Chain Management at this time in your career, and what are you hoping to accomplish by doing so? Why are you interested in pursuing an M.S. degree in Supply Chain Management at the Carlson School of Management? What do you feel makes you a strong candidate for the program? How will you contribute to the M.S. in Supply Chain Management program overall? Applicants must submit a current resume that includes job responsibilities and accomplishments in the online application.
- Applicants may choose to submit an essay to comment on any item(s) in their application they consider worthy of further explanation.
- Applicants may be required to complete an admissions interview, which are by invitation only.
- Video essay.

Applicants must submit their test score(s) from the following:

- GRE



- GMAT

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

Key to [test abbreviations](#)(GRE, GMAT, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 32 major credits and up to null credits outside the major. There is no final exam.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

### Core Courses: Fall (12 credits)

- [SCO 6290](#) - Managing Supply Chain Operations (4.0 cr)
- [SCO 6190](#) - Statistics (2.0 cr)
- [SCO 6191](#) - Big Data Analytics in Supply Chains (2.0 cr)
- [SCO 6098](#) - Operations Excellence via Lean Thinking (2.0 cr)
- [SCO 6090](#) - Sales, Inventory, and Operations Planning (2.0 cr)

### Core Courses: Spring (8 credits)

- [SCO 6072](#) - Managing Technologies in the Supply Chain (2.0 cr)
- [SCO 6094](#) - Responsible Supply Chain Management (2.0 cr)
- [SCO 6045](#) - Strategic Sourcing (2.0 cr)
- [SCO 6048](#) - Logistics and Transportation (2.0 cr)

### Core Courses: Summer (6 credits)

- [SCO 6192](#) - Supply Chain Finance (2.0 cr)
- [SCO 6292](#) - Global Operations Capstone (4.0 cr)

### Core Course: Leadership Development - All Year (Fall, Spring and Summer) (2 credits)

- [SCO 6291](#) - Leadership Development (0.0 - 2.0 cr)

### Spring Electives (4 credits)

- [SCO 6095](#) - Supply Chain Management in the Food and Agribusiness Sector (2.0 cr)
- [SCO 6096](#) - Supply Chain Management in the Health Care and Medical Devices Sector (2.0 cr)
- [SCO 6097](#) - Supply Chain Management in the Retail Sector (2.0 cr)
- [SCO 6041](#) - Project Management (2.0 cr)
- [SCO 6092](#) - Supply Chain Risk and Security (2.0 cr)
- [SCO 6093](#) - Negotiations in Supply Chain (2.0 cr)
- [MGMT 6004](#) - Negotiation Strategies (2.0 cr)



### **Twin Cities Campus**

## **Tax Executive Postbaccalaureate Certificate**

Accounting

**Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Masters Programs in Accounting, 3-110 Carlson School of Management, 321 19th Avenue South, Minneapolis, MN 55455. Phone: 612-624-7511.

Email: [mbt@umn.edu](mailto:mbt@umn.edu)

Website: <http://www.carlsonschool.umn.edu/degrees/master-business-taxation>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Tax Executive Postbaccalaureate Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Tax Executive certificate is designed primarily for tax professionals working in tax departments of large corporations. It prepares graduates for greater responsibilities within their tax department. A rigorous curriculum, taught online by top faculty in the tax community, focuses on the analytical, problem solving, writing, and communication skills that foster career advancement. The certificate can be completed in 12 to 24 months, with breaks from early March through April 15 to accommodate schedules during peak tax season.

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

#### **Required prerequisites**

#### **Introduction to Financial Reporting**

[ACCT 2050](#) - Introduction to Financial Reporting (4.0 cr)  
or equivalent course taken at another institution

#### **Introduction to Federal Income Tax**

[ACCT 5135](#) - Fundamentals of Federal Income Tax (4.0 cr)  
or equivalent course taken at another institution

Other requirements to be completed before admission:

Applicants must have a bachelor's degree from an accredited college or university.

#### **Special Application Requirements:**

Fall application deadline: June 15

Spring application deadline: October 15

Summer application deadline: March 15

Applicants must submit all application materials through the University's admission system.

A GMAT or LSAT (Law School Admission Test) score that is not more than five years old is required. The GMAT score must be sent directly from GMAT to be considered official. The GMAT requirement will be waived for domestic students in the following cases: 1) applicant has a CPA license (either active or inactive), 2) applicant has at least two years of relevant U.S. based tax-related work experience within the prior five years, or 3) applicant is a Carlson School accounting graduate within the prior five years. In order for the waiver to apply, the applicant must have a minimum 3.0 undergraduate GPA from an accredited university.

Applicants may submit their copy of their LSAT score to the MBT office.



For additional application details, review the MBT admissions webpages.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Required Courses (12 credits)

Take the following courses:

- [MBT 5230](#) - Corporate Taxation I (2.0 cr)
- [MBT 5346](#) - ASC 740 Computations and Analysis (2.0 cr)
- [MBT 5347](#) - Tax Technology and Analytics Fundamentals (2.0 cr)
- [MBT 5348](#) - Advanced ASC 740 Concepts (2.0 cr)
- [MBT 5360](#) - State and Local Taxation (2.0 cr)
- [MBT 5380](#) - Tax Aspects of International Business I (2.0 cr)



### *Twin Cities Campus*

## Taxation Postbaccalaureate Certificate

Accounting

**Curtis L. Carlson School of Management**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Masters Programs in Accounting, 3-110 Carlson School of Management, 321 19th Ave South, Minneapolis, MN 55455; phone 612-624-7511

Email: [mbt@umn.edu](mailto:mbt@umn.edu)

Website: <http://www.carlsonschool.umn.edu/degrees/master-business-taxation>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Taxation Postbaccalaureate Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Certificate in Taxation is designed for tax professionals seeking a credential that identifies them as an expert in the field while preparing graduates for greater responsibilities in business management and consulting. A rigorous curriculum, taught online by top faculty in the tax community, focuses on the analytical, problem solving, writing, and communication skills that foster career advancement. The certificate can be completed in 12 to 24 months, with breaks from early March through April 15 to accommodate schedules during peak tax season.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- partially online (between 50% to 80% of instruction is online)

## Prerequisites for Admission

### **Required prerequisites**

#### **Introduction to Financial Reporting**

[ACCT 2050](#) - Introduction to Financial Reporting (4.0 cr)  
or equivalent course taken at another institution

#### **Introduction to Federal Income Tax**

[ACCT 5135](#) - Fundamentals of Federal Income Tax (4.0 cr)  
or equivalent course taken at another institution

Other requirements to be completed before admission:

Applicants must have a bachelor's degree from an accredited college or university.

### **Special Application Requirements:**

Fall application deadline: June 15

Spring application deadline: October 15

Summer application deadline: March 15

Applicants must submit all application materials through the University's admission system.

A GMAT or LSAT (Law School Admission Test) score that is not more than five years old is required. The GMAT score must be sent directly from GMAT to be considered official. The GMAT requirement will be waived for domestic students in the following cases: 1) applicant has a CPA license (either active or inactive), 2) applicant has at least two years of relevant U.S. based tax-related work experience within the prior five years, or 3) applicant is a Carlson School accounting graduate within the prior five years. In order for the waiver to apply, the applicant must have a minimum 3.0 undergraduate GPA from an accredited university.





Applicants may submit their copy of their LSAT score to the MBT office.

For additional application details, review the MBT admissions webpages.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Required Courses (10 credits)

Take the following courses:

- MBT 5200 - Tax Accounting Methods I (2.0 cr)
- MBT 5220 - Tax Research, Communication, and Practice (4.0 cr)
- MBT 5230 - Corporate Taxation I (2.0 cr)
- MBT 5340 - Taxation of Partners and Partnerships (2.0 cr)

### Elective Course (2 credits)

Select one of the following courses to meet the 12-credit requirement:

- MBT 5201 - Tax Accounting Methods II (2.0 cr)
- MBT 5226 - Negotiation Techniques in Taxation (2.0 cr)
- MBT 5323 - Corporate Taxation II (2.0 cr)
- MBT 5333 - Tax Aspects of Consolidated Returns (2.0 cr)
- MBT 5335 - Taxation of the Small Business Corporation (2.0 cr)
- MBT 5346 - ASC 740 Computations and Analysis (2.0 cr)
- MBT 5347 - Tax Technology and Analytics Fundamentals (2.0 cr)
- MBT 5350 - Wealth Transfer I (Estates and Gifts) (2.0 cr)
- MBT 5353 - Trusts and Estates (2.0 cr)
- MBT 5360 - State and Local Taxation (2.0 cr)
- MBT 5363 - Compensation and Benefits (2.0 cr)
- MBT 5370 - Taxation of Property Transactions (2.0 cr)
- MBT 5380 - Tax Aspects of International Business I (2.0 cr)
- MBT 5382 - Transfer Pricing (2.0 cr)
- MBT 5500 - Business, Government, and Economic Tax Policy (2.0 cr)



### **Twin Cities Campus**

## **Integrative Biology and Physiology M.S.**

*Integrative Biology and Physiology*

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Integrative Biology and Physiology, Jackson Hall 6-125, 321 Church Street S.E., Minneapolis, MN 55455 (612-625-5902; fax: 612-625-5149)

Email: [ibpdept@umn.edu](mailto:ibpdept@umn.edu)

Website: <http://physiology.med.umn.edu/graduate-program/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 32
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: The Integrative Biology and Physiology graduate program does not routinely accept applications directly to the MS; rather, the MS is an additional or alternative credential for students admitted to the Integrative Biology and Physiology PhD program.

The Twin Cities graduate program has a cardiovascular emphasis, although other areas of specialization are represented.

The program includes faculty and corresponding research laboratories from the Department of Integrative Biology and Physiology and also the Departments of Medicine; Surgery; Neuroscience; Neurosurgery; Biochemistry, Molecular Biology, and Biophysics; Pharmacology; Physical Medicine and Rehabilitation; Kinesiology; and Animal Science.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Note: The Integrative Biology and Physiology graduate program does not routinely accept applications directly to the MS; rather, the MS is an additional or alternative credential for students admitted to the Integrative Biology and Physiology PhD program.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 22 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project, completed under the direction of an IBP faculty member, focuses on an aspect of Physiology.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Twin Cities campus: Students complete the MS degree only under exceptional circumstances.

### Required Coursework (15 credits)

Take PHSL 8232 in conjunction with PHSL 5101. Take PHSL 8294, on an S/N grade basis, at least twice for 2 credits.

[ANSC 5702](#) - Cell Physiology (4.0 cr)

[PHSL 5101](#) - Human Physiology (5.0 cr)

[PHSL 8232](#) - Critical Reading of Journal Articles in Physiology (2.0 cr)

[PHSL 8294](#) - Research in Physiology (1.0 - 18.0 cr)

### Molecular Biology and Genetics Coursework (3 credits)

Select at least 3 credits chosen from the following in consultation with the advisor.

[BIOC 4331](#) - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)

[BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)

[BIOC 6021](#) - Biochemistry (3.0 cr)

[BIOL 4003](#) - Genetics (3.0 cr)

[BIOL 4004](#) - Cell Biology (3.0 cr)

[GCD 5036](#) - Molecular Cell Biology (3.0 cr)

### IBP Seminar Series (4 credits)

Take PHSL 5096 at least 4 times for a minimum of 4 credits.

[PHSL 5096](#) - Integrative Biology and Physiology Research Advances (1.0 cr)

### Plan Options

#### Plan A

Take at least 10 master's thesis credits.

[PHSL 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

##### Electives

Select elective credits in consultation with the advisor to meet the minimum course credit requirement. Coursework may include the following courses:

[NUTR 8620](#) - Advances in Nutrition (2.0 cr)

[PHSL 5197](#) - Stress Physiology (1.0 cr)

[PHSL 5701](#) - Physiology Laboratory (1.0 - 2.0 cr)

[PHSL 8242](#) - Professional Skills Development for Biomedical Scientists (2.0 cr)

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[PUBH 6451](#) - Biostatistics II (4.0 cr)

[STAT 5021](#) - Statistical Analysis (4.0 cr)



### ***Twin Cities Campus***

## **Integrative Biology and Physiology Minor**

*Integrative Biology and Physiology*

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Integrative Biology and Physiology, Jackson Hall 6-125, 321 Church Street S.E., Minneapolis, MN 55455 (612-625-5902; fax: 612-301-1543)

Email: [ibpdept@umn.edu](mailto:ibpdept@umn.edu)

Website: <http://physiology.med.umn.edu/graduate-program/>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Physiology may be defined as the application of mathematics, physics, and chemistry to the study of structure and function in living systems. As such, physiology is a "hybrid" field in which expertise from many other disciplines is ordinarily required and combined. The program emphasizes a quantitative approach to understanding the functions of cells, organs, and systems in living animals.

The graduate program in the Twin Cities has a cardiovascular emphasis, although many other areas of specialization are represented.

The program includes faculty and corresponding research laboratories from the Department of Integrative Biology and Physiology and also the Departments of Medicine; Surgery; Neuroscience; Neurosurgery; Biochemistry, Molecular Biology, and Biophysics; Pharmacology; Physical Medicine and Rehabilitation; Kinesiology; and Animal Science.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Integrative Biology and Physiology director of graduate studies regarding feasibility and requirements.

For the minor, a background in mathematics, physics, chemistry, and biology acceptable to the graduate faculty is required.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Students must complete the minor with a 3.00 GPA. All coursework must be taken A-F.

#### **Coursework**

Select coursework in consultation with the IBP director of graduate studies. Masters students must complete at least 9 credits; doctoral students complete at least 12 credits.

PHSL 4xxx

PHSL 5xxx

PHSL 8xxx



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### ***Twin Cities Campus***

## **Integrative Biology and Physiology Ph.D.**

*Integrative Biology and Physiology*

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Integrative Biology and Physiology, Jackson Hall 6-125, 321 Church Street SE, Minneapolis, MN 55455 (612-625-5902; fax: 612-301-1543)

Email: [ibpdept@umn.edu](mailto:ibpdept@umn.edu)

Website: <http://z.umn.edu/ibpgradprog>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 55
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Physiology may be defined as the application of mathematics, physics, and chemistry to the study of structure and function in living systems. As such, physiology is a "hybrid" field in which expertise from many other disciplines is ordinarily required and combined.

The program emphasizes a quantitative approach to understanding the functions of cells, organs, and systems in living animals. PhD students take a core concentration that provides a broad background in the physiology of membranes, cells, transport, and organ systems. Individualized programs are structured to build on the student's strengths and to fill in gaps that would otherwise be an impediment to specific problem solving. Teaching experience is also available to all students.

The graduate program in the Twin Cities has cardiovascular, hypertension and metabolism emphases, although many other areas of specialization are represented.

Students can enter the PhD program from the Twin Cities or Duluth campus. Highly qualified individuals with solid quantitative backgrounds are encouraged to apply. In the Twin Cities, prospective students also include people with previous medical training who are already at the University of Minnesota or are considering the University of Minnesota Medical School for residency or fellowship training.

Entering PhD students are expected to take a series of laboratory rotations to familiarize themselves with active areas of research within the degree program. The program includes faculty and corresponding research laboratories from the Department of Integrative Biology and Physiology and also the Departments of Medicine; Surgery; Neuroscience; Neurosurgery; Biochemistry, Molecular Biology, and Biophysics; Pharmacology; Physical Medicine and Rehabilitation; Kinesiology; and Animal Science.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

An undergraduate degree with at least one year (three quarters or two semesters) of calculus, one year of physics, one year of biology, and two years of chemistry is required. For the minor, a background in mathematics, physics, chemistry and biology acceptable to the graduate faculty is required.

#### **Special Application Requirements:**

There are no minimum GPA or GRE score requirements. All applicants need three letters of recommendation. Admission to the program begins in the Fall semester.

International applicants must submit score(s) from one of the following tests:



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 107
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 625
- IELTS
  - Total Score: 6.5

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

31 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 3 semesters must be completed before filing a Degree Program Form.

During the first year, students rotate through three to four laboratories, attend weekly seminars, choose an advisor, and begin a research project.

All coursework must be taken A/F and with an earned grade of B or higher unless offered S/N only.

### Required Coursework (21 credits)

Take the following courses in consultation with the advisor. Take PHSL 8232 in conjunction with PHSL 5101; 2 credits of PHSL 5701; and 2 credits of PHSL 8294, on an S/N grade basis, at least twice for 4 credits.

- [ANSC 5702](#) - Cell Physiology (4.0 cr)
- [BIOC 8401](#) - Ethics, Public Policy, and Careers in Molecular and Cellular Biology (1.0 cr)
- [PHSL 5101](#) - Human Physiology (5.0 cr)
- [PHSL 5197](#) - Stress Physiology (1.0 cr)
- [PHSL 5701](#) - Physiology Laboratory (1.0 - 2.0 cr)
- [PHSL 8232](#) - Critical Reading of Journal Articles in Physiology (2.0 cr)
- [PHSL 8242](#) - Professional Skills Development for Biomedical Scientists (2.0 cr)
- [PHSL 8294](#) - Research in Physiology (1.0 - 18.0 cr)

### PhD Seminar (4 credits)

Take PHSL 5096 at least 4 times for a total of 4 credits.

- [PHSL 5096](#) - Integrative Biology and Physiology Research Advances (1.0 cr)

### Molecular Biology and Genetic Coursework (3 credits)

Select at least 3 credits from the following, in consultation with the advisor.

- [BIOC 4331](#) - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)
- [BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)
- [BIOC 6021](#) - Biochemistry (3.0 cr)
- [BIOL 4003](#) - Genetics (3.0 cr)
- [BIOL 4004](#) - Cell Biology (3.0 cr)
- [GCD 5036](#) - Molecular Cell Biology (3.0 cr)

### Biostatistics Coursework (3 credits)

Select at least 3 credits from the following, in consultation with the advisor.

- [PUBH 6414](#) - Biostatistical Literacy (3.0 cr)
- [PUBH 6450](#) - Biostatistics I (4.0 cr)
- [PUBH 6451](#) - Biostatistics II (4.0 cr)



[STAT 5021](#) - Statistical Analysis (4.0 cr)

**Thesis Credits (24 credits)**

Take 24 credits of doctoral thesis credits.

[PHSL 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)





### **Twin Cities Campus**

## **Medical Physics M.S.**

*Radiation Oncology Administration, Radiology*

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Radiation Oncology

420 Delaware Street SE

MMC 494

Minneapolis, MN 55455

phone: 612-626-6505; fax: 612-626-7060)

Email: [alaei001@umn.edu](mailto:alaei001@umn.edu)

Website: <https://www.radiationoncology.umn.edu/medical-physics-graduate-program>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 31
- This program does not require summer semesters for timely completion.
- no
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The program is made up of faculty members with primary appointments in the departments of radiation oncology and radiology. Affiliate faculty have primary appointments in other departments. The goal of the program is to prepare students (1) for further education, teaching, and research in medical physics, (2) to qualify to enter a medical physics residency program in radiation therapy or imaging, and (3) to provide the mathematical and technical knowledge needed to succeed in the field of medical physics.

## **Accreditation**

This program is accredited by Commission on Accreditation of Medical Physics Education Programs, Inc. (CAMPEP)

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A degree in physics or engineering or other physical science. Equivalent of an undergraduate physics minor-at least 2 semesters of calculus based physics and at least 3 upper level physics courses.

Other requirements to be completed before admission:

All students should have some familiarity with physical chemistry, intermediate physics, intermediate mathematics, biostatistics, computer programming, biology, physiology, and biochemistry. This may be demonstrated by coursework completed at the undergraduate level or as part of the graduate program; by reading or practical experience; or by informal competency examinations.

#### **Special Application Requirements:**

Three letters of recommendation and the general GRE test are required. If the GRE was taken more than two years prior to application, the applicant may need to retake the examination. We have no absolute GRE cutoff score, but the score is taken into consideration along with other factors in the evaluation of each application. Applicants with a graduate degree from a US institution are waived the GRE requirement. Applicants are considered for admission in fall semester only.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19



- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 31 major credits and 0 credits outside the major. The final exam is oral.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

In the fall semester of the first year, students must take University ethics training: Responsible Conduct of Research (RCR), Part 1 (a 3-hour session offered about 4 times/year) and Part 2.

### Required Courses (25 Credits)

Take all of the following courses. Take MPHY 5138 for at least 1 credit.

- [MPHY 5138](#) - Research Seminar (1.0 - 5.0 cr)
- [MPHY 5160](#) - Advanced Radiation Physics and Dosimetry (3.0 cr)
- [MPHY 5170](#) - Basic Radiological Physics (3.0 cr)
- [MPHY 5171](#) - Medical and Health Physics of Imaging I (3.0 cr)
- [MPHY 5172](#) - Radiation Biology (3.0 cr)
- [MPHY 5173](#) - Medical and Health Physics of Radiation Therapy (3.0 cr)
- [MPHY 5174](#) - Medical and Health Physics of Imaging II (3.0 cr)
- [PHSL 5061](#) - Principles of Physiology for Biomedical Engineering (4.0 cr)
- [PHAR 5201](#) - Applied Medical Terminology (2.0 cr)

### Electives (6 Credits)

Take at least 6 elective credits, in consultation with the advisor, to complete the 31-credit requirement.

- [MPHY 5177](#) - Radiation Therapy Physics Lab: Radiation Physics Basics (3.0 cr)
- [MPHY 5178](#) - Physical Principles of Magnetic Resonance Imaging (3.0 cr)
- [MPHY 8147](#) - Advanced Physics of Magnetic Resonance Imaging (MRI) (3.0 cr)
- [MPHY 8148](#) - Advanced Digital Imaging Science (3.0 cr)
- [MPHY 8149](#) - Advanced Topics in Radiation Therapy Physics (2.0 cr)



### **Twin Cities Campus**

## **Medical Physics Ph.D.**

*Radiation Oncology Administration, Radiology*

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Radiation Oncology

420 Delaware Street SE

MMC 494

Minneapolis, MN 55455

Email: [alaei001@umn.edu](mailto:alaei001@umn.edu)

Website: <https://www.radiationoncology.umn.edu/medical-physics-graduate-program>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 49
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The program is made up of faculty members with primary appointments in the departments of radiation oncology and radiology. Affiliate faculty have primary appointments in other departments. The goal of the program is to prepare students (1) for further education, teaching, and research in medical physics, (2) to qualify to enter a medical physics residency program in radiation therapy or imaging, and (3) to provide the mathematical and technical knowledge needed to succeed in the field of medical physics.

### **Accreditation**

This program is accredited by Commission on Accreditation of Medical Physics Education Programs, Inc. (CAMPEP)

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A degree in physics or engineering or other physical science. Equivalent of an undergraduate physics minor-at least 2 semesters of calculus based physics and at least 3 upper level physics courses.

#### **Special Application Requirements:**

Three letters of recommendation and the general GRE test are required. If the GRE was taken more than two years prior to application, the applicant may need to retake the examination. There are no absolute GRE cutoff score, but the score is taken into consideration along with other factors in the evaluation of each application. Applicants with a graduate degree from a US institution are waived the GRE requirement. Applicants are considered for admission in fall semester only.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

25 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

In the fall semester of the first year, students must take University ethics training: Responsible Conduct of Research (RCR), Part 1 (a 3-hour session offered about 4 times/year) and Part 2.

### Required Courses (25 Credits)

Take the following required courses. Take MPHY 5138 for at least 1 credit.

[MPHY 5138](#) - Research Seminar (1.0 - 5.0 cr)

[MPHY 5160](#) - Advanced Radiation Physics and Dosimetry (3.0 cr)

[MPHY 5170](#) - Basic Radiological Physics (3.0 cr)

[MPHY 5171](#) - Medical and Health Physics of Imaging I (3.0 cr)

[MPHY 5172](#) - Radiation Biology (3.0 cr)

[MPHY 5173](#) - Medical and Health Physics of Radiation Therapy (3.0 cr)

[MPHY 5174](#) - Medical and Health Physics of Imaging II (3.0 cr)

[PHAR 5201](#) - Applied Medical Terminology (2.0 cr)

[PHSL 5061](#) - Principles of Physiology for Biomedical Engineering (4.0 cr)

### Thesis Credits

Take at least 24 doctoral thesis credits.

[MPHY 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Microbiology, Immunology, and Cancer Biology M.S.**

Medical School - Adm

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Microbiology and Immunology, 689 23rd Avenue SE, Minneapolis, MN 55455, 612-624-5947

Email: [micab@umn.edu](mailto:micab@umn.edu)

Website: <http://micab.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 34
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: Students are not admitted directly into the master's program; it is available only by special arrangement with the program.

Students prepare for careers in biomedical research and teaching by completing broad training in molecular biology or biological sciences, and focused specialization in one of three concentrations (microbiology, immunology, or cancer biology). The program offers exceptional research opportunities for graduate training in autoimmunity, biotechnology, cancer biology and therapy, environmental microbiology, genetic engineering of microorganisms, lymphocyte activation and development, microbial pathogenesis, molecular genetics of disease, tumor immunology, vaccine development, and vascular biology and inflammation.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Applicants must have a bachelor's degree (BS preferred).

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 96
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 85

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

**Plan A:** Plan A requires 24 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is written and oral.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.



At least 2 semesters must be completed before filing a Degree Program Form.

During the first year of study, students will identify an advisor through completing laboratory rotations, select a focus area, and initiate thesis research. Students also must complete an ethics seminar and responsible conduct of research course their first year in the program.

All coursework must be taken for an A/F grade and completed with a minimum grade of C, unless the course is only offered for an S/N grade.

No more than one 4xxx-level elective course can be applied to this degree.

#### Core Coursework (4 credits)

Take one of the following 4-credit core courses in consultation with the advisor. Although only one of the 3 courses is required, taking all 3 is strongly encouraged. If students take more than one of these courses, the additional course(s) will count towards the elective coursework requirement.

[MICA 8002](#) - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)

[MICA 8003](#) - Immunity and Immunopathology (4.0 cr)

[MICA 8004](#) - Cellular and Cancer Biology (4.0 cr)

#### Required Coursework (4 credits)

Take both of the following courses. Take MICA 8094 twice (fall and spring semester of the first year) for 2 credits.

[MICA 8012](#) - Writing and Reviewing a Research Proposal (2.0 cr)

[MICA 8094](#) - Research in Microbiology, Immunology, and Cancer Biology (1.0 cr)

#### Practicum and Seminar Coursework

Take all of the following courses. Take MICA 8910 4 times; and MICA 8920 4 times.

[MICA 5000](#) - Practicum: Teaching (0.0 cr)

[MICA 8910](#) - Seminar: Faculty Research Topics (0.0 cr)

[MICA 8920](#) - Seminar: Student Research Topics (0.0 cr)

#### Elective Coursework

Select electives, in consultation with the advisor, to complete the 24 course credits required. Use of 4xxx- and 5xxx-level courses is restricted to either two 5-level courses or one 4- and one 5-level course.

[BIOC 4331](#) - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)

[BIOC 5351](#) - Protein Engineering (3.0 cr)

[BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)

[BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)

[BIOC 5960](#) - Special Topics in Biochemistry (3.0 cr)

[BIOC 8001](#) - Biochemistry: Structure, Catalysis, and Metabolism (3.0 cr)

[BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)

[BIOC 8007](#) - Molecular Biology of DNA (2.0 cr)

[BIOC 8216](#) - Signal Transduction and Gene Expression (3.0 cr)

[BTHX 5610](#) - Research & Publication Seminar (1.0 cr)

[CHEM 8412](#) - Chemical Biology of Enzymes (4.0 cr)

[CHEN 8754](#) - Systems Analysis of Biological Processes (3.0 cr)

[CHEN 8995](#) - Special Topics (1.0 - 4.0 cr)

[CSCI 5465](#) - Introduction to Computing for Biologists (3.0 cr)

[CSCI 5481](#) - Computational Techniques for Genomics (3.0 cr)

[CSCI 5980](#) - Special Topics in Computer Science (1.0 - 3.0 cr)

[ESCI 4801](#) - Geomicrobiology (3.0 cr)

[ESCI 8801](#) - Geomicrobiology (3.0 cr)

[GCD 5005](#) - Computer Programming for Biology (3.0 cr)

[GCD 6103](#) - Human Histology (3.0 - 8.0 cr)

[GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)

[GCD 8073](#) - Genetics & Genomics in Human Health (3.0 cr)

[GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)

[GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)

[GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)

[GCD 8401](#) - Ethics, Public Policy & Careers in Molecular Cell Biology (1.0 cr)

[GCD 8920](#) - Special Topics (1.0 - 4.0 cr)

[GEOG 8260](#) - Seminar: Physical Geography (2.0 cr)

[GRAD 5102](#) - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)

[GRAD 8101](#) - Teaching in Higher Education (3.0 cr)

[GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)

[HINF 5502](#) - Python Programming Essentials for the Health Sciences (1.0 cr)



LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)  
MICA 8009 - Biochemical Aspects of Normal and Abnormal Cell Growth and Cell Death (2.0 cr)  
MICA 8010 - Microbial Pathogenesis (3.0 cr)  
MICA 8011 - Current Topics in Immunology (3.0 cr)  
MICA 8013 - Translational Cancer Research (2.0 cr)  
MICA 8014 - Small RNA Biology (2.0 cr)  
MICE 5035 - Personal Microbiome Analysis (3.0 cr)  
OBIO 5010 - Molecular Virology (1.0 cr)  
OBIO 5020 - Virus Pathogenesis and Host Interactions (1.0 cr)  
PHCL 5111 - Pharmacogenomics (3.0 cr)  
PHSL 8242 - Professional Skills Development for Biomedical Scientists (2.0 cr)  
PMB 5111 - Microbial Physiology and Diversity (3.0 cr)  
PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6414 - Biostatistical Literacy (3.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
SCB 8181 - Stem Cell Biology (3.0 cr)  
VMED 5180 - Ecology of Infectious Disease (3.0 cr)

#### Thesis Credits

Take at least 10 master's thesis credits.

MICA 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Microbiology, Immunology, and Cancer Biology Minor**

Medical School - Adm

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Microbiology and Immunology  
689 23rd Avenue SE, Minneapolis, MN 55455  
612-624-5947  
Email: [micab@umn.edu](mailto:micab@umn.edu)  
Website: <http://micab.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.
- No

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students prepare for careers in biomedical research and teaching by completing broad training in molecular biology or biological sciences, and focused specialization in one of three concentrations (microbiology, immunology, or cancer biology). The program offers exceptional research opportunities for graduate training in autoimmunity, biotechnology, cancer biology and therapy, environmental microbiology, genetic engineering of microorganisms, lymphocyte activation and development, microbial pathogenesis, molecular genetics of disease, tumor immunology, vaccine development, and vascular biology and inflammation.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Required courses include calculus, general chemistry, organic chemistry, and physics. A minimum of two upper-level biology courses, which may include biochemistry, genetics, cell biology, molecular biology, microbiology, or immunology, etc. are also required.

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the MICaB director of graduate studies regarding feasibility and requirements.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 96

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

All courses must be taken A/F unless only offered S/N. A minimum grade of C is required for A/F coursework. The minimum cumulative GPA for the minor is 3.0.





### Required Coursework (8 credits)

Masters and doctoral students must take 2 of the following courses, selected in consultation with the MICaB director of graduate studies, for a total of 8 credits:

- [MICA 8002](#) - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
- [MICA 8003](#) - Immunity and Immunopathology (4.0 cr)
- [MICA 8004](#) - Cellular and Cancer Biology (4.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

#### Masters

##### Master's Requirements

See Program Requirements, above.

#### Doctoral

##### Doctoral Requirements (4 credits)

Select at least 4 credits of MICaB coursework, in consultation with the MICaB director of graduate studies, to complete the 12-credit minimum.

- [MICA 8005](#) - Topics in Microbiology, Immunology, and Cancer Biology (1.0 - 4.0 cr)
- [MICA 8006](#) - Protein Sequence Analysis (3.0 cr)
- [MICA 8007](#) - Cell Biology and Biochemistry of the Extracellular Matrix (3.0 cr)
- [MICA 8009](#) - Biochemical Aspects of Normal and Abnormal Cell Growth and Cell Death (2.0 cr)
- [MICA 8010](#) - Microbial Pathogenesis (3.0 cr)
- [MICA 8011](#) - Current Topics in Immunology (3.0 cr)
- [MICA 8013](#) - Translational Cancer Research (2.0 cr)
- [MICA 8014](#) - Small RNA Biology (2.0 cr)
- [MICA 8320](#) - Readings in Neurobiology (1.0 - 4.0 cr)



### **Twin Cities Campus**

## **Microbiology, Immunology, and Cancer Biology Ph.D.**

Medical School - Adm

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Microbiology, Immunology and Cancer Biology PhD Program

689 23rd Avenue SE, Room 1-109 MRF

Minneapolis, MN 55455

612-624-5947

Email: [micab@umn.edu](mailto:micab@umn.edu)

Website: <http://micab.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students prepare for careers in biomedical research and teaching by completing broad training in molecular biology or biological sciences, and focused specialization in one of three concentrations (microbiology, immunology, or cancer biology). The program offers exceptional research opportunities for graduate training in autoimmunity, biotechnology, cancer biology and therapy, environmental microbiology, genetic engineering of microorganisms, lymphocyte activation and development, microbial pathogenesis, molecular genetics of disease, tumor immunology, vaccine development, and vascular biology and inflammation.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Applicants must have a bachelor's degree (BS preferred).

Other requirements to be completed before admission:

Required courses include calculus, general chemistry, organic chemistry, and physics. A minimum of two upper-level biology courses, which may include biochemistry, genetics, cell biology, molecular biology, microbiology, or immunology, etc., are also required.

Research experience is required. Relevant undergraduate experience includes honors thesis work, paid or volunteer work in a research laboratory and summer internships. It does not include laboratory courses that accompany science courses such as biology.

Postbaccalaureate research experience is preferred but not required.

#### **Special Application Requirements:**

The program evaluates applications based on four equally weighted criteria: academics, letters (3) of recommendation, a personal statement, and research experience. We do not accept or require GRE scores. Letters of recommendation from research advisers or mentors are preferred as these individuals can comment knowledgeably on the student's potential in biomedical research. Applicants' personal statements should describe their research in general and their specific contribution to it, their rationale for seeking a doctoral degree, and any information they wish to share regarding their backgrounds and interest in the MICaB Program. Finally, applicants should provide specific details of their research experiences (project titles, mentors, dates, locations, etc.), along with a list of relevant abstracts, publications, etc.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 96
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB



- Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

During the first year of study, students will identify an advisor through completing laboratory rotations, select a focus area, and initiate thesis research. Students also must complete an ethics seminar and responsible conduct of research course their first year in the program.

All coursework must be taken for an A/F grade and completed with a minimum grade of C, unless the course is only offered for an S/N grade.

No more than one 4xxx-level elective course can be applied to this degree.

### Core Coursework (4 credits)

Take one of the following 4-credit core courses in consultation with the advisor. Although only one of the 3 courses is required, taking all 3 is strongly encouraged. If students take more than one of these courses, the additional course(s) will count towards the elective coursework requirement.

[MICA 8002](#) - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)

[MICA 8003](#) - Immunity and Immunopathology (4.0 cr)

[MICA 8004](#) - Cellular and Cancer Biology (4.0 cr)

### Required Coursework (4 credits)

Take both of the following courses. Take MICA 8094 twice (fall and spring semester of the first year) for 2 credits.

[MICA 8012](#) - Writing and Reviewing a Research Proposal (2.0 cr)

[MICA 8094](#) - Research in Microbiology, Immunology, and Cancer Biology (1.0 cr)

### Practicum and Seminar Coursework

Take all of the following courses. Take MICA 5000 twice; MICA 8910 4 times; and MICA 8920 4 times.

[MICA 5000](#) - Practicum: Teaching (0.0 cr)

[MICA 8910](#) - Seminar: Faculty Research Topics (0.0 cr)

[MICA 8920](#) - Seminar: Student Research Topics (0.0 cr)

### Elective Coursework

Select electives, in consultation with the advisor, to complete the 24 course credits required. Use of 4xxx- and 5xxx-level courses is restricted to either two 5-level courses or one 4- and one 5-level course.

[BIOC 4331](#) - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)

[BIOC 5351](#) - Protein Engineering (3.0 cr)

[BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)

[BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)

[BIOC 5960](#) - Special Topics in Biochemistry (3.0 cr)

[BIOC 8001](#) - Biochemistry: Structure, Catalysis, and Metabolism (3.0 cr)

[BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)

[BIOC 8007](#) - Molecular Biology of DNA (2.0 cr)

[BIOC 8216](#) - Signal Transduction and Gene Expression (3.0 cr)

[BTHX 5610](#) - Research & Publication Seminar (1.0 cr)

[CHEM 8412](#) - Chemical Biology of Enzymes (4.0 cr)



CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)  
CHEN 8995 - Special Topics (1.0 - 4.0 cr)  
CSCI 5465 - Introduction to Computing for Biologists (3.0 cr)  
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)  
CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)  
ESCI 4801 - Geomicrobiology (3.0 cr)  
ESCI 8801 - Geomicrobiology (3.0 cr)  
GCD 5005 - Computer Programming for Biology (3.0 cr)  
GCD 6103 - Human Histology (3.0 - 8.0 cr)  
GCD 8008 - Mammalian Gene Transfer and Genome Engineering (2.0 cr)  
GCD 8073 - Genetics & Genomics in Human Health (3.0 cr)  
GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)  
GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)  
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)  
GCD 8401 - Ethics, Public Policy & Careers in Molecular Cell Biology (1.0 cr)  
GCD 8920 - Special Topics (1.0 - 4.0 cr)  
GEOG 8260 - Seminar: Physical Geography (2.0 cr)  
GRAD 5102 - Preparation for University Teaching for Nonnative English Speakers (2.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)  
GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)  
MICA 8009 - Biochemical Aspects of Normal and Abnormal Cell Growth and Cell Death (2.0 cr)  
MICA 8010 - Microbial Pathogenesis (3.0 cr)  
MICA 8011 - Current Topics in Immunology (3.0 cr)  
MICA 8013 - Translational Cancer Research (2.0 cr)  
MICA 8014 - Small RNA Biology (2.0 cr)  
MICE 5035 - Personal Microbiome Analysis (3.0 cr)  
OBIO 5010 - Molecular Virology (1.0 cr)  
OBIO 5020 - Virus Pathogenesis and Host Interactions (1.0 cr)  
PHCL 5111 - Pharmacogenomics (3.0 cr)  
PHSL 8242 - Professional Skills Development for Biomedical Scientists (2.0 cr)  
PMB 5111 - Microbial Physiology and Diversity (3.0 cr)  
PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6414 - Biostatistical Literacy (3.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
SCB 8181 - Stem Cell Biology (3.0 cr)  
VMED 5180 - Ecology of Infectious Disease (3.0 cr)

#### Thesis Credits

Take at least 24 doctoral thesis credits.

MICA 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:** MD/PhD-Microbiology, Immunology, and Cancer Biology Student may take a total of 15 credits in common among the academic programs.



### *Twin Cities Campus*

## Neuroscience M.S.

Neuroscience

Medical School

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Neuroscience, 6-145 Jackson Hall, 321 Church Street S.E., Minneapolis, MN 55455 (612-626-6474; fax: 612-626-6460)

Email: [neurosci@umn.edu](mailto:neurosci@umn.edu)

Website: <http://www.neuroscience.umn.edu>

- Program Type: Master's
  - Requirements for this program are current for Fall 2020
  - Length of program in credits: 35
  - This program requires summer semesters for timely completion.
  - NSCI 5551 Cell & Molecular Neurobiology Lab is held at the Itasca Biological Station in Shevlin, Minnesota the first semester the first semester of the program.
- 
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: Neuroscience does not admit students directly to the MS program.

Neuroscience is an interdisciplinary field of inquiry. The objects of this inquiry, the brain, and nervous system, are sufficiently complex and unique among biological systems to require experimental and analytical approaches that cross the traditional boundaries of molecular and cell biology, behavioral biology, biochemistry, genetics, pharmacology, physiology, and psychology. In some instances, neuroscientific inquiry may also encompass computer science, information processing, engineering, physics, and mathematics.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### **Special Application Requirements:**

Neuroscience does not admit students directly to the MS program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan A:** Plan A requires 25 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

#### **Summer - First Year (4 credits)**

Take the following course or, with adviser approval, a substitute course:

[NSC 5551](#) - Itasca Cell and Molecular Neurobiology Laboratory (4.0 cr)



**Fall - First Year (9.5 Credits)**

Take the following courses or, with advisor approval, substitute courses. Take 1 credit of NSC 8334.

[NSC 5461](#) - Cellular and Molecular Neuroscience (4.0 cr)

[NSC 5561](#) - Systems Neuroscience (4.0 cr)

[NSC 8321](#) - Career Skills and Understanding Responsibilities as a Neuroscientist (0.5 cr)

[NSC 8334](#) - Laboratory Neuroscience (1.0 - 3.0 cr)

**Spring - First Year (8.5 Credits)**

Take the following courses or, with advisor approval, substitute courses. Take 1 credit of NSC 8334.

[NSC 5661W](#) - Behavioral Neuroscience [WI] (4.0 cr)

[NSC 8211](#) - Developmental Neurobiology (4.0 cr)

[NSC 8321](#) - Career Skills and Understanding Responsibilities as a Neuroscientist (0.5 cr)

[NSC 8334](#) - Laboratory Neuroscience (1.0 - 3.0 cr)

**Fall - Second Year (3.0 Credits)**

Take the following courses or, with advisor approval, substitute courses:

[NSC 8111](#) - Quantitative Neuroscience (3.0 cr)

**Spring - Second Year (0.5 credits)**

Take the following course or, with advisor approval, substitute course.

[NSC 8321](#) - Career Skills and Understanding Responsibilities as a Neuroscientist (0.5 cr)

**Thesis Credits**

Take 10 master's thesis credits.

[NSC 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Neuroscience Minor**

Neuroscience

Medical School

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Neuroscience, 6-145 Jackson Hall, 321 Church Street S.E., Minneapolis, MN 55455 (612-626-6474; fax: 612-626-6460)

Email: [neurosci@umn.edu](mailto:neurosci@umn.edu)

Website: <http://www.neuroscience.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 12
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Neuroscience is an interdisciplinary field of inquiry. The objects of this inquiry, the brain and nervous system, are sufficiently complex and unique among biological systems to require experimental and analytical approaches that cross the traditional boundaries of molecular and cell biology, behavioral biology, biochemistry, genetics, pharmacology, physiology, and psychology. In some instances, neuroscientific inquiry may also encompass computer science, information processing, engineering, physics, and mathematics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

#### **Required Coursework (4 credits)**

All students pursuing the minor must take one of the following courses:

[NSC 5461](#) - Cellular and Molecular Neuroscience (4.0 cr)

[NSC 5561](#) - Systems Neuroscience (4.0 cr)

#### **Electives (8 credits)**

All students pursuing the minor must take at least eight elective credits, selected in consultation with the Neuroscience director of graduate studies.

[NSC 5203](#) - Basic and Clinical Vision Science (3.0 cr)

[NSC 5461](#) - Cellular and Molecular Neuroscience (4.0 cr)

[NSC 5462](#) - Neuroscience Principles of Drug Abuse (2.0 cr)

[NSC 5561](#) - Systems Neuroscience (4.0 cr)

[NSC 5661W](#) - Behavioral Neuroscience [WI] (4.0 cr)

[NSC 8026](#) - Neuro-Immune Interactions (3.0 cr)

[NSC 8111](#) - Quantitative Neuroscience (3.0 cr)

[NSC 8208](#) - Neuropsychopharmacology (3.0 cr)

[NSC 8211](#) - Developmental Neurobiology (4.0 cr)

[NSC 8320](#) - Readings in Neurobiology (1.0 - 4.0 cr)

[NSC 8411](#) - Teaching in Neuroscience (1.0 cr)

[NSC 8481](#) - Advanced Neuropharmacology (4.0 cr)

[NSCI 4101](#) - Development of the Nervous System: Cellular and Molecular Mechanisms (3.0 cr)



[NSCI 4105](#) - Neurobiology Laboratory I (3.0 cr)  
[NSCI 4201](#) - Neuroscience of Drug Abuse (3.0 cr)  
[NSCI 4501](#) - Neurodegenerative Diseases, Mechanisms to Therapies (3.0 cr)  
[NSCI 5101](#) - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)  
[NSCI 5501](#) - Neurodegenerative Diseases, Mechanisms to Therapies (3.0 cr)  
[NSCI 6110](#) - Neuroscience for Dental Students (2.0 cr)  
[NSCI 6112](#) - Medical Neuroscience for Professional Students (5.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Doctoral

Masters





### *Twin Cities Campus*

## Neuroscience Ph.D.

Neuroscience

### Medical School

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Neuroscience, 6-145 Jackson Hall, 321 Church Street SE, Minneapolis, MN 55455 (612-626-6474; fax: 612-626-6460)

Email: [neurosci@umn.edu](mailto:neurosci@umn.edu)

Website: <http://www.neuroscience.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 49
- This program requires summer semesters for timely completion.
- The NSCI 5551 Cell & Molecular Neurobiology Lab at Itasca is held at the Itasca Biological Station in Shevlin, Minnesota their first semester.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Neuroscience is an interdisciplinary field of inquiry. The objects of this inquiry, the brain and nervous system, are sufficiently complex and unique among biological systems to require experimental and analytical approaches that cross the traditional boundaries of molecular and cell biology, behavioral biology, biochemistry, genetics, pharmacology, physiology, and psychology. In some instances, neuroscientific inquiry may also encompass computer science, information processing, engineering, physics, and mathematics.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

#### **Special Application Requirements:**

Applicants whose native language is not English are required to take the TOEFL and obtain a minimum score of 625 (paper) or 107 (Internet); or obtain 6.5 on the IELTS examination. There is no minimum GPA requirement to apply.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 107
  - Paper Based - Total Score: 625
- IELTS
  - Total Score: 6.5

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

25 credits are required in the major.

24 thesis credits are required.

**Plan A:** Plan A requires 23 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.



Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

The neuroscience PhD curriculum begins in the summer session with the intensive laboratory course in cellular and molecular neurobiology (NSC 5551), held at the Itasca Biological Station and Laboratories.

While taking courses, students explore research opportunities in the faculty's laboratories and thereby select a thesis advisor.

#### **Summer - First Year (4 credits)**

Take the following course or, with advisor approval, a substitute course.

[NSC 5551](#) - Itasca Cell and Molecular Neurobiology Laboratory (4.0 cr)

#### **Fall - First Year (9.5 credits)**

Take the following courses or, with advisor approval, substitute courses. Take 1 credit of NSC 8334.

[NSC 5461](#) - Cellular and Molecular Neuroscience (4.0 cr)

[NSC 5561](#) - Systems Neuroscience (4.0 cr)

[NSC 8321](#) - Career Skills and Understanding Responsibilities as a Neuroscientist (0.5 cr)

[NSC 8334](#) - Laboratory Neuroscience (1.0 - 3.0 cr)

#### **Spring - First Year (8.5 credits)**

Take the following courses or, with advisor approval, substitute courses. Take 1 credit of NSC 8334.

[NSC 5661W](#) - Behavioral Neuroscience [WI] (4.0 cr)

[NSC 8211](#) - Developmental Neurobiology (4.0 cr)

[NSC 8321](#) - Career Skills and Understanding Responsibilities as a Neuroscientist (0.5 cr)

[NSC 8334](#) - Laboratory Neuroscience (1.0 - 3.0 cr)

#### **Fall - Second Year (3.0 credits)**

Take the following course or, with advisor approval, substitute course.

[NSC 8111](#) - Quantitative Neuroscience (3.0 cr)

#### **Spring - Second Year (0.5 credits)**

Take the following course or, with advisor approval, substitute course.

[NSC 8321](#) - Career Skills and Understanding Responsibilities as a Neuroscientist (0.5 cr)

#### **Thesis Credits**

Take at least 24 doctoral thesis credits.

[NSC 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### *Twin Cities Campus*

## Orthoptics Post-baccalaureate Certificate

*Ophthalmology*

**Medical School**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Minnesota Lions Children's Eye Clinic  
(University of Minnesota Physicians and University of Minnesota Masonic Children's Hospital)

701 25th Ave S. Ste 300

Minneapolis, MN 55454

612-365-8365

612-365-8351 (Fax)

Email: [kmerrill@umphysicians.umn.edu](mailto:kmerrill@umphysicians.umn.edu)

Website: <http://www.med.umn.edu/ophthalmology/education-training/orthoptic-program>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 14 to 28
- This program requires summer semesters for timely completion.
- Degree: Orthoptics PostBaccalaureate Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Orthoptics post-baccalaureate certificate program is a vital part of the ophthalmic health care profession. This is a specialized profession, the focus of which is the evaluation and treatment of disorders of vision, eye movements, and eye alignment in children and adults. The study of orthoptics follows a logical sequence of studies vital to the understanding of the visual system. The didactic education is integrated with practical clinical experience. Orthoptists work with ophthalmologists, eye physicians and surgeons, as part of the medical team. They are employed in a variety of settings, including university and teaching hospitals, children's hospitals, and solo or multi-specialty group medical practices. An orthoptist sees a variety of patients of all ages, although due to the nature of their visual disorders, the majority of the patients are young children; some individuals with multiple health concerns are also evaluated as they commonly have ocular/binocular problems.

Students who successfully complete the Orthoptics post-baccalaureate certificate are eligible to sit for the written and practical examinations, administered by the American Orthoptic Council, required for national certification.

### Accreditation

This program is accredited by American Orthoptic Council

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 2.50.

Other requirements to be completed before admission:

All applicants must have an earned baccalaureate degree with a minimum GPA of 2.50.

Applicants to the accelerated certificate also must provide confirmation of:  
ophthalmic tech program completion, and  
COMT/COT certification.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

Each course includes 35+ clinical hours/week under supervision of a staff orthoptist/pediatric ophthalmologist.

### Required Coursework (28 credits)

Students admitted to the full 28-credit post-baccalaureate certificate program take OPH 5201, 5301, and 5401 during the first year of study, and OPH 5501, 5601, and 5701 the second year of study for a total of 28 credits.

[OPH 5201](#) - Orthoptics I (4.0 cr)

[OPH 5301](#) - Orthoptics II (5.0 cr)

[OPH 5401](#) - Orthoptics III (5.0 cr)

[OPH 5501](#) - Orthoptics IV (4.0 cr)

[OPH 5601](#) - Orthoptics V (5.0 cr)

[OPH 5701](#) - Orthoptics III (5.0 cr)

### Accelerated Program Required Coursework (14 credits)

Students admitted to the accelerated 14-credit certificate program take OPH 5501, 5601, and 5701 to meet their 14-credit requirement.

[OPH 5501](#) - Orthoptics IV (4.0 cr)

[OPH 5601](#) - Orthoptics V (5.0 cr)

[OPH 5701](#) - Orthoptics III (5.0 cr)



### **Twin Cities Campus**

## **Otolaryngology Ph.D. Otol.**

Otolaryngology

Medical School

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Otolaryngology, MMC 396, 420 Delaware Street SE, Minneapolis, MN 55455 (612-625-7692; fax: 612-625-2101)

Website: <http://www.ent.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy in Otolaryngology

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This program prepares students in both clinical and experimental aspects of otolaryngology. The Ph.D.Otol. degree requires a publishable thesis. Rotations at University of Minnesota Medical Center-Fairview, Minneapolis Veterans Administration Medical Center, Regions Hospital, Minneapolis Children's Hospital, and Hennepin County Medical Center provide a wide range of opportunity for clinical education and surgical experience.

Opportunities for independent research are provided in the areas of audiology, auditory electrophysiology, auditory neurophysiology, basic sciences research, biochemistry, cancer biology, cell biology and genetics, chemical senses, clinical epidemiology, education research, electron microscopy, electrophysiology, histochemistry, laryngeal physiology, mandibular bone physiology, microvascular tissue transfer, morphometry, outcomes research, psychoacoustics, psychometrics, skin-flap physiology, temporal bone pathology, tumor immunology, and vestibular physiology. Graduates of the program have careers in teaching, research, and professional practice.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Requires an M.D. degree.

Other requirements to be completed before admission:

Doctorate will be completed in conjunction with otolaryngology residency.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

24 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Coursework will vary depending on preparation and the research undertaken. An advisory committee, including the student, the advisor, and the director of graduate studies, determines coursework. Understanding and application of basic statistics and experimental methodology are expected. Statistics coursework is usually necessary. Choice of statistics courses is made with the



guidance of the director of graduate studies.

All students are expected to publish a research paper in a peer-reviewed journal. Students are concurrently in otolaryngology residency and usually take five to six years to complete research, course, and dissertation requirements.

**Thesis Credits**

Take 24 doctoral thesis credits.

[OTOL 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### ***Twin Cities Campus***

## **Pharmacology M.S.**

*Pharmacology*

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Pharmacology, 6-120 Jackson Hall, 321 Church Street S.E., Minneapolis MN 55455 (612-626-1248; fax: 612-625-8408)

Email: [phclgrad@umn.edu](mailto:phclgrad@umn.edu)

Website: <http://www.pharmacology.med.umn.edu/graduate.html>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 39
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Pharmacology is the study of the interactions of chemicals with biological systems. Courses and research training in biochemistry, biophysics, genetics, and molecular biology provide a solid foundation for performing original research in pharmacology, neuropharmacology, and cancer chemotherapy.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

A four-year BA or BS degree (or its equivalent) in a basic science program is generally required.

Other requirements to be completed before admission:

Candidates for admission are evaluated on the basis of undergraduate record, previous research experience, and letters of recommendation.

#### **Special Application Requirements:**

Applicants must submit three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of official transcripts; and a clearly written statement of career interests, goals, and objectives.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7.5

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

**Plan A:** Plan A requires 29 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.



**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.  
**Capstone Project:** A research project approved by the advisor and director of graduate studies.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Students are required to maintain a GPA of 3.00. Students who fail to maintain this standard must petition the director of graduate studies for permission to remain in the program. A minimum grade is B- per course is required.

#### **Required Courses (29-30 credits)**

Plan A students take 8 credits (4 credits/2 semesters), and Plan B students take 9 credits (4 credits/2 semesters; 1 credit/1 semester) of PHCL 5109. All students take PHCL 8100 twice; 5 credits of PHCL 8211; and 3 credits of PHCL 8212.

[PHCL 5109](#) - Problems in Pharmacology (1.0 - 18.0 cr)

[PHCL 5110](#) - Introduction to Pharmacology (3.0 cr)

[PHCL 5112](#) - A Graduate Toolkit I: An Introduction to the Scientific Research Lab (1.0 cr)

[PHCL 8100](#) - Laboratory Research in Pharmacology (4.0 cr)

[PHCL 8200](#) - Seminar: Selected Topics in Pharmacology (1.0 cr)

[PHCL 8211](#) - Advanced Medical Pharmacology I (5.0 cr)

[PHCL 8212](#) - Advanced Medical Pharmacology II (0.0 - 3.0 cr)

#### **Plan Options**

##### **Plan A**

Take at least 10 master's thesis credits.

[PHCL 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)





### **Twin Cities Campus**

## **Pharmacology Minor**

Pharmacology

Medical School

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Pharmacology, 6-120 Jackson Hall, 321 Church Street S.E., Minneapolis MN 55455 (612-626-1248; fax: 612-625-8408)

Email: [phclgrad@umn.edu](mailto:phclgrad@umn.edu)

Website: <http://www.pharmacology.med.umn.edu/graduate.html>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Pharmacology is the study of the interactions of chemicals with biological systems. Courses and research training in biochemistry, biophysics, genetics, and molecular biology provide a solid foundation for performing original research in pharmacology, neuropharmacology, and cancer chemotherapy.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

Students must be enrolled in a University masters or doctoral program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

### **Required Coursework (9 to 12 credits)**

In consultation with the Pharmacology director of graduate studies, select at least 9 credits from the following for a masters minor or at least 12 for the doctoral minor. Other courses may be substituted with Pharmacology director of graduate studies approval.

- [PHCL 5109](#) - Problems in Pharmacology (1.0 - 18.0 cr)
- [PHCL 5110](#) - Introduction to Pharmacology (3.0 cr)
- [PHCL 5111](#) - Pharmacogenomics (3.0 cr)
- [PHCL 5112](#) - A Graduate Toolkit I: An Introduction to the Scientific Research Lab (1.0 cr)
- [PHCL 8209](#) - Substance Abuse at the Bedside (1.0 cr)
- [PHCL 8211](#) - Advanced Medical Pharmacology I (5.0 cr)
- [PHCL 5113](#) - A Graduate Toolkit II: Scientific Speaking and Writing for Graduate Students (2.0 cr)
- [PHCL 8212](#) - Advanced Medical Pharmacology II (0.0 - 3.0 cr)

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.



Master's

Doctoral



**Twin Cities Campus**

## Pharmacology Ph.D.

Pharmacology

Medical School

Link to a [list of faculty](#) for this program.

**Contact Information:**

Department of Pharmacology, 6-120 Jackson Hall, 321 Church Street S.E., Minneapolis MN 55455 (612-626-1248; fax: 612-625-8408)

Email: [phclgrad@umn.edu](mailto:phclgrad@umn.edu)

Website: <http://www.pharmacology.med.umn.edu/graduate.html>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Pharmacology is the study of the interactions of chemicals with biological systems. Courses and research training in biochemistry, biophysics, genetics, and molecular biology provide a solid foundation for performing original research in pharmacology, neuropharmacology, and cancer chemotherapy.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.50.

A four-year BA or BS degree (or its equivalent) in a basic science program is generally required.

Other requirements to be completed before admission:

Candidates for admission are evaluated on the basis of undergraduate record, previous research experience, and letters of recommendation.

**Special Application Requirements:**

Applicants must submit three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of official transcripts; and a clearly written statement of career interests, goals, and objectives.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7.5

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements



24 credits are required in the major.  
0 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Students are required to maintain a GPA of 3.00. Students who fail to maintain this standard must petition the director of graduate studies for permission to remain in the program.

For more detailed information, contact the director of graduate studies in pharmacology.

#### **Required Coursework (24 credits)**

Take PHCL 8100 twice for a total of eight credits, and PHCL 8200 twice for a total of 2 credits. Take 3 credits of PHCL 8212. All courses, with the exception of PHCL 8100, must be taken A/F and be graded B or higher.

[PHCL 5110](#) - Introduction to Pharmacology (3.0 cr)

[PHCL 5112](#) - A Graduate Toolkit I: An Introduction to the Scientific Research Lab (1.0 cr)

[PHCL 5113](#) - A Graduate Toolkit II: Scientific Speaking and Writing for Graduate Students (2.0 cr)

[PHCL 8100](#) - Laboratory Research in Pharmacology (4.0 cr)

[PHCL 8200](#) - Seminar: Selected Topics in Pharmacology (1.0 cr)

[PHCL 8211](#) - Advanced Medical Pharmacology I (5.0 cr)

[PHCL 8212](#) - Advanced Medical Pharmacology II (0.0 - 3.0 cr)

#### **Thesis Credits**

Take at least 24 doctoral thesis credits.

[PHCL 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:** Joint Degree Program in Law, Health and the Life Sciences. Student may take a total of 12 credits in common among the academic programs.



### **Twin Cities Campus**

## **Physical Therapy D.P.T.**

Rehabilitation Medicine Administration

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Division of Physical Therapy, 420 Delaware Street SE, MMC 388, Minneapolis, MN 55455, (612-624-2662; fax: 612-625-4274)

Email: [ruuda@umn.edu](mailto:ruuda@umn.edu)

Website: <https://www.med.umn.edu/rehabmedicine/about/divisions/physical-therapy/doctor-physical-therapy>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 138
- This program requires summer semesters for timely completion.
- Courses for the DPT are taught on the Twin Cities East Bank Campus for the first seven semesters (including summers), with numerous off-site clinical education opportunities scheduled throughout. During the student's 3rd year, the student will complete four full-time clinical experiences, which occur off-campus in various physical therapy settings.
- Degree: Doctor of Physical Therapy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Division of Physical Therapy Program, a division within the Department of Rehabilitation Medicine, offers a professional doctoral degree in physical therapy (DPT). Physical therapy is a healthcare discipline involved with the study and rehabilitation of movement impairments, such as muscular weakness, impaired coordination, joint stiffness, and pain, which can lead to functional problems affecting self care, employment, ambulation, etc. Graduates are prepared to promote proper health care and quality of living by maximizing human movement following disease or injury or by preventing its loss. The program requires three years of year-round, full-time graduate study (9 semesters including summers). Academic coursework, clinical education, and research activity are completed during the first seven semesters. The final two semesters are devoted to clinical rotations.

### **Accreditation**

This program is accredited by Commission on Accreditation in Physical Therapy Education (CAPTE)

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

The University of Minnesota Division of Physical Therapy has no required or preferred undergraduate major. Any baccalaureate degree or equivalent from an accredited institution is accepted.

Other requirements to be completed before admission:

To be eligible for admission, applicants must complete a baccalaureate degree, or its foreign equivalent, from an accredited institution by June 1 of the year of admission, including all required prerequisite courses or their program-approved equivalents.

Applicants must complete at least 100 observation hours (shadow/volunteer/work) in a clinical physical therapy setting. Exposure to multiple and varied areas of practice in physical therapy and additional health care exposure are considered important preparation for entry into the program.

Applicants must complete the GRE General Exam. TOEFL is required for international students.

Two letters of recommendation are also required. One letter must be from a practicing physical therapist with whom the applicant completed observation hours.

#### **Special Application Requirements:**

Below is a list of required prerequisite coursework applicants must complete to apply to the program. Courses must be taken for college



credit and graded A-F with a received minimum letter grade of C. The exception is medical terminology, which will be accepted pass/fail. Courses may be taken at any accredited college or university. Up to two prerequisite courses may be listed as in progress - either currently being taken or planned to take and complete by June 1 of the year of admission. The program will also accept two AP scores of 4 or above or two IB scores of 6 or above to meet prerequisite requirements. It is recommended that these courses be taken within the previous five years.

- General Biology, with on-site lab
- A second Biology, with on-site lab
- General Chemistry, with on-site lab
- A second Chemistry, with on-site lab
- Human Anatomy (lab strongly recommended)
- Human Physiology
- General Physics I (covering mechanics and electricity), with on-site lab
- General Physics II, with on-site lab
- General Psychology
- Abnormal Psychology
- Statistics (ANOVA and regression analysis content strongly recommended)
- Calculus (Intro to Calculus or Short Calculus are accepted; Pre-Calculus is not accepted)
- Medical Terminology

Distance learning courses are accepted; however, labs must be taken on-site unless prior approval is given by the Admissions Chair.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Listening Score: 18
  - Internet Based - Writing Score: 24
  - Internet Based - Reading Score: 21
  - Internet Based - Speaking Score: 26
- IELTS
  - Total Score: 6.5

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

138 credits are required in the major.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

At least 6 semesters must be completed before filing a Degree Program Form.

### Year 1 Summer (6 credits)

[PT 6058](#) - Anatomy for Physical Therapy (6.0 cr)

### Year 1 Fall (20 credits)

[PT 6002](#) - Ethics in Health Care (1.0 cr)

[PT 6213](#) - Clerkship I: Introduction to Physical Therapy: Legal and Ethical Considerations (2.0 cr)

[PT 6231](#) - Clinical Biomechanics (5.0 cr)

[PT 6280](#) - Clinical Assessment (4.0 cr)

[PT 6281](#) - Physiology for Physical Rehabilitation (4.0 cr)

[PT 6340](#) - Human Growth and Development (3.0 cr)



PT 6219 - Foundations in Interprofessional Communication and Collaboration (1.0 cr)

**Year 1 Spring (16 credits)**

NSCI 6112 - Medical Neuroscience for Professional Students (5.0 cr)  
PT 8132 - Research Seminar (1.0 cr)  
PT 6214 - Clerkship II: Documentation and Reimbursement (2.0 cr)  
PT 6221 - Therapeutic Procedures (4.0 cr)  
PT 6282 - Cardiopulmonary Physiology and Rehabilitation (4.0 cr)

**Year 2 Summer (14 credits)**

Take PT 8193 for 2 credits.  
PT 6250 - Acute Care in Physical Therapy (2.0 cr)  
PT 6251 - Integument (2.0 cr)  
PT 6252 - Pathophysiology (3.0 cr)  
PHAR 6800 - Rehabilitation Pharmacotherapy (2.0 cr)  
PT 8193 - Research Problems (2.0 - 6.0 cr)  
PT 6241 - Movement and Pathokinesiology (3.0 cr)

**Year 2 Fall (15 credits)**

Take PT 8193 for 2 credits. PT 6286 course name will change to Neurorehabilitation I in Fall 2020.  
PT 6283 - Musculoskeletal Rehabilitation 1 (6.0 cr)  
PT 6293 - Essentials of Rehabilitation Research (3.0 cr)  
PT 6215 - Clerkship III: The Physical Therapist in Today's Society (1.0 cr)  
PT 8193 - Research Problems (2.0 - 6.0 cr)  
PT 6286 - Scientific Foundations II: Neuromotor Control (3.0 cr)

**Year 2 Spring (16 credits)**

Take PT 8193 for 2 credits. PT 6284 will be offered for 5 credits beginning Spring 2021 and students will complete the course for 5 credits.  
PT 6287 - Neurorehabilitation II (8.0 cr)  
PT 6284 - Musculoskeletal Rehabilitation II (4.0 cr)  
PT 6216 - Clerkship IV: Advocacy and Adjustment to Disability (1.0 cr)  
PT 8193 - Research Problems (2.0 - 6.0 cr)

**Year 3 Summer (13 credits)**

PT 6288 will be offered for 3 credits beginning Summer 2021 and students will complete the course for 3 credits. Elective PT 6403 will be offered for 3 credits beginning Summer 2021 and students will complete the course for 3 credits.  
PT 6288 - Pediatric Rehabilitation (5.0 cr)  
PT 6290 - Contemporary Physical Therapist Practice (4.0 cr)  
PT 6294 - Clinical Integration (3.0 cr)

**Electives**

PT 6401 - Pediatric Rehabilitation Elective (3.0 cr)  
or PT 6402 - The Shoulder in Sports (3.0 cr)  
or PT 6403 - Topics in Aging (1.0 cr)

**Year 3 Fall (18 credits)**

PT 6295 - Clinical Internship I (9.0 cr)  
PT 6296 - Clinical Internship II (9.0 cr)

**Year 3 Spring (20 credits)**

PT 6297 - Clinical Internship III (10.0 cr)  
PT 6298 - Clinical Internship IV (10.0 cr)

**Joint- or Dual-degree Coursework:** Doctorate in Physical Therapy / PhD in Rehabilitation Science



### **Twin Cities Campus**

## **Rehabilitation Science M.S.**

*Rehabilitation Medicine Administration*

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Rehabilitation Science Graduate Program, 420 Delaware Street SE - MMC 388, Minneapolis, MN, 55455

Phone: 612-625-3966

Email: [adamc002@umn.edu](mailto:adamc002@umn.edu)

Website: <https://med.umn.edu/rehabmedicine/about/divisions/rehabilitation-science>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 33
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The mission of the graduate program in Rehabilitation Science is to discover and disseminate rehabilitation knowledge and improve the quality of life, participation, health, performance, and well-being of people in Minnesota and throughout the world. The mission further encompasses the cultivation of premier leaders and researchers in academia, industry, and clinical environments to transform the science and practice of rehabilitation. The program is interdisciplinary, with student and faculty backgrounds in physical therapy, occupational therapy, exercise physiology, biomedical engineering, and a variety of other biology and health care backgrounds. The programs philosophy is to provide students with a strong foundation in research methodology; a concentrated educational and research experience tailored toward a students specific area of interest in rehabilitation science; and a working knowledge of the importance of a collaborative and interdisciplinary approach to the scientific process.

Note: The Rehabilitation Science program does not normally admit students to the MS degree. The exception is for students who wish to pursue the integrated Biomedical Engineering BS /Rehabilitation Science MS program. For more information, contact the Rehabilitation Science graduate program office.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.30.

University of Minnesota BME bachelor's degree.

#### **Special Application Requirements:**

In addition to the University's application (including personal statement and fee), applicants must submit the following materials: unofficial transcripts; two reference names with email address and phone number, one reference must be from BME. Student must also have an agreed-upon faculty adviser at the time of applying. Compatibility of research interests is a major determinant in the student/adviser relationship.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

**Plan A:** Plan A requires 20 major credits, 3 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 27 major credits and 3 credits outside the major. The final exam is written and oral. A capstone project is





required.

**Capstone Project:** The Plan B project is determined in consultation with the advisor.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Coursework (20 to 27 credits)

Plan A students select at least 20 credits, and Plan B students select at least 27 credits from the following list, in consultation with the advisor. For both Plan A and Plan B students, at least 14 of the credits must be from RSC courses.

- RSC 5058 - Anatomy for Rehabilitation Science (6.0 cr)
- RSC 5060 - Lower Extremity Anatomy Intensive (2.0 cr)
- RSC 5065 - Upper Extremity Anatomy Intensive (2.0 cr)
- RSC 5101 - Mathematical Tools for Research Applications in Health, Rehab, and Human Movement Sciences (1.0 cr)
- RSC 5106 - Introduction to Rehabilitation Science (1.0 cr)
- RSC 5135 - Advanced Biomechanics I: Kinematics (3.0 cr)
- RSC 5200 - Introduction to Neuromodulation (1.0 - 3.0 cr)
- RSC 5231 - Clinical Biomechanics (2.0 - 5.0 cr)
- RSC 5235 - Advanced Biomechanics II: Kinetics (3.0 cr)
- RSC 5281 - Physiology for Physical Rehabilitation (2.0 - 4.0 cr)
- RSC 5294 - Independent Study in Rehabilitation Science (1.0 - 3.0 cr)
- RSC 5306 - Scientific and Professional Presentation (1.0 cr)
- RSC 5310 - Physiology for Physical Rehabilitation (1.0 - 5.0 cr)
- RSC 5814 - Age, Exercise, and Rehabilitation (2.0 cr)
- RSC 5841 - Applied Data Acquisition and Processing (3.0 cr)
- RSC 5901 - Scholarly Inquiry in Health Sciences (4.0 cr)
- RSC 8106 - Critical Analysis of Scientific Literature (2.0 cr)
- RSC 8130 - Current Literature Seminar (1.0 - 3.0 cr)
- RSC 8135 - Human Kinematics (3.0 cr)
- RSC 8170 - Special Topics in Rehabilitation Science (1.0 - 3.0 cr)
- RSC 8185 - Problems in Rehabilitation Science (1.0 - 3.0 cr)
- RSC 8188 - Teaching Practicum (1.0 - 5.0 cr)
- RSC 8192 - Research Design in Rehabilitation Science (4.0 cr)
- RSC 8206 - Grant Writing (2.0 cr)
- RSC 8235 - Human Kinetics (3.0 cr)
- RSC 8282 - Problems in Human Movement (4.0 cr)
- RSC 8306 - Peer Review and Publication (2.0 cr)

### Statistics Requirement (3 credits)

All master's students must take one of the two statistics courses below, or another statistics course approved by the advisor, for at least three credits.

- PUBH 6450 - Biostatistics I (4.0 cr)
- EPSY 8251 - Statistical Methods in Education I (3.0 cr)

### Plan Options

#### Plan A

Take at least 10 master's thesis credits.

- RSC 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

### Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Integrated BS-Biomedical Engineering/MS-Rehabilitation Science

The Integrated BS Biomedical Engineering / MS Rehabilitation Science program offers students the opportunity to earn a bachelor's degree and a master's degree in a shortened amount of time. The integrated program offers several benefits, including streamlined



admissions from the undergraduate to the graduate program, and flexibility in fulfilling required courses for both degrees during the senior year.

Students pursuing the integrated BS/MS may complete either the Plan A or Plan B option for the Rehabilitation Science master's degree. Both the BS and MS degrees must be completed in their entirety, with no courses shared between them. The graduate degree cannot be earned before the undergraduate requirements are satisfied. Admitted students who decide not to complete the MS degree may count credits originally planned for the graduate program toward their BS degree with approval of the Biomedical Engineering advisors.

For more information regarding the integrated BS/MS degree, including eligibility requirements, contact the Biomedical Engineering or Rehabilitation Science program office.



### **Twin Cities Campus**

## **Rehabilitation Science Ph.D.**

*Rehabilitation Medicine Administration*

### **Medical School**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Rehabilitation Science Graduate Program, 420 Delaware Street SE - MMC 388, Minneapolis, MN, 55455

Phone: 612-625-3966

Email: [adamc002@umn.edu](mailto:adamc002@umn.edu)

Website: <https://med.umn.edu/rehabmedicine/about/divisions/rehabilitation-science>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The mission of the graduate program in Rehabilitation Science is to discover and disseminate rehabilitation knowledge and improve the quality of life, participation, health, performance, and well-being of people in Minnesota and throughout the world. The mission further encompasses the cultivation of premier leaders and researchers in academia, industry, and clinical environments to transform the science and practice of rehabilitation. The program is interdisciplinary, with student and faculty backgrounds in physical therapy, occupational therapy, exercise physiology, biomedical engineering and a variety of other biology and health care backgrounds. The programs philosophy is to provide students with a strong foundation in research methodology; a concentrated educational and research experience tailored toward a students specific area of interest in rehabilitation science; and a working knowledge of the importance of a collaborative and interdisciplinary approach to the scientific process.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Bachelor's degree or US equivalent in a related discipline is minimal requirement.

Professional, graduate, or master's degree preferred but not required.

Other requirements to be completed before admission:

Applicants must hold a bachelor's or graduate degree, or accredited US equivalent, in a discipline related to rehabilitation; for example, biomedical engineering, kinesiology, medicine, occupational therapy, physical therapy, public health, or speech/audiology. Depending on the educational background of the applicant, admission may be contingent upon completion of selected prerequisite coursework.

#### **Special Application Requirements:**

In addition to completing and submitting the University's Graduate School application (which includes submission of a personal statement, diversity statement, and upload of CV/resume), applicants must submit the following materials: report of GRE General Test scores (scores in the 50th percentile or higher are preferred); transcripts from all institutions attended; three letters of recommendation; and TOEFL and/or IELTS scores for international students. Student must also have an agreed-upon faculty adviser at the time of application. Compatibility of research interest is a major determinant in the student/adviser relationship.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 88
  - Internet Based - Listening Score: 21



- Internet Based - Writing Score: 21
- Internet Based - Reading Score: 21
- Internet Based - Speaking Score: 23
- IELTS
  - Total Score: 6.5

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

36 credits are required in the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Professional Development Coursework (8 credits)

The following Rehabilitation Science courses are required:

- [RSC 5106](#) - Introduction to Rehabilitation Science (1.0 cr)
- [RSC 5306](#) - Scientific and Professional Presentation (1.0 cr)
- [RSC 8106](#) - Critical Analysis of Scientific Literature (2.0 cr)
- [RSC 8206](#) - Grant Writing (2.0 cr)
- [RSC 8306](#) - Peer Review and Publication (2.0 cr)

### Statistics Coursework (6 to 8 credits)

Take the following Public Health or Educational Psychology series. Other statistics courses may be selected with advisor approval.

#### Public Health Statistics Series

- [PUBH 6450](#) - Biostatistics I (4.0 cr)
- [PUBH 6451](#) - Biostatistics II (4.0 cr)

#### or Educational Psychology Statistics Series

- [EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)
- [EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)

### Electives

Take elective credits, at least 8 credits of which must be from RSC coursework, to complete the 36 course credits required for the degree. Coursework is selected in consultation with the advisor.

- [RSC 5058](#) - Anatomy for Rehabilitation Science (6.0 cr)
- [RSC 5060](#) - Lower Extremity Anatomy Intensive (2.0 cr)
- [RSC 5065](#) - Upper Extremity Anatomy Intensive (2.0 cr)
- [RSC 5101](#) - Mathematical Tools for Research Applications in Health, Rehab, and Human Movement Sciences (1.0 cr)
- [RSC 5135](#) - Advanced Biomechanics I: Kinematics (3.0 cr)
- [RSC 5200](#) - Introduction to Neuromodulation (1.0 - 3.0 cr)
- [RSC 5231](#) - Clinical Biomechanics (2.0 - 5.0 cr)
- [RSC 5235](#) - Advanced Biomechanics II: Kinetics (3.0 cr)
- [RSC 5281](#) - Physiology for Physical Rehabilitation (2.0 - 4.0 cr)
- [RSC 5294](#) - Independent Study in Rehabilitation Science (1.0 - 3.0 cr)
- [RSC 5310](#) - Physiology for Physical Rehabilitation (1.0 - 5.0 cr)
- [RSC 5814](#) - Age, Exercise, and Rehabilitation (2.0 cr)
- [RSC 5841](#) - Applied Data Acquisition and Processing (3.0 cr)
- [RSC 5901](#) - Scholarly Inquiry in Health Sciences (4.0 cr)
- [RSC 8130](#) - Current Literature Seminar (1.0 - 3.0 cr)
- [RSC 8135](#) - Human Kinematics (3.0 cr)
- [RSC 8170](#) - Special Topics in Rehabilitation Science (1.0 - 3.0 cr)
- [RSC 8185](#) - Problems in Rehabilitation Science (1.0 - 3.0 cr)
- [RSC 8188](#) - Teaching Practicum (1.0 - 5.0 cr)
- [RSC 8192](#) - Research Design in Rehabilitation Science (4.0 cr)
- [RSC 8235](#) - Human Kinetics (3.0 cr)
- [RSC 8282](#) - Problems in Human Movement (4.0 cr)



**Thesis Credits**

Take at least 24 doctoral thesis credits.

[RSC 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:** DPT/PhDStudent may take a total of 18 credits in common among the academic programs.



### **Twin Cities Campus**

## **Stem Cell Biology M.S.**

Stem Cell Institute

Medical School

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Stem Cell Institute, 2001 6th Street S.E., Mail Code 2873, Minneapolis, MN 55455-3007

Email: [scbgrad@umn.edu](mailto:scbgrad@umn.edu)

Website: <https://med.umn.edu/stemcell/graduate-programs/master-science-stem-cell-biology>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The stem cell biology master's program is a multidisciplinary program that prepares graduates for a career in research, teaching, or industry within the field of stem cell biology. It offers training in stem cell biology, a rapidly growing interdisciplinary field that rests on foundations provided by molecular, cellular, and developmental biology. Students will take lecture, lab, and seminar courses in these various disciplines, in addition to stem cell biology. They will interact with members of the Stem Cell Institute through participation in research seminars and journal clubs.

Students who elect Plan A will spend a full calendar year, including summer, conducting research in the laboratory of a stem cell graduate program faculty member. This research will form the basis of the master's thesis.

Students who elect Plan B will conduct research of primary literature resulting in a written paper and seminar on a topic in Stem Cell Biology agreed upon in advance by the student and faculty advisor. Part-time students choosing Plan B are expected to complete the degree within 3 years by taking one to two courses per semester, excluding summers.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

A bachelor's degree or foreign equivalent in biological science or a related field.

### **Special Application Requirements:**

Applicants must upload to the University's on-line application website: 1) a personal statement (500 words or less) outlining research interests and long- and short-term goals (NOTE: students applying to Plan A should include information about previous research experience); 2) a curriculum vitae or resume; 3) the names of three individuals whom the student has asked to write letters of recommendation; and 4) unofficial transcripts.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 94
  - Internet Based - Listening Score: 22
  - Internet Based - Writing Score: 24
  - Internet Based - Reading Score: 22
  - Internet Based - Speaking Score: 26
  - Paper Based - Total Score: 580
- IELTS



- Total Score: 7
- Listening Score: 6.2
- Reading Score: 6.2
- Writing Score: 6.2
- Speaking Score: 6.2

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Students must demonstrate familiarity with the tools of research and scholarship in their major field, the ability to work independently, and the ability to present the results of their investigation effectively.

## Plan Options

### Plan A Course and Thesis

#### Required Plan A Course (1 credit)

[SCB 5051](#) - Stem Cell Biology Practical Training Module (1.0 cr)

#### Thesis Credits

Take 10 master's thesis credits. Students are recommended to take five thesis credits in spring of the first year, and the remaining five in fall of the second year.

[SCB 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

### Plan B Course

Take the following course:

[SCB 5900](#) - Master's Plan B Research Paper and Presentation (2.0 cr)

#### Required Coursework (14 to 15 credits)

Plan A and Plan B students take the following courses. All required courses must be taken A/F.

#### Core Courses (9 credits)

Take SCB 5054 three times for a total of 6 credits.

[SCB 5054](#) - Stem Cell Institute Research Seminar and Journal Club (2.0 cr)

[SCB 8181](#) - Stem Cell Biology (3.0 cr)

#### Option 1: Molecular Biology Course (3 to 4 credits)

Students complete either Option 1 or Option 2.

Select at least one of the following courses.

[GCD 4034](#) - Molecular Genetics and Genomics (3.0 cr)

or [GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)

or Students complete either Option 1 or Option 2.

Both of the following courses are required.

[BIOC 8007](#) - Molecular Biology of DNA (2.0 cr)

[BIOC 8008](#) - Molecular Biology of RNA (2.0 cr)

#### Other Courses

Take at least one of the following courses, or other 5000-level or 8000-level course approved prior to registration by the SCB



program, for a minimum of two credits.

[GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)

or [GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)

or [BTHX 8000](#) - Advanced Topics in Bioethics (1.0 - 4.0 cr)

or [BTHX 5210](#) - Ethics of Human Subjects Research (3.0 cr)

or [BTHX 5325](#) - Biomedical Ethics (3.0 cr)

or [BTHX 5400](#) - Intro Ethics in Hlth Policy (3.0 cr)

or [BTHX 5100](#) - Introduction to Clinical Ethics (3.0 cr)

or [BTHX 5000](#) - Topics in Bioethics (1.0 - 4.0 cr)

### Electives

Take elective credits from the following list, or other courses in consultation with the advisor, to complete the minimum credit requirement.

Take 5 or more credit(s) from the following:

•[BIOC 5213](#) - Selected Topics in Molecular Biology (3.0 cr)

•[BIOC 8401](#) - Ethics, Public Policy, and Careers in Molecular and Cellular Biology (1.0 cr)

•[BIOL 4004](#) - Cell Biology (3.0 cr)

•[BMEN 5041](#) - Tissue Engineering (3.0 cr)

•[BMEN 5351](#) - Cell Engineering (3.0 cr)

•[BMEN 5701](#) - Cancer Bioengineering (3.0 cr)

•[BTHX 5210](#) - Ethics of Human Subjects Research (3.0 cr)

•[BTHX 5325](#) - Biomedical Ethics (3.0 cr)

•[BTHX 5400](#) - Intro Ethics in Hlth Policy (3.0 cr)

•[CMB 5910](#) - Grantwriting: What Makes a Winning Proposal? (2.0 cr)

•[CSCI 5461](#) - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)

•[CSCI 5465](#) - Introduction to Computing for Biologists (3.0 cr)

•[GCD 4161](#) - Developmental Biology (3.0 cr)

•[GCD 5005](#) - Computer Programming for Biology (3.0 cr)

•[GCD 5036](#) - Molecular Cell Biology (3.0 cr)

•[GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)

•[GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)

•[GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)

•[GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)

•[MICA 8003](#) - Immunity and Immunopathology (4.0 cr)

•[MICA 8004](#) - Cellular and Cancer Biology (4.0 cr)

•[MICA 8014](#) - Small RNA Biology (2.0 cr)

•[MILI 6235](#) - Pharmaceutical Industry: Business and Policy (2.0 cr)

•[MILI 6726](#) - Medical Device Industry: Business and Public Policy (2.0 cr)

•[MILI 6990](#) - The Health Care Marketplace (2.0 cr)

•[MILI 6995](#) - Medical Industry Valuation Laboratory (2.0 cr)

•[NSC 8211](#) - Developmental Neurobiology (4.0 cr)

•[NSCI 4101](#) - Development of the Nervous System: Cellular and Molecular Mechanisms (3.0 cr)

•[NSCI 5101](#) - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)

•[PHCL 5110](#) - Introduction to Pharmacology (3.0 cr)

•[PHCL 5112](#) - A Graduate Toolkit I: An Introduction to the Scientific Research Lab (1.0 cr)

•[PHSL 5061](#) - Principles of Physiology for Biomedical Engineering (4.0 cr)

•[PHSL 5510](#) - Advanced Cardiac Physiology and Anatomy (2.0 - 3.0 cr)

•[PHSL 8242](#) - Professional Skills Development for Biomedical Scientists (2.0 cr)

•[PSY 5063](#) - Introduction to Functional MRI (3.0 cr)

•[PUBH 6450](#) - Biostatistics I (4.0 cr)

•[PUBH 6451](#) - Biostatistics II (4.0 cr)





### **Twin Cities Campus**

## **Stem Cell Biology Minor**

Stem Cell Institute

Medical School

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Stem Cell Biology Institute, 2001 6th Street SE, Mail Code 2873, Minneapolis, MN 55455-3007 (612-625-0602; fax: 612-624-2436)

Email: [scbgrad@umn.edu](mailto:scbgrad@umn.edu)

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The stem cell biology minor is available to PhD students in relevant programs such as MCDB&G, MiCaB, pharmacology, microbiology, bio-engineering, or a medical or veterinary medicine school program, and who have an interest in stem cell biology. It offers training in stem cell biology, which is a rapidly growing interdisciplinary field that rests on foundations provided by molecular, cellular, and developmental biology. Students will take lecture and seminar courses, interact with members of the Stem Cell Institute through participation in research seminar and journal clubs, and conduct stem cell research in the laboratory of a stem cell biology graduate program faculty member.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Applicants must be admitted to a Ph.D. program and obtain approval from the Stem Cell Biology director of graduate studies.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

In addition to course requirements, the student's research project must be done in the lab of a Stem Cell Biology faculty member; therefore, students must obtain approval from the Stem Cell Biology director of graduate studies prior to declaring the minor.

The minimum GPA for minor field coursework is 3.00.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Doctoral**

##### **Required Courses (5 credits)**

Take the following required courses on the A/F grade basis.

[SCB 5054](#) - Stem Cell Institute Research Seminar and Journal Club (2.0 cr)

[SCB 8181](#) - Stem Cell Biology (3.0 cr)

##### **Electives (7 credits)**



Select at least seven elective credits in consultation with the Stem Cell Biology director of graduate studies to complete the 12-credit minimum. Elective courses should be taken on the A/F grade basis. Courses required to meet the student's major field requirement cannot be applied to the minor.

Take 7 or more credit(s) from the following:

- [BIOC 5213](#) - Selected Topics in Molecular Biology (3.0 cr)
- [BIOC 8007](#) - Molecular Biology of DNA (2.0 cr)
- [BIOC 8008](#) - Molecular Biology of RNA (2.0 cr)
- [BIOC 8401](#) - Ethics, Public Policy, and Careers in Molecular and Cellular Biology (1.0 cr)
- [BMEN 5041](#) - Tissue Engineering (3.0 cr)
- [BMEN 5351](#) - Cell Engineering (3.0 cr)
- [BMEN 5701](#) - Cancer Bioengineering (3.0 cr)
- [BTHX 5000](#) - Topics in Bioethics (1.0 - 4.0 cr)
- [BTHX 5100](#) - Introduction to Clinical Ethics (3.0 cr)
- [BTHX 5210](#) - Ethics of Human Subjects Research (3.0 cr)
- [BTHX 5325](#) - Biomedical Ethics (3.0 cr)
- [BTHX 5400](#) - Intro Ethics in Hlth Policy (3.0 cr)
- [BTHX 8000](#) - Advanced Topics in Bioethics (1.0 - 4.0 cr)
- [CSCI 5461](#) - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- [CSCI 5465](#) - Introduction to Computing for Biologists (3.0 cr)
- [GCD 5005](#) - Computer Programming for Biology (3.0 cr)
- [GCD 5036](#) - Molecular Cell Biology (3.0 cr)
- [GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)
- [GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)
- [GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- [GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)
- [MICA 8003](#) - Immunity and Immunopathology (4.0 cr)
- [MICA 8004](#) - Cellular and Cancer Biology (4.0 cr)
- [MICA 8014](#) - Small RNA Biology (2.0 cr)
- [MILI 6235](#) - Pharmaceutical Industry: Business and Policy (2.0 cr)
- [MILI 6726](#) - Medical Device Industry: Business and Public Policy (2.0 cr)
- [MILI 6990](#) - The Health Care Marketplace (2.0 cr)
- [MILI 6995](#) - Medical Industry Valuation Laboratory (2.0 cr)
- [NSC 8211](#) - Developmental Neurobiology (4.0 cr)
- [PHCL 5110](#) - Introduction to Pharmacology (3.0 cr)
- [PHCL 5112](#) - A Graduate Toolkit I: An Introduction to the Scientific Research Lab (1.0 cr)
- [PHSL 8242](#) - Professional Skills Development for Biomedical Scientists (2.0 cr)
- [PSY 5063](#) - Introduction to Functional MRI (3.0 cr)
- [PUBH 6450](#) - Biostatistics I (4.0 cr)
- [PUBH 6451](#) - Biostatistics II (4.0 cr)



### *Twin Cities Campus*

## Surgery M.S. Surg.

*Surgery*

### Medical School

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Surgery, University of Minnesota, 420 Delaware Street S.E., MMC 195, Minneapolis, MN 55455 (612-625-3457)

Email: [alanpher@umn.edu](mailto:alanpher@umn.edu)

Website: <http://www.surgery.umn.edu/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 37
- This program requires summer semesters for timely completion.
- Degree: Master of Science in Surgery

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The general surgery residency program trains medical doctors for the practice of surgery and for academic positions. During residency, research trainees spend two to three years in either a basic science laboratory or in clinical translational surgery. The Department of Surgery offers supervised work in its experimental research laboratories, hospital, and outpatient departments.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

MD or graduate student in an applicable field.

Other requirements to be completed before admission:

Prospective students must be in the general surgery training program, with two to three clinical years of training completed; physicians interested in an advanced research degree; or individuals with relevant research education and experience. Non-physician applicants should confer with the director of graduate studies prior to applying to determine their potential for the MSSurg degree.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 27 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

#### **Core Coursework (18 credits)**

Take the following courses, in consultation with the advisor, for 18 credits. Take 4 credits each of SURG 8990, 8992, and 8994.

Alternative course credits can be applied to the core requirement only with approval of the director of graduate studies. All courses must be taken A/F, with minimum earned grade of B.

[PUBH 6301](#) - Fundamentals of Clinical Research (3.0 cr)

[SURG 8202](#) - Surgical Research (3.0 cr)

[SURG 8990](#) - Topics in Pancreatology (1.0 - 4.0 cr)

[SURG 8994](#) - Directed Readings (1.0 - 4.0 cr)

[SURG 8992](#) - Directed Research (2.0 - 4.0 cr)

#### **Biostatistics Requirement (8 credits)**

Both courses must be taken A/F with a minimum earned grade of B.

[PUBH 6450](#) - Biostatistics I (4.0 cr)



[PUBH 6451](#) - Biostatistics II (4.0 cr)

**Ethics Requirement (1 credit)**

Course must be taken A/F with minimum earned grade of B.

[PUBH 6742](#) - Ethics in Public Health: Research and Policy (1.0 cr)

**Thesis Credits (10 credits)**

Take at least 10 master's thesis credits.

[SURG 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### *Twin Cities Campus*

## Adult Health/Gerontological Clinical Nurse Specialist Postgraduate Certificate

School of Nursing

### School of Nursing

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Nursing, 5-160 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-625-7980; fax: 612-625-7727)

Email: [nursecerts@umn.edu](mailto:nursecerts@umn.edu)

Website: <http://www.nursing.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 21 to 34
- This program requires summer semesters for timely completion.
- Degree: Adlt Hlth/Geron Clnical Nurse Spec Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The postgraduate certificate program in nursing offers students with a doctor of nursing practice (DNP) or other graduate degree in a clinical nursing specialty area the opportunity to complete an additional area of study. Completion of required coursework and practice hours provides eligibility to take certification examinations.

### Accreditation

This program is accredited by Commission on Collegiate Nursing Education (CCNE).

### Program Delivery

This program is available:

- partially online (between 50% to 80% of instruction is online)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A DNP degree and coursework in 3 of the 5 following subjects: physiology, pathophysiology, pharmacology, pharmacotherapeutics, advanced physical assessment.

Other requirements to be completed before admission:

All applicants must have a current registered nurse license.

#### **Special Application Requirements:**

Applicants are required to submit transcripts from all institutions where post-secondary credit was earned, reference materials containing an Admission Reference Form and personal letter of reference from two separate individuals, two essays, a current curriculum vitae/resume, a current registered nurse license, and English language proficiency scores (if applicable). Application deadlines for this certificate are a priority deadline of November 1, with rolling admissions on a space-available basis until March 1.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Paper Based - Total Score: 586
- MELAB
  - Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

3.0 cumulative GPA is required. Please contact the School of Nursing for detailed information about the requirements for this certificate.

### Specialty Courses (21 Credits)

Complete the following required specialty courses for the certificate. NURS 6408 must be taken for 1 credit. NURS 6502 must be taken for 3 credits. NURS 7505 must be taken for 2 credits.

[NURS 6405](#) - Advanced Practice CNS Roles Across the Lifespan (3.0 cr)

[NURS 6406](#) - Advanced Practice CNS Roles Across the Lifespan: Practicum (1.0 cr)

[NURS 6407](#) - Advanced Nursing Care of Older Adults (3.0 cr)

[NURS 6408](#) - Advanced Nursing Care of Older Adults Practicum (1.0 - 2.0 cr)

[NURS 6501](#) - Assessment and Management of Health for Advanced Practice Nurses, I (3.0 cr)

[NURS 6502](#) - Assessment and Management of Health for Advanced Practice Nurses, II (2.0 - 3.0 cr)

[NURS 7406](#) - Advanced Nursing Practicum in Adult-Gerontology Health (2.0 cr)

[NURS 7505](#) - Assessment and Management of Health for Advanced Practice Nurses Practicum II (1.0 - 2.0 cr)

[NURS 7705](#) - The Adult and Gerontological Clinical Nurse Specialist in Acute Care (2.0 cr)

[NURS 7706](#) - Implementing the Role of the Clinical Nurse Specialist in Acute Care (1.0 cr)

### Advanced Practice Registered Nurse Core Courses (0 to 13 credits)

Completion of the following coursework is required for the post-graduate certificate program. Students who have not completed these courses or their equivalents prior to admission must do so to meet requirements. Consult with the Doctor of Nursing Practice Program Director to evaluate prior APRN coursework for equivalency. NURS 5229 must be taken for 4 credits.

[NURS 5200](#) - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)

[NURS 5222](#) - Advanced Human Physiology (2.0 cr)

[NURS 5226](#) - Advanced Human Pathophysiology (2.0 cr)

[NURS 5228](#) - Pharmacology for Advanced Practice Nursing (2.0 cr)

[NURS 5229](#) - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)



### *Twin Cities Campus*

## Adult/Gerontological Primary Care Nurse Practitioner Postgraduate Certificate

School of Nursing

### School of Nursing

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Nursing, 5-160 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-625-7980; fax: 612-625-7727)

Email: [nursecerts@umn.edu](mailto:nursecerts@umn.edu)

Website: <http://www.nursing.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 18 to 31
- This program requires summer semesters for timely completion.
- Degree: Adult/Gerontological Primary Care NP Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The postgraduate certificate program in nursing offers students with a doctor of nursing practice (DNP) or other graduate degree in a clinical nursing specialty area the opportunity to complete an additional area of study. Completion of required coursework and practice hours provides eligibility to take certification examinations.

### Accreditation

This program is accredited by Commission on Collegiate Nursing Education (CCNE).

### Program Delivery

This program is available:

- partially online (between 50% to 80% of instruction is online)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

DNP with coursework in the 3 of the 5 following subject areas: adv. physiology; adv. pathophysiology; pharmacology; pharmacotherapeutics; adv.health assessment

Other requirements to be completed before admission:

All applicants must have a current registered nurse license.

#### **Special Application Requirements:**

Applicants are required to submit transcripts from all institutions where post-secondary credit was earned, reference materials containing an Admission Reference Form and personal letter of reference from two separate individuals, two essays, a current curriculum vitae/resume, a current registered nurse license, and English language proficiency scores (if applicable). Application deadlines for this certificate are a priority deadline of November 1, with rolling admissions on a space available basis until March 1.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Paper Based - Total Score: 586
- MELAB
  - Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

A 3.00 cumulative GPA is required. Please contact the School of Nursing for detailed information about the requirements for this certificate.

### Specialty Courses (18 Credits)

Complete the following required specialty courses for the certificate. Take NURS 6305 for 2 credits; NURS 6408 for 2 credits; NURS 6502 for 3 credits; NURS 7504 for 1 credit; and NURS 7505 must be taken for 1 credit.

[NURS 6305](#) - Reproductive and Sexual Health Care (3.0 cr)

[NURS 6307](#) - Assessment and Management of Health for APNs Practicum III (1.0 cr)

[NURS 6407](#) - Advanced Nursing Care of Older Adults (3.0 cr)

[NURS 6408](#) - Advanced Nursing Care of Older Adults Practicum (1.0 - 2.0 cr)

[NURS 6501](#) - Assessment and Management of Health for Advanced Practice Nurses, I (3.0 cr)

[NURS 6502](#) - Assessment and Management of Health for Advanced Practice Nurses, II (2.0 - 3.0 cr)

[NURS 7406](#) - Advanced Nursing Practicum in Adult-Gerontology Health (2.0 cr)

[NURS 7504](#) - Assessment and Management of Health for Advanced Practice Nurses, Practicum I (1.0 - 2.0 cr)

[NURS 7505](#) - Assessment and Management of Health for Advanced Practice Nurses Practicum II (1.0 - 2.0 cr)

### Advanced Practice Registered Nurse Core Courses (0 to 13 Credits)

Completion of the following coursework is required for the post-graduate certificate program. Students who have not completed these courses or their equivalents prior to admission must do so to meet requirements. Consult with the Director of Nursing Practice Program Director to evaluate prior APRN coursework for equivalency. NURS 5229 must be taken for 4 credits.

[NURS 5200](#) - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)

[NURS 5222](#) - Advanced Human Physiology (2.0 cr)

[NURS 5226](#) - Advanced Human Pathophysiology (2.0 cr)

[NURS 5228](#) - Pharmacology for Advanced Practice Nursing (2.0 cr)

[NURS 5229](#) - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)





### **Twin Cities Campus**

## **Doctor of Nursing Practice D.N.P.**

School of Nursing

### **School of Nursing**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Office of Student Career & Advancement Services, 5-160 Weaver Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455 (612-625-7980; fax: 612-625-7727)

Email: [sonstudentinfo@umn.edu](mailto:sonstudentinfo@umn.edu)

Website: <http://www.nursing.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 39 to 100
- This program requires summer semesters for timely completion.
- Degree: Doctor of Nursing Practice

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Doctor of Nursing Practice (DNP) Program is offered as the post-baccalaureate with specialty (12 specialties). The School of Nursing also offers a post-master's DNP program for students who have completed a master's degree in a nursing practice specialty.

The DNP program is an innovative, practice-focused program that prepares students to be leaders in health care, develop quality improvement, and systems problem solving. It prepares nurses to create and lead new models of care delivery for communities locally, across the nation, and around the world. Students work with faculty who are leaders in their fields and on the cutting edge of nursing research and practice. These experts become mentors and guide students through the program. The unique, interdisciplinary core curriculum is divided into the following four areas.

1. DNP core - Includes science of nursing intervention, moral and ethical positions, research, statistics, program evaluation, evidence-based practice, epidemiology, informatics, leadership, health economics, health policy, and teaching and learning.
2. DNP specialty core - Prepares students for advanced clinical practice; includes physiology, pharmacology, pharmacotherapeutics, and advanced health assessment.
3. DNP specialization - Prepares graduates for certification in their chosen specialty by a national certifying body and includes:
  - a. Advanced clinical practice with specialty-specific courses for each of the areas of clinical specialization
  - b. Other specialization in innovation and leadership, informatics, and integrative health and healing
4. DNP project - Completed by all students in a three-semester sequence during which the project is planned, implemented, evaluated, and disseminated

The School of Nursing and the School of Public Health offer a DNP/MPH-Public Health Practice dual degree program. This dual degree option provides students with a unique opportunity to provide advanced nursing care as leaders of inter-professional health care teams, emphasizing population-focused practice, and quality improvement to impact patient outcomes.

### **Accreditation**

This program is accredited by Commission on Collegiate Nursing Education (CCNE).

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

The post-baccalaureate DNP specialty areas and post-master's DNP require an entry-level nursing degree (e.g. BSN, BAN, post-bacc certificate in nursing, or entry-level master of nursing).

A graduate degree is not required for admission to the post-baccalaureate DNP program.



Applicants for the post-master's DNP must hold a master's degree in a nursing practice specialty.

Other requirements to be completed before admission:

The required application process is available on the School of Nursing website at [www.nursing.umn.edu](http://www.nursing.umn.edu). Interviews are by invitation only and are not granted to all applicants. Application deadlines for the DNP program are available on the School of Nursing website.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Paper Based - Total Score: 586
- MELAB
  - Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#) (TOEFL, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

39 to 100 credits are required in the major.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Students MUST complete coursework according to the program plan appropriate for their term of admission and year plan. Any modifications to the program plan must be approved by the Specialty Coordinator/Faculty Advisor and Doctoral Programs Coordinator.

### Core Coursework

Students with a Master of Nursing (MN) degree earned prior to 2010 must take NURS 7600 for 4 credits, and complete the remaining core coursework for a total of 41 credits. Students with an MN degree earned between 2010 and 2014 must take NURS 7600 for 2 credits and complete the remaining core courses for a total of 39 credits. All core courses with the exception of NURS 7110 must be completed with the A-F grade base.

- NURS 5115 - Interprofessional Health Care Informatics (3.0 cr)
- NURS 6200 - Science of Nursing Intervention (3.0 cr)
- NURS 7000 - DNP Proseminar (1.0 cr)
- NURS 7100 - Quality Improvement and Implementation Science in Health Care (3.0 cr)
- NURS 7102 - Scholarly Dissemination and Advanced Professional Engagement (2.0 cr)
- NURS 7200 - Economics of Health Care (3.0 cr)
- NURS 7300 - Program Planning and Evaluation (3.0 cr)
- NURS 7400 - Health Policy Leadership (3.0 cr)
- NURS 7600 - Nursing Research and Evidence Based Practice (2.0 - 4.0 cr)
- NURS 7610 - System Leadership and Innovation (3.0 cr)
- NURS 7900 - Scholarly Teaching and Learning in Nursing (3.0 cr)
- NURS 6110 - Epidemiology in Nursing (2.0 cr)  
or PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)

Take 3 or more credit(s) from the following:

- NURS 7110 - NURS 7110 DNP Project Practicum (1.0 - 3.0 cr)

### Statistics

Complete at least 3 credits of graduate-level inferential statistics

- EPSY 5261 - Introductory Statistical Methods (3.0 cr)
- or PUBH 6414 - Biostatistical Literacy (3.0 cr)

**Joint- or Dual-degree Coursework:** Doctor of Nursing Practice/Master of Public Health - Public Health Practice (D.N.P./M.P.H.-Public Health Practice) Student may take a total of 14 credits in common among the academic programs.

## Program Sub-plans

Students are required to complete one of the following sub-plans.



Students may complete the program with more than one sub-plan.

### Adult Health/Gerontological Clinical Nurse Specialist

The DNP program with a specialty in adult health and gerontological nursing as a clinical nurse specialist (CNS) prepares clinical experts to provide advanced nursing care to adults and older adults in a variety of settings as well as leadership role as advanced practice nurses.

Graduates work as expert clinicians and consultants in acute care settings, nursing homes, transitional care, and specialty practices. The adult health and gerontological specialty offers leadership preparation for nurses desiring expertise in the management of complex health conditions, working with nurses and interdisciplinary teams and organizations to provide care and services for adults and older adults. Students ground their studies in the science of nursing interventions, moral/ethical issues, and nursing research. Practicum experiences are arranged to meet the individual needs of students while also meeting CNS competency, accreditation and certification requirements. In addition to completing core studies in the specialty, students also gain skills in evidence-based practice, program evaluation, informatics, teaching/learning, health economics, health care policy, and epidemiology.

### Required Specialty Coursework

Complete the following courses for at least 39 credits. 4 credits of NURS 5229 is required; 3 credits of NURS 6502 is required; 2 credits of NURS 7505 is required; 1 credit of NURS 6408; 3 credits of NURS 6501 is required for this specialty.

- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- NURS 5200 - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 5226 - Advanced Human Pathophysiology (2.0 cr)
- NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)
- NURS 5229 - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)
- NURS 6405 - Advanced Practice CNS Roles Across the Lifespan (3.0 cr)
- NURS 6406 - Advanced Practice CNS Roles Across the Lifespan: Practicum (1.0 cr)
- NURS 6407 - Advanced Nursing Care of Older Adults (3.0 cr)
- NURS 6408 - Advanced Nursing Care of Older Adults Practicum (1.0 - 2.0 cr)
- NURS 6501 - Assessment and Management of Health for Advanced Practice Nurses, I (3.0 cr)
- NURS 6502 - Assessment and Management of Health for Advanced Practice Nurses, II (2.0 - 3.0 cr)
- NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)
- NURS 7406 - Advanced Nursing Practicum in Adult-Gerontology Health (2.0 cr)
- NURS 7505 - Assessment and Management of Health for Advanced Practice Nurses Practicum II (1.0 - 2.0 cr)
- NURS 7705 - The Adult and Gerontological Clinical Nurse Specialist in Acute Care (2.0 cr)
- NURS 7706 - Implementing the Role of the Clinical Nurse Specialist in Acute Care (1.0 cr)

### Adult/Gerontological Primary Care Nurse Practitioner

The DNP program with a specialty in adult health and gerontological nursing as a nurse practitioner prepares nurses for leadership as advanced practice nurses and clinical experts to provide advanced nursing care to adults and elders in a variety of settings. This DNP program is for students who already hold a baccalaureate degree in nursing, and involves both coursework and practicum experiences, as well as a final internship where the student has the opportunity focus on a sub-specialty area (e.g. oncology, cardiology, palliative care), if desired. Graduates work in primary care/ambulatory care settings, hospitals, group practices of advanced practice gerontological nurses that manage care of adults and older adults in nursing homes, transitional care settings, assisted living, and specialty practices.

The adult health and gerontological specialty offers leadership preparation for nurses desiring expertise in advanced nursing assessment and management for health promotion and disease prevention, management of complex health conditions, and working with interdisciplinary teams to provide care and services for persons ranging from adolescents, adults, and older adults. Practicum experiences are arranged to meet the individual needs of students while also meeting accreditation and certification requirements.

### Required Specialty Coursework

Complete the following courses for 37 credits. Specialty requirements for Variable credit course: NURS 5229 = 4 credits; NURS 6305 = 3 credits; NURS 7504 = 1 credit; NURS 7505 = 1 credit; NURS 6502 = 3 credits; NURS 6408 = 2 credits

- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- NURS 5200 - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 5226 - Advanced Human Pathophysiology (2.0 cr)
- NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)
- NURS 5229 - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)
- NURS 6305 - Reproductive and Sexual Health Care (3.0 cr)
- NURS 6307 - Assessment and Management of Health for APNs Practicum III (1.0 cr)
- NURS 6407 - Advanced Nursing Care of Older Adults (3.0 cr)
- NURS 6408 - Advanced Nursing Care of Older Adults Practicum (1.0 - 2.0 cr)
- NURS 6501 - Assessment and Management of Health for Advanced Practice Nurses, I (3.0 cr)
- NURS 6502 - Assessment and Management of Health for Advanced Practice Nurses, II (2.0 - 3.0 cr)
- NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)



- NURS 7406 - Advanced Nursing Practicum in Adult-Gerontology Health (2.0 cr)
- NURS 7504 - Assessment and Management of Health for Advanced Practice Nurses, Practicum I (1.0 - 2.0 cr)
- NURS 7505 - Assessment and Management of Health for Advanced Practice Nurses Practicum II (1.0 - 2.0 cr)

### Women's Health/Gender-Related Nurse Practitioner

The DNP program with a specialty in women's health prepares nurses for leadership as advanced practice nurses.

Clinical experience is offered in primary care, women's health, and specialty practice areas, such as oncology and reproductive endocrinology. Students ground their studies in the science of nursing intervention, moral/ethical issues, and nursing research. They then focus on courses that examine the basis of assessment and intervention for adolescent and adult populations with an emphasis on adolescent and adult women. Practicum experiences are arranged to meet the individual needs of students while also meeting accreditation and certification requirements. In addition to completing core studies in the specialty, students also gain skills in evidence-based practice, program evaluation, informatics, teaching/learning, health economics, health care policy, and epidemiology. A final project that is a systematic investigation of a practice problem is planned, implemented, and completed during the curriculum.

### Required Specialty Coursework

Complete the following courses for at least 38 credits. Courses with Variable credit requirements for this specialty: NURS 5229 = 3 credits; NURS 6305 = 3 credits; NURS 6925 = 3 credits.

- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- NURS 5200 - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 5226 - Advanced Human Pathophysiology (2.0 cr)
- NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)
- NURS 5229 - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)
- NURS 6213 - Reproductive Healthcare for Patients with Complex Conditions (2.0 cr)
- NURS 6214 - Reproductive Health Care for Patients with Complex Conditions Practicum (2.0 cr)
- NURS 6305 - Reproductive and Sexual Health Care (3.0 cr)
- NURS 6306 - Reproductive and Sexual Health Practicum (1.0 cr)
- NURS 6501 - Assessment and Management of Health for Advanced Practice Nurses, I (3.0 cr)
- NURS 6925 - Advanced Concepts in Women's Health Care I (1.0 - 3.0 cr)
- NURS 6926 - Advanced Concepts in Women's Health for WHNP Practicum I (1.0 cr)
- NURS 6927 - Advanced Concepts in Women's Health II (3.0 cr)
- NURS 6928 - Adv Concepts in Women's Health II WHNP Prac (1.0 cr)
- NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)
- NURS 7310 - WHNP Clinical and Professional Integration (2.0 cr)

### Nurse Anesthesia

This sub-plan is optional and does not fulfill the sub-plan requirement for this program.

The nurse anesthesia area of study prepares registered nurses to become Certified Registered Nurse Anesthetists (CRNAs) who are prepared for nurse anesthesia practice at the highest level. Graduates will possess expertise in general and regional anesthesia techniques and will be prepared to provide leadership in the practice setting. The nurse anesthesia area of study is fully accredited by the Council on Accreditation of Nurse Anesthesia Education Programs. The program was the first nurse anesthesia program in the US to be accredited to offer the entry-level DNP.

With the Minneapolis VA Medical Center serving as the primary clinical site for the program, the University of Minnesota nurse anesthesia students rotate to several urban and rural clinical sites, which offer a broad spectrum of practice experiences.

Nurse anesthesia students complete the requirements for the DNP degree, as well as the requirements to take the National Certification Exam for nurse anesthetists.

### Required Specialty Coursework

Complete the following courses for at least 61 credits.

- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 5226 - Advanced Human Pathophysiology (2.0 cr)
- NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)
- NURS 5230 - Pharmacotherapeutics for Nurse Anesthesia (4.0 cr)
- NURS 6895 - Adult Acute Care Holistic Health Assessment and Wellness (2.0 cr)
- NURS 6900 - Introduction to Principles of Anesthesia (4.0 cr)
- NURS 6901 - Basic Nurse Anesthesia Principles (3.0 cr)
- NURS 6902 - Nurse Anesthesia Care: Cardiothoracic and Vascular Diseases (2.0 cr)
- NURS 6903 - Nurse Anesthesia Care: Special Populations Across the Lifespan (2.0 cr)
- NURS 6910 - Nurse Anesthesia Clinical Integration (3.0 cr)
- NURS 6911 - Basic Nurse Anesthesia Principles Practicum I (2.0 cr)
- NURS 6912 - Nurse Anesthesia Care: Cardiothoracic and Vascular Disease Practicum III (3.0 cr)



[NURS 6913](#) - Nurse Anesthesia Care of the Special Population and Across the Lifespan Practicum IV (4.0 cr)  
[NURS 6914](#) - Basic Nurse Anesthesia Principles Practicum II (3.0 cr)  
[NURS 7004](#) - Advanced Nurse Anesthesia Practicum V (5.0 cr)  
[NURS 7005](#) - Advanced Nurse Anesthesia Practicum VI (5.0 cr)  
[NURS 7006](#) - Advanced Nurse Anesthesia Practicum VII (5.0 cr)  
[NURS 7202](#) - Moral and Ethical Positions and Actions in Nursing (2.0 cr)  
[PHSL 5115](#) - Clinical Physiology I (3.0 cr)  
[PHSL 5116](#) - Clinical Physiology II (3.0 cr)

### Family Nurse Practitioner

The DNP program with a specialty in the family nurse practitioner (FNP) area of study prepares advanced practice nurses for leadership in the provision of health care to individuals and families across the lifespan. The program is for students who already hold a baccalaureate degree in nursing, and involves both coursework and clinical practicums.

The FNP area of study offers an academic-practice program to develop nurse leaders for health promotion and clinical management of health conditions in individuals across the lifespan within the context of their families and environment. Students ground their studies in the science of nursing intervention, evidence-based practice, scientific knowledge, moral/ethical issues, and nursing research. They apply skills focused on evaluating the basis of assessment and intervention for families and individuals of all ages and backgrounds. Faculty and staff within the School of Nursing arrange clinical practicum experiences to provide practice opportunities with diverse populations and settings and to meet the individual needs of students while also meeting national accreditation and certification requirements. In addition to completing core studies in the specialty population, students also gain skills in program evaluation, informatics, teaching/learning, health economics, health care policy, and epidemiology. During the curriculum, students design, implement and complete a final project that is a systematic investigation of a practice.

### Required Specialty Coursework

Completion of the courses for 41 credits is required for this specialty. Specialty Credit requirements for courses with variable credits:

NURS 5229 = 4 credits; NURS 6305 = 3 credits; NURS 6502 = 3 credits; NURS 7504 = 1 credit; NURS 7505 = 1 credit

[CSPH 5101](#) - Introduction to Integrative Healing Practices (3.0 cr)  
[NURS 5200](#) - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)  
[NURS 5222](#) - Advanced Human Physiology (2.0 cr)  
[NURS 5226](#) - Advanced Human Pathophysiology (2.0 cr)  
[NURS 5228](#) - Pharmacology for Advanced Practice Nursing (2.0 cr)  
[NURS 5229](#) - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)  
[NURS 6102](#) - Family Health Theory (2.0 cr)  
[NURS 6305](#) - Reproductive and Sexual Health Care (3.0 cr)  
[NURS 6501](#) - Assessment and Management of Health for Advanced Practice Nurses, I (3.0 cr)  
[NURS 6502](#) - Assessment and Management of Health for Advanced Practice Nurses, II (2.0 - 3.0 cr)  
[NURS 7202](#) - Moral and Ethical Positions and Actions in Nursing (2.0 cr)  
[NURS 7501](#) - Health Care of Children for the Family Nurse Practitioner Practicum (1.0 cr)  
[NURS 7503](#) - Reproductive Health Care of Women Practicum for Family Nurse Practitioners (1.0 cr)  
[NURS 7504](#) - Assessment and Management of Health for Advanced Practice Nurses, Practicum I (1.0 - 2.0 cr)  
[NURS 7505](#) - Assessment and Management of Health for Advanced Practice Nurses Practicum II (1.0 - 2.0 cr)  
[NURS 7506](#) - Family Practice Practicum III: Assessment and Management of Health for the Family Nurse Practitioner (1.0 cr)  
[NURS 7507](#) - Assessment Management of Health Practicum IV: Community Health Leadership for Family Nurse Prac (1.0 cr)  
[NURS 7508](#) - Health Care of the Elderly for the Family Nurse Practitioner Practicum (1.0 cr)  
[NURS 7509](#) - Assessment and Management of Health Practicum VI: Primary Care for the Family Nurse Practitioner (1.0 cr)  
[NURS 7515](#) - Health Care of Children for the Family Nurse Practitioner: Well Child Care (1.0 cr)  
[NURS 7516](#) - Health Care of Children for the Family Nurse Practitioner: Acute and Chronic Management (2.0 cr)  
[NURS 7518](#) - Health Care of the Elder Patient for the Family Nurse Practitioner (1.0 cr)

### Health Innovation and Leadership

Health care is delivered today in diverse settings, by an expanding workforce and with extraordinary opportunities for nurses to lead, whether through formal leadership positions or through personal advocacy, in traditional settings, or in emerging sites. This requires an individual who can think broadly and embrace a global perspective; who embraces diversity in all its forms, including diversity of thought; who is curious and never satisfied with the status quo; who stimulates new ways of thinking and solutions which open up possibilities for action; who bases action on informed practice gained from multiple ways of knowing; who engages in critical thinking, and learns from other thought leaders; who inspires and creates needed change within a particular environment; who can work effectively with a variety of individuals and within disparate groups; and who can create healing environments within which others can do their best work.

The DNP, with a focus on health innovation and leadership, prepares nurses to function effectively as leaders in traditional and contemporary settings. The goal is to prepare a leader who can work well in the current environment while promoting change and improvement. Students in the program utilize a combination of learning strategies, readings, reflections, and independent learning experiences. Seminars will enable students and faculty to discuss relevant issues and share expertise.



Students must complete the required specialty courses for 34 credits and at least 5 credits of electives to achieve 39 graduate level credits to complete the specialty. Credit requirements for this specialty for courses with variable credits: NURS 6704 = 1 credit; NURS 6706 = 2 credits; NURS 7605 = 2 credits. Students choose 5 credits of elective graduate level coursework in consultation with their faculty advisor.

### Required Coursework

Completion of the following courses for at least 39 credits.

- CSPH 5711 - Optimal Healing Environments (3.0 cr)
- HUMF 5874 - Service Design: Designing complex systems to improve service delivery (4.0 cr)
- NURS 6600 - Health Systems and Care Models (3.0 cr)
- NURS 6702 - Nursing Leadership Seminar: Introduction to Innovation and Leadership (3.0 cr)
- NURS 6703 - Nursing Leadership Seminar: Organizational Culture and Leadership (2.0 cr)
- NURS 6704 - Nursing Leadership Practicum: Organizational Culture and Leadership (1.0 - 2.0 cr)
- NURS 6705 - Nursing Leadership Seminar: Quality and Change Management (2.0 cr)
- NURS 6706 - Nursing Leadership Practicum: Quality and Change Management (1.0 - 2.0 cr)
- NURS 6707 - Health Care Design and Innovation Practicum (2.0 cr)
- NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)
- NURS 7604 - Executive Leadership Seminar: Boundary Spanning Leadership (2.0 cr)
- NURS 7605 - Executive Leadership Practicum: Boundary Spanning Leadership (1.0 - 2.0 cr)
- NURS 7606 - Relationship-Based Leadership and Management (3.0 cr)
- NURS 7608 - Health Care Finance and Resource Management (3.0 cr)

### Specialty Electives

Choose 5 credits of elective coursework in collaboration with faculty advisor. Additional selections permitted with approval from the faculty advisor.

Take 5 or more credit(s) from the following:

- CSPH 5118 - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)
- NURS 5812 - Global Health Through Study Abroad (1.0 - 2.0 cr)
- GCC 5031 - The Global Climate Challenge: Creating an Empowered Movement for Change [CIV] (3.0 cr)
- CSPH 5805 - Wellbeing in the Workplace (3.0 cr)
- CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)
- CSPH 5807 - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)
- CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6100 - Topics: Environmental Health (1.0 - 4.0 cr)

### Nursing Informatics

The nursing informatics (NI) specialty area prepares graduates with knowledge and skills necessary for leadership roles in health and nursing informatics to address the issues for consumers, clinical providers, and public health for processing and managing information through the use of various technologies. A wide array of courses throughout the University of Minnesota accompany nursing offerings, which offers students the opportunity to strengthen their disciplinary and interdisciplinary expertise.

With increasing demand for computerizing health information, graduates of the nursing informatics specialty are well positioned to assume leadership roles in nursing and health informatics field. The NI area of study provides knowledge and scholarship complemented by clinical experiences in the following areas:

Systems analysis and design  
Knowledge representation and interoperability  
Clinical decision support and evidence-based practice  
Human factors and usability  
Leadership and health informatics  
Consumer, clinical provider, and population health informatics  
Health policy leadership  
Development and project management of health informatics projects  
Program evaluation  
Organization and administration of health services  
Ethical foundations of nursing  
Applied research

### Required Specialty Coursework

Complete the following courses and at least 28 credits:

- CSPH 5711 - Optimal Healing Environments (3.0 cr)
- NURS 5611 - Database Principles for Healthcare (2.0 cr)
- NURS 6105 - Systems Analysis and Design (3.0 cr)
- NURS 7051 - Data Science for Healthcare (2.0 cr)
- NURS 7052 - Data Science for Healthcare Practicum (1.0 cr)



NURS 7105 - Knowledge Representation and Interoperability (2.0 cr)  
NURS 7106 - Knowledge Representation and Interoperability Practicum (2.0 cr)  
NURS 7108 - Population Health Informatics (2.0 cr)  
NURS 7109 - Population Health Informatics Practicum (2.0 cr)  
NURS 7113 - Clinical Decision Support: Theory (2.0 cr)  
NURS 7114 - Clinical Decision Support Practicum (2.0 cr)  
NURS 7118 - Human Factors and Human-Computer Interaction in Health Informatics (3.0 cr)  
NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)

### Integrative Health and Healing

The integrative health and healing specialty area prepares graduates with skills necessary for working with individuals, families, communities, and health systems in developing holistic approaches to health promotion, disease prevention, and chronic disease management, with a special emphasis on managing lifestyle changes and incorporating the use of complementary therapies. Graduates are prepared to work in diverse settings including hospitals, outpatient settings, health plans, corporate and community organizations, and in private practice. A wide array of courses are available which offer students the opportunity to strengthen their disciplinary and interdisciplinary expertise. Through a collaboration with the Center for Spirituality and Healing, students can opt to concurrently earn a graduate certificate in integrative therapies and healing practices, including a focus in health coaching.

The integrative health and healing area of study provides a foundation of knowledge and practical experiences in the following areas:

- Optimal healing environments
- Botanical medicine
- Clinical aromatherapy
- Mind/body healing
- Functional nutrition
- Energy healing
- Health coaching
- Self-care
- Advanced integrative health and healing skills and program planning
- Applied research

Students choosing to complete coursework part-time are well accommodated by the curriculum.

Completion of 40 graduate level credits is required for the specialty - 38 credits of required coursework and 2 credits of elective coursework.

### Required Specialty Coursework

Complete the following courses for at least 39 credits.

CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)  
CSPH 5226 - Advanced Meditation: Body, Brain, Mind, and Universe (1.0 cr)  
CSPH 5313 - Acupressure (1.0 cr)  
CSPH 5423 - Botanical Medicines: Foundations and Practical Applications (1.0 cr)  
CSPH 5431 - Functional Nutrition: An Expanded View of Nutrition, Chronic Disease, and Optimal Health (2.0 cr)  
CSPH 5503 - Aromatherapy Fundamentals (1.0 cr)  
CSPH 5535 - Reiki Healing (1.0 cr)  
CSPH 5536 - Advanced Reiki Healing: Level II (1.0 cr)  
CSPH 5631 - Healing Imagery I (2.0 cr)  
CSPH 5701 - Fundamentals of Health Coaching I (4.0 cr)  
CSPH 5711 - Optimal Healing Environments (3.0 cr)  
NURS 5200 - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)  
NURS 5222 - Advanced Human Physiology (2.0 cr)  
NURS 5226 - Advanced Human Pathophysiology (2.0 cr)  
NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)  
NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)  
NURS 7209 - Integrative Nursing I (1.0 cr)  
NURS 7210 - Integrative Nursing Practicum I (1.0 cr)  
NURS 7211 - Integrative Nursing Didactic II (1.0 cr)  
NURS 7212 - Integrative Nursing Practicum II (2.0 cr)  
NURS 7214 - Integrative Health and Healing III (1.0 cr)  
NURS 7215 - Integrative Health and Healing Practicum III (2.0 cr)

Complete one of the following course options

CSPH 5102 - Art of Healing: Self as Healer (1.0 cr)  
or CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)

### Specialty Electives

Additional course options may be available with faculty advisor approval.

Take 2 or more credit(s) from the following:



- CSPH 5000 - Explorations in Integrative Therapies and Healing Practices (1.0 - 4.0 cr)
- CSPH 5111 - Ways of Thinking about Health (2.0 cr)
- CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)
- CSPH 5121 - Whole Systems Healing: Health and the Environment (2.0 cr)
- CSPH 5201 - Spirituality and Resilience (2.0 cr)
- CSPH 5212 - Peacebuilding Through Mindfulness: Transformative Dialogue in the Global Community (3.0 cr)
- CSPH 5215 - Forgiveness and Healing: A Journey Toward Wholeness (3.0 cr)
- CSPH 5225 - Meditation: Integrating Body and Mind (2.0 cr)
- CSPH 5311 - Introduction to Traditional Chinese Medicine (2.0 cr)
- CSPH 5315 - Traditional Tibetan Medicine: Ethics, Spirituality, and Healing (2.0 cr)
- CSPH 5317 - Yoga: Ethics, Spirituality, and Healing (2.0 cr)
- CSPH 5318 - Tibetan Medicine, Ayurveda, and Yoga in India (4.0 cr)
- CSPH 5319 - Yoga and Ayurveda in India (4.0 cr)
- CSPH 5331 - Foundations of Shamanism and Shamanic Healing (2.0 cr)
- CSPH 5343 - Ayurveda Medicine: The Science of Self-healing (2.0 cr)
- CSPH 5401 - People, Plants, and Drugs: Introduction to Ethnopharmacology (3.0 cr)
- CSPH 5423 - Botanical Medicines: Foundations and Practical Applications (1.0 cr)
- CSPH 5521 - Therapeutic Landscapes (3.0 cr)
- CSPH 5522 - Therapeutic Horticulture (3.0 cr)
- CSPH 5523 - Applications in Therapeutic Horticulture (2.0 cr)
- CSPH 5541 - Emotional Healing and Happiness: Eastern and Western Approaches to Transforming the Mind (2.0 cr)
- CSPH 5555 - Introduction to Body and Movement-based Therapies (2.0 cr)
- CSPH 5561 - Overview of the Creative Arts in Health and Healing (2.0 cr)
- CSPH 5601 - Music, Health and Healing (2.0 cr)
- CSPH 5605 - Movement and Music for Well-being and Healing (2.0 cr)
- CSPH 5641 - Animals in Health Care: The Healing Dimensions of Human/Animal Relationships (3.0 cr)
- CSPH 5642 - Nature Heals: An Introduction to Nature-Based Therapeutics (3.0 cr)
- CSPH 5643 - Horse as Teacher: Intro to Nature-Based Therapeutics Equine-Assisted Activities & Therapies (EAAT) (3.0 cr)
- CSPH 5805 - Wellbeing in the Workplace (3.0 cr)
- CSPH 6000 - Integrative Therapies and Healing Practices Topics (1.0 - 4.0 cr)
- CSPH 8101 - Critiquing and Synthesizing Complementary and Alternative Healing Practices (CAHP) Research (2.0 cr)
- CSPH 8191 - Independent Study in Integrative Therapies and Healing Practices (1.0 - 6.0 cr)

### Nurse Midwifery

This program combines academic preparation with clinical skills for the independent management of health care for women/individuals seeking midwifery care and newborns. Further, students receive additional academic preparation in health care policy, economics, evidence-based practice, evaluation and informatics, and complete a systems change project while in the program. DNP midwifery graduates will be prepared to more quickly fulfill leadership roles in the health care setting. Courses are offered in a web-based format, with multi-day, on-campus seminars approximately three to four times per semester, in Minneapolis. By taking the courses in an online format, students may complete the midwifery program without having to relocate. Trips to campus to interact with faculty and other students allow for development of a professional learning community and enhance professional socialization. Midwifery clinical sites are used in or near a student's home community if available. Travel may be necessary depending on available midwifery practice locations. The online program is primarily geared to students in the five-state Upper Midwest region of Minnesota, Iowa, South Dakota, North Dakota, and Wisconsin. Nurse-midwives assist women/individuals seeking midwifery care, newborns and families to promote and maintain health, and to facilitate optimal individual and family integrity in the in the context of culture and community.

Completion of the following courses and at least 40 credits is required. NURS 5505 is required for students without labor and delivery experience as a Registered Nurse. Specialty credit requirements for courses with variable credits: NURS 5229 = 3 credits; NURS 6305 = 3 credits; NURS 6925 = 3 credits; NURS 6308 = 2 credits

### Required Specialty Coursework

Complete the following courses for at least 41 credits.

- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- NURS 5200 - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 5226 - Advanced Human Pathophysiology (2.0 cr)
- NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)
- NURS 5229 - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)
- NURS 6210 - Midwifery Care of the Childbearing Family (3.0 cr)
- NURS 6211 - Midwifery Care of the Childbearing Family Practicum (2.0 cr)
- NURS 6213 - Reproductive Healthcare for Patients with Complex Conditions (2.0 cr)
- NURS 6214 - Reproductive Health Care for Patients with Complex Conditions Practicum (2.0 cr)
- NURS 6305 - Reproductive and Sexual Health Care (3.0 cr)
- NURS 6306 - Reproductive and Sexual Health Practicum (1.0 cr)
- NURS 6308 - Women's Primary Care Practicum (1.0 - 2.0 cr)





- NURS 6501 - Assessment and Management of Health for Advanced Practice Nurses, I (3.0 cr)
- NURS 6925 - Advanced Concepts in Women's Health Care I (1.0 - 3.0 cr)
- NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)
- NURS 7213 - Midwifery Clinical and Professional Integration (3.0 cr)

#### Labor and Delivery Experience

Students are required to complete NURS 5505 if they do not have labor and delivery experience as Registered Nurse

- NURS 5505 - Assessment and Support of Women in Labor (2.0 cr)

#### Pediatric Clinical Nurse Specialist

Students who pursue the pediatric clinical nurse specialist (PCNS) specialty area take core courses in nursing theory, moral/ethical issues, and research. They acquire skills in health assessment, intervention, and evaluation. They examine the care of children and families with special health care needs. They focus on planning and implementing programs to improve quality of care for children with chronic and complex illnesses. As the population of children with special health care needs continues to increase, there is likely to be a greater demand for clinical experts and leaders in pediatric nursing. The PCNS area of study is supported by the Center for Children with Special Health Care Needs.

PCNS coursework includes supervised clinical experiences. Efforts are made to provide students with clinical settings within their geographical area. Clinical courses are directed by certified faculty and supervised by clinical nurse specialist preceptors. The PCNS area of study can be completed in a two-year (full-time) or three-year (part-time) sequence.

PCNSs work in collaboration with health care teams in a variety of settings to facilitate quality care for children across the continuum of care settings. They function as clinical experts in the planning, implementation, and evaluation of patient care standards. They provide direct care, oversee staff, patient and family education, participate in clinical research, and develop programs specific to the needs of children.

#### Required Specialty Coursework

Completion of the courses for 40 credits. Specialty credit requirements for courses with variable credits: NURs 5229 = 3 credits; NURS 6921 = 1 credit

- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- NURS 5200 - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 5226 - Advanced Human Pathophysiology (2.0 cr)
- NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)
- NURS 5229 - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)
- NURS 6102 - Family Health Theory (2.0 cr)
- NURS 6405 - Advanced Practice CNS Roles Across the Lifespan (3.0 cr)
- NURS 6406 - Advanced Practice CNS Roles Across the Lifespan: Practicum (1.0 cr)
- NURS 6519 - Advanced Pediatric Assessment (1.0 cr)
- NURS 6920 - Primary Care: Assessment of Health and Care of Well Children (3.0 cr)
- NURS 6921 - Assessment of Health and Care of Well Children: Primary Care Practicum (1.0 - 2.0 cr)
- NURS 6924 - Assessment and Interventions for Children and Youth With Special Health Care Needs (2.0 cr)
- NURS 6929 - Advanced Nursing Care of Children with Acute Illness; Practicum for PCNS (2.0 cr)
- NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)
- NURS 7925 - Systems of Care for Children and Youth With Special Health Care Needs Practicum (2.0 cr)
- NURS 7926 - Advanced Assessment, Intervention in Families of Children and Youth With Special Health Care Needs (2.0 cr)
- NURS 7927 - Adv Assessment, Intervention in Families of Children and Youth With Special Health Care Needs Prac (1.0 cr)
- OLPD 5356 - Disability Policy and Services (3.0 cr)

#### Pediatric Nurse Practitioner - Primary Care

The pediatric nurse practitioner (PNP) area of study incorporates theory and clinical courses to prepare students to provide comprehensive care to children and their families. Most students elect to complete the children with special health care needs (CSHCN) leadership track by taking additional courses which are supported by the Center for Children with Special Health Care Needs.

Coursework includes nursing theory, moral/ethical issues, research, child assessment, management of childhood illnesses, and health policy. Courses are taught by faculty from the School of Nursing, School of Public Health, the Institute of Child Development, Family Social Science, the Medical School, and the Institute of Community Integration in the College of Education.

Supervised clinical experience is incorporated in the program. Efforts are made to meet students' individual goals and to provide experiences in their geographic area. Clinical experiences are available in interdisciplinary settings such as primary care, home care, schools, specialty clinics, community agencies, the legislature, and the Minnesota Department of Health.

At the completion of the program, students are eligible to take the Pediatric Nurse Practitioner certification examinations offered by the American Nurses Credentialing Center or the National Certification Board of Pediatric Nurse Practitioners and Nurses. Students in the CSHCN track are eligible for certification from the Institute on Community Integration.



### Required Specialty Coursework

Completion of the following courses for at least 40 credits is required. Specialty credit requirements for variable credit courses: NURS 5229 = 3 credits; NURS 6921 = 2 credits

- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- NURS 5200 - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 5226 - Advanced Human Pathophysiology (2.0 cr)
- NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)
- NURS 5229 - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)
- NURS 6102 - Family Health Theory (2.0 cr)
- NURS 6519 - Advanced Pediatric Assessment (1.0 cr)
- NURS 6920 - Primary Care: Assessment of Health and Care of Well Children (3.0 cr)
- NURS 6921 - Assessment of Health and Care of Well Children: Primary Care Practicum (1.0 - 2.0 cr)
- NURS 6922 - Primary Care: Assessment and Management of Common Conditions Affecting Children (3.0 cr)
- NURS 6923 - Primary Care Practicum: Assessment and Management of Common Conditions Affecting Children (2.0 cr)
- NURS 6924 - Assessment and Interventions for Children and Youth With Special Health Care Needs (2.0 cr)
- NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)
- NURS 7925 - Systems of Care for Children and Youth With Special Health Care Needs Practicum (2.0 cr)
- NURS 7926 - Advanced Assessment, Intervention in Families of Children and Youth With Special Health Care Needs (2.0 cr)
- NURS 7927 - Adv Assessment, Intervention in Families of Children and Youth With Special Health Care Needs Prac (1.0 cr)
- OLPD 5356 - Disability Policy and Services (3.0 cr)

### Psychiatric-Mental Health Nurse Practitioner

Graduate studies in psychiatric-mental health nursing prepare nurses to assume clinical nurse specialist roles with an emphasis on providing direct patient care to persons with major mental disorders and their families. Coursework focuses on the development of advanced practice nursing knowledge and skills required to provide both psychotherapeutic and biological interventions for the management of acute and chronic psychiatric symptoms with a variety of patients in diverse settings. Coursework integrates extant theories and research in the study of advanced health assessment, psychopathology assessment, psychopharmacology, and individual family and group therapy within various community and institutional systems.

Clinical emphasis is on secondary and tertiary psychiatric interventions and outcomes within a managed care context. Students are clinically precepted by certified psychiatric-mental health clinical nurse specialists. Clinical experiences are available in outpatient clinics, community mental health centers, hospitals, schools, and home care agencies. Full-time or part-time students may enroll in the area of study. Current psychiatric nursing experience is strongly encouraged.

Graduates will be academically prepared to take the American Nurses Credentialing Center (ANCC) certification examination for certified specialists in psychiatric-mental health nursing, after obtaining additional required post-master's clinical hours and supervision.

Completion of 42 credits is required for the specialty - 39 credits of required specialty coursework and 3 credits of complementary alternative medicine elective coursework.

### Required Specialty Coursework

Completion of the following courses for at least 39 credits. Specialty requirements for courses with variable credits: NURS 5229 = 3 credits

- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- NURS 5200 - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 5225 - Psychopharmacology Advanced Practice Psychiatric/Mental Health Nursing (3.0 cr)
- NURS 5226 - Advanced Human Pathophysiology (2.0 cr)
- NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)
- NURS 5229 - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)
- NURS 6102 - Family Health Theory (2.0 cr)
- NURS 6504 - Assessing, Managing Psychiatric Disorders in Adv Practice Psychiatric-Mental Health Nursing (2.0 cr)
- NURS 6505 - PMH/APN Prac II: Assessing, Managing Psychiatric Disorders in Adv Prac Psychiatric-Mental Health Nurs (2.0 cr)
- NURS 6602 - PMH Advanced Practice Nursing: Group as a Health Care Intervention (2.0 cr)
- NURS 6603 - PMH APN Practicum IV: Group as a Health Care Intervention (2.0 cr)
- NURS 6604 - Foundations for Integrative Mental Health and Psychiatric Advanced Practice Nursing (2.0 cr)
- NURS 6605 - Psychiatric/Mental Health Advanced Nursing Practice Practicum I (1.0 cr)
- NURS 6802 - Psychiatric/Mental Health Advance Practice Nursing: Psychotherapy with Individuals and Families (2.0 cr)
- NURS 6803 - Psychiatric/Mental Health Adv Prac Nurs Practicum III: Psychotherapy With Individuals, Families (1.0 cr)
- NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)
- NURS 7612 - Psychiatric/Mental Health Advanced Practice Nursing: Professional Seminar (1.0 cr)
- NURS 7613 - Psychiatric/Mental Health Advanced Practice Nursing: Practicum V (2.0 cr)

### Complimentary Alternative Medicine Electives

Elective coursework is required and chosen in consultation with faculty advisors. Additional options may be permitted with faculty



advisor approval.

Take 3 or more credit(s) from the following:

- CSPH 5102 - Art of Healing: Self as Healer (1.0 cr)
- CSPH 5111 - Ways of Thinking about Health (2.0 cr)
- CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)
- CSPH 5311 - Introduction to Traditional Chinese Medicine (2.0 cr)
- CSPH 5315 - Traditional Tibetan Medicine: Ethics, Spirituality, and Healing (2.0 cr)
- CSPH 5317 - Yoga: Ethics, Spirituality, and Healing (2.0 cr)
- CSPH 5313 - Acupressure (1.0 cr)
- CSPH 5331 - Foundations of Shamanism and Shamanic Healing (2.0 cr)
- CSPH 5401 - People, Plants, and Drugs: Introduction to Ethnopharmacology (3.0 cr)
- CSPH 5421 - Botanical Medicines in Integrative Healthcare (3.0 cr)
- CSPH 5431 - Functional Nutrition: An Expanded View of Nutrition, Chronic Disease, and Optimal Health (2.0 cr)
- CSPH 5503 - Aromatherapy Fundamentals (1.0 cr)
- CSPH 5523 - Applications in Therapeutic Horticulture (2.0 cr)
- CSPH 5535 - Reiki Healing (1.0 cr)
- CSPH 5536 - Advanced Reiki Healing: Level II (1.0 cr)
- CSPH 5555 - Introduction to Body and Movement-based Therapies (2.0 cr)
- CSPH 5631 - Healing Imagery I (2.0 cr)
- CSPH 5641 - Animals in Health Care: The Healing Dimensions of Human/Animal Relationships (3.0 cr)
- CSPH 5121 - Whole Systems Healing: Health and the Environment (2.0 cr)
- CSPH 5201 - Spirituality and Resilience (2.0 cr)
- CSPH 5318 - Tibetan Medicine, Ayurveda, and Yoga in India (4.0 cr)
- CSPH 5343 - Ayurveda Medicine: The Science of Self-healing (2.0 cr)
- CSPH 5341 - Overview of Indigenous Hawaiian Healing (2.0 cr)
- CSPH 5423 - Botanical Medicines: Foundations and Practical Applications (1.0 cr)
- CSPH 5642 - Nature Heals: An Introduction to Nature-Based Therapeutics (3.0 cr)
- CSPH 5708 - Mind-Body Science and the Art of Transformation (1.0 cr)
- CSPH 5805 - Wellbeing in the Workplace (3.0 cr)
- CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)
- CSPH 5807 - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)
- CSPH 5905 - Food Matters: Cook Like Your Life Depends On It (1.0 cr)

#### Post-Master's D.N.P.

The post-master's option is for individuals who already hold a master's degree in a nursing practice specialty and who have nursing specialty preparation. The DNP program prepares nurses for leadership as advanced practice nurses, clinical experts, health care executives, policy experts, and informaticians.

Post-master's DNP students complete the core DNP requirements and any additional coursework needed to achieve the 1000 hour practicum requirement. Consult with the DNP program for more information.

#### Preceptor Supervisor Practicum Hours

Students completing the Post-Master's DNP must complete 1000 supervised hours of practicum. Upon admission, the total hours completed through the master's degree is documented and a gap analysis identifies whether additional practicum hours are needed. The number of credits of appropriate systems-level practicum coursework necessary to meet the 1000-hour requirement, if any, will be determined in consultation with the faculty advisor.

#### Practicum Course Options

Courses are chosen in consultation with the faculty advisor. Additional options are permitted with advisor approval.

Take 0 or more credit(s) from the following:

- NURS 5117 - Consumer Health Informatics Practicum (1.0 cr)
- NURS 6704 - Nursing Leadership Practicum: Organizational Culture and Leadership (1.0 - 2.0 cr)
- NURS 6706 - Nursing Leadership Practicum: Quality and Change Management (1.0 - 2.0 cr)
- NURS 7106 - Knowledge Representation and Interoperability Practicum (2.0 cr)
- NURS 7109 - Population Health Informatics Practicum (2.0 cr)
- NURS 7401 - Health Policy Leadership Practicum (0.5 - 1.0 cr)
- NURS 7605 - Executive Leadership Practicum: Boundary Spanning Leadership (1.0 - 2.0 cr)
- NURS 7904 - Nursing Education Practicum (2.0 cr)
- NURS 7113 - Clinical Decision Support: Theory (2.0 cr)
- NURS 5812 - Global Health Through Study Abroad (1.0 - 2.0 cr)



### **Twin Cities Campus**

## **Leadership in Health Information Technology for Health Professionals Postbaccalaureate Certificate**

School of Nursing

### **School of Nursing**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Nursing, 5-160 Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455 (612-625-7980; fax: 612-625-7727)

Email: [nursecerts@umn.edu](mailto:nursecerts@umn.edu)

Website: <http://www.nursing.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 16
- This program requires summer semesters for timely completion.
- Degree: Ldrshp in Hlth Info Tec for Hlth Pro PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

By combining formal clinical or public health advanced preparation with course work in health information technology (HIT), individuals who earn the postbaccalaureate certificate in leadership in health information technology for health professionals will be able to lead the successful deployment and use of HIT to achieve transformational improvement in the quality, safety, outcomes, and thus in the value of health services.

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Admittance to the program requires a baccalaureate degree from an accredited institution in a clinical or public health discipline. Example degrees would be a BS/BA in nursing or public health.

Preferred: Advanced degree in clinical or public health discipline from an accredited institution (nursing MS/DNP/PhD; public health MPH/MS/PhD; MS/PhD in other health-related field)

Other requirements to be completed before admission:

Applicants must have clinical or public health experience. A minimum of two years of management experience is required if the applicant does not hold an advanced degree.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Paper Based - Total Score: 587
- MELAB
  - Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Coursework (16 credits)

Take the following courses:

- [NURS 5115](#) - Interprofessional Health Care Informatics (3.0 cr)
- [NURS 5611](#) - Database Principles for Healthcare (2.0 cr)
- [NURS 6105](#) - Systems Analysis and Design (3.0 cr)
- [NURS 7051](#) - Data Science for Healthcare (2.0 cr)
- [NURS 7105](#) - Knowledge Representation and Interoperability (2.0 cr)
- [NURS 7108](#) - Population Health Informatics (2.0 cr)
- [NURS 7113](#) - Clinical Decision Support: Theory (2.0 cr)



### **Twin Cities Campus**

## **Master of Nursing M.N.**

School of Nursing

### **School of Nursing**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Office of Student Career and Advancement Services, 5-160 Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455  
(612-625-7980; fax: 612-625-7727)

Email: [sonstudentinfo@umn.edu](mailto:sonstudentinfo@umn.edu)

Website: <http://www.nursing.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 51
- This program requires summer semesters for timely completion.
- Degree: Master of Nursing

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of nursing degree (MN) is a full-time, 16-month, graduate-level program for students with a baccalaureate (or higher) degree in a non-nursing field. The program includes all the essentials of a bachelor of science in nursing (BSN) program, plus additional graduate work. Upon completion of the coursework, students are eligible to take the National Council Licensure Examination for Registered Nurses (NCLEX-RN) and are also eligible for Public Health Nursing (PHN) certification in Minnesota. Traditional classroom formats are complemented by interactive components and web-based resources.

### **Accreditation**

This program is accredited by Commission on Collegiate Nursing Education (CCNE).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Completion of a baccalaureate degree from an accredited institution in a non-nursing area of study completed no later than June 1 prior to start of fall semester for year admitted.

Other requirements to be completed before admission:

There are nine prerequisite courses to complete before the start of the master of nursing (MN) program: General Chemistry, Human Anatomy, Human Physiology, Microbiology, Pathology, Human Nutrition, Lifespan Growth and Development, Abnormal Psychology, Inferential Statistics.

Five courses must be complete, with final grades sent to the School of Nursing, by the application deadline. Students are recommended to make three of the five courses their science courses.

#### **Special Application Requirements:**

Prior to matriculation to the program, students must complete a Minnesota background check, immunizations, submit provider-level CPR verification, and meet the School of Nursing published technical standards. Application to the Master of Nursing program is available on the School of Nursing website. After a preliminary review of submitted materials, selected applicants are invited to participate in an interview with representatives of the admissions committee.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL



- Internet Based - Total Score: 95
- Paper Based - Total Score: 586
- IELTS
  - Total Score: 7

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 51 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The capstone project is an examination of a clinical problem in the setting where students complete their final clinical rotation. It may also be a type of research experience or practicum with a School of Nursing faculty member.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Students must maintain the compliance requirements (Minnesota background check, immunizations, provider-level CPR verification, and School of Nursing published technical standards) throughout the program.

### Required Coursework

- [NURS 5029](#) - Introduction to Nursing Interventions (3.0 cr)
- [NURS 5030](#) - Foundational Concepts of Professional Nursing (3.0 cr)
- [NURS 5031](#) - Human Response to Health and Illness: Adults and Elders (4.0 cr)
- [NURS 5032](#) - Human Response to Health and Illness: Children and Childbearing Families (5.0 cr)
- [NURS 5033](#) - Population-Focused Health in Public Health and Mental Health Nursing (5.0 cr)
- [NURS 5034](#) - Transition to Professional Nursing Practice (3.0 cr)
- [NURS 5035](#) - Practicum Nursing Care for Complex Health Conditions (4.0 cr)
- [NURS 5115](#) - Interprofessional Health Care Informatics (3.0 cr)
- [NURS 5190](#) - Essentials of Holistic Health Assessment and Foundational Clinical (3.0 cr)
- [NURS 5222](#) - Advanced Human Physiology (2.0 cr)
- [NURS 5241](#) - Nursing Leadership for Effective Practice (2.0 cr)
- [PHAR 5800](#) - Pharmacotherapy for the Health Professions (3.0 cr)
- [NURS 6200](#) - Science of Nursing Intervention (3.0 cr)
- [NURS 7202](#) - Moral and Ethical Positions and Actions in Nursing (2.0 cr)
- [NURS 7600](#) - Nursing Research and Evidence Based Practice (2.0 - 4.0 cr)
- [NURS 5226](#) - Advanced Human Pathophysiology (2.0 cr)

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.



### **Twin Cities Campus**

## **Nurse Midwifery Postgraduate Certificate**

School of Nursing

### **School of Nursing**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Nursing, 5-160 Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455

(612-625-7980; fax: 612-625-7727)

Email: [nursecerts@umn.edu](mailto:nursecerts@umn.edu)

Website: <http://www.nursing.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 23 to 37
- This program requires summer semesters for timely completion.
- Degree: Nurse Midwifery Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The postgraduate certificate program in nurse midwifery offers students with a doctor of nursing practice (DNP) or other graduate degree in a clinical nursing specialty area the opportunity to complete an additional area of study. Completion of required coursework and practice hours provides eligibility to take certification examinations.

### **Accreditation**

This program is accredited by American Midwifery Certification Board & Commission on Collegiate Nursing Education (CCNE).

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

DNP with coursework in the 3 of the 5 following subject areas: adv. physiology, adv. pathophysiology, pharmacology, pharmacotherapeutics, adv. health assessment is required for admission to this program

Other requirements to be completed before admission:

All applicants must have a current registered nurse license.

#### **Special Application Requirements:**

Applicants are required to submit transcripts from all institutions where postsecondary credit was earned, reference materials containing an Admission Reference Form and personal letter of reference from two separate individuals, two essays, a current curriculum vitae/resume, a current registered nurse license, and English language proficiency scores (if applicable). Application deadlines for this certificate are a priority deadline of November 1, with rolling admissions on a space available basis until March 1.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Paper Based - Total Score: 586
- MELAB
  - Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the





catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Please contact the School of Nursing for detailed information about the requirements for this certificate. Each applicant's curriculum is unique and based on the applicant's previous DNP degree and coursework. Final coursework decisions are made by the faculty advisor. A 3.0 cumulative GPA is required.

### Specialty Courses (23 Credits)

Complete the following required specialty courses for the certificate. Credit requirements for courses with variable credits: Take NURS 6305 for 3 credits; NURS 6308 for 2 credits; and NURS 6925 for 2 credits.

[NURS 6305](#) - Reproductive and Sexual Health Care (3.0 cr)

[NURS 6306](#) - Reproductive and Sexual Health Practicum (1.0 cr)

[NURS 6501](#) - Assessment and Management of Health for Advanced Practice Nurses, I (3.0 cr)

[NURS 6308](#) - Women's Primary Care Practicum (1.0 - 2.0 cr)

[NURS 6210](#) - Midwifery Care of the Childbearing Family (3.0 cr)

[NURS 6211](#) - Midwifery Care of the Childbearing Family Practicum (2.0 cr)

[NURS 6213](#) - Reproductive Healthcare for Patients with Complex Conditions (2.0 cr)

[NURS 6214](#) - Reproductive Health Care for Patients with Complex Conditions Practicum (2.0 cr)

[NURS 7213](#) - Midwifery Clinical and Professional Integration (3.0 cr)

[NURS 6925](#) - Advanced Concepts in Women's Health Care I (1.0 - 3.0 cr)

### Advanced Practice Registered Nurse Core Courses (0 to 12 Credits)

Completion of the following coursework is required for the post-graduate certificate program. Students who have not completed these courses or their equivalents prior to admission must do so to meet requirements. Consult with the Doctor of Nursing Practice Program Director to evaluate prior APRN coursework for equivalency. NURS 5229 must be taken for 3 credits.

[NURS 5200](#) - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)

[NURS 5222](#) - Advanced Human Physiology (2.0 cr)

[NURS 5226](#) - Advanced Human Pathophysiology (2.0 cr)

[NURS 5228](#) - Pharmacology for Advanced Practice Nursing (2.0 cr)

[NURS 5229](#) - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)

### Labor and Delivery Competencies (2 Credits)

Students are required to complete NURS 5505 if they do not have labor and delivery experience as a registered nurse.

[NURS 5505](#) - Assessment and Support of Women in Labor (2.0 cr)



### ***Twin Cities Campus***

## **Nursing Ph.D.**

*School of Nursing*

### **School of Nursing**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Nursing, 5-160 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-625-7980; fax: 612-625-7727)

Website: <https://www.nursing.umn.edu/degrees-programs/phd-nursing>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 58 to 70
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The PhD program in nursing prepares scholars as scientists, leaders, innovators, and educators in nursing and health care who:

- Discover new knowledge for nursing science and health care practice through ethical, innovative, theory-based research;
- Integrate knowledge to influence health care delivery and policy through collaborative, interprofessional initiatives at organizational, local, state, regional, national, and global levels;
- Create and evaluate strategies to improve the health and well-being of individuals, families, communities, and populations; and
- Disseminate knowledge to those in nursing, other health sciences, policy makers, and the public through scholarly publication, formal teaching, and other creative venues.

### **Accreditation**

This program is accredited by Commission on Collegiate Nursing Education (CCNE).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 156
  - General Test - Quantitative Reasoning: 146
  - General Test - Analytical Writing: 5

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
- MELAB
  - Final score: 85

Key to [test abbreviations](#)(GRE, TOEFL, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**



34 to 46 credits are required in the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

#### **Core Coursework (26 credits)**

All students take the following courses. Take NURS 8171 for 3 credits.

- NURS 8180 - Doctoral Proseminar I: Scholarly Development (1.0 cr)
- NURS 8175 - Quantitative Research Design and Methods (3.0 cr)
- NURS 8172 - Theory and Theory Development for Research (3.0 cr)
- NURS 8152 - Scholarship in Health Care Ethics (3.0 cr)
- NURS 8171 - Qualitative Research Design and Methods (3.0 - 4.0 cr)
- NURS 8177 - Advanced Nursing Research Practicum (1.0 - 2.0 cr)
- NURS 8190 - Critical Review in Health Research (2.0 cr)
- NURS 8121 - Health Behaviors and Illness Responses (3.0 cr)
- NURS 8173 - Principles and Methods of Implementing Research (3.0 cr)
- NURS 8134 - Interventions and Outcomes Research (3.0 cr)

#### **Statistics (6 credits)**

Select at least 6 statistics credits from the courses listed below, in consultation with the faculty advisor.

##### **Biostatistics**

- PUBH 6450 - Biostatistics I (4.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)
- or EPSY 8251 - Statistical Methods in Education I (3.0 cr)
- EPSY 8252 - Statistical Methods in Education II (3.0 cr)

#### **Thesis Credits**

- Take at least 24 doctoral thesis credits.
- NURS 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

#### **Program Electives**

The number of required elective credits is determined by nursing background and the highest degree awarded prior to Nursing PhD enrollment. Note that the Master of Nursing degree does not qualify for Post-Master's-Entry status.

#### **Graduate Degree Prepared Nurse Electives (2 credits)**

Take two or more credits from the following list, or select alternative courses, in consultation with the faculty advisor:

- NURS 5115 - Interprofessional Health Care Informatics (3.0 cr)
- NURS 5925 - Grant Writing and Critique (1.0 cr)
- NURS 7600 - Nursing Research and Evidence Based Practice (2.0 - 4.0 cr)
- NURS 6102 - Family Health Theory (2.0 cr)
- NURS 7200 - Economics of Health Care (3.0 cr)
- NURS 7300 - Program Planning and Evaluation (3.0 cr)
- NURS 7900 - Scholarly Teaching and Learning in Nursing (3.0 cr)
- NURS 7904 - Nursing Education Practicum (2.0 cr)
- NURS 8185 - Qualitative Data Analysis for Health Care Research (3.0 - 4.0 cr)
- HINF 5430 - Foundations of Health Informatics I (3.0 cr)
- HINF 5431 - Foundations of Health Informatics II (3.0 cr)
- FSOS 8105 - Family Gerontology (3.0 cr)
- PUBH 6904 - Nutrition and Aging (2.0 cr)
- PUBH 8803 - Long-Term Care: Principles, Programs, and Policies (2.0 cr)
- SW 5810 - Seminar: Special Topics (1.0 - 4.0 cr)
- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
- PUBH 6341 - Epidemiologic Methods I (3.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7251 - Data Analysis From Focus Groups (1.0 cr)
- EPSY 5245 - Advanced Survey Data Analysis for Categorical and Rating Scale Data (1.0 cr)
- EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)
- EPSY 8265 - Factor Analysis (3.0 cr)



EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)  
EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
NURS 6110 - Epidemiology in Nursing (2.0 cr)  
NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)  
CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)  
CSPH 5111 - Ways of Thinking about Health (2.0 cr)  
CSPH 5303 - Pain Management and Evidence Based Complementary Health Approaches (3.0 cr)  
CSPH 5513 - Living Well, Dying Well: Empowering Patient Communication at the End of Life (2.0 cr)  
CSPH 5711 - Optimal Healing Environments (3.0 cr)  
CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)  
CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)  
CSPH 5118 - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)  
CSPH 5305 - Introduction to Integrative Mental Health (2.0 cr)

-OR-

**Baccalaureate Prepared & Non Nurse Electives (14 credits)**

Take 14 or more credits from the following list, or select alternative courses, in consultation with the faculty advisor. A minimum of 12 credits must be selected within the NURS or CSPH department.

NURS 5115 - Interprofessional Health Care Informatics (3.0 cr)  
NURS 5925 - Grant Writing and Critique (1.0 cr)  
NURS 7600 - Nursing Research and Evidence Based Practice (2.0 - 4.0 cr)  
NURS 6102 - Family Health Theory (2.0 cr)  
NURS 7200 - Economics of Health Care (3.0 cr)  
NURS 7300 - Program Planning and Evaluation (3.0 cr)  
NURS 7900 - Scholarly Teaching and Learning in Nursing (3.0 cr)  
NURS 7904 - Nursing Education Practicum (2.0 cr)  
NURS 8185 - Qualitative Data Analysis for Health Care Research (3.0 - 4.0 cr)  
HINF 5430 - Foundations of Health Informatics I (3.0 cr)  
HINF 5431 - Foundations of Health Informatics II (3.0 cr)  
FSOS 8105 - Family Gerontology (3.0 cr)  
PUBH 6904 - Nutrition and Aging (2.0 cr)  
PUBH 8803 - Long-Term Care: Principles, Programs, and Policies (2.0 cr)  
SW 5810 - Seminar: Special Topics (1.0 - 4.0 cr)  
PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6810 - Survey Research Methods (3.0 cr)  
PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)  
PUBH 7251 - Data Analysis From Focus Groups (1.0 cr)  
EPSY 5245 - Advanced Survey Data Analysis for Categorical and Rating Scale Data (1.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
EPSY 8265 - Factor Analysis (3.0 cr)  
EPSY 8266 - Statistical Analysis Using Structural Equation Methods (3.0 cr)  
EPSY 8268 - Hierarchical Linear Modeling in Educational Research (3.0 cr)  
NURS 6110 - Epidemiology in Nursing (2.0 cr)  
NURS 7202 - Moral and Ethical Positions and Actions in Nursing (2.0 cr)  
CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)  
CSPH 5111 - Ways of Thinking about Health (2.0 cr)  
CSPH 5303 - Pain Management and Evidence Based Complementary Health Approaches (3.0 cr)  
CSPH 5513 - Living Well, Dying Well: Empowering Patient Communication at the End of Life (2.0 cr)  
CSPH 5711 - Optimal Healing Environments (3.0 cr)  
CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)  
CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)  
CSPH 5118 - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)  
CSPH 5305 - Introduction to Integrative Mental Health (2.0 cr)



### ***Twin Cities Campus***

## **Pediatric Clinical Nurse Specialist Postgraduate Certificate**

School of Nursing

### **School of Nursing**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Nursing, 5-160 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-625-7980; fax: 612-625-7727)

Email: [nursecerts@umn.edu](mailto:nursecerts@umn.edu)

Website: <http://www.nursing.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 20 to 32
- This program requires summer semesters for timely completion.
- Degree: Pediatric Clinical Nurse Specialist Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The postgraduate certificate program in nursing offers students with a doctor of nursing practice (DNP) or other graduate degree in a clinical nursing specialty area the opportunity to complete an additional area of study. Completion of required coursework and practice hours provides eligibility to take certification examinations.

### **Accreditation**

This program is accredited by Commission on Collegiate Nursing Education (CCNE).

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

DNP with coursework in the 3 of the 5 following subject areas: adv.physiology, adv. pathophysiology, pharmacology, pharmacotherapeutics, adv.health assessment is required for admission to this program

Other requirements to be completed before admission:

All applicants must have a current registered nurse license.

#### **Special Application Requirements:**

Applicants are required to submit transcripts from all institutions where post-secondary credit was earned, reference materials containing an Admission Reference Form and personal letter of reference from two separate individuals, two essays, a current curriculum vitae/resume, a current registered nurse license, and English language proficiency scores (if applicable). Application deadlines for this certificate are a priority deadline of November 1, with rolling admissions on a space available basis until March 1.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Paper Based - Total Score: 586
- MELAB
  - Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Please contact the School of Nursing for detailed information about the requirements for this certificate. Each applicant's curriculum is unique and based on the applicant's previous DNP degree and coursework; final coursework decisions are made by the faculty advisor. A 3.0 cumulative GPA is required.

### Specialty Courses (20 Credits)

Complete the following courses for a total of 20 credits. Take NURS 6921 for 1 credit.

- NURS 6102 - Family Health Theory (2.0 cr)
- NURS 6405 - Advanced Practice CNS Roles Across the Lifespan (3.0 cr)
- NURS 6406 - Advanced Practice CNS Roles Across the Lifespan: Practicum (1.0 cr)
- NURS 6519 - Advanced Pediatric Assessment (1.0 cr)
- NURS 6920 - Primary Care: Assessment of Health and Care of Well Children (3.0 cr)
- NURS 6921 - Assessment of Health and Care of Well Children: Primary Care Practicum (1.0 - 2.0 cr)
- NURS 6924 - Assessment and Interventions for Children and Youth With Special Health Care Needs (2.0 cr)
- NURS 6929 - Advanced Nursing Care of Children with Acute Illness; Practicum for PCNS (2.0 cr)
- NURS 7925 - Systems of Care for Children and Youth With Special Health Care Needs Practicum (2.0 cr)
- NURS 7926 - Advanced Assessment, Intervention in Families of Children and Youth With Special Health Care Needs (2.0 cr)
- NURS 7927 - Adv Assessment, Intervention in Families of Children and Youth With Special Health Care Needs Prac (1.0 cr)

### Advanced Practice Registered Nurse Core Courses (0 to 12 Credits)

Completion of the following coursework is required for the post-graduate certificate program. Students who have not completed these courses or their equivalents prior to admission must do so to meet requirements. Consult with the Doctor of Nursing Practice Program Director to evaluate prior APRN coursework for equivalency. NURS 5229 must be taken for 3 credits.

- NURS 5200 - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 5226 - Advanced Human Pathophysiology (2.0 cr)
- NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)
- NURS 5229 - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)



### **Twin Cities Campus**

## **Pediatric Nurse Practitioner - Primary Care Postgraduate Certificate**

School of Nursing

### **School of Nursing**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Nursing, 5-160 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455

(612-625-7980; fax: 612-625-7727)

Email: [nursecerts@umn.edu](mailto:nursecerts@umn.edu)

Website: <http://www.nursing.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 18 to 30
- This program requires summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The postgraduate certificate program in nursing offers students with a Doctor of Nursing Practice (DNP) or other graduate degree in a clinical nursing specialty area the opportunity to complete an additional area of study. Completion of required coursework and practice hours provides eligibility to take certification examinations.

### **Accreditation**

This program is accredited by Commission on Collegiate Nursing Education (CCNE).

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

DNP with coursework in the 3 of the 5 following subject areas: adv. physiology, adv. pathophysiology, pharmacology, pharmacotherapeutics, adv. health assessment is required for admission to this program

Other requirements to be completed before admission:

All applicants must have a current registered nurse license.

#### **Special Application Requirements:**

Applicants are required to submit transcripts from all institutions where post-secondary credit was earned, reference materials containing an Admission Reference Form and personal letter of reference from two separate individuals, two essays, a current curriculum vitae/resume, a current registered nurse license, and English language proficiency scores (if applicable).

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Paper Based - Total Score: 586
- MELAB
  - Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

### Coursework (18 credits)

Take the following courses. Nurs 6921 must be completed for 2 credits.

[NURS 6519](#) - Advanced Pediatric Assessment (1.0 cr)

[NURS 6920](#) - Primary Care: Assessment of Health and Care of Well Children (3.0 cr)

[NURS 6921](#) - Assessment of Health and Care of Well Children: Primary Care Practicum (1.0 - 2.0 cr)

[NURS 6922](#) - Primary Care: Assessment and Management of Common Conditions Affecting Children (3.0 cr)

[NURS 6923](#) - Primary Care Practicum: Assessment and Management of Common Conditions Affecting Children (2.0 cr)

[NURS 6924](#) - Assessment and Interventions for Children and Youth With Special Health Care Needs (2.0 cr)

[NURS 7925](#) - Systems of Care for Children and Youth With Special Health Care Needs Practicum (2.0 cr)

[NURS 7926](#) - Advanced Assessment, Intervention in Families of Children and Youth With Special Health Care Needs (2.0 cr)

[NURS 7927](#) - Adv Assessment, Intervention in Families of Children and Youth With Special Health Care Needs Prac (1.0 cr)

### Advanced Practice Registered Nurse Core Courses (0 to 12 credits)

Completion of the following coursework is required for the post-graduate certificate program. Students who have not completed these courses or their equivalents prior to admission must do so to meet requirements. Consult with the Doctor of Nursing Practice Program Director to evaluate prior APRN coursework for equivalency. NURS 5229 must be taken for 3 credits.

[NURS 5200](#) - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)

[NURS 5222](#) - Advanced Human Physiology (2.0 cr)

[NURS 5226](#) - Advanced Human Pathophysiology (2.0 cr)

[NURS 5228](#) - Pharmacology for Advanced Practice Nursing (2.0 cr)

[NURS 5229](#) - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)





### **Twin Cities Campus**

## **Psychiatric Mental Health Nurse Practitioner Postgraduate Certificate**

School of Nursing

### **School of Nursing**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Nursing, 5-160 Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455

(612-625-7980; fax: 612-625-7727)

Email: [nursecerts@umn.edu](mailto:nursecerts@umn.edu)

Website: <http://www.nursing.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 20 to 32
- This program requires summer semesters for timely completion.
- Degree: Psych Mental Hlth Nurse Practitioner Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The postgraduate certificate program in nursing offers students with a doctor of nursing practice (DNP) or other graduate degree in a clinical nursing specialty area the opportunity to complete an additional area of study. Completion of required coursework and practice hours provides eligibility to take certification examinations.

### **Accreditation**

This program is accredited by Commission on Collegiate Nursing Education (CCNE).

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

DNP with coursework in the 3 of the 5 following subject areas: adv. physiology, adv. pathophysiology, pharmacology, pharmacotherapeutics, adv. health assessment is required for admission to this program

Other requirements to be completed before admission:

All applicants must have a current registered nurse license.

#### **Special Application Requirements:**

Applicants are required to submit transcripts from all institutions where post-secondary credit was earned, reference materials containing an Admission Reference Form and personal letter of reference from two separate individuals, two essays, a current curriculum vitae/resume, a current registered nurse license, and English language proficiency scores (if applicable). Application deadlines for this certificate are a priority deadline of November 1, with rolling admissions on a space available basis until March 1.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Paper Based - Total Score: 586
- MELAB
  - Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Contact the School of Nursing for detailed information about the requirements for this certificate. Each student's course of study will be unique, based on their previous DNP degree and coursework, and will require approval of the faculty advisor. A 3.0 cumulative GPA is required.

### Coursework (20 credits)

Select courses from the following list, or select alternative courses, in consultation with the advisor.

- NURS 6604 - Foundations for Integrative Mental Health and Psychiatric Advanced Practice Nursing (2.0 cr)
- NURS 6605 - Psychiatric/Mental Health Advanced Nursing Practice Practicum I (1.0 cr)
- NURS 6504 - Assessing, Managing Psychiatric Disorders in Adv Practice Psychiatric-Mental Health Nursing (2.0 cr)
- NURS 5225 - Psychopharmacology Advanced Practice Psychiatric/Mental Health Nursing (3.0 cr)
- NURS 6505 - PMH/APN Prac II:Assessing, Managing Psychiatric Disorders in Adv Prac Psychiatric-Mental Health Nurs (2.0 cr)
- NURS 6602 - PMH Advanced Practice Nursing: Group as a Health Care Intervention (2.0 cr)
- NURS 6603 - PMH APN Practicum IV: Group as a Health Care Intervention (2.0 cr)
- NURS 7612 - Psychiatric/Mental Health Advanced Practice Nursing: Professional Seminar (1.0 cr)
- NURS 7613 - Psychiatric/Mental Health Advanced Practice Nursing: Practicum V (2.0 cr)
- NURS 6802 - Psychiatric/Mental Health Advance Practice Nursing: Psychotherapy with Individuals and Families (2.0 cr)
- NURS 6803 - Psychiatric/Mental Health Adv Prac Nurs Practicum III: Psychotherapy With Individuals,Families (1.0 cr)

### Advanced Practice Registered Nurse Core Courses (0 to 12 credits)

Completion of the following coursework is required for the post-graduate certificate program. Students who have not completed these courses or their equivalents prior to admission must do so to meet requirements. Consult with the Doctor of Nursing Practice Program Director to evaluate prior APRN coursework for equivalency. NURS 5229 must be taken for 3 credits.

- NURS 5200 - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)
- NURS 5222 - Advanced Human Physiology (2.0 cr)
- NURS 5226 - Advanced Human Pathophysiology (2.0 cr)
- NURS 5228 - Pharmacology for Advanced Practice Nursing (2.0 cr)
- NURS 5229 - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)



### **Twin Cities Campus**

## **Women's Health/Gender Related Nurse Practitioner Postgraduate Certificate**

School of Nursing

### **School of Nursing**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Nursing, 5-160 Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455 (612-625-7980; fax: 612-625-7727)

Email: [nursecerts@umn.edu](mailto:nursecerts@umn.edu)

Website: <http://www.nursing.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 21 to 33
- This program requires summer semesters for timely completion.
- Degree: Ad Hlth/Wmn Hlth Care Nrs Pract Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The postgraduate certificate program in nursing offers students with a Doctor of Nursing Practice (DNP) or other graduate degree in a clinical nursing specialty area the opportunity to complete an additional area of study. Completion of required coursework and practice hours provides eligibility to take certification examinations.

### **Accreditation**

This program is accredited by Commission on Collegiate Nursing Education (CCNE).

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

DNP with coursework in the 3 of the 5 following subject areas: adv. physiology, adv. pathophysiology, pharmacology, pharmacotherapeutics, adv. health assessment is required for admission to this program

Other requirements to be completed before admission:

All applicants must have a current registered nurse license.

#### **Special Application Requirements:**

Applicants are required to submit transcripts from all institutions where post-secondary credit was earned, reference materials containing an Admission Reference Form and personal letter of reference from two separate individuals, two essays, a current curriculum vitae/resume, a current registered nurse license, and English language proficiency scores (if applicable). Application deadlines for this certificate are a priority deadline of November 1, with rolling admissions on a space available basis until March 1.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Paper Based - Total Score: 586
- MELAB
  - Final score: 85

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

3.0 cumulative GPA is required.

### Specialty Courses (21 Credits)

Complete the following required specialty courses for the certificate. NURS 6305 and NURS 6925 each must be taken for 3 credits.

[NURS 6305](#) - Reproductive and Sexual Health Care (3.0 cr)

[NURS 6306](#) - Reproductive and Sexual Health Practicum (1.0 cr)

[NURS 6501](#) - Assessment and Management of Health for Advanced Practice Nurses, I (3.0 cr)

[NURS 6925](#) - Advanced Concepts in Women's Health Care I (1.0 - 3.0 cr)

[NURS 6926](#) - Advanced Concepts in Women's Health for WHNP Practicum I (1.0 cr)

[NURS 6927](#) - Advanced Concepts in Women's Health II (3.0 cr)

[NURS 6928](#) - Adv Concepts in Women's Health II WHNP Prac (1.0 cr)

[NURS 6213](#) - Reproductive Healthcare for Patients with Complex Conditions (2.0 cr)

[NURS 6214](#) - Reproductive Health Care for Patients with Complex Conditions Practicum (2.0 cr)

[NURS 7310](#) - WHNP Clinical and Professional Integration (2.0 cr)

### Advanced Practice Registered Nurse Core Courses (0 to 12 Credits)

Completion of the following coursework is required for the certificate. Students who have not completed these courses or their equivalents prior to admission must do so to meet requirements. Consult with the Doctor of Nursing Practice Program Director to evaluate prior APRN coursework for equivalency. NURS 5229 must be take for 3 credits.

[NURS 5200](#) - Advanced Holistic Health Assessment for the Advanced Practice Nurse (3.0 cr)

[NURS 5222](#) - Advanced Human Physiology (2.0 cr)

[NURS 5226](#) - Advanced Human Pathophysiology (2.0 cr)

[NURS 5228](#) - Pharmacology for Advanced Practice Nursing (2.0 cr)

[NURS 5229](#) - Clinical Pharmacotherapeutics (3.0 - 4.0 cr)



### ***Twin Cities Campus***

## **Experimental and Clinical Pharmacology M.S.**

*Experimental and Clinical Pharmacology*

### **College of Pharmacy**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Experimental and Clinical Pharmacology, University of Minnesota College of Pharmacy, 7-115 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-625-2160)

Email: [grad-ecp@umn.edu](mailto:grad-ecp@umn.edu)

Website: <https://z.umn.edu/ecpgrad>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 34
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Experimental and Clinical Pharmacology (ECP) graduate program was designed specifically for students interested in clinical research. Its goal is to advance the science of human pharmacology and therapeutics to improve the safe, effective, and economical use of drugs by patients.

Students study such topics as experimental pharmacotherapy, drug metabolism, infectious disease, neuroscience/neuropharmacology, pharmacometrics, and pharmacogenomics. Graduates are prepared for distinguished careers in clinical research.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A U.S. bachelor's degree or a comparable foreign degree from a recognized college or university is required.

Preference is given to candidates who have had professionally-related pharmacy education, but those from other fields such as biology, chemistry, statistics, and public health will be considered.

Other requirements to be completed before admission:

All international students who are non-English speakers are required to submit TOEFL scores. TOEFL test date must be within 2 years of program start. However, applicants who have completed 24 quarter credits or 16 semester credits within the past 24 months in residence as full-time students at recognized institutions of higher learning in the United States or other English-speaking countries before entering the University of Minnesota are generally exempted from this requirement. GRE required by all students except for applicants that have completed a PharmD at a U.S.-accredited institution.

#### **Special Application Requirements:**

Students are generally admitted to the ECP program for fall semester only. All application materials should be submitted by the admissions deadline listed on the departmental website. Applications received after the application deadline will be considered on a space-available basis only.

Application to the ECP program at the University of Minnesota is done entirely online.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19



The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 24 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 34 major credits and up to null credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

### Required Courses (8 credits)

Take the following courses. Take ECP 8982 twice for a total of 2 credits.

[ECP 5220](#) - Regulatory Issues in Drug Research (2.0 cr)

[ECP 8230](#) - Principles of Clinical Pharmacology (2.0 cr)

[ECP 8983](#) - Scientific Communications in Experimental and Clinical Pharmacology (1.0 cr)

[ECP 8982](#) - Inter-Institutional Journal Club in Translational Research (1.0 cr)

[ECP 8100](#) - Seminar (1.0 cr)

### Statistical Analysis (4 credits)

Select at least one of the following courses in consultation with the advisor. Two courses are preferred and will count towards Electives or Focus Area.

[PUBH 6450](#) - Biostatistics I (4.0 cr)

or [PUBH 6451](#) - Biostatistics II (4.0 cr)

or [STAT 5101](#) - Theory of Statistics I (4.0 cr)

or [STAT 5102](#) - Theory of Statistics II (4.0 cr)

### Electives

Select electives, in consultation with the director of graduate studies and/or the advisor, to complete the master's minimum credit requirement.

ANAT 5xxx

ANAT 6xxx

ANAT 7xxx

ANSC 5xxx

ANSC 8xxx

BBE 5xxx

BBE 8xxx

BICB 5xxx

BICB 8xxx

BINF 5xxx

BIOC 5xxx

BIOC 6xxx

BIOL 5xxx

BIOL 6xxx

BIOL 8xxx

BMEN 5xxx

BMEN 8xxx

BMSC 8xxx

BTHX 5xxx

BTHX 8xxx

CGSC 8xxx

CHEM 5xxx

CHEM 8xxx



CLS 5xxx  
CLS 8xxx  
CMB 5xxx  
CMB 8xxx  
ECHO 4xxx  
ECP 5xxx  
ECP 8xxx  
EEB 5xxx  
EEB 8xxx  
GCD 5xxx  
GCD 6xxx  
GCD 8xxx  
HINF 5xxx  
HINF 8xxx  
MATH 5xxx  
MATH 8xxx  
MCDG 8xxx  
MEDC 5xxx  
MEDC 8xxx  
MICA 8xxx  
NSC 5xxx  
NSC 8xxx  
NSCI 5xxx  
NSCI 6xxx  
NURS 5xxx  
NURS 6xxx  
NURS 7xxx  
NURS 8xxx  
PHAR 5xxx  
PHAR 6xxx  
PHAR 7xxx  
PHCL 5xxx  
PHCL 8xxx  
PHM 5xxx  
PHM 6xxx  
PHM 8xxx  
PHSL 5xxx  
PHSL 6xxx  
PHSL 8xxx  
PUBH 5xxx  
PUBH 6xxx  
PUBH 7xxx  
PUBH 8xxx  
SAPH 5xxx  
SAPH 8xxx  
SCB 5xxx  
SCB 8xxx  
SCIC 8xxx  
STAT 5xxx  
STAT 8xxx  
TXCL 5xxx  
TXCL 8xxx  
VMED 5xxx  
VMED 8xxx  
BIOC 8xxx

#### Focus Areas

##### Plan A

Take exactly 10 credit(s) from the following:

- [ECP 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### Plan B

Take 10 project credits.



ECP 8776 - Project Credits: Master's Plan B (1.0 - 18.0 cr)

-OR-

**Focus Area -- Pharmacometrics (12 credits)**

Coursework chosen from the following list, or other courses to meet the 12-credit focus area requirement, are selected in consultation with the advisor.

ECP 8500 - Advances in Pharmacometrics Modeling and Simulation (1.0 cr)

or ECP 8501 - Pharmacometrics (2.0 cr)

or ECP 8502 - Introductory Population Pharmacokinetic Methods (2.0 cr)

or ECP 8503 - Intermediate Population PK/PD Methods (2.0 cr)

or ECP 8504 - Modeling Biologics (2.0 cr)

or ECP 8505 - Application of physiological-based pharmacokinetic modeling(PBPK) to model-informed drug development (2.0 cr)

or ECP 8506 - Clinical Trial Simulation (2.0 cr)

or PUBH 6450 - Biostatistics I (4.0 cr)

or PUBH 6451 - Biostatistics II (4.0 cr)

or PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

or PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)

or PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)

or PUBH 7450 - Survival Analysis (3.0 cr)

or STAT 5101 - Theory of Statistics I (4.0 cr)

or STAT 5102 - Theory of Statistics II (4.0 cr)

-OR-

**Focus Area -- Neuroscience/Neuropharmacology (12 credits)**

Coursework chosen from the following list, or other courses to meet the 12-credit focus area requirement, are selected in consultation with the advisor.

NSC 5461 - Cellular and Molecular Neuroscience (4.0 cr)

or NSCI 5501 - Neurodegenerative Diseases, Mechanisms to Therapies (3.0 cr)

or PUBH 6450 - Biostatistics I (4.0 cr)

or PUBH 6451 - Biostatistics II (4.0 cr)

or PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

**or Neuro-Immune Interactions**

CMB 8361 - Neuro-Immune Interactions (3.0 cr)

or NSC 8026 - Neuro-Immune Interactions (3.0 cr)

or PHCL 8026 - Neuro-Immune Interactions (3.0 cr)

**or Advanced Neuropharmaceutics**

CMB 8481 - Advanced Neuropharmaceutics (4.0 cr)

or NSC 8481 - Advanced Neuropharmaceutics (4.0 cr)

or PHM 8481 - Advanced Neuropharmaceutics (4.0 cr)

-OR-

**Focus Area -- Infectious Diseases (12 credits)**

Coursework chosen from the following list, or other courses to meet the 12-credit focus area requirement, are selected in consultation with the advisor.

ECP 5620 - Drug Metabolism and Disposition (3.0 cr)

or MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)

or MICA 8003 - Immunity and Immunopathology (4.0 cr)

or MICA 8010 - Microbial Pathogenesis (3.0 cr)

or PHAR 6224 - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)

or PUBH 6450 - Biostatistics I (4.0 cr)

or PUBH 6451 - Biostatistics II (4.0 cr)

or PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

-OR-

**Focus Area -- Pharmacogenomics (12 credits)**

Coursework chosen from the following list, or other courses to meet the 12-credit focus area requirement, are selected in consultation with the advisor.

ECP 5620 - Drug Metabolism and Disposition (3.0 cr)

or ECP 8900 - Advanced Topics in Experimental and Clinical Pharmacology (1.0 - 4.0 cr)

or GCD 4034 - Molecular Genetics and Genomics (3.0 cr)

or GCD 4143 - Human Genetics and Genomics (3.0 cr)

or GCD 8073 - Genetics & Genomics in Human Health (3.0 cr)

or PHAR 6224 - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)

or PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)





or [PUBH 6450](#) - Biostatistics I (4.0 cr)  
or [PUBH 6451](#) - Biostatistics II (4.0 cr)  
or [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)



### **Twin Cities Campus**

## **Experimental and Clinical Pharmacology Ph.D.**

*Experimental and Clinical Pharmacology*

### **College of Pharmacy**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Experimental and Clinical Pharmacology, University of Minnesota College of Pharmacy, 7-115 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-625-2160)

Email: [grad-ecp@umn.edu](mailto:grad-ecp@umn.edu)

Website: <https://z.umn.edu/ecpgrad>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Experimental and Clinical Pharmacology (ECP) graduate program was designed specifically for students interested in clinical research. Its goal is to advance the science of human pharmacology and therapeutics to improve the safe, effective, and economical use of drugs by patients.

Students study such topics as experimental pharmacotherapy, drug metabolism, infectious disease, neuroscience/neuropharmacology, pharmacometrics, and pharmacogenomics. Graduates are prepared for distinguished careers in clinical research.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A US bachelor's degree or a comparable foreign degree from a recognized college or university is required.

Preference is given to candidates who have had a professionally-related pharmacy education, but those from other fields such as biology, chemistry, statistics, and public health will be considered.

Other requirements to be completed before admission:

All international students who are non-English speakers are required to submit TOEFL scores. TOEFL test date must be within 2 years of program start. However, applicants who have completed 24 quarter credits or 16 semester credits within the past 24 months in residence as full-time students at recognized institutions of higher learning in the United States or other English-speaking countries before entering the University of Minnesota are generally exempted from this requirement. GRE required by all students except for applicants that have completed a PharmD at a U.S.-accredited institution.

#### **Special Application Requirements:**

Students are generally admitted to the ECP program for fall semester only. All application materials should be submitted by the admissions deadline listed on the departmental website. Applications received after the application deadline will be considered on a space-available basis only.

Application to the ECP program at the University of Minnesota is done entirely online.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19



The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

### Required Courses (9 credits)

Take the following courses. Take ECP 8982 twice for a total of 2 credits, and take ECP 8100 2 times for a total of 2 credits.

[ECP 5220](#) - Regulatory Issues in Drug Research (2.0 cr)

[ECP 8230](#) - Principles of Clinical Pharmacology (2.0 cr)

[ECP 8983](#) - Scientific Communications in Experimental and Clinical Pharmacology (1.0 cr)

[ECP 8982](#) - Inter-Institutional Journal Club in Translational Research (1.0 cr)

[ECP 8100](#) - Seminar (1.0 cr)

### Statistical Analysis (4 credits)

Select at least one of the following courses in consultation with the advisor. Two courses are preferred and will count towards Electives or Focus Area.

[PUBH 6450](#) - Biostatistics I (4.0 cr)

or [STAT 5101](#) - Theory of Statistics I (4.0 cr)

or [PUBH 6451](#) - Biostatistics II (4.0 cr)

or [STAT 5102](#) - Theory of Statistics II (4.0 cr)

### Electives

Take additional courses, in consultation with the director of graduate studies and/or advisor to complete the 24 course credits required.

ANAT 5xxx

or ANAT 6xxx

or ANAT 7xxx

or ANSC 5xxx

or ANSC 8xxx

or BBE 5xxx

or BBE 8xxx

or BICB 5xxx

or BICB 8xxx

or BINF 5xxx

or BIOC 5xxx

or BIOC 6xxx

or BIOC 8xxx

or BIOL 5xxx

or BIOL 6xxx

or BIOL 8xxx

or BMEN 5xxx

or BMEN 8xxx

or BMSC 8xxx

or BTHX 5xxx

or BTHX 8xxx

or CGSC 8xxx

or CHEM 5xxx

or CHEM 8xxx

or CLS 5xxx

or CLS 8xxx



or CMB 5xxx  
or CMB 8xxx  
or ECHO 4xxx  
or ECP 5xxx  
or ECP 8xxx  
or EEB 5xxx  
or EEB 8xxx  
or GCD 5xxx  
or GCD 6xxx  
or GCD 8xxx  
or HINF 5xxx  
or HINF 8xxx  
or MATH 5xxx  
or MATH 8xxx  
or MCDG 8xxx  
or MEDC 5xxx  
or MEDC 8xxx  
or MICA 8xxx  
or NSC 5xxx  
or NSC 8xxx  
or NSCI 5xxx  
or NSCI 6xxx  
or NURS 5xxx  
or NURS 6xxx  
or NURS 7xxx  
or NURS 8xxx  
or PHAR 5xxx  
or PHAR 6xxx  
or PHAR 7xxx  
or PHCL 5xxx  
or PHCL 8xxx  
or PHM 5xxx  
or PHM 6xxx  
or PHM 8xxx  
or PHSL 5xxx  
or PHSL 6xxx  
or PHSL 8xxx  
or PUBH 5xxx  
or PUBH 6xxx  
or PUBH 7xxx  
or PUBH 8xxx  
or SAPH 5xxx  
or SAPH 8xxx  
or SCB 5xxx  
or SCB 8xxx  
or SCIC 8xxx  
or STAT 5xxx  
or STAT 8xxx  
or TXCL 5xxx  
or TXCL 8xxx  
or VMED 5xxx  
or VMED 8xxx

#### **Thesis Credits**

Take exactly 24 credit(s) from the following:

- [ECP 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

#### **Focus Areas**

##### **Pharmacometrics (11 credits)**

Coursework chosen from the following list, or other courses to meet the 11-credit focus area requirement, are selected in consultation with the advisor.

- [ECP 8500](#) - Advances in Pharmacometrics Modeling and Simulation (1.0 cr)
- or [ECP 8501](#) - Pharmacometrics (2.0 cr)
- or [ECP 8502](#) - Introductory Population Pharmacokinetic Methods (2.0 cr)



or [ECP 8503](#) - Intermediate Population PK/PD Methods (2.0 cr)  
or [ECP 8504](#) - Modeling Biologics (2.0 cr)  
or [ECP 8505](#) - Application of physiological-based pharmacokinetic modeling(PBPK) to model-informed drug development (2.0 cr)  
or [ECP 8506](#) - Clinical Trial Simulation (2.0 cr)  
or [PUBH 6450](#) - Biostatistics I (4.0 cr)  
or [PUBH 6451](#) - Biostatistics II (4.0 cr)  
or [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)  
or [PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)  
or [PUBH 7440](#) - Introduction to Bayesian Analysis (3.0 cr)  
or [PUBH 7450](#) - Survival Analysis (3.0 cr)  
or [STAT 5101](#) - Theory of Statistics I (4.0 cr)  
or [STAT 5102](#) - Theory of Statistics II (4.0 cr)

-OR-

#### **Neuroscience/Neuropharmacology (11 credits)**

Coursework chosen from the following list, or other courses to meet the 11-credit focus area requirement, are selected in consultation with the advisor.

[NSC 5461](#) - Cellular and Molecular Neuroscience (4.0 cr)  
or [NSCI 5501](#) - Neurodegenerative Diseases, Mechanisms to Therapies (3.0 cr)  
or [PUBH 6450](#) - Biostatistics I (4.0 cr)  
or [PUBH 6451](#) - Biostatistics II (4.0 cr)  
or [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)  
or **Neuro-Immune Interactions**  
[CMB 8361](#) - Neuro-Immune Interactions (3.0 cr)  
or [NSC 8026](#) - Neuro-Immune Interactions (3.0 cr)  
or [PHCL 8026](#) - Neuro-Immune Interactions (3.0 cr)  
or **Advanced Neuropharmaceutics**  
[CMB 8481](#) - Advanced Neuropharmaceutics (4.0 cr)  
or [NSC 8481](#) - Advanced Neuropharmaceutics (4.0 cr)  
or [PHM 8481](#) - Advanced Neuropharmaceutics (4.0 cr)

-OR-

#### **Infectious Diseases (11 credits)**

Coursework chosen from the following list, or other courses to meet the 11-credit focus area requirement, are selected in consultation with the advisor.

[ECP 5620](#) - Drug Metabolism and Disposition (3.0 cr)  
or [MICA 8002](#) - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)  
or [MICA 8003](#) - Immunity and Immunopathology (4.0 cr)  
or [MICA 8010](#) - Microbial Pathogenesis (3.0 cr)  
or [PHAR 6224](#) - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)  
or [PUBH 6450](#) - Biostatistics I (4.0 cr)  
or [PUBH 6451](#) - Biostatistics II (4.0 cr)  
or [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

-OR-

#### **Pharmacogenomics (11 credits)**

Coursework chosen from the following list, or other courses to meet the 11-credit focus area requirement, are selected in consultation with the advisor.

[ECP 5620](#) - Drug Metabolism and Disposition (3.0 cr)  
or [ECP 8900](#) - Advanced Topics in Experimental and Clinical Pharmacology (1.0 - 4.0 cr)  
or [GCD 4034](#) - Molecular Genetics and Genomics (3.0 cr)  
or [GCD 4143](#) - Human Genetics and Genomics (3.0 cr)  
or [GCD 8073](#) - Genetics & Genomics in Human Health (3.0 cr)  
or [PHAR 6224](#) - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)  
or [PUBH 6381](#) - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
or [PUBH 6450](#) - Biostatistics I (4.0 cr)  
or [PUBH 6451](#) - Biostatistics II (4.0 cr)  
or [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)



### *Twin Cities Campus*

## Medicinal Chemistry M.S.

*Graduate Studies in Medicinal Chemistry*

### College of Pharmacy

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Medicinal Chemistry, 8-101 Weaver-Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455 (612-624-9919; fax: 612-626-3114)

Email: [medchem@umn.edu](mailto:medchem@umn.edu)

Website: <http://z.umn.edu/medchemgrad>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: Students are not admitted directly to the MS program. See the Medicinal Chemistry PhD or contact the director of graduate studies for more information.

The medicinal chemistry program emphasizes the application of chemical principles to research on the action of drugs on biological systems. Courses offered by the program focus on general principles of medicinal chemistry, drug design and synthesis, chemical aspects of drug metabolism, chemical mechanisms of drug toxicity and carcinogenicity, computer-assisted drug design and receptor modeling, and combinatorial chemistry.

Students must complete a core curriculum of advanced courses in organic and medicinal chemistry, as well as credits in a minor or related field.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Note: Students are not admitted directly to the M.S. program. See the Medicinal Chemistry Ph.D.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.



Students must take all courses for an A-F grade, unless the course is only offered on the S/N grading basis.

#### Required Courses (14 credits)

Take the following courses:

- MEDC 8001 - General Principles of Medicinal Chemistry (3.0 cr)
- MEDC 8002 - General Principles of Medicinal Chemistry (3.0 cr)
- MEDC 8050 - Physical and Mechanistic Organic Chemistry (2.0 cr)
- MEDC 8435 - BioAssay & Data Analysis (1.0 cr)
- CHEM 8321 - Organic Synthesis (4.0 cr)
- CHEM 8066 - Professional Conduct of Chemical Research (1.0 cr)

#### Biochemistry Requirement (2 to 4 credits)

Select one of the following 2- to 4-credit courses in consultation with the advisor. A substitute course can be selected with approval of the advisor and director of graduate studies.

- BIOC 8005 - Biochemistry: Structure and Catalysis (2.0 cr)
- BIOC 8006 - Biochemistry: Metabolism and Control (2.0 cr)
- BIOC 5535 - Introduction to Modern Structural Biology -- Diffraction (2.0 cr)
- BIOC 5528 - Spectroscopy and Kinetics (4.0 cr)
- GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- CHEM 8411 - Introduction to Chemical Biology (4.0 cr)

#### Additional Courses to Satisfy Elective Requirement

Select remaining courses in consultation with the advisor to complete the 20 course credits required for the Plan A, or the 30-credit requirement for the Plan B. At least one course must be selected from the following options.

- MEDC 5185 - Principles of Biomolecular Simulation (3.0 cr)
- MEDC 5494 - Advanced Methods in Quantitative Drug Analysis (2.0 cr)
- MEDC 8070 - The Chemistry and Biology of Infectious Diseases (3.0 cr)
- MEDC 8420 - Natural Products Chemistry (3.0 cr)
- MEDC 8471 - High Throughput Drug Discovery (3.0 cr)
- MEDC 8413 - Chemistry of Nucleic Acids (4.0 cr)
- MEDC 8461 - Design of Cancer Therapeutics (3.0 cr)
- MEDC 8700 - Advanced Concepts in Drug Design (2.0 cr)
- MEDC 8753 - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)
- CHEM 8322 - Advanced Organic Chemistry (4.0 cr)
- MEDC 8401 - Chemistry of Counterterrorism: Chemical, Biological, Radiological, Nuclear & High Explosive Threats (2.0 cr)

#### Thesis Credits

Take at least 10 masters thesis credits.

- MEDC 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Medicinal Chemistry Ph.D.**

*Graduate Studies in Medicinal Chemistry*

### **College of Pharmacy**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Medicinal Chemistry, 8-101 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-624-9919; fax: 612-626-3114)

Email: [medchem@umn.edu](mailto:medchem@umn.edu)

Website: <http://z.umn.edu/medchemgrad>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The program in medicinal chemistry emphasizes the application of chemical principles to research on the action of drugs on biological systems. Courses offered by the program focus on general principles of medicinal chemistry, drug design and synthesis, chemical aspects of drug metabolism, chemical mechanisms of drug toxicity and carcinogenicity, computer-assisted drug design and receptor modeling, and combinatorial chemistry.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants should have a BS or MS degree in an appropriate related science field such as pharmacy, chemistry, or biology. Students majoring in other degree programs that encompass chemical, biochemical, or biological fields of study are also encouraged to apply. All applicants should have completed undergraduate chemistry through elementary organic chemistry. Undergraduate coursework in biochemistry and physical chemistry is also a prerequisite, but under certain circumstances such coursework may be taken during the first year. Students may apply for admission to the PhD program only and are only admitted fall semester.

#### **Special Application Requirements:**

Scores from the General (Aptitude) Test of the GRE, three letters of recommendation from college-level faculty, a complete set of official transcripts, and a statement of immediate and long range career objectives are required. All application materials should be submitted by the admissions deadline listed on the departmental website in order to be considered for fellowship, teaching, and research assistantships awarded in the next academic year.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.





## Program Requirements

24 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Students must take all courses for an A-F grade, unless the course is only offered on the S/N grading basis.

### Required Courses (15 credits)

- MEDC 8001 - General Principles of Medicinal Chemistry (3.0 cr)
- MEDC 8002 - General Principles of Medicinal Chemistry (3.0 cr)
- MEDC 8050 - Physical and Mechanistic Organic Chemistry (2.0 cr)
- MEDC 8435 - BioAssay & Data Analysis (1.0 cr)
- MEDC 8100 - Medicinal Chemistry Seminar (1.0 cr)
- CHEM 8066 - Professional Conduct of Chemical Research (1.0 cr)
- CHEM 8321 - Organic Synthesis (4.0 cr)

### Biochemistry Requirement (2 to 4 credits)

Take at least one of the following courses or select a different 2 to 4 credit course in consultation with the advisor and director of graduate studies.

- BIOC 8005 - Biochemistry: Structure and Catalysis (2.0 cr)
- BIOC 8006 - Biochemistry: Metabolism and Control (2.0 cr)
- BIOC 5535 - Introduction to Modern Structural Biology -- Diffraction (2.0 cr)
- BIOC 5528 - Spectroscopy and Kinetics (4.0 cr)
- GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- CHEM 8411 - Introduction to Chemical Biology (4.0 cr)

### Additional Course Requirements

Take three additional courses, two of which must be from the following list, to complete the 24 course-credit requirement.

- MEDC 5185 - Principles of Biomolecular Simulation (3.0 cr)
- MEDC 5494 - Advanced Methods in Quantitative Drug Analysis (2.0 cr)
- MEDC 8070 - The Chemistry and Biology of Infectious Diseases (3.0 cr)
- MEDC 8420 - Natural Products Chemistry (3.0 cr)
- MEDC 8471 - High Throughput Drug Discovery (3.0 cr)
- MEDC 8413 - Chemistry of Nucleic Acids (4.0 cr)
- MEDC 8461 - Design of Cancer Therapeutics (3.0 cr)
- MEDC 8700 - Advanced Concepts in Drug Design (2.0 cr)
- MEDC 8753 - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)
- CHEM 8322 - Advanced Organic Chemistry (4.0 cr)
- MEDC 8401 - Chemistry of Counterterrorism: Chemical, Biological, Radiological, Nuclear & High Explosive Threats (2.0 cr)

### Thesis Credits

Take at least 24 doctoral thesis credits.

- MEDC 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Pharmaceutics M.S.**

*Graduate Studies in Pharmaceutics*

### **College of Pharmacy**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Pharmaceutics  
Room 9-177 Weaver-Densford Hall  
308 Harvard Street SE  
Minneapolis, MN 55455  
USA  
Phone: 612-624-5151  
Fax: 612-626-2125  
Email: [pceuts@umn.edu](mailto:pceuts@umn.edu)  
Website: <http://www.pharmacy.umn.edu/pharmaceutics>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Pharmaceutics program offers emphases in physical pharmacy, biopharmaceutics, and pharmacokinetics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

Other requirements to be completed before admission:

Undergraduate (and graduate, if applicable) scholastic records, recent GRE scores (with a preferred minimum 80% quantitative reasoning score and 3.5 analytical writing score), a statement of career goals and research interests, and three letters of recommendation.

International applicants must submit results from the TOEFL (with a preferred minimum 100 total score and 23 speaking score, and a required minimum 21 writing score and 19 reading score) or IELTS (with a required minimum 6.5 total score, 6.5 reading score, and 6.5 writing score, and a preferred 6.5 speaking score). Prefer "First Class" or the equivalent on transcripts from foreign institutions.

All of the above are collectively used to determine each candidate's admissibility. Fall admission is highly preferred and the deadline to apply is November 30.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Coursework offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of B- earned for each.

Required Background:

Students must demonstrate sufficient background knowledge in Pharmacology. Equivalent coursework or previous experience, with approval of the program faculty, may be substituted in lieu of required background coursework.

### Required Courses (8 credits)

#### Pharmaceutics Modules (4 credits)

Take the following courses:

[PHM 8210](#) - Pharmacokinetics Module (1.0 cr)

[PHM 8220](#) - Physical Pharmacy Module I (1.0 cr)

[PHM 8230](#) - Physical Pharmacy Module II (1.0 cr)

[PHM 8240](#) - Biopharmaceutics Module (1.0 cr)

#### Pharmaceutics 84xx Courses (4 credits)

Select one of the following courses in consultation with the advisor:

[PHM 8421](#) - Advanced Pharmacokinetics (4.0 cr)

[PHM 8431](#) - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)

[PHM 8441](#) - Solubility and Solid-State Properties of Drugs (4.0 cr)

[PHM 8481](#) - Advanced Neuropharmaceutics (4.0 cr)

### Electives (6 credits)

Take at least 6 credits of electives in the major, which can include PHAR-designated courses noted below taken to satisfy the background knowledge requirement, or other PHAR- and PHM-designated coursework. All courses must be selected in consultation with the advisor.

#### Pharmacology Background

[PHAR 6726](#) - Principles of Pharmacology (2.3 cr)

[PHAR 6762](#) - Medicinal Chemistry and Neuropharmacology (2.8 cr)

### Outside Coursework (6 credits)

Take at least 6 credits of coursework outside the major, which can include non-PHAR- and non-PHM-designated courses noted below taken to satisfy the background knowledge requirement, or other non-PHAR- and non-PHM-designated coursework. All courses must be selected in consultation with the advisor.

#### Pharmacology Background

[NSC 5461](#) - Cellular and Molecular Neuroscience (4.0 cr)

[PHCL 5110](#) - Introduction to Pharmacology (3.0 cr)

### Thesis Credits

Take 10 master's thesis credits.

[PHM 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### ***Twin Cities Campus***

## **Pharmaceutics Minor**

*Graduate Studies in Pharmaceutics*

### **College of Pharmacy**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Pharmaceutics  
Room 9-177 Weaver-Densford Hall  
308 Harvard Street SE  
Minneapolis, MN 55455  
USA  
Phone: 612-624-5151  
Fax: 612-626-2125  
Email: [pceuts@umn.edu](mailto:pceuts@umn.edu)  
Website: <http://www.pharmacy.umn.edu/pharmaceutics>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The pharmaceutics program offers emphases in physical pharmacy, biopharmaceutics, and pharmacokinetics.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

#### **Minor Coursework (6-12 credits)**

Master's students choose 6 credits and doctoral students complete 12 credits in consultation with the pharmaceutics director of graduate studies.  
PHAR 6xxx  
PHM 8xxx

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

**Doctoral**

**Masters**



### ***Twin Cities Campus***

## **Pharmaceutics Ph.D.**

*Graduate Studies in Pharmaceutics*

### **College of Pharmacy**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Pharmaceutics  
Room 9-177 Weaver-Densford Hall  
308 Harvard Street SE  
Minneapolis, MN 55455  
USA  
Phone: 612-624-5151  
Fax: 612-626-2125  
Email: [pceuts@umn.edu](mailto:pceuts@umn.edu)  
Website: <http://www.pharmacy.umn.edu/pharmaceutics>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The pharmaceutics program offers emphases in physical pharmacy, biopharmaceutics, and pharmacokinetics. Minor fields of particular value include biochemistry, biomedical engineering, biometry, chemistry, chemical engineering, mechanical engineering, molecular biology, pharmacology, and statistics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

Other requirements to be completed before admission:

Undergraduate (and graduate, if applicable) scholastic records, recent GRE scores (with a preferred minimum 80% quantitative reasoning score and 3.5 analytical writing score), a statement of career goals and research interests, and three letters of recommendation.

International applicants must submit results from the TOEFL (with a preferred minimum 100 total score and 23 speaking score, and a required minimum 21 writing score and 19 reading score) or IELTS (with a required minimum 6.5 total score, 6.5 reading score, and 6.5 writing score, and a preferred 6.5 speaking score). Prefer "First Class" or the equivalent on transcripts from foreign institutions.

All of the above are collectively used to determine each candidate's admissibility. Fall admission is highly preferred and the deadline to apply is November 30.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

16 credits are required in the major.

8 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Successful completion of program examinations and timely progress towards the degree are also required for students to remain in good standing.

### Required Background:

Students must demonstrate sufficient background knowledge in each of the following areas: Pharmacy, Math, and Statistics. Equivalent coursework or previous experience, with approval of the program faculty, may be substituted in lieu of required background coursework.

### Required Courses

#### Pharmaceutics Modules

[PHM 8210](#) - Pharmacokinetics Module (1.0 cr)

[PHM 8220](#) - Physical Pharmacy Module I (1.0 cr)

[PHM 8230](#) - Physical Pharmacy Module II (1.0 cr)

[PHM 8240](#) - Biopharmaceutics Module (1.0 cr)

#### Pharmaceutics Seminar

Register for 1 credit each semester in which presenting a seminar and for a total of 3 credits.

[PHM 8100](#) - Seminar: Pharmaceutics (1.0 cr)

#### Pharmaceutics Graduate Courses: 81xx

Take two courses for a total of 2 credits from the following list:

[PHM 8110](#) - Readings in Pharmaceutics (1.0 cr)

or [PHM 8120](#) - Readings in Central Nervous System (CNS) Drug Delivery (1.0 cr)

or [PHM 8150](#) - Pharmacokinetics Research Seminar (1.0 cr)

#### Pharmaceutics Graduate Courses: 84xx

Choose two courses from the following list for at least 7 credits:

[PHM 8421](#) - Advanced Pharmacokinetics (4.0 cr)

or [PHM 8431](#) - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)

or [PHM 8441](#) - Solubility and Solid-State Properties of Drugs (4.0 cr)

or [PHM 8481](#) - Advanced Neuropharmaceutics (4.0 cr)

### Outside Coursework

Take at least 8 credits of coursework outside the major, which can include non-PHAR- and non-PHM-designated courses noted below taken to satisfy the background knowledge requirement, or other non-PHAR- and non-PHM-designated coursework. All courses must be selected in consultation with the advisor.

#### Pharmacy Background

[PHCL 5110](#) - Introduction to Pharmacology (3.0 cr)

#### Math Background

[MATH 4512](#) - Differential Equations with Applications (3.0 cr)

#### Statistics Background

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[STAT 5021](#) - Statistical Analysis (4.0 cr)

[STAT 5101](#) - Theory of Statistics I (4.0 cr)

[STAT 5102](#) - Theory of Statistics II (4.0 cr)

[STAT 5302](#) - Applied Regression Analysis (4.0 cr)

[STAT 5303](#) - Designing Experiments (4.0 cr)

[STAT 5401](#) - Applied Multivariate Methods (3.0 cr)

### Thesis Credits

Take at least 24 doctoral thesis credits.



[PHM 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Social and Administrative Pharmacy M.S.**

*Pharmaceutical Care and Health*

### **College of Pharmacy**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

7-155 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-624-2973; fax: 612-625-9931)

Email: [cremi001@umn.edu](mailto:cremi001@umn.edu)

Website: <http://z.umn.edu/saphgrad>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 32
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Study within the Social and Administrative Pharmacy Program is tailored carefully to the specific needs and objectives of the student. It is a flexible, interdisciplinary program which utilizes all resources of the University's many outstanding departments in an effort to provide the student with knowledge and experience in areas she/he feels are applicable to the resolution of pharmacy-oriented problems.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Although the majority of students in the program are pharmacists, a pharmacy education is not required. A bachelor's degree or its foreign equivalent from a recognized college of pharmacy and a strong scholastic record are desirable. Individuals from other fields such as economics, engineering, computer science, medicine, psychology, sociology, or public health may be admitted if their undergraduate coursework satisfies the prerequisites for graduate coursework.

#### **Special Application Requirements:**

Applicants must complete a supplementary application form in addition to the University application. The supplementary form along with three letters of recommendation should be uploaded to the University's online application. GRE scores are required and a performance level of 580 (158 for November 1, 2011-June 30, 2012) is preferred on the TOEFL for all international applicants whose native language is not English.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.





## Program Requirements

**Plan A:** Plan A requires 16 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** Plan B also requires two papers of publishable quality; one paper must include a research component with an analysis of data.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

### Required Courses (16 credits)

All MS students must complete the following courses for 16 credits and take all courses for an A-F grade. Students are required to complete SAPH 8100 (1 credit) 2 times.

[SAPH 5100](#) - Pro-Seminar (1.0 cr)

[SAPH 8100](#) - Seminar (1.0 cr)

[SAPH 8500](#) - Pharmacy and Its Environment (3.0 cr)

[SAPH 8235](#) - Pharmaceutical Economics and Policy (3.0 cr)

[SAPH 8420](#) - Social and Behavioral Aspects of Pharmacy Practice (3.0 cr)

[STAT 5021](#) - Statistical Analysis (4.0 cr)

### Outside Coursework (6 credits)

Select at least 6 credits outside the major, in consultation with the advisor.

### Plan Options

#### Plan A

Plan A students must take at least 10 master's thesis credits.

[SAPH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

Plan B students must take at least 8 additional course credits, selected in consultation with the advisor, to complete the 30-credit minimum.



### **Twin Cities Campus**

## **Social and Administrative Pharmacy Minor**

*Pharmaceutical Care and Health*

### **College of Pharmacy**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

7-155 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-624-2973; fax: 612-625-9931)

Email: [cremi001@umn.edu](mailto:cremi001@umn.edu)

Website: <http://z.umn.edu/saphgrad>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Students in the Social and Administrative Pharmacy Program are prepared for research and related activities investigating relationships between biological and physical factors in social settings that involve the drug use process. The flexible interdisciplinary program uses the resources of the many health and social science departments at the University, and may include courses and offerings from public health, geriatrics, management, sociology, psychology, and public affairs.

The program focuses on the discovery and dissemination of new knowledge to foster appropriate use of drugs to improve patient outcomes at the individual and societal level. Students are educated and mentored to become professional scientists. Those who complete the program will understand the process of conducting high-quality research and problem solving through the application of disciplinary and interdisciplinary knowledge, theory, and research methodology.

Social and administrative pharmacy (SAPH) is the application of behavior-oriented interdisciplinary theories to pharmacy problem solving and pharmacy system development. This includes the study of the social, psychosocial, political, legal, public policy, historic, and economic factors that impinge upon the use, non-use, and abuse of drugs.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

In addition to coursework, a written examination is required.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **Required Courses (6 credits)**

Courses must be selected in consultation with the minor field director of graduate studies.

Take exactly 2 course(s) from the following:

- **SAPH 8235** - Pharmaceutical Economics and Policy (3.0 cr)



- SAPH 8420 - Social and Behavioral Aspects of Pharmacy Practice (3.0 cr)

#### Doctoral

##### Required Courses (9 credits)

Courses must be selected in consultation with the minor field director of graduate studies.

Take exactly 3 course(s) from the following:

- SAPH 8235 - Pharmaceutical Economics and Policy (3.0 cr)
- SAPH 8420 - Social and Behavioral Aspects of Pharmacy Practice (3.0 cr)
- SAPH 8500 - Pharmacy and Its Environment (3.0 cr)

##### Elective (3 credits)

Courses must be selected in consultation with the minor field director of graduate studies.

- SAPH 8255 - Pharmaceutical Marketing (3.0 cr)
- or SAPH 8610 - Pharmacoepidemiology (3.0 cr)
- or SAPH 8810 - Social Psychology of Health Care (3.0 cr)
- or SAPH 8840 - Social Measurement (3.0 cr)



### **Twin Cities Campus**

## **Social and Administrative Pharmacy Ph.D.**

*Pharmaceutical Care and Health*

### **College of Pharmacy**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

7-155 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-624-2973; fax:612-625-9931)

Email: [cremi001@umn.edu](mailto:cremi001@umn.edu)

Website: <http://z.umn.edu/saphgrad>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 71
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Social and administrative pharmacy (SAPH) is the application of behavior-oriented interdisciplinary theories to pharmacy problem solving and pharmacy system development. This includes the study of the social, psycho-social, political, legal, public policy, historic, and economic factors that impinge upon the use, non-use, and abuse of drugs.

Students in the Social and Administrative Pharmacy Program are prepared for research and related activities of investigating relationships between biological and physical factors in social settings that involve the drug use process. This flexible interdisciplinary program uses the resources of the many health and social science departments at the University, and may include courses and offerings from public health, geriatrics, management, sociology, psychology, and public affairs.

The program focuses on the discovery and dissemination of new knowledge to foster appropriate use of drugs to improve patient outcomes at the individual and societal level. Students are educated and mentored to become professional scientists. Those who complete the program will understand the process of conducting high-quality research and problem solving through the application of disciplinary and interdisciplinary knowledge, theory, and research methodology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Applicants must complete a supplementary application form in addition to the University application. The supplementary form along with three letters of recommendation should be uploaded to the University's online application. GRE scores are required and a performance level of 580 (158 for November 1, 2011-June 30, 2012) is preferred on the TOEFL for all international applicants whose native language is not English.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

35 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Required Courses (23 credits)

All PhD students must complete the following courses for 23 credits and take all courses for an A-F grade. Students are required to complete SAPH 8100 (1 credit) 8 times.

[SAPH 5100](#) - Pro-Seminar (1.0 cr)

[SAPH 8100](#) - Seminar (1.0 cr)

[SAPH 8173](#) - Principles and Methods of Implementing Research (3.0 cr)

[SAPH 8235](#) - Pharmaceutical Economics and Policy (3.0 cr)

[SAPH 8420](#) - Social and Behavioral Aspects of Pharmacy Practice (3.0 cr)

[SAPH 8500](#) - Pharmacy and Its Environment (3.0 cr)

[PUBH 6806](#) - Principles of Public Health Research (2.0 cr)

### Statistics Requirement (6 - 8 credits)

Take at least 2 of the following courses or equivalent statistics courses selected in consultation with the advisor.

Take 6 - 8 credit(s) from the following:

•[STAT 5021](#) - Statistical Analysis (4.0 cr)

•[STAT 5302](#) - Applied Regression Analysis (4.0 cr)

•[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

•[EPSY 8252](#) - Statistical Methods in Education II (3.0 cr)

•[PUBH 6450](#) - Biostatistics I (4.0 cr)

•[PUBH 6451](#) - Biostatistics II (4.0 cr)

### Electives (6 credits)

Take 6 or more credit(s) from the following:

•[SAPH 8054](#) - Advanced Studies in Pharmaceutical Care Practice (3.0 cr)

•[SAPH 8200](#) - Research Problems (1.0 - 8.0 cr)

•[SAPH 8255](#) - Pharmaceutical Marketing (3.0 cr)

•[SAPH 8610](#) - Pharmacoepidemiology (3.0 cr)

•[SAPH 8700](#) - Hospital Pharmacy Administration (3.0 cr)

•[SAPH 8702](#) - Hospital Pharmacy Survey (1.0 cr)

•[SAPH 8810](#) - Social Psychology of Health Care (3.0 cr)

•[SAPH 8840](#) - Social Measurement (3.0 cr)

### Outside Coursework (12 credits)

Take at least 12 credits outside the major, selected in consultation with the advisor.

### Thesis Credits

Take at least 24 doctoral thesis credits.

[SAPH 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Advanced Management Training for Clinician Leaders Postbaccalaureate Certificate**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health  
MMC 819, A395 Mayo Memorial Building  
420 Delaware Street SE  
Minneapolis, MN 55455  
Phone: (612)626-3500  
Fax: (612)624-4498  
Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)  
Website: <http://www.sph.umn.edu/>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 13
- This program requires summer semesters for timely completion.
- Degree: Adv Mgmt Training for Clin Leaders PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

NOTE: Applications to the Advanced Management Training for Clinician Leaders Certificate program are not being accepted at this time. For more information, please contact [sph-ask@umn.edu](mailto:sph-ask@umn.edu).

The Regents Certificate in Advanced Management Training for Clinician Leaders is intended for clinicians employed by integrated health systems who will take on critical and expanded roles as executives and managers. This one-year course of study will prepare clinician leaders for successful innovation in emerging forms of healthcare organizations, bring new healthcare leaders with clinical backgrounds into network relationships with other administrators, and consider new approaches to strategy and success in healthcare that are specific to integrated systems.

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants must have at least two years experience in a US-based healthcare organization that either has developed or is considering integrated system relationships. International applications will be considered on a case-by-case basis with special attention paid to the nature and structure of their employing organizations.

#### **Special Application Requirements:**

NOTE: Applications to the Advanced Management Training for Clinician Leaders Certificate program are not being accepted at this time. For more information, please contact [sph-ask@umn.edu](mailto:sph-ask@umn.edu).

Applicants must submit a letter of intent describing career interests and the relevance of the certificate to the applicant's personal development. One letter of recommendation from a person qualified to assess the applicant's academic work; clinical, public health or professional experience; or leadership potential in integrated health systems is required.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7



Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

The certificate is build on a cohort model and comprises 13 credits: five 2-credit courses, one 1-credit face-to-face course and a 2-credit face-to-face practicum. Students will be required to attend on-campus sessions twice during the program. The first on-campus session will be four days in length, during which students will complete a 1-credit course, PUBH 7571. The second session will be held at the end of the program over three days, during which students will present their capstone projects.

### Requirements

The certificate requires 13 total credits. PUBH 7571, PUBH 7572, along with four brand-new courses and a practicum/capstone project (each offered as topics courses via PUBH 6570) make up the requirements for the program. Students complete PUBH 7571 while on campus during for four days at the start of the program, and will complete five courses online during the remaining 12 months. Students will present their capstone projects completed for the practicum during their final three days on campus.

[PUBH 7572](#) - Health Care Strategies in Competitive Markets (2.0 cr)

[PUBH 6570](#) - Healthcare Administration (1.0 - 4.0 cr)



### *Twin Cities Campus*

## Aging Studies Postbaccalaureate Certificate

*School of Public Health - Adm*

### School of Public Health

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636, Fax: 612-624-4498)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu/>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.
- Degree: Aging Studies PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

NOTE: Applications to the Aging Certificate program are not being accepted at this time. For more information, please contact [sph-ask@umn.edu](mailto:sph-ask@umn.edu). The Certificate on Aging is a 12-credit graduate level program with some courses offerings available online, as well as in a face-to-face format. The certificate is designed to increase knowledge and understanding in the multifaceted field of human aging. This interdisciplinary program provides students with the background and confidence necessary to meet the challenges of serving the aging population. The courses are offered through the Center on Aging within the Division of Health Policy and Management.

Aging studies at the University of Minnesota involves an interdisciplinary approach to gerontology for those individuals who hold at least a bachelor's degree. The interdisciplinary nature of the program embraces different backgrounds and interests, and is suitable for graduates from any major.

The primary purpose of aging studies is to prepare professionals for work in programs, businesses, organizations, and agencies that address the needs of an aging population. Examples include the following: hospitals, long-term care facilities, education, clinics, home health care agencies, hospice and end-of-life care organizations, insurance groups, counseling and social services, physician groups, financial planning, architecture and design, public policy makers, and nursing.

### Accreditation

This program is accredited by CEPH

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

NOTE: Applications to the Aging Certificate program are not being accepted at this time. For more information, please contact [sph-ask@umn.edu](mailto:sph-ask@umn.edu). Students who have completed 16-semester credits/24-quarter credits (within the past 24 months) in an academic program in a recognized institution of higher learning in the U.S. do not need to submit the TOEFL as part of the application process.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).





For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Suggested Coursework

Select coursework from the following list, or other courses in consultation with the director of graduate studies, to meet the 12-credit minimum.

Take 12 or more credit(s) from the following:

- **FSOS 8105** - Family Gerontology (3.0 cr)
- **GERO 5100** - Topics in Gerontology (0.5 - 4.0 cr)
- **GERO 5111** - Studying Aging and Chronic Illness (2.0 cr)
- **GERO 5125** - Gerontology Service Learning (3.0 cr)
- **GERO 8020** - Seminar in Gerontology (2.0 cr)
- **SW 5810** - Seminar: Special Topics (1.0 - 4.0 cr)
- **SOC 8590** - Topics in Life Course Sociology (3.0 cr)
- **PUBH 6904** - Nutrition and Aging (2.0 cr)
- **PUBH 8803** - Long-Term Care: Principles, Programs, and Policies (2.0 cr)
- **PA 5412** - Aging and Disability Policy (3.0 cr)



### **Twin Cities Campus**

## **American Indian Public Health and Wellness Minor**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, Room A395 Mayo Memorial Building, 420 Delaware Street SE, Minneapolis, MN 55455 (612-626-3500 or 1-800-774-8636)

Email: [sph.ask@umn.edu](mailto:sph.ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This minor is designed to help students understand how to work respectfully and effectively with Tribes and American Indian communities, to understand the basis of health services and implications of specific tribal (local and federal) law to help improve the devastating health issues currently experienced by American Indians.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Students must be enrolled in a University master's or doctoral degree-granting program. Consult with the program advisor, then contact the American Indian Public Health and Wellness director of graduate studies regarding requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Master's**

##### **Required Coursework (6 credits)**

Take the following required courses for the masters-level minor:

[PUBH 6241](#) - American Indian Public Health and Wellness, Health Policy, Law, Health Services Administration (2.0 cr)

[PUBH 6242](#) - Cultural Humility with American Indian Populations (2.0 cr)

[PUBH 6243](#) - American Indian Research, Evaluation and Collaborations (2.0 cr)

#### **Doctoral**

##### **Required Coursework (6 credits)**

Take the following required courses:



[PUBH 6241](#) - American Indian Public Health and Wellness, Health Policy, Law, Health Services Administration (2.0 cr)

[PUBH 6242](#) - Cultural Humility with American Indian Populations (2.0 cr)

[PUBH 6243](#) - American Indian Research, Evaluation and Collaborations (2.0 cr)

**Electives (6 credits)**

Select elective credits, in consultation with the advisor and the American Indian Public Health and Wellness director of graduate studies, to complete the 12-credit minimum for the doctoral-level minor.

[AMIN 5107](#) - The Structure of Anishinaabemowin, the Ojibwe Language (3.0 cr)

or [AMIN 5141](#) - American Indian Language Planning (3.0 cr)

or [AMIN 5202](#) - Indigenous Peoples and Issues Before the United States Supreme Court (3.0 cr)

or [AMIN 5402](#) - American Indians and the Cinema [AH, DSJ] (3.0 cr)

or [AMIN 5412](#) - Comparative Indigenous Feminisms [GP] (3.0 cr)

or [AMIN 5890](#) - Readings in American Indian and Indigenous History (3.0 cr)

or [AMIN 8910](#) - Topics in American Indian and Indigenous Studies (1.0 - 3.0 cr)

or [CI 8645](#) - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)

or [CSPH 5212](#) - Peacebuilding Through Mindfulness: Transformative Dialogue in the Global Community (3.0 cr)

or [DAKO 5126](#) - Advanced Dakota Language I (3.0 cr)

or [DAKO 5129](#) - Advanced Dakota Language II (3.0 cr)

or [LAW 6236](#) - Indian Law (3.0 cr)

or [OJIB 5106](#) - Advanced Ojibwe Language I (3.0 cr)

or [OJIB 5109](#) - Advanced Ojibwe Language II (3.0 cr)

or [OJIB 5202](#) - Ojibwe Mastery I (3.0 cr)



### Twin Cities Campus

## American Indian Public Health and Wellness Post-Baccalaureate Certificate

School of Public Health - Adm

### School of Public Health

Link to a [list of faculty](#) for this program.

#### Contact Information:

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street SE  
Minneapolis, MN 55455

(612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <https://www.sph.umn.edu/>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The American Indian Public Health and Wellness certificate prepares students to understand how to work respectfully and effectively with Tribes and American Indian communities, to understand the basis of health services, and study the implication of specific local and federal laws to improve the health issues currently experienced by American Indians.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

#### Required Coursework (6 credits)

Take the following courses. All required courses must be taken A/F.

[PUBH 6241](#) - American Indian Public Health and Wellness, Health Policy, Law, Health Services Administration (2.0 cr)

[PUBH 6242](#) - Cultural Humility with American Indian Populations (2.0 cr)

[PUBH 6243](#) - American Indian Research, Evaluation and Collaborations (2.0 cr)

#### Electives (6 credits)

Choose electives in consultation with the advisor to complete the 12-credit minimum.

[AMIN 5107](#) - The Structure of Anishinaabemowin, the Ojibwe Language (3.0 cr)

[AMIN 5141](#) - American Indian Language Planning (3.0 cr)

[AMIN 5202](#) - Indigenous Peoples and Issues Before the United States Supreme Court (3.0 cr)

[AMIN 5402](#) - American Indians and the Cinema [AH, DSJ] (3.0 cr)

[AMIN 5409](#) - American Indian Women: Ethnographic and Ethnohistorical Perspectives [HIS, DSJ] (3.0 cr)

[AMIN 5412](#) - Comparative Indigenous Feminisms [GP] (3.0 cr)

[AMIN 5890](#) - Readings in American Indian and Indigenous History (3.0 cr)

[AMIN 8910](#) - Topics in American Indian and Indigenous Studies (1.0 - 3.0 cr)

[ANTH 5601](#) - Archaeology and Native Americans [DSJ] (3.0 cr)

[CI 8645](#) - Indigenous Language Revitalization and Activist Research Methods (3.0 cr)

[CSPH 5212](#) - Peacebuilding Through Mindfulness: Transformative Dialogue in the Global Community (3.0 cr)



[PUBH 6244](#) - American Indian Health & Wellness Equity (2.0 cr)

[PUBH 6245](#) - American Indian Environmental Health Tribal Case Studies (2.0 cr)

[PUBH 6246](#) - General History of American Indians Post Colonization and Review of Historical Trauma (2.0 cr)



### ***Twin Cities Campus***

## **Applied Biostatistics Postbaccalaureate Certificate**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware St, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu/>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 15
- This program requires summer semesters for timely completion.
- Degree: Applied Biostatistics PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This primarily online certificate program is designed for working biostatisticians, such as data managers and analysts, who are not formally trained and want to improve their technical, mathematical, and computational skills.

The certificate focuses on key aspects of study design, implementation, and analysis for observational and clinical studies.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH)

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Admission preferences and prerequisites:

- Bachelor's degree
- Strong GPA in math and science coursework
- Strong written skills
- Work experience

#### **Special Application Requirements:**

Applicants must submit to SOPHAS Express, a centralized online application service:

- Completed SOPHAS Express application and application fee, designating the University of Minnesota School of Public Health
- Personal statement describing the applicant's reason for applying, career goals, and how the certificate will help them achieve their goals
- One letter of recommendation
- Unofficial transcripts of record from each college/university where a degree was earned. (If admitted, official transcripts will need to be sent directly to the School of Public Health.)
- Resume or C.V.

For detailed application requirements and instructions visit [www.sph.umn.edu](http://www.sph.umn.edu).

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100



- Paper Based - Total Score: 600
- IELTS
- Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses must be taken A-F, unless offered only S-N. The minimum grade for each A-F graded course is B-.

### Required Coursework (15 credits)

Select PubH 6431 or PubH 6432 in consultation with the advisor.

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[PUBH 6451](#) - Biostatistics II (4.0 cr)

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

[PUBH 7415](#) - Introduction to Clinical Trials (3.0 cr)

[PUBH 6431](#) - Topics in Hierarchical Bayesian Analysis (1.0 cr)

or [PUBH 6432](#) - Biostatistical Methods in Translational and Clinical Research (1.0 cr)



### *Twin Cities Campus*

## **Biostatistics M.P.H.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street S.E., Minneapolis, MN 55455 (612-626-3500 or 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 42
- This program requires summer semesters for timely completion.
- Degree: Master of Public Health

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

A biostatistician is an important member of many research teams. Working in close partnership with researchers across a wide array of scientific disciplines, a biostatistician designs studies and develops statistical tools to extract meaning from complex data. The Biostatistics MPH program requires students to meet core competencies in public health administration, behavioral science, biostatistics, environmental health, foundations, epidemiology, and ethics, as well as complete both an applied practice and integrative learning experience.

## **Accreditation**

This program is accredited by CEPH (Council on Education for Public Health).

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

The admissions committee reviews applicants according to their record of academic achievement, demonstrated academic potential, letters of recommendation, background and experience, and other factors. GPAs and standardized test scores provide competitive points of reference for admission but are not alone decisive in the admissions review.

Prospective applicants should have taken at least:

- Three semesters of calculus (including multivariable calculus)
- One semester of linear algebra

Experience with a programming language (eg. Java, C, Python) is helpful, but not required.

#### **Special Application Requirements:**

International applicants who have attended post-secondary institutions outside of the U.S. are also required to submit the following supporting documentation to SOPHAS.

World Education Services (WES) evaluation of foreign academic credentials. The University of Minnesota School of Public Health requires all applicants with foreign academic credentials to provide a WES course-by-course evaluation of those credentials.

Note: Applicants with transcripts from Canadian schools are exempt from this requirement. Instead, applicants should have copies of their Canadian transcripts sent directly to SOPHAS.

Through special arrangements with SOPHAS, WES will deliver its credential evaluation report directly to SOPHAS by secure electronic transmission. This expedites the delivery of the evaluation report as well as images of the applicant's verified transcripts to SOPHAS





and allows SOPHAS to process the report most efficiently. Go to <http://www.wes.org/sophas> for more information.

Note: Once WES receives the required documentation, it can complete an evaluation in seven business days or less, depending on the type of service requested. However, if additional research, correspondence, or verification is required, the evaluation will take longer. Students are recommended to start the process at least six weeks prior to the program deadline to ensure that their WES evaluation reports are complete by the deadline.

#### Proof of English Proficiency

Applicants whose native language is not English, or whose academic study was done exclusively at non-English speaking institutions, must prove English proficiency by providing either official Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) scores.

Official report of the scores should be sent directly to SOPHAS using designation code 5688 for the TOEFL or designation code SOPHAS for the IELTS.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 150
  - General Test - Quantitative Reasoning: 146
  - General Test - Analytical Writing: 4

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#) (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 42 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required.  
**Capstone Project:** Students complete 1 credit of PUBH 7494 (Integrative Learning Experience).

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Courses must be taken A/F unless offered only S/N. Minimum grade of B- must be earned for required courses.

#### Public Health Core Requirements (12 credits)

A minimum grade of B- must be earned for each of the following PUBH core courses:

##### Administration

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

##### Foundations of Social and Behavioral Science

[PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)

##### Environmental Health

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

##### Epidemiology

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

##### Foundations of Public Health

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

##### Ethics



[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

**Biostatistics Core Requirements (22 credits)**

- [PUBH 7405](#) - Biostatistics: Regression (4.0 cr)
- [PUBH 7406](#) - Advanced Regression and Design (4.0 cr)
- [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- [PUBH 7450](#) - Survival Analysis (3.0 cr)
- [STAT 5101](#) - Theory of Statistics I (4.0 cr)
- [STAT 5102](#) - Theory of Statistics II (4.0 cr)

**Applied Practice Experience (1 cr)**

- [PUBH 7496](#) - Applied Practice Experience: Biostatistics (1.0 cr)

**Integrated Learning Experience (1 credit)**

- Take [PUBH 7494](#) for one credit.
- [PUBH 7494](#) - Integrative Learning Experience: Biostatistics (1.0 - 3.0 cr)

**Biostatistics Electives (6 credits)**

- [PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)
- [PUBH 7440](#) - Introduction to Bayesian Analysis (3.0 cr)
- [PUBH 7445](#) - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- [PUBH 7460](#) - Advanced Statistical Computing (3.0 cr)
- [PUBH 7461](#) - Exploring and Visualizing Data in R (2.0 cr)
- [PUBH 7462](#) - Advanced Programming and Data Analysis in R (2.0 cr)
- [PUBH 7465](#) - Biostatistics Consulting (3.0 cr)
- [PUBH 7470](#) - Study Designs in Biomedical Research (3.0 cr)
- [PUBH 7475](#) - Statistical Learning and Data Mining (3.0 cr)
- [PUBH 7485](#) - Methods for Causal Inference (3.0 cr)
- [PUBH 8422](#) - Modern Nonparametrics (3.0 cr)
- [PUBH 8472](#) - Spatial Biostatistics (3.0 cr)



### *Twin Cities Campus*

## **Biostatistics M.S.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 33
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The biostatistics MS prepares graduates to collaborate with researchers across a wide array of scientific disciplines in the design of biomedical studies, development of statistical tools, and the analysis of data.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.10.

Other requirements to be completed before admission:

The admissions committee reviews applicants according to their record of academic achievement, demonstrated academic potential, letters of recommendation, background and experience, and other factors. GPA and standardized test scores provide competitive points of preference for admission but are not alone decisive in the admissions review. At least three semesters of calculus (including multivariable calculus) and one semester of linear algebra, as well as a year (two semesters) of coursework in undergraduate-level probability and mathematical statistics are recommended. Experience with a programming language (e.g., R, Java, C, Python) and exposure to applied statistics is helpful, but not required.

#### **Special Application Requirements:**

Applications are accepted for fall semester admission only.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 150
  - General Test - Quantitative Reasoning: 146
  - General Test - Analytical Writing: 4

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 33 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** PubH 7494, Integrated Learning Experience, 3 credits

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Courses must be taken A/F, unless offered only S/N.

### Biostatistics Plan A Requirements (30 credits)

#### Required Coursework (2 credits)

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

#### Biostatistics Courses (12 credits)

Select 12 credits in consultation with advisor.

[PUBH 7405](#) - Biostatistics: Regression (4.0 cr)

[PUBH 7406](#) - Advanced Regression and Design (4.0 cr)

[PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

[PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)

[PUBH 7440](#) - Introduction to Bayesian Analysis (3.0 cr)

[PUBH 7445](#) - Statistics for Human Genetics and Molecular Biology (3.0 cr)

[PUBH 7450](#) - Survival Analysis (3.0 cr)

[PUBH 7460](#) - Advanced Statistical Computing (3.0 cr)

[PUBH 7461](#) - Exploring and Visualizing Data in R (2.0 cr)

[PUBH 7462](#) - Advanced Programming and Data Analysis in R (2.0 cr)

[PUBH 7465](#) - Biostatistics Consulting (3.0 cr)

[PUBH 7470](#) - Study Designs in Biomedical Research (3.0 cr)

[PUBH 7475](#) - Statistical Learning and Data Mining (3.0 cr)

[PUBH 7485](#) - Methods for Causal Inference (3.0 cr)

[PUBH 8422](#) - Modern Nonparametrics (3.0 cr)

[PUBH 8445](#) - Statistics for Human Genetics and Molecular Biology (3.0 cr)

[PUBH 8472](#) - Spatial Biostatistics (3.0 cr)

[PUBH 8475](#) - Statistical Learning and Data Mining (3.0 cr)

[PUBH 8485](#) - Methods for Causal Inference (3.0 cr)

#### Electives (6 credits)

Complete 6 credits in consultation with advisor.

[MATH 5615H](#) - Honors: Introduction to Analysis I (4.0 cr)

[MATH 5616H](#) - Honors: Introduction to Analysis II (4.0 cr)

[STAT 5101](#) - Theory of Statistics I (4.0 cr)

[STAT 5102](#) - Theory of Statistics II (4.0 cr)

[STAT 5401](#) - Applied Multivariate Methods (3.0 cr)

[STAT 5601](#) - Nonparametric Methods (3.0 cr)

[STAT 8101](#) - Theory of Statistics 1 (3.0 cr)

[STAT 8102](#) - Theory of Statistics 2 (3.0 cr)

#### Plan A Thesis (10 credits)

[PUBH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

### Biostatistics Plan B Requirements (33 credits)

In consultation with advisor, Plan B students complete 33 credits.

#### Biostatistics Core (14 credits)

[PUBH 7405](#) - Biostatistics: Regression (4.0 cr)

[PUBH 7406](#) - Advanced Regression and Design (4.0 cr)

[PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

[PUBH 7450](#) - Survival Analysis (3.0 cr)



STAT 5101 - Theory of Statistics I (4.0 cr)  
or STAT 8101 - Theory of Statistics 1 (3.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
or STAT 8102 - Theory of Statistics 2 (3.0 cr)

**Public Health Foundations (2 credits)**

PUBH 6250 - Foundations of Public Health (2.0 cr)

**Biostatistics Electives (8 credits)**

Plan B students complete courses in consultation with advisor to meet the 33-credit minimum.

GEOG 5561 - Principles of Geographic Information Science (4.0 cr)

GIS 5571 - ArcGIS I (3.0 cr)

MATH 5615H - Honors: Introduction to Analysis I (4.0 cr)

MATH 5616H - Honors: Introduction to Analysis II (4.0 cr)

PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)

PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)

PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)

PUBH 7460 - Advanced Statistical Computing (3.0 cr)

PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)

PUBH 7462 - Advanced Programming and Data Analysis in R (2.0 cr)

PUBH 7465 - Biostatistics Consulting (3.0 cr)

PUBH 7470 - Study Designs in Biomedical Research (3.0 cr)

PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)

PUBH 7485 - Methods for Causal Inference (3.0 cr)

PUBH 8422 - Modern Nonparametrics (3.0 cr)

PUBH 8472 - Spatial Biostatistics (3.0 cr)

STAT 5401 - Applied Multivariate Methods (3.0 cr)

STAT 5601 - Nonparametric Methods (3.0 cr)

WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)

WRIT 5052 - Graduate Research Presentations and Conference Writing for Non-Native Speakers of English (3.0 cr)

**Plan B Project (3 credits)**

PUBH 7494 - Integrative Learning Experience: Biostatistics (1.0 - 3.0 cr)



### *Twin Cities Campus*

## Biostatistics Minor

School of Public Health - Adm

### School of Public Health

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12 to 14
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The biostatistics minor is designed to familiarize students with the statistical tools necessary to analyze health science data. By taking public health courses focused on the fundamentals of statistical methodologies and programming techniques, students will gain skills that enable them to be involved in the design and analysis of quantitative studies as part of their future professional career or graduate study in an applied field.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Admission to the biostatistics graduate minor is contingent upon enrollment in a University graduate program. Students should consult with their advisor about pursuing the biostatistics minor prior to contacting the biostatistics program office for information.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Masters

No more than one course can be taken S/N. Approval by the Biostatistics director of graduate studies is required. A minimum GPA of 3.0 is required.

### Required Courses (6 credits)

Select at least two courses, in consultation with the Biostatistics director of graduate studies, from the following list:

[PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)

[PUBH 7440](#) - Introduction to Bayesian Analysis (3.0 cr)

[PUBH 7445](#) - Statistics for Human Genetics and Molecular Biology (3.0 cr)



PUBH 7450 - Survival Analysis (3.0 cr)  
PUBH 7470 - Study Designs in Biomedical Research (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 7485 - Methods for Causal Inference (3.0 cr)  
Students may take 7415 or 7420 but not both.  
PUBH 7415 - Introduction to Clinical Trials (3.0 cr)  
or PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

#### Doctoral

PhD students must obtain pre-approval from the Biostatistics director of graduate studies for proposed minor field coursework.

No more than one course can be taken S/N, and must be approved by the Biostatistics director of graduate studies is required.

#### Required Courses for students in the Statistics PhD program (12 credits)

##### Required Courses (6 credits)

Take the following courses:

PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)  
PUBH 7450 - Survival Analysis (3.0 cr)

##### Electives (6 credits)

Select at least 6 credits, in consultation with the Biostatistics director of graduate studies, from the following list:

PUBH 8422 - Modern Nonparametrics (3.0 cr)  
PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)  
PUBH 8452 - Advanced Longitudinal Data Analysis (3.0 cr)  
PUBH 8462 - Advanced Survival Analysis (3.0 cr)  
PUBH 8472 - Spatial Biostatistics (3.0 cr)  
PUBH 8475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 8482 - Sequential and Adaptive Methods for Clinical Trials (3.0 cr)  
PUBH 8485 - Methods for Causal Inference (3.0 cr)

#### or Required Courses for students in a PhD program outside of Statistics (14 credits)

##### Required Course Sequence (8 credits)

Select one of the following course sequences, in consultation with the Biostatistics director of graduate studies:

##### Option 1

PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)  
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)

##### or Option 2

PUBH 7405 - Biostatistics: Regression (4.0 cr)  
PUBH 7406 - Advanced Regression and Design (4.0 cr)

##### Electives (6 credits)

Select at least 6 credits, in consultation with the Biostatistics director of graduate studies, from the following list:

PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 7450 - Survival Analysis (3.0 cr)  
PUBH 7470 - Study Designs in Biomedical Research (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 7485 - Methods for Causal Inference (3.0 cr)

##### Clinical Trials course options

Students may take 7415 or 7420 but not both.

PUBH 7415 - Introduction to Clinical Trials (3.0 cr)  
or PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)



### *Twin Cities Campus*

## Biostatistics Ph.D.

School of Public Health - Adm

### School of Public Health

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 53 to 67
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The biostatistics PhD prepares graduates to conduct original research, collaborate and consult with biomedical researchers, implement and disseminate results of this research, and teach and mentor others in the field.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.70.

Other requirements to be completed before admission:

At least three semesters of calculus (including multivariable) and one semester of linear algebra, and two semesters of undergraduate courses in probability and mathematical statistics are strongly recommended. Real analysis or an equivalent is recommended. Experience with programming language (e.g., R, Java, C) and exposure to applied statistics is helpful, but not required.

In addition to completing the SOPHAS application, applicants must submit the following directly to SOPHAS:

Statement of purpose and objectives (an essay describing past education, experience, and current professional career objectives)

Résumé or curriculum vitae

Official postsecondary transcripts from all institutions attended, including previous study at the University of Minnesota (have transcripts sent directly from the institutions to SOPHAS)

Three letters of recommendation from persons qualified to assess academic work; clinical, public health, or professional experience; and leadership potential

#### **Special Application Requirements:**

Applications are accepted for fall semester admission only. All admitted international Ph.D. applicants are required to provide a World Education Services (WES) document verification report prior to beginning the program.

#### Proof of English Proficiency

Applicants whose native language is not English, or whose academic study was done exclusively at non-English speaking institutions, must prove English proficiency by providing either official Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) scores. Official report of the scores should be sent directly to SOPHAS using designation code 5688 for the TOEFL or designation code SOPHAS for the IELTS. Scores must be less than two years old. The preferred minimum English language test scores for admission to the School of Public Health are listed below.

The English Language test requirement may be waived if an applicant can provide proof of one of the following:

- Completion of 16 semester credits/24 quarter credits (within the past 24 months) in an academic program at a recognized institution of higher learning in the U.S. or Canada.
- An Educational Commission for Foreign Medical Graduates (ECFMG) certificate. Students should have an official or attested copy sent directly to the University of Minnesota School of Public Health at the address listed above.





Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 150
  - General Test - Quantitative Reasoning: 146
  - General Test - Analytical Writing: 4

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

29 to 43 credits are required in the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.3 is required for students to remain in good standing.

At least 3 semesters must be completed before filing a Degree Program Form.

Students entering the program without a statistics or biostatistics master's degree may need to complete additional preparatory coursework in their first year, selected in consultation with the advisor and Biostatistics director of graduate studies upon admission. Students who have not taken a real analysis course may need to complete MATH 4603 Advanced Calculus. Those who have taken a real analysis course are strongly encouraged, but not required to, take MATH 5615H. Preparatory coursework cannot be applied toward degree requirements.

Courses must be taken A/F, unless offered only S/N.

### Biostatistics Core Requirements (19 credits)

- [PUBH 6250](#) - Foundations of Public Health (2.0 cr)
- [PUBH 7450](#) - Survival Analysis (3.0 cr)
- [PUBH 8401](#) - Linear Models (4.0 cr)
- [PUBH 8403](#) - Research Skills in Biostatistics (1.0 cr)
- [PUBH 8412](#) - Advanced Statistical Inference (3.0 cr)
- [PUBH 8432](#) - Probability Models for Biostatistics (3.0 cr)
- [PUBH 8442](#) - Bayesian Decision Theory and Data Analysis (3.0 cr)

### Biostatistics Electives (9 credits)

Select at least 9 credits, in consultation with the advisor, from the following:

- [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- [PUBH 7465](#) - Biostatistics Consulting (3.0 cr)
- [PUBH 8422](#) - Modern Nonparametrics (3.0 cr)
- [PUBH 8445](#) - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- [PUBH 8446](#) - Advanced Statistical Genetics and Genomics (3.0 cr)
- [PUBH 8452](#) - Advanced Longitudinal Data Analysis (3.0 cr)
- [PUBH 8462](#) - Advanced Survival Analysis (3.0 cr)



- [PUBH 8472](#) - Spatial Biostatistics (3.0 cr)
- [PUBH 8475](#) - Statistical Learning and Data Mining (3.0 cr)
- [PUBH 8482](#) - Sequential and Adaptive Methods for Clinical Trials (3.0 cr)
- [PUBH 8485](#) - Methods for Causal Inference (3.0 cr)
- [PUBH 8492](#) - Theories of Hierarchical and Other Richly Parametrized Linear Models (3.0 cr)

**Health Science Elective (1 credit)**

Take at least one credit offered by other School of Public Health divisions or Health Sciences programs. This course is chosen in consultation with the advisor.

- [PUBH 6xxx](#)
- [PUBH 7xxx](#)
- [PUBH 8xxx](#)

**Thesis Credits**

Take at least 24 doctoral thesis credits.

- [PUBH 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Requirements for students entering the PhD without a master's in statistics or biostatistics**

Students entering the PhD without a master's in statistics or biostatistics must complete an additional 14 credits, selected in consultation with advisor.

**Additional Biostatistics Coursework (14 credits)**

Take the following courses for 14 credits:

- [STAT 8101](#) - Theory of Statistics 1 (3.0 cr)
- [STAT 8102](#) - Theory of Statistics 2 (3.0 cr)
- [PUBH 7405](#) - Biostatistics: Regression (4.0 cr)
- [PUBH 7406](#) - Advanced Regression and Design (4.0 cr)



### **Twin Cities Campus**

## **Clinical Research M.S.**

School of Public Health - Adm

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 38
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MS in clinical research is a graduate degree as well as a career development path for physician-scientists, clinical scholars, and biomedical researchers.

The program trains students to conduct patient-oriented research, directly interacting with human subjects to better understand disease, the development of therapeutic interventions, and the conduct of clinical trials. Students learn how to conduct epidemiologic and behavioral studies and understand issues related to outcomes-based research, and also develop grant writing and data analytic skills.

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

An advanced health professional degree (MD, DDS, DVM, DO, DNP, DC, PharmD, PhD, etc.) or other advanced doctoral degree in a clinical biomedical field from an accredited university.

Other requirements to be completed before admission:

Students must have completed or must be at an advanced stage of their clinical practice training and be affiliated with a University faculty member eligible to advise and access a clinical project. The admissions committee considers exceptions on an individual basis.

#### **Special Application Requirements:**

An official transcript verifying completion of an advanced health professional degree and training sufficient to be eligible for a license to practice. One of the three required recommendation letters and a completed School of Public Health Recommendation form from the clinical director of training supporting the applicant's potential as a clinical researcher.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 38 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** Students can opt to complete a manuscript or a grant proposal for their capstone project. The topic and scope of the project must be approved by the advisor and director of graduate studies.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Students must complete both sessions of the University's Responsible Conduct of Research course, validated by ORTTA. Students also must complete the NIH's online training, Protection of Human Research Subjects, validated by electronic certificate upon successful completion.

A grade of at least B- must be earned for the core, epidemiology, and clinical trials courses taken on the A/F grade basis. If PUBH 6320 is taken, a grade of at least A- must be earned.

### Required Core Courses (16 credits)

Take the following courses:

[PUBH 6301](#) - Fundamentals of Clinical Research (3.0 cr)

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[PUBH 6451](#) - Biostatistics II (4.0 cr)

[PUBH 6742](#) - Ethics in Public Health: Research and Policy (1.0 cr)

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

[PUBH 6310](#) - Clinical Epidemiology 1 (1.0 cr)

[PUBH 6311](#) - Clinical Epidemiology II (1.0 cr)

### Epidemiology Course (3 credits)

Select one of the following courses in consultation with the director of graduate studies.

[PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

or [PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

### Clinical Trials Course (3 credits)

Select one of the following courses in consultation with the director of graduate studies.

[PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

or [PUBH 7415](#) - Introduction to Clinical Trials (3.0 cr)

### Capstone Project (6 to 10 credits)

Take 6 to 10 credits of PUBH 8394, in consultation with the advisor and director of graduate studies.

[PUBH 8394](#) - Capstone Project: Clinical Research (1.0 - 10.0 cr)

### Electives

Select electives in consultation with the director of graduate studies to meet the 38-credit requirement.

[DENT 8100](#) - Topics in Advanced Periodontology: Literature Review (2.0 cr)

[DENT 8120](#) - Advanced Principles and Techniques of Orofacial Pain Disorders (2.0 cr)

[DENT 8121](#) - Current Literature in TMD and Orofacial Pain (1.0 cr)

[ECP 5220](#) - Regulatory Issues in Drug Research (2.0 cr)

[ECP 5620](#) - Drug Metabolism and Disposition (3.0 cr)

[ECP 8100](#) - Seminar (1.0 cr)

[MICA 8013](#) - Translational Cancer Research (2.0 cr)

[NURS 5925](#) - Grant Writing and Critique (1.0 cr)

[NURS 6102](#) - Family Health Theory (2.0 cr)

[NURS 7202](#) - Moral and Ethical Positions and Actions in Nursing (2.0 cr)

[NURS 8152](#) - Scholarship in Health Care Ethics (3.0 cr)

[NURS 8172](#) - Theory and Theory Development for Research (3.0 cr)

[NURS 8173](#) - Principles and Methods of Implementing Research (3.0 cr)

[NURS 8175](#) - Quantitative Research Design and Methods (3.0 cr)

[PHAR 6224](#) - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)



PHCL 5111 - Pharmacogenomics (3.0 cr)  
PUBH 6108 - Foundations of Global Health (2.0 cr)  
PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)  
PUBH 6303 - Clinical Research Project Seminar (2.0 cr)  
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)  
PUBH 6343 - Epidemiologic Methods III (4.0 cr)  
PUBH 6348 - Writing Research Grants (2.0 cr)  
PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6387 - Cancer Epidemiology (2.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6717 - Decision Analysis for Health Care (2.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6863 - Understanding Health Care Quality (2.0 cr)  
PUBH 6864 - Conducting Health Outcomes Research (3.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 7450 - Survival Analysis (3.0 cr)  
PUBH 7470 - Study Designs in Biomedical Research (3.0 cr)  
TMDP 8441 - Seminar in Temporomandibular Disorders & Orofacial Pain (1.0 cr)  
VMED 5080 - Problems in Veterinary Epidemiology and Public Health (1.0 - 3.0 cr)  
VMED 5165 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)  
VMED 8090 - Epidemiology of Zoonoses and Diseases Common to Animals and Humans (3.0 cr)



### ***Twin Cities Campus***

## **Clinical Research Postbaccalaureate Certificate**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 16
- This program does not require summer semesters for timely completion.
- Degree: Clinical Research PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The certificate is designed for clinicians and other health professionals with at least five years of relevant experience who want to learn how to design, implement, and interpret clinical research studies. Students can pursue the certificate on a part-time basis.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH)

### **Program Delivery**

This program is available:

- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants are required to have a baccalaureate degree and either a minimum of five years of relevant clinical research experience or GRE scores.

#### **Special Application Requirements:**

Applicants must submit to SOPHAS Express, a centralized online application service:

- Completed SOPHAS Express application and application fee, designating the University of Minnesota School of Public Health
- Personal statement describing the applicant's reason for applying, career goals, and how the certificate will help them achieve their goals
- One letter of recommendation
- Unofficial transcripts of record from each college/university where a degree was earned. (If admitted, official transcripts will need to be sent directly to the School of Public Health.)
- Resume or C.V.

For detailed application requirements and instructions visit [www.sph.umn.edu](http://www.sph.umn.edu).

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Analytical Writing: 3.5

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600



- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

A grade of at least B- must be earned for courses taken on the A/F grade basis.

### Required Coursework (14 credits)

Take the following courses in consultation with the program director:

- [PUBH 6301](#) - Fundamentals of Clinical Research (3.0 cr)
- [PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)
- [PUBH 6450](#) - Biostatistics I (4.0 cr)
- [PUBH 6742](#) - Ethics in Public Health: Research and Policy (1.0 cr)

Select 1 of the following 2 courses:

- [PUBH 7415](#) - Introduction to Clinical Trials (3.0 cr)
- or [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

### Electives (2 credits)

Select 2 elective credits from the following in consultation with the program director:

- [DENT 8100](#) - Topics in Advanced Periodontology: Literature Review (2.0 cr)
- [DENT 8120](#) - Advanced Principles and Techniques of Orofacial Pain Disorders (2.0 cr)
- [DENT 8121](#) - Current Literature in TMD and Orofacial Pain (1.0 cr)
- [ECP 5220](#) - Regulatory Issues in Drug Research (2.0 cr)
- [ECP 5620](#) - Drug Metabolism and Disposition (3.0 cr)
- [ECP 8100](#) - Seminar (1.0 cr)
- [MICA 8013](#) - Translational Cancer Research (2.0 cr)
- [NURS 5925](#) - Grant Writing and Critique (1.0 cr)
- [NURS 6102](#) - Family Health Theory (2.0 cr)
- [NURS 7202](#) - Moral and Ethical Positions and Actions in Nursing (2.0 cr)
- [NURS 8152](#) - Scholarship in Health Care Ethics (3.0 cr)
- [NURS 8172](#) - Theory and Theory Development for Research (3.0 cr)
- [NURS 8173](#) - Principles and Methods of Implementing Research (3.0 cr)
- [NURS 8175](#) - Quantitative Research Design and Methods (3.0 cr)
- [PHAR 6224](#) - Pharmacogenomics: Genetic Basis for Variability in Drug Response (2.0 cr)
- [PHCL 5111](#) - Pharmacogenomics (3.0 cr)
- [PUBH 6108](#) - Foundations of Global Health (2.0 cr)
- [PUBH 6181](#) - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- [PUBH 6303](#) - Clinical Research Project Seminar (2.0 cr)
- [PUBH 6325](#) - Data Processing with PC-SAS (1.0 cr)
- [PUBH 6343](#) - Epidemiologic Methods III (4.0 cr)
- [PUBH 6348](#) - Writing Research Grants (2.0 cr)
- [PUBH 6381](#) - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- [PUBH 6385](#) - Epidemiology and Control of Infectious Diseases (2.0 cr)
- [PUBH 6386](#) - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- [PUBH 6387](#) - Cancer Epidemiology (2.0 cr)
- [PUBH 6389](#) - Nutritional Epidemiology (2.0 cr)
- [PUBH 6420](#) - Introduction to SAS Programming (1.0 cr)
- [PUBH 6717](#) - Decision Analysis for Health Care (2.0 cr)
- [PUBH 6803](#) - Conducting a Systematic Literature Review (3.0 cr)
- [PUBH 6863](#) - Understanding Health Care Quality (2.0 cr)
- [PUBH 6864](#) - Conducting Health Outcomes Research (3.0 cr)
- [PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)
- [PUBH 7440](#) - Introduction to Bayesian Analysis (3.0 cr)



- [PUBH 7445](#) - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- [PUBH 7450](#) - Survival Analysis (3.0 cr)
- [PUBH 7470](#) - Study Designs in Biomedical Research (3.0 cr)
- [TMDP 8441](#) - Seminar in Temporomandibular Disorders & Orofacial Pain (1.0 cr)
- [VMED 5080](#) - Problems in Veterinary Epidemiology and Public Health (1.0 - 3.0 cr)
- [VMED 5165](#) - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- [VMED 8090](#) - Epidemiology of Zoonoses and Diseases Common to Animals and Humans (3.0 cr)





### *Twin Cities Campus*

## Community Health Promotion M.P.H.

*School of Public Health - Adm*

### School of Public Health

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program requires summer semesters for timely completion.
- Degree: Master of Public Health

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Through coursework and fieldwork taken at the School of Public Health, students in community health promotion develop basic competencies in theory, health behavior and policy interventions, assessment methods, cultural competency, and management.

Each graduate should have the ability to:

- Use theories of behavior and social change to inform the planning and evaluation of health interventions
- Identify individual, community, and policy-level interventions that are effective in promoting healthy behaviors and social conditions
- Design and implement effective individual, community, and policy-level interventions targeting a variety of health behaviors
- Assess the health status of populations and communities
- Utilize appropriate data collection strategies and qualitative and quantitative methods to evaluate health interventions
- Identify the role of cultural, social, and behavioral factors in influencing health behaviors and status
- Develop and adapt approaches to solving health problems, taking into account cultural differences
- Communicate health information effectively both in writing and orally
- Advocate for public health programs and resources
- Collaborate with public health agencies and other constituency groups
- Coordinate and manage health programs/services
- Relate ethical considerations and values to one's professional practice

The MPH in community health promotion is a good path for students planning for careers as public health practitioners or planning to pursue a PhD in social and behavioral epidemiology, which is available in the School of Public Health.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Baccalaureate degree or higher from an accredited college or university. College-level courses in the following areas: social and behavioral sciences (at least 3 courses) and introductory statistics (1 course).

#### **Special Application Requirements:**

Applicants must have one year of paid or volunteer experience in a public health, social service, or community setting.

International applicants must submit score(s) from one of the following tests:



- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 48 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.  
**Capstone Project:** Students complete an Integrated Learning Experience (ILE) in consultation with the advisor.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken A/F unless offered only S/N. Minimum grade of B- must be earned for required courses.

### Public Health Core Requirements (15 credits)

#### Biostatistics (4 credits)

Take the following course:

[PUBH 6450](#) - Biostatistics I (4.0 cr)

#### Environmental Health (2 credits)

Take the following course:

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

#### Epidemiology (3 credits)

Select one of the following:

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

#### Ethics (1 credit)

Take the following course:

[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

#### Administration/Management (2 credits)

Take the following course:

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

#### Community Health Theory/Social and Behavioral Health (3 credits)

Take the following course:

[PUBH 6050](#) - Community Health Promotion I: Integrating Theory, Evidence, and Context (3.0 cr)

#### Theory (3 credits)

Take the following course:

[PUBH 6051](#) - Community Health Promotion II: Developing, Implementing, and Justifying Interventions (3.0 cr)

### Health Behavior and Policy Interventions (8 credits)

#### Required Course

Take 1 of the following courses:

[PUBH 6045](#) - Skills for Policy Development (1.0 cr)

or [PUBH 6078](#) - Public Health Policy as a Prevention Strategy (2.0 cr)

Select courses from the following to meet to complete this 8-credit minimum:

[PUBH 5231](#) - Emergency Preparedness: A Public Health Perspective (2.0 cr)

[PUBH 6011](#) - Public Health Approaches to HIV/AIDS (3.0 cr)

[PUBH 6049](#) - Legislative Advocacy Skills for Public Health (3.0 cr)

[PUBH 6055](#) - Social Inequalities in Health (2.0 cr)

[PUBH 6066](#) - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)

[PUBH 6074](#) - Mass Communication and Public Health (3.0 cr)

[PUBH 6081](#) - Sex, Sexuality, and Sexual Health (2.0 cr)

[PUBH 6094](#) - Obesity and Eating Disorder Interventions (2.0 cr)

[PUBH 6120](#) - Injury Prevention in the Workplace, Community, and Home (2.0 cr)



[PUBH 6123](#) - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)  
[PUBH 6627](#) - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)

#### **Evaluation-related Methods (6-10 credits)**

##### **Required Course**

Take the following course:

[PUBH 6035](#) - Evaluation II: Applications (3.0 cr)

##### **Evaluation Course**

Select one of the following courses in consultation with the advisor:

[PUBH 6034](#) - Evaluation (3.0 cr)

or [PUBH 6852](#) - Program Evaluation in Health and Mental Health Settings (2.0 cr)

##### **Methods Course**

Select one of the following courses in consultation with the advisor:

[PUBH 6107](#) - Excel and Access Skills in Public Health Settings (1.0 cr)

[PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

[PUBH 6451](#) - Biostatistics II (4.0 cr)

[PUBH 6636](#) - Qualitative Research Methods in Public Health Practice (2.0 cr)

#### **Applied Practice Experience (1-2 credits)**

Take at least 1 credit, in consultation with the advisor:

[PUBH 7096](#) - Applied Practice Experience: Community Health Promotion (1.0 - 5.0 cr)

#### **Integrated Learning Experience (1 credit)**

Take at least 1 credit, in consultation with the advisor:

[PUBH 7094](#) - Integrative Learning Experience: Community Health Promotion (1.0 - 6.0 cr)

#### **Electives**

Select electives, in consultation with the advisor, to complete the 48-credit requirement.

[CSPH 5111](#) - Ways of Thinking about Health (2.0 cr)

[CSPH 5115](#) - Cultural Awareness, Knowledge and Health (3.0 cr)

[CSPH 5118](#) - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)

[CSPH 5215](#) - Forgiveness and Healing: A Journey Toward Wholeness (3.0 cr)

[CSPH 5303](#) - Pain Management and Evidence Based Complementary Health Approaches (3.0 cr)

[CSPH 5305](#) - Introduction to Integrative Mental Health (2.0 cr)

[CSPH 5701](#) - Fundamentals of Health Coaching I (4.0 cr)

[CSPH 5702](#) - Fundamentals of Health Coaching II (4.0 cr)

[CSPH 5703](#) - Advanced Health Coaching Practicum (3.0 cr)

[CSPH 5704](#) - Business of Health Coaching (2.0 cr)

[CSPH 5706](#) - Lifestyle Medicine (2.0 cr)

[CSPH 5707](#) - Coaching People with Clinical Conditions (2.0 cr)

[CSPH 5708](#) - Mind-Body Science and the Art of Transformation (1.0 cr)

[CSPH 5709](#) - Health and Wellbeing Group Coaching (2.0 cr)

[CSPH 5713](#) - Health Coaching for Health Professionals (2.0 cr)

[CSPH 5805](#) - Wellbeing in the Workplace (3.0 cr)

[CSPH 5806](#) - Wellbeing and Resiliency for Health Professionals (1.0 cr)

[CSPH 5807](#) - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)

[CSPH 5905](#) - Food Matters: Cook Like Your Life Depends On It (1.0 cr)

[EPSY 5114](#) - Psychology of Student Learning (3.0 cr)

[EPSY 5244](#) - Survey Design, Sampling, and Implementation (3.0 cr)

[EPSY 5247](#) - Qualitative Methods in Educational Psychology (3.0 cr)

[EPSY 5609](#) - Family-centered Services (3.0 cr)

[EPSY 8251](#) - Statistical Methods in Education I (3.0 cr)

[EPSY 8264](#) - Advanced Multiple Regression Analysis (3.0 cr)

[EPSY 8282](#) - Statistical Analysis of Longitudinal Data (3.0 cr)

[FSCN 4612W](#) - Advanced Human Nutrition [WI] (4.0 cr)

[FSCN 4614W](#) - Community Nutrition [SOCS, DSJ, WI] (3.0 cr)

[FSCN 4621](#) - Nutrition and Metabolism (4.0 cr)

[FSCN 4622](#) - Nutritional Toxicology, the basic science of diet-related toxicants (3.0 cr)

[FSCN 4665](#) - Medical Nutrition Therapy I (3.0 cr)

[FSCN 4666](#) - Medical Nutrition Therapy II (3.0 cr)

[FSCN 4732](#) - Food and Nutrition Management (3.0 cr)

[FSCN 5131](#) - Food Quality for Graduate Credit (3.0 cr)

[FSCN 5312](#) - Food Analysis (4.0 cr)

[FSCN 5601](#) - Management of Eating Disorders (3.0 cr)

[FSOS 5014](#) - Quantitative Family Research Methods I (3.0 cr)



FSOS 5015 - Family Research Laboratory (1.0 cr)  
FSOS 5111 - Introduction to Family Therapy (3.0 cr)  
FSOS 5701 - Prevention Science: Principles and Practices (3.0 cr)  
FSOS 5937 - Parent-Child Interaction (3.0 cr)  
FSOS 5942 - Diverse Family Experiences (3.0 cr)  
FSOS 5944 - Curricular Design in Parent Education (3.0 cr)  
FSOS 5945 - Teaching and Learning in Parent Education (3.0 cr)  
FSOS 5946 - Assessment and Evaluation in Parent Education (3.0 cr)  
FSOS 8001 - Conceptual Frameworks in the Family (3.0 cr)  
FSOS 8002 - Advanced Family Conceptual Frameworks (3.0 cr)  
FSOS 8014 - Quantitative Family Research Methods II (3.0 cr)  
FSOS 8036 - Couple/Marriage and Family Therapy Research (3.0 cr)  
FSOS 8101 - Family Stress, Coping, and Adaptation (3.0 cr)  
HINF 5430 - Foundations of Health Informatics I (3.0 cr)  
HINF 5431 - Foundations of Health Informatics II (3.0 cr)  
HINF 5440 - Foundations of Translational Bioinformatics (3.0 cr)  
HINF 5450 - Foundations of Precision Medicine Informatics (3.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
HINF 5510 - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)  
HINF 5520 - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)  
HINF 5531 - Health Data Analytics and Data Science (3.0 cr)  
HINF 5610 - Foundations of Biomedical Natural Language Processing (3.0 cr)  
HINF 5620 - Data Visualization for the Health Sciences (3.0 cr)  
HINF 5630 - Clinical Data Mining (3.0 cr)  
HSEX 6001 - Foundations of Human Sexuality (3.0 cr)  
HSEX 6011 - Policy in Human Sexuality: Cutting Edge Analyses (3.0 cr)  
HSEX 6012 - Sexual Function and Dysfunction (3.0 cr)  
HSEX 6013 - Perspectives and Practices in Sexuality Education (3.0 cr)  
LAW 6036 - Reproductive Rights (3.0 cr)  
LAW 6046 - Human Trafficking (2.0 cr)  
LAW 6058 - Human Rights Advocacy (3.0 cr)  
LAW 6621 - Rights in Conflict: Citizenship and Human Rights (2.0 cr)  
LAW 6718 - Immigration and Criminal Law: Immigration Consequences of Crimes and Criminalizing Migration (2.0 cr)  
LAW 6827 - Women's International Human Rights (2.0 cr)  
LAW 6862 - Sexual Orientation, Gender Identity, and Human Rights (2.0 cr)  
NURS 5029 - Introduction to Nursing Interventions (3.0 cr)  
NURS 5031 - Human Response to Health and Illness: Adults and Elders (4.0 cr)  
NURS 5032 - Human Response to Health and Illness: Children and Childbearing Families (5.0 cr)  
NURS 5115 - Interprofessional Health Care Informatics (3.0 cr)  
NURS 5116 - Consumer Health Informatics (1.0 cr)  
NURS 5117 - Consumer Health Informatics Practicum (1.0 cr)  
NURS 5190 - Essentials of Holistic Health Assessment and Foundational Clinical (3.0 cr)  
NURS 5284 - Supporting Physiologic Labor and Childbirth for Nurses (2.0 cr)  
NURS 5505 - Assessment and Support of Women in Labor (2.0 cr)  
NURS 6110 - Epidemiology in Nursing (2.0 cr)  
NURS 6213 - Reproductive Healthcare for Patients with Complex Conditions (2.0 cr)  
NURS 6305 - Reproductive and Sexual Health Care (3.0 cr)  
NURS 6600 - Health Systems and Care Models (3.0 cr)  
NURS 6895 - Adult Acute Care Holistic Health Assessment and Wellness (2.0 cr)  
NURS 6924 - Assessment and Interventions for Children and Youth With Special Health Care Needs (2.0 cr)  
NURS 7100 - Quality Improvement and Implementation Science in Health Care (3.0 cr)  
NURS 7108 - Population Health Informatics (2.0 cr)  
NURS 7209 - Integrative Nursing I (1.0 cr)  
NURS 7300 - Program Planning and Evaluation (3.0 cr)  
NURS 8134 - Interventions and Outcomes Research (3.0 cr)  
NURS 8171 - Qualitative Research Design and Methods (3.0 - 4.0 cr)  
NURS 8185 - Qualitative Data Analysis for Health Care Research (3.0 - 4.0 cr)  
NUTR 5624 - Nutrition and Genetics (2.0 cr)  
NUTR 5626 - Nutritional Physiology (3.0 cr)  
NUTR 5627 - Nutritional and Food Toxicology (3.0 cr)  
NUTR 8620 - Advances in Nutrition (2.0 cr)  
OLPD 5011 - Leading Organizational Change: Theory and Practice (3.0 cr)  
OLPD 5095 - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)  
OLPD 5096 - Internship: Organizational Leadership, Policy, and Development (1.0 - 9.0 cr)  
OLPD 5103 - Comparative Education (3.0 cr)



- OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)
- OLPD 5107 - Gender, Education, and International Development (3.0 cr)
- OLPD 5124 - Critical Issues in International Education and Educational Exchange (3.0 cr)
- OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)
- OLPD 5201 - Strategies for Teaching Adults (3.0 cr)
- OLPD 5202 - Perspectives of Adult Learning and Development (3.0 cr)
- OLPD 5346 - Politics of Education (3.0 cr)
- OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)
- OLPD 5502 - Theory and Models of Evaluation (3.0 cr)
- OLPD 5607 - Organization Development (3.0 cr)
- OLPD 5611 - Facilitation and Meeting Skills (1.0 cr)
- OLPD 5619 - Planning and Decision-Making Skills (1.0 cr)
- OLPD 5819 - Evaluating and Using Research in Organizations and Education (3.0 cr)
- OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)
- PA 5002 - Introduction to Policy Analysis (1.5 cr)
- PA 5003 - Introduction to Financial Analysis and Management (1.5 cr)
- PA 5004 - Introduction to Planning (3.0 cr)
- PA 5011 - Management of Organizations (3.0 cr)
- PA 5012 - The Politics of Public Affairs (3.0 cr)
- PA 5013 - Law and Urban Land Use (1.5 cr)
- PA 5021 - Microeconomics for Policy Analysis (3.0 cr)
- PA 5022 - Applications of Economics for Policy Analysis (1.5 - 3.0 cr)
- PA 5031 - Statistics for Public Affairs (4.0 cr)
- PA 5032 - Applied Regression (2.0 cr)
- PA 5033 - Multivariate Techniques (2.0 cr)
- PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)
- PA 5042 - Urban and Regional Economics (2.0 cr)
- PA 5043 - Economic and Demographic Data Analysis (2.0 cr)
- PA 5044 - Applied Regression, Accelerated (2.0 cr)
- PA 5051 - Public Affairs Leadership (2.0 cr)
- PA 5053 - Policy Analysis in Public Affairs (2.0 cr)
- PA 5054 - Program Design and Implementation Analysis (2.0 cr)
- PA 5055 - Qualitative Research Methods and Analysis (2.0 cr)
- PA 5056 - Quantitative Research Methods and Analysis (2.0 cr)
- PA 5081 - Working in Teams: Crossing Disciplines and Learning from Difference (0.5 cr)
- PA 5101 - Management and Governance of Nonprofit Organizations (3.0 cr)
- PA 5103 - Leadership and Change (1.5 - 3.0 cr)
- PA 5104 - Strategic Human Resource Management (3.0 cr)
- PA 5105 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- PA 5113 - State and Local Public Finance (3.0 cr)
- PA 5114 - Budget Analysis in Public and Nonprofit Orgs (1.5 cr)
- PA 5116 - Financing Public and Nonprofit Organizations (1.5 cr)
- PA 5122 - Law and Public Affairs (3.0 cr)
- PA 5123 - Philanthropy in America: History, Practice, and Trends (1.5 - 3.0 cr)
- PA 5135 - Managing Conflict: Negotiation (3.0 cr)
- PA 5136 - Group Process Facilitation for Organizational and Public/Community Engagement (1.0 cr)
- PA 5137 - Project Management in the Public Arena (1.5 cr)
- PA 5145 - Civic Participation in Public Affairs (3.0 cr)
- PA 5151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)
- PA 5209 - Urban Planning and Health Equity (3.0 cr)
- PA 5211 - Land Use Planning (3.0 cr)
- PA 5212 - Managing Urban Growth and Change (3.0 cr)
- PA 5213 - Introduction to Site Planning (3.0 cr)
- PA 5231 - Transit Planning and Management (3.0 cr)
- PA 5234 - Urban Transportation Planning and Policy (3.0 cr)
- PA 5242 - Environmental Planning, Policy, and Decision Making (3.0 cr)
- PA 5251 - Strategic Planning and Management (3.0 cr)
- PA 5261 - Housing Policy (3.0 cr)
- PA 5262 - Neighborhood Revitalization Theories and Strategies (3.0 cr)
- PA 5281 - Immigrants, Urban Planning and Policymaking in the U.S. (3.0 cr)
- PA 5301 - Population Methods & Issues for the United States & Global South (3.0 cr)
- PA 5311 - Program Evaluation (3.0 cr)
- PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)
- PA 5405 - Public Policy Implementation (3.0 cr)



- PA 5413 - Early Childhood and Public Policy (1.5 - 3.0 cr)
- PA 5415 - Economics of Early Childhood Development (1.5 - 3.0 cr)
- PA 5421 - Racial Inequality and Public Policy (3.0 cr)
- PA 5426 - Community-Engaged Research and Policy with Marginalized Groups (3.0 cr)
- PA 5431 - Public Policies on Work and Pay (3.0 cr)
- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PA 5521 - Development Planning and Policy Analysis (4.0 cr)
- PA 5561 - Gender and International Development (3.0 cr)
- PA 5601 - Global Survey of Gender and Public Policy (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5721 - Energy Systems and Policy (3.0 cr)
- PA 5723 - Water Policy (3.0 cr)
- PA 5724 - Climate Change Policy (3.0 cr)
- PA 5741 - Risk, Resilience and Decision Making (1.5 cr)
- PA 5801 - Global Public Policy (3.0 cr)
- PA 5805 - Global Economics (3.0 cr)
- PA 5813 - US Foreign Policy: Issues and Institutions (3.0 cr)
- PA 5814 - Global Diplomacy in a Time of Change (3.0 cr)
- PA 5823 - Managing Humanitarian and Refugee Crises: Challenges for Policymakers & Practitioners (1.0 cr)
- PA 5825 - Crisis Management in Foreign Affairs (1.5 cr)
- PA 5826 - National Security Policy (3.0 cr)
- PA 5885 - Human Rights Policy: Issues and Actors (3.0 cr)
- PA 5927 - Effective Grantwriting for Nonprofit Organizations (1.5 cr)
- PA 5928 - Data Management and Visualization with R (1.0 cr)
- PA 5929 - Data Visualization: Telling Stories with Numbers (2.0 cr)
- PA 5933 - Survey Methods: Designing Effective Questionnaires (2.0 cr)
- PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)
- PUBH 6004 - Global Health Capstone (1.0 cr)
- PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)
- PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)
- PUBH 6035 - Evaluation II: Applications (3.0 cr)
- PUBH 6045 - Skills for Policy Development (1.0 cr)
- PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)
- PUBH 6050 - Community Health Promotion I: Integrating Theory, Evidence, and Context (3.0 cr)
- PUBH 6051 - Community Health Promotion II: Developing, Implementing, and Justifying Interventions (3.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6081 - Sex, Sexuality, and Sexual Health (2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6102 - Issues in Environmental Health (2.0 cr)
- PUBH 6107 - Excel and Access Skills in Public Health Settings (1.0 cr)
- PUBH 6108 - Foundations of Global Health (2.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)
- PUBH 6132 - Air, Water, and Health (2.0 cr)
- PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)
- PUBH 6135 - Job Search Strategies and Career Professional Development (1.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6159 - Principles of Toxicology I (2.0 cr)
- PUBH 6161 - Regulatory Toxicology (2.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6175 - Environmental Measurements Laboratory (2.0 cr)
- PUBH 6177 - Nanotechnology Health and Safety (3.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)



- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)  
PUBH 6183 - Theory and Practice in Foodborne Disease Outbreak Detection, Investigation and Control (1.0 cr)  
PUBH 6184 - Field and laboratory methods in public health entomology (2.0 cr)  
PUBH 6192 - Measurement and Properties of Air Contaminants (2.0 cr)  
PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)  
PUBH 6241 - American Indian Public Health and Wellness, Health Policy, Law, Health Services Administration (2.0 cr)  
PUBH 6242 - Cultural Humility with American Indian Populations (2.0 cr)  
PUBH 6243 - American Indian Research, Evaluation and Collaborations (2.0 cr)  
PUBH 6250 - Foundations of Public Health (2.0 cr)  
PUBH 6261 - Human Centered Design for Public Health Leadership, Practice and Innovation (2.0 cr)  
PUBH 6290 - International Humanitarian Crisis Simulation (1.0 cr)  
PUBH 6301 - Fundamentals of Clinical Research (3.0 cr)  
PUBH 6303 - Clinical Research Project Seminar (2.0 cr)  
PUBH 6310 - Clinical Epidemiology 1 (1.0 cr)  
PUBH 6311 - Clinical Epidemiology II (1.0 cr)  
PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)  
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)  
PUBH 6333 - Principles of Human Behavior I (2.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)  
PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)  
PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)  
PUBH 6365 - Global Challenges in Infectious Disease Epidemiology (2.0 cr)  
PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6387 - Cancer Epidemiology (2.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 6396 - Applied Practice Experience Global Health (0.5 - 8.0 cr)  
PUBH 6414 - Biostatistical Literacy (3.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6432 - Biostatistical Methods in Translational and Clinical Research (1.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)  
PUBH 6525 - Introduction to Population Health: A Health System (2.0 cr)  
PUBH 6535 - Managerial Accounting for Health Services (3.0 cr)  
PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 6542 - Management of Health Care Organizations (3.0 cr)  
PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)  
PUBH 6553 - Health Care Management Ethics (1.0 cr)  
PUBH 6554 - Healthcare Strategy and Marketing (2.0 cr)  
PUBH 6555 - Topics in Health Economics (2.0 cr)  
PUBH 6556 - Health and Health Systems (3.0 cr)  
PUBH 6558 - Health Finance II (3.0 cr)  
PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)  
PUBH 6562 - Information Technology in Health Care (2.0 cr)  
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)  
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 6570 - Healthcare Administration (1.0 - 4.0 cr)  
PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)  
PUBH 6576 - Understanding Clinical Quality Using Administrative Data (2.0 cr)  
PUBH 6577 - Advanced Problem Solving in Health Services Administration (2.0 cr)  
PUBH 6578 - Negotiation Strategies (2.0 cr)  
PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)  
PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)  
PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)  
PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)  
PUBH 6607 - Adolescent Health: Issues, Programs, and Policies (2.0 cr)  
PUBH 6613 - Children and Youth With Special Health Care Needs (2.0 cr)  
PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)  
PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)  
PUBH 6636 - Qualitative Research Methods in Public Health Practice (2.0 cr)  
PUBH 6673 - Grant Writing for Public Health (1.0 cr)  
PUBH 6675 - Women's Health (2.0 cr)  
PUBH 6703 - Health Impact Assessment: A Tool to Promote Health Equity (1.5 cr)



- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6713 - Global Health in a Local Context (3.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6730 - International Comparative Health Systems (2.0 cr)
- PUBH 6735 - Principles of Health Policy (3.0 cr)
- PUBH 6737 - Structural Racism and Health (2.0 cr)
- PUBH 6741 - Ethics in Public Health: Professional Practice and Policy (1.0 cr)
- PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)
- PUBH 6744 - State Health Policy and Politics (2.0 cr)
- PUBH 6745 - Rural Health (2.0 cr)
- PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)
- PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 6772 - Health Disparities Capstone Seminar (1.0 cr)
- PUBH 6780 - Topics: Public Health Administration and Policy (1.0 - 3.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6864 - Conducting Health Outcomes Research (3.0 cr)
- PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)
- PUBH 6904 - Nutrition and Aging (2.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)
- PUBH 6907 - Maternal, Infant, Child and Adolescent Nutrition (3.0 cr)
- PUBH 6914 - Community Nutrition Intervention (3.0 cr)
- PUBH 6915 - Nutrition Assessment (2.0 cr)
- PUBH 6933 - Nutrition and Chronic Diseases (2.0 cr)
- PUBH 6954 - Personal, Social and Environmental Influences on the Weight-Related Health of Pediatric Populations (2.0 cr)
- PUBH 6955 - Using Policy to Address the Weight-Related Health of Child and Adolescent Populations (1.0 cr)
- PUBH 6995 - Community Nutrition Practicum (6.0 - 7.0 cr)
- PUBH 6996 - Clinical Nutrition Practicum (7.0 cr)
- PUBH 7091 - Independent Study: Community Health Promotion (1.0 - 4.0 cr)
- PUBH 7193 - Directed Study: Environmental Health (1.0 - 4.0 cr)
- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7221 - Planning for Urgent Threats (1.0 cr)
- PUBH 7230 - Topics in Infectious Disease (0.5 - 4.0 cr)
- PUBH 7231 - Surveillance of Foodborne Diseases in Humans (1.0 cr)
- PUBH 7235 - Surveillance of Zoonotic Pathogens in Animals (1.0 cr)
- PUBH 7242 - War and Public Health (1.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7253 - Introduction to GIS (1.0 cr)
- PUBH 7257 - Qualitative Data Analysis (1.0 cr)
- PUBH 7262 - Globalization and Health (1.0 cr)
- PUBH 7391 - Independent Study: Epidemiology (1.0 - 4.0 cr)
- PUBH 7392 - Readings in Epidemiology (1.0 - 4.0 cr)
- PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)
- PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)
- PUBH 7405 - Biostatistics: Regression (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 7415 - Introduction to Clinical Trials (3.0 cr)
- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
- PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- PUBH 7450 - Survival Analysis (3.0 cr)
- PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)





- PUBH 7462 - Advanced Programming and Data Analysis in R (2.0 cr)
- PUBH 7465 - Biostatistics Consulting (3.0 cr)
- PUBH 7470 - Study Designs in Biomedical Research (3.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 7485 - Methods for Causal Inference (3.0 cr)
- PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)
- PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 7536 - Health Finance I (3.0 cr)
- PUBH 7537 - Health Finance II (3.0 cr)
- PUBH 7542 - Quality Improvement and Patient Safety (2.0 cr)
- PUBH 7547 - Health Care Human Resource Management (2.0 cr)
- PUBH 7551 - Principles of Management in Health Services Organizations (2.0 cr)
- PUBH 7553 - Health Care Management Ethics (1.0 cr)
- PUBH 7554 - Health Care Strategy and Marketing (3.0 cr)
- PUBH 7555 - Topics in Health Economics (2.0 cr)
- PUBH 7556 - Health and Health Systems (2.0 cr)
- PUBH 7560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 7562 - Information Technology in Health Care (2.0 cr)
- PUBH 7564 - Private Purchasers of Health Care (2.0 cr)
- PUBH 7565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 7569 - Health Care Policy (1.0 cr)
- PUBH 7570 - Topics: Healthcare Administration (1.0 cr)
- PUBH 7576 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 7590 - Gerontology for Healthcare Managers (1.0 cr)
- PUBH 7591 - Independent Study: Health Care Administration (1.0 - 4.0 cr)
- PUBH 7691 - Independent Study: Maternal and Child Health (1.0 - 4.0 cr)
- PUBH 7720 - Data to Drive Public Health (2.0 cr)
- PUBH 7730 - Public Health Laws, Rules, and Regulations (1.0 cr)
- PUBH 7791 - Independent Study: Public Health Administration and Policy (1.0 - 6.0 cr)
- PUBH 7991 - Independent Study: Public Health Nutrition (1.0 - 4.0 cr)
- PUBH 8120 - Occupational Health and Safety Research Seminar (1.0 cr)
- PUBH 8160 - Advanced Toxicology (2.0 cr)
- PUBH 8166 - Experiences in Toxicology Research (3.0 cr)
- PUBH 8194 - Directed Research: Environmental Health (1.0 - 6.0 cr)
- PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)
- PUBH 8342 - Advanced Epidemiologic Methods: Applications (3.0 cr)
- PUBH 8344 - Advanced Epidemiologic Methods Workshop (1.0 cr)
- PUBH 8392 - Readings in Clinical Research (1.0 - 4.0 cr)
- PUBH 8393 - Directed Study: Clinical Research (1.0 - 4.0 cr)
- PUBH 8401 - Linear Models (4.0 cr)
- PUBH 8403 - Research Skills in Biostatistics (1.0 cr)
- PUBH 8432 - Probability Models for Biostatistics (3.0 cr)
- PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- PUBH 8446 - Advanced Statistical Genetics and Genomics (3.0 cr)
- PUBH 8475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 8482 - Sequential and Adaptive Methods for Clinical Trials (3.0 cr)
- PUBH 8485 - Methods for Causal Inference (3.0 cr)
- PUBH 8492 - Theories of Hierarchical and Other Richly Parametrized Linear Models (3.0 cr)
- PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)
- PUBH 8810 - Research Studies in Health Care (3.0 cr)
- PUBH 8811 - Research Methods in Health Care (3.0 cr)
- PUBH 8814 - Mixed Methods: Quantitative and Qualitative Strategies in Research (2.0 cr)
- PUBH 8816 - Implementation Science in Public Health (2.0 cr)
- PUBH 8821 - Health Economics II (3.0 cr)
- PUBH 8830 - Writing for Research (2.0 cr)
- PUBH 8831 - Writing for Research (2.0 cr)
- SW 5051 - Human Behavior and the Social Environment (2.0 cr)
- SW 5101 - Historical Origins and Contemporary Policies in Social Welfare (3.0 cr)
- SW 5562 - Global Social Work and Social Development (3.0 cr)
- SW 5904 - Facilitation and Conflict Management: Humanistic Approach (2.0 cr)
- SW 5906 - Advanced Ethical Decision Making (1.0 cr)
- SW 5912 - Grief and Loss in Social Work Practice (1.0 cr)
- SW 8151 - Social Work Methods: Practice With Individuals and Systems (2.0 cr)
- SW 8152 - Social Work Practice Methods: Families and Groups (2.0 cr)
- SW 8153 - Social Work Practice Methods: Macro Practice and Organizations (2.0 cr)



- SW 8251 - Social Work Practice in Health, Disabilities, and Aging (3.0 cr)
- SW 8262 - Empowerment Practice With Persons With Disabilities (3.0 cr)
- SW 8263 - Advanced Direct Practice and Community-Based Interventions in Gerontology (3.0 cr)
- SW 8351 - Assessment and Engagement with Families and Children (3.0 cr)
- SW 8352 - Intervention Methods with Families (3.0 cr)
- SW 8361 - Identification and Assessment of Family Violence (3.0 cr)
- SW 8363 - Social Work in Child Welfare (3.0 cr)
- SW 8451 - Assessment and Engagement in Clinical Social Work Practice (3.0 cr)
- SW 8452 - Core Concepts in Clinical Social Work Practice (3.0 cr)
- SW 8461 - Advanced Clinical Social Work Practice with Adults (3.0 cr)
- SW 8462 - Advanced Clinical Practice With Children and Adolescents (3.0 cr)
- SW 8463 - Social Work Practice With Severe and Persistent Mental Illness and Severe Emotional Disturbance (3.0 cr)
- SW 8551 - Advanced Community Practice: Assessment, Organizing, and Advocacy (3.0 cr)
- SW 8552 - Advanced Community Practice: Leadership, Planning, and Program Development (3.0 cr)
- SW 8563 - Advanced Policy Advocacy (3.0 cr)
- SW 8804 - Child Welfare Policy (3.0 cr)
- SW 8806 - Health and Mental Health Policy (3.0 cr)
- SW 8807 - International and Comparative Social Welfare Policy (3.0 cr)
- SW 8821 - Social Work and Difference, Diversity and Privilege (2.0 cr)
- SW 8841 - Social Work Research Methods (2.0 cr)
- SW 8842 - Advanced Social Work Evaluation (1.0 - 3.0 cr)
- SW 8843 - Social Work Program Evaluation (1.0 - 2.0 cr)
- SW 8851 - Social Welfare History and Historical Research Methods (3.0 cr)
- SW 8901 - Assessment and Treatment of Trauma (2.0 cr)
- SW 8902 - Social Work Supervision, Consultation, and Leadership (2.0 cr)
- VMED 5101 - Molecular and Cellular Basis of Nanoparticle Toxicity (3.0 cr)
- VMED 5165 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- VMED 5180 - Ecology of Infectious Disease (3.0 cr)
- VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)
- VMED 5915 - Essential Statistics for Life Sciences (3.0 cr)
- VMED 8134 - Ethical Conduct of Animal Research (3.0 cr)

**Joint- or Dual-degree Coursework:**MSW/MPH-Community Health PromotionJD/MPH-Community Health PromotionStudent may take a total of 12 credits in common among the academic programs.



### **Twin Cities Campus**

## **Environmental Health M.P.H.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 42 to 52
- This program does not require summer semesters for timely completion.
- Degree: Master of Public Health

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Environmental health is the study of how exposures to external hazards, including chemical, physical, and biological agents, affect human health. Environmental health researchers and professionals seek to understand how to evaluate exposures that create risk to human health, how those exposures elicit biological responses that lead to disease and injury, and how policy is developed and used to prevent adverse health effects. This program offers academic programs at the master's and doctoral levels, conducts research in diverse areas of environmental health, offers continuing education, and conducts outreach. The academic programs prepare students to be leaders in environmental health in academia, industry, consulting groups, and government agencies. The program's training and research emphasizes the importance of translating basic scientific knowledge into solutions for current societal problems and concerns.

The School of Public Health (SPH) and College of Biological Sciences (CBS) offer an early-admission opportunity for eligible University CBS students interested in completing the MPH Environmental Health degree. Interested CBS students should contact their college office or the SPH for more information.

### **Accreditation**

This program is accredited by Council on Education for Public Health

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Minimum qualifications include a baccalaureate degree with coursework in the basic sciences. Occupational health nursing/medicine applicants must have a relevant degree from an accredited school.

Other requirements to be completed before admission:

Applicants to the Industrial Hygiene sub-plan must meet the following additional criteria: a good undergraduate academic record in a relevant discipline (preferably science or engineering), with a minimum level of coursework in biology, chemistry (including organic), physics, and mathematics (including calculus). Students with undergraduate non-science fields, with appropriate additional coursework or work experience, may also apply, but must demonstrate strengths in physics, chemistry (including organic), biology, and mathematics (including calculus) and complementary non-science coursework (e.g. social sciences, languages). Strong letters of recommendation and a written statement that reflects a clear motivation toward occupational and environmental health. Success in prior industrial hygiene-related work is a strong factor for admission to this track. Applicants interested in the Environmental Infectious Diseases emphasis: microbiology background is preferred.

Applicants must submit their test score(s) from the following:

- GRE



- General Test - Verbal Reasoning: 150
- General Test - Quantitative Reasoning: 150
- General Test - Analytical Writing: 3.5
- GMAT
- MCAT
  - Verbal Reasoning score: 10
  - Physical Science score: 10
  - Biological Reasoning score: 10
  - Writing Sample score: 10
- LSAT
  - Law School Admission Test (LSAT) score: 140
- DAT
  - Score: 15

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#) (GRE, GMAT, MCAT, LSAT, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 42 to 52 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Students complete PUBH 7194 (Integrative Learning Experience) in consultation with the advisor.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Public Health Core Requirements (16 credits)

Take the following courses for a total of 9 credits. A minimum grade of B- is required for each course.

[PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

### Epidemiology Requirement (3 cr)

Take one of the following courses. Students taking electives from the Environmental and Occupational Epidemiology emphasis or Injury and Violence Epidemiology and Prevention emphasis must take PubH 6341. A minimum grade of B- is required.

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

### Biostatistics Requirement (4 cr)

Select [PubH 6450](#) or [PubH 6414](#) in consultation with the advisor. Students taking electives from the Environmental and Occupational Epidemiology emphasis, Injury and Violence Epidemiology and Prevention emphasis, or pursuing the Industrial Hygiene track must take [PubH 6450](#). Students who take [PubH 6414](#) must take at least one additional credit from the biostatistical program course list to complete the 4-credit requirement. A minimum grade of B- is required.

[PUBH 6450](#) - Biostatistics I (4.0 cr)

or [PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

### Biostatistical Programming Options

Students who take [PubH 6414](#) must select one of the following courses in consultation with the advisor to complete the biostatistics programming requirement. A minimum grade of B- is required.

[PUBH 6107](#) - Excel and Access Skills in Public Health Settings (1.0 cr)



- or PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)
- or PUBH 6325 - Data Processing with PC-SAS (1.0 cr)
- or PUBH 6420 - Introduction to SAS Programming (1.0 cr)
- or PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)
- or PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)
- or PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- or PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- or PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)

#### Applied Practice Experience (1 to 3 credits)

Take the following course in consultation with the advisor. Students pursuing the Industrial Hygiene track must take PUBH 7196 for 3 credits. All other students take the course for 1 credit.

- PUBH 7196 - Applied Practice Experience: Environmental Health (1.0 - 5.0 cr)

#### Integrative Learning Experience (1 to 3 credits)

Take the following course in consultation with the advisor. Students pursuing the Industrial Hygiene track must take PUBH 7194 for 3 credits. All other students take the course for 1 credit.

- PUBH 7194 - Integrative Learning Experience: Environmental Health (1.0 - 5.0 cr)

#### Emphasis Areas

##### Generalist (24 credits)

Students pursue and develop their particular interests to complete this emphasis.

##### Environmental Health Required Coursework (4 credits)

Take one course from each of the following lists. A minimum of B- is required.

###### Integrated Exposure & Health Effects

Take one course from the following list.

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

###### Risk Management

Take one from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

Choose electives in consultation with the advisor to complete the 42-credit minimum.

- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)
- PUBH 6045 - Skills for Policy Development (1.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6527 - Healthcare Leadership and Effecting Change (2.0 cr)
- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)
- PUBH 6730 - International Comparative Health Systems (2.0 cr)
- PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6160 - Principles of Toxicology II (3.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)
- PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6035 - Evaluation II: Applications (3.0 cr)
- PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)
- PUBH 6210 - Public Health Medicine Seminar (1.0 cr)



- PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)
- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6343 - Epidemiologic Methods III (4.0 cr)
- PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)
- PUBH 6389 - Nutritional Epidemiology (2.0 cr)
- PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)
- PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6420 - Introduction to SAS Programming (1.0 cr)
- PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)
- PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)
- PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 6542 - Management of Health Care Organizations (3.0 cr)
- PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)
- PUBH 6547 - Health Care Human Resources Management (2.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 6562 - Information Technology in Health Care (2.0 cr)
- PUBH 6563 - Integrated Delivery Systems (2.0 cr)
- PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)
- PUBH 6565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)
- PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)
- PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)
- PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)
- PUBH 6655 - Principles and Programs in Maternal and Child Health (2.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6729 - Public Health Leadership (1.0 cr)
- PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)
- PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 6812 - Applied Projects in Health Intelligence and Analytics (2.0 cr)
- PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- PUBH 6814 - Data and Information for Population Health Management (2.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 6835 - Principles of Health Policy (2.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 7222 - Best Practices in Emergency Response (1.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6863 - Understanding Health Care Quality (2.0 cr)
- PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)
- PUBH 6920 - Foundations of Interprofessional Professional Communication and Collaboration (1.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 7236 - Farm to Table Program:Minnesota (2.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)



- PUBH 7252 - Qualitative Research Methods: Discovering the Value of Voice in Words, Stories and Photographs (1.0 cr)
- PUBH 7253 - Introduction to GIS (1.0 cr)
- PUBH 7257 - Qualitative Data Analysis (1.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)
- PUBH 7541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 7556 - Health and Health Systems (2.0 cr)
- PUBH 7562 - Information Technology in Health Care (2.0 cr)
- PUBH 7564 - Private Purchasers of Health Care (2.0 cr)
- PUBH 7565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 7568 - Interdisciplinary Teamwork in Health Care (2.0 cr)
- PUBH 7569 - Health Care Policy (1.0 cr)

-OR-

### **Environmental and Occupational Epidemiology (24 credits)**

#### **Required Coursework (9 credits)**

Take the following courses. Students taking electives from the Environmental and Occupational Epidemiology emphasis must have completed PUBH 6341 and PUBH 6450.

- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)

#### **Environmental Health Requirement (4 credits)**

Take one course from each of the following lists. A minimum of B- is required.

##### **Integrated Exposure & Health Effects**

Take one course from the following list.

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

##### **Risk Management**

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

#### **Electives (11 credits)**

Choose electives in consultation with the advisor to meet the 42-credit minimum.

- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)
- PUBH 6045 - Skills for Policy Development (1.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6527 - Healthcare Leadership and Effecting Change (2.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)
- PUBH 6730 - International Comparative Health Systems (2.0 cr)
- PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6160 - Principles of Toxicology II (3.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)
- PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6035 - Evaluation II: Applications (3.0 cr)
- PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)
- PUBH 6210 - Public Health Medicine Seminar (1.0 cr)
- PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)
- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)



PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)  
PUBH 6343 - Epidemiologic Methods III (4.0 cr)  
PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)  
PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)  
PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)  
PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)  
PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 6542 - Management of Health Care Organizations (3.0 cr)  
PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)  
PUBH 6547 - Health Care Human Resources Management (2.0 cr)  
PUBH 6555 - Topics in Health Economics (2.0 cr)  
PUBH 6556 - Health and Health Systems (3.0 cr)  
PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)  
PUBH 6562 - Information Technology in Health Care (2.0 cr)  
PUBH 6563 - Integrated Delivery Systems (2.0 cr)  
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)  
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)  
PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)  
PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)  
PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)  
PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)  
PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)  
PUBH 6655 - Principles and Programs in Maternal and Child Health (2.0 cr)  
PUBH 6702 - Integrative Leadership Seminar (3.0 cr)  
PUBH 6711 - Public Health Law (2.0 cr)  
PUBH 6717 - Decision Analysis for Health Care (2.0 cr)  
PUBH 6724 - The Health Care System and Public Health (3.0 cr)  
PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)  
PUBH 6729 - Public Health Leadership (1.0 cr)  
PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)  
PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)  
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)  
PUBH 6806 - Principles of Public Health Research (2.0 cr)  
PUBH 6832 - Economics of the Health Care System (3.0 cr)  
PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)  
PUBH 6810 - Survey Research Methods (3.0 cr)  
PUBH 6812 - Applied Projects in Health Intelligence and Analytics (2.0 cr)  
PUBH 6813 - Managing Electronic Health Information (2.0 cr)  
PUBH 6814 - Data and Information for Population Health Management (2.0 cr)  
PUBH 6815 - Community-based Participatory Research (2.0 cr)  
PUBH 7214 - Principles of Risk Communication (1.0 cr)  
PUBH 6835 - Principles of Health Policy (2.0 cr)  
PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)  
PUBH 7222 - Best Practices in Emergency Response (1.0 cr)  
PUBH 6855 - Medical Sociology (3.0 cr)  
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)  
PUBH 6863 - Understanding Health Care Quality (2.0 cr)  
PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)  
PUBH 6920 - Foundations of Interprofessional Professional Communication and Collaboration (1.0 cr)  
PUBH 7210 - Topics: Global Food Systems (0.5 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)  
PUBH 7236 - Farm to Table Program: Minnesota (2.0 cr)  
PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)  
PUBH 7252 - Qualitative Research Methods: Discovering the Value of Voice in Words, Stories and Photographs (1.0 cr)  
PUBH 7253 - Introduction to GIS (1.0 cr)  
PUBH 7257 - Qualitative Data Analysis (1.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)





PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)  
PUBH 7541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 7556 - Health and Health Systems (2.0 cr)  
PUBH 7562 - Information Technology in Health Care (2.0 cr)  
PUBH 7564 - Private Purchasers of Health Care (2.0 cr)  
PUBH 7565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 7568 - Interdisciplinary Teamwork in Health Care (2.0 cr)  
PUBH 7569 - Health Care Policy (1.0 cr)  
PA 5451 - Immigration, Health and Public Policy (3.0 cr)

-OR-

### **Environmental Infectious Diseases (24 credits)**

#### **Required Coursework (10 credits)**

Take the following courses:

PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)  
PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)  
PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)  
VMED 5180 - Ecology of Infectious Disease (3.0 cr)

#### **Environmental Health Requirement (4 credits)**

Take one course from each of the following lists. A minimum grade of B- is required.

##### **Integrated Exposure & Health Effects**

Take one course from the following list.

PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)  
PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)  
PUBH 6154 - Climate Change and Global Health (3.0 cr)  
PUBH 6162 - Biomarkers (2.0 cr)  
PUBH 6190 - Environmental Chemistry (3.0 cr)  
PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

##### **Risk Management**

Take one course from the following list:

PUBH 6115 - Worker Protection Law (1.0 cr)  
PUBH 6116 - Environmental Law (1.0 cr)  
PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)  
PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

#### **Electives (10 credits)**

Choose electives in consultation with the advisor to meet the 42-credit minimum.

PUBH 6547 - Health Care Human Resources Management (2.0 cr)  
PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)  
PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)  
PUBH 6034 - Evaluation (3.0 cr)  
PUBH 6045 - Skills for Policy Development (1.0 cr)  
PUBH 6055 - Social Inequalities in Health (2.0 cr)  
PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)  
PUBH 6527 - Healthcare Leadership and Effecting Change (2.0 cr)  
PUBH 6906 - Global Nutrition (2.0 cr)  
PA 5451 - Immigration, Health and Public Policy (3.0 cr)  
PUBH 6730 - International Comparative Health Systems (2.0 cr)  
PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)  
PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)  
PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)  
PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)  
PUBH 6160 - Principles of Toxicology II (3.0 cr)  
PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)  
PUBH 6810 - Survey Research Methods (3.0 cr)  
PUBH 6173 - Exposure to Physical Agents (2.0 cr)  
PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)  
PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6035 - Evaluation II: Applications (3.0 cr)  
PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)  
PUBH 6210 - Public Health Medicine Seminar (1.0 cr)  
PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)  
PUBH 6074 - Mass Communication and Public Health (3.0 cr)  
PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)  
PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)



- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6343 - Epidemiologic Methods III (4.0 cr)
- PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)
- PUBH 6389 - Nutritional Epidemiology (2.0 cr)
- PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)
- PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6420 - Introduction to SAS Programming (1.0 cr)
- PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)
- PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)
- PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 6542 - Management of Health Care Organizations (3.0 cr)
- PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 6562 - Information Technology in Health Care (2.0 cr)
- PUBH 6563 - Integrated Delivery Systems (2.0 cr)
- PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)
- PUBH 6565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)
- PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)
- PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)
- PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)
- PUBH 6655 - Principles and Programs in Maternal and Child Health (2.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6729 - Public Health Leadership (1.0 cr)
- PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)
- PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6812 - Applied Projects in Health Intelligence and Analytics (2.0 cr)
- PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- PUBH 6814 - Data and Information for Population Health Management (2.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 6835 - Principles of Health Policy (2.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6863 - Understanding Health Care Quality (2.0 cr)
- PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)
- PUBH 6920 - Foundations of Interprofessional Professional Communication and Collaboration (1.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 7236 - Farm to Table Program:Minnesota (2.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7252 - Qualitative Research Methods: Discovering the Value of Voice in Words, Stories and Photographs (1.0 cr)
- PUBH 7253 - Introduction to GIS (1.0 cr)
- PUBH 7257 - Qualitative Data Analysis (1.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)
- PUBH 7541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 7556 - Health and Health Systems (2.0 cr)



PUBH 7562 - Information Technology in Health Care (2.0 cr)  
PUBH 7564 - Private Purchasers of Health Care (2.0 cr)  
PUBH 7565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 7568 - Interdisciplinary Teamwork in Health Care (2.0 cr)  
PUBH 7569 - Health Care Policy (1.0 cr)

-OR-

### **Global Environmental Health (24 credits)**

#### **Required Coursework (11 credits)**

Take the following courses. PUBH 6108 must be taken for two credits.

PUBH 6131 - Working in Global Health (2.0 cr)  
PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)  
PUBH 6132 - Air, Water, and Health (2.0 cr)  
PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)  
PUBH 6108 - Foundations of Global Health (2.0 cr)

#### **Environmental Health Requirement (4 credits)**

Take one course from each of the following lists. A minimum of B- is required.

##### **Integrated Exposure & Health Effects**

Take one course from the following list.

PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)  
PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)  
PUBH 6154 - Climate Change and Global Health (3.0 cr)  
PUBH 6162 - Biomarkers (2.0 cr)  
PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)  
PUBH 6190 - Environmental Chemistry (3.0 cr)  
PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

##### **Risk Management**

Take one course from the following list:

PUBH 6115 - Worker Protection Law (1.0 cr)  
PUBH 6116 - Environmental Law (1.0 cr)  
PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)  
PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

#### **Electives (9 credits)**

Choose electives in consultation with the advisor to meet the 42-credit minimum.

PA 5451 - Immigration, Health and Public Policy (3.0 cr)  
PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)  
PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)  
PUBH 6034 - Evaluation (3.0 cr)  
PUBH 6035 - Evaluation II: Applications (3.0 cr)  
PUBH 6045 - Skills for Policy Development (1.0 cr)  
PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)  
PUBH 6055 - Social Inequalities in Health (2.0 cr)  
PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)  
PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)  
PUBH 6074 - Mass Communication and Public Health (3.0 cr)  
PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)  
PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)  
PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)  
PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)  
PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)  
PUBH 6160 - Principles of Toxicology II (3.0 cr)  
PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)  
PUBH 6173 - Exposure to Physical Agents (2.0 cr)  
PUBH 6210 - Public Health Medicine Seminar (1.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6343 - Epidemiologic Methods III (4.0 cr)  
PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)  
PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)  
PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)  
PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)



- PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)
- PUBH 6527 - Healthcare Leadership and Effecting Change (2.0 cr)
- PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 6542 - Management of Health Care Organizations (3.0 cr)
- PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)
- PUBH 6547 - Health Care Human Resources Management (2.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 6562 - Information Technology in Health Care (2.0 cr)
- PUBH 6563 - Integrated Delivery Systems (2.0 cr)
- PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)
- PUBH 6565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)
- PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)
- PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)
- PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)
- PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)
- PUBH 6655 - Principles and Programs in Maternal and Child Health (2.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6729 - Public Health Leadership (1.0 cr)
- PUBH 6730 - International Comparative Health Systems (2.0 cr)
- PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)
- PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 6812 - Applied Projects in Health Intelligence and Analytics (2.0 cr)
- PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- PUBH 6814 - Data and Information for Population Health Management (2.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6835 - Principles of Health Policy (2.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6863 - Understanding Health Care Quality (2.0 cr)
- PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)
- PUBH 6920 - Foundations of Interprofessional Professional Communication and Collaboration (1.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7222 - Best Practices in Emergency Response (1.0 cr)
- PUBH 7236 - Farm to Table Program: Minnesota (2.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7252 - Qualitative Research Methods: Discovering the Value of Voice in Words, Stories and Photographs (1.0 cr)
- PUBH 7253 - Introduction to GIS (1.0 cr)
- PUBH 7257 - Qualitative Data Analysis (1.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)
- PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 7541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 7556 - Health and Health Systems (2.0 cr)



PUBH 7562 - Information Technology in Health Care (2.0 cr)  
PUBH 7564 - Private Purchasers of Health Care (2.0 cr)  
PUBH 7565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 7568 - Interdisciplinary Teamwork in Health Care (2.0 cr)  
PUBH 7569 - Health Care Policy (1.0 cr)

-OR-

### **Occupational and Environmental Health Nursing (24 credits)**

#### **Required Coursework (9 credits)**

Take the following courses:

PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)  
PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)  
PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)  
PUBH 6151 - Occupational and Environmental Health Nursing Seminar (1.0 cr)

#### **Environmental Health Requirement (4 credits)**

Take one course from each of the following lists. A minimum grade of B- is required.

##### **Integrated Exposure & Health Effects**

Take one course from the following list.

PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)  
PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)  
PUBH 6154 - Climate Change and Global Health (3.0 cr)  
PUBH 6162 - Biomarkers (2.0 cr)  
PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)  
PUBH 6190 - Environmental Chemistry (3.0 cr)  
PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

##### **Risk Management**

Take one course from the following list:

PUBH 6115 - Worker Protection Law (1.0 cr)  
PUBH 6116 - Environmental Law (1.0 cr)  
PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)  
PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

#### **Electives (11 credits)**

Choose electives in consultation with the advisor to meet the 42-credit minimum.

PA 5451 - Immigration, Health and Public Policy (3.0 cr)  
PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)  
PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)  
PUBH 6034 - Evaluation (3.0 cr)  
PUBH 6035 - Evaluation II: Applications (3.0 cr)  
PUBH 6045 - Skills for Policy Development (1.0 cr)  
PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)  
PUBH 6055 - Social Inequalities in Health (2.0 cr)  
PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)  
PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)  
PUBH 6074 - Mass Communication and Public Health (3.0 cr)  
PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)  
PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)  
PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)  
PUBH 6160 - Principles of Toxicology II (3.0 cr)  
PUBH 6173 - Exposure to Physical Agents (2.0 cr)  
PUBH 6210 - Public Health Medicine Seminar (1.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6343 - Epidemiologic Methods III (4.0 cr)  
PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)  
PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)  
PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)  
PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)  
PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)  
PUBH 6527 - Healthcare Leadership and Effecting Change (2.0 cr)  
PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 6542 - Management of Health Care Organizations (3.0 cr)



- PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)
- PUBH 6547 - Health Care Human Resources Management (2.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 6562 - Information Technology in Health Care (2.0 cr)
- PUBH 6563 - Integrated Delivery Systems (2.0 cr)
- PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)
- PUBH 6565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)
- PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)
- PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)
- PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)
- PUBH 6655 - Principles and Programs in Maternal and Child Health (2.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6729 - Public Health Leadership (1.0 cr)
- PUBH 6730 - International Comparative Health Systems (2.0 cr)
- PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)
- PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 6812 - Applied Projects in Health Intelligence and Analytics (2.0 cr)
- PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- PUBH 6814 - Data and Information for Population Health Management (2.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6835 - Principles of Health Policy (2.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6863 - Understanding Health Care Quality (2.0 cr)
- PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)
- PUBH 6920 - Foundations of Interprofessional Professional Communication and Collaboration (1.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7222 - Best Practices in Emergency Response (1.0 cr)
- PUBH 7236 - Farm to Table Program:Minnesota (2.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7252 - Qualitative Research Methods: Discovering the Value of Voice in Words, Stories and Photographs (1.0 cr)
- PUBH 7253 - Introduction to GIS (1.0 cr)
- PUBH 7257 - Qualitative Data Analysis (1.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)
- PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 7541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 7556 - Health and Health Systems (2.0 cr)
- PUBH 7562 - Information Technology in Health Care (2.0 cr)
- PUBH 7564 - Private Purchasers of Health Care (2.0 cr)
- PUBH 7565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 7568 - Interdisciplinary Teamwork in Health Care (2.0 cr)
- PUBH 7569 - Health Care Policy (1.0 cr)

-OR-



## Occupational and Environmental Medicine (24 credits)

### Required Coursework (19 credits)

Take the following courses:

- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6159 - Principles of Toxicology I (2.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6387 - Cancer Epidemiology (2.0 cr)
- PUBH 8120 - Occupational Health and Safety Research Seminar (1.0 cr)

### Environmental Health Requirement (4 credits)

Take one course from each of the following lists. A minimum of B- is required.

#### Integrated Exposure & Health Effects

Take one course from the following list.

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

#### Risk Management

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

### Electives (1 credit)

Choose electives in consultation with the advisor to meet the 42-credit minimum.

- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)
- PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)
- PUBH 6035 - Evaluation II: Applications (3.0 cr)
- PUBH 6045 - Skills for Policy Development (1.0 cr)
- PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6160 - Principles of Toxicology II (3.0 cr)
- PUBH 6210 - Public Health Medicine Seminar (1.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6343 - Epidemiologic Methods III (4.0 cr)
- PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)
- PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)
- PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6389 - Nutritional Epidemiology (2.0 cr)
- PUBH 6420 - Introduction to SAS Programming (1.0 cr)
- PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)
- PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)
- PUBH 6527 - Healthcare Leadership and Effecting Change (2.0 cr)
- PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 6542 - Management of Health Care Organizations (3.0 cr)
- PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)
- PUBH 6547 - Health Care Human Resources Management (2.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)



PUBH 6562 - Information Technology in Health Care (2.0 cr)  
PUBH 6563 - Integrated Delivery Systems (2.0 cr)  
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)  
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)  
PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)  
PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)  
PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)  
PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)  
PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)  
PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)  
PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)  
PUBH 6655 - Principles and Programs in Maternal and Child Health (2.0 cr)  
PUBH 6702 - Integrative Leadership Seminar (3.0 cr)  
PUBH 6711 - Public Health Law (2.0 cr)  
PUBH 6717 - Decision Analysis for Health Care (2.0 cr)  
PUBH 6724 - The Health Care System and Public Health (3.0 cr)  
PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)  
PUBH 6729 - Public Health Leadership (1.0 cr)  
PUBH 6730 - International Comparative Health Systems (2.0 cr)  
PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)  
PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)  
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)  
PUBH 6806 - Principles of Public Health Research (2.0 cr)  
PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)  
PUBH 6810 - Survey Research Methods (3.0 cr)  
PUBH 6812 - Applied Projects in Health Intelligence and Analytics (2.0 cr)  
PUBH 6813 - Managing Electronic Health Information (2.0 cr)  
PUBH 6814 - Data and Information for Population Health Management (2.0 cr)  
PUBH 6815 - Community-based Participatory Research (2.0 cr)  
PUBH 6832 - Economics of the Health Care System (3.0 cr)  
PUBH 6835 - Principles of Health Policy (2.0 cr)  
PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)  
PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)  
PUBH 6855 - Medical Sociology (3.0 cr)  
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)  
PUBH 6863 - Understanding Health Care Quality (2.0 cr)  
PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)  
PUBH 6906 - Global Nutrition (2.0 cr)  
PUBH 6920 - Foundations of Interprofessional Professional Communication and Collaboration (1.0 cr)  
PUBH 7210 - Topics: Global Food Systems (0.5 cr)  
PUBH 7214 - Principles of Risk Communication (1.0 cr)  
PUBH 7222 - Best Practices in Emergency Response (1.0 cr)  
PUBH 7236 - Farm to Table Program:Minnesota (2.0 cr)  
PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)  
PUBH 7252 - Qualitative Research Methods: Discovering the Value of Voice in Words, Stories and Photographs (1.0 cr)  
PUBH 7253 - Introduction to GIS (1.0 cr)  
PUBH 7257 - Qualitative Data Analysis (1.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)  
PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)  
PUBH 7541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 7556 - Health and Health Systems (2.0 cr)  
PUBH 7562 - Information Technology in Health Care (2.0 cr)  
PUBH 7564 - Private Purchasers of Health Care (2.0 cr)  
PUBH 7565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 7568 - Interdisciplinary Teamwork in Health Care (2.0 cr)  
PUBH 7569 - Health Care Policy (1.0 cr)

-OR-

**Regulatory Toxicology and Risk Assessment (24 credits)**  
**Required Coursework (14 credits)**





Take the following courses:

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6159 - Principles of Toxicology I (2.0 cr)
- PUBH 6160 - Principles of Toxicology II (3.0 cr)
- PUBH 6161 - Regulatory Toxicology (2.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 8160 - Advanced Toxicology (2.0 cr)
- PUBH 8161 - Current Literature in Toxicology (1.0 cr)

#### **Environmental Health Requirement (4 credits)**

Take one course from each of the following lists. A minimum grade of B- is required.

##### **Integrated Exposure & Health Effects**

Take one course from the following list

- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

##### **Risk Management**

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

#### **Electives (6 credits)**

Choose electives in consultation with the advisor to meet the 42-credit minimum.

- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)
- PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)
- PUBH 6035 - Evaluation II: Applications (3.0 cr)
- PUBH 6045 - Skills for Policy Development (1.0 cr)
- PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6210 - Public Health Medicine Seminar (1.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6343 - Epidemiologic Methods III (4.0 cr)
- PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)
- PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)
- PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6389 - Nutritional Epidemiology (2.0 cr)
- PUBH 6420 - Introduction to SAS Programming (1.0 cr)
- PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)
- PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)
- PUBH 6527 - Healthcare Leadership and Effecting Change (2.0 cr)
- PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 6542 - Management of Health Care Organizations (3.0 cr)
- PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)
- PUBH 6547 - Health Care Human Resources Management (2.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 6562 - Information Technology in Health Care (2.0 cr)



- PUBH 6563 - Integrated Delivery Systems (2.0 cr)
- PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)
- PUBH 6565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)
- PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)
- PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)
- PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)
- PUBH 6655 - Principles and Programs in Maternal and Child Health (2.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6729 - Public Health Leadership (1.0 cr)
- PUBH 6730 - International Comparative Health Systems (2.0 cr)
- PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)
- PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 6812 - Applied Projects in Health Intelligence and Analytics (2.0 cr)
- PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- PUBH 6814 - Data and Information for Population Health Management (2.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6835 - Principles of Health Policy (2.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6863 - Understanding Health Care Quality (2.0 cr)
- PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)
- PUBH 6920 - Foundations of Interprofessional Professional Communication and Collaboration (1.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7222 - Best Practices in Emergency Response (1.0 cr)
- PUBH 7236 - Farm to Table Program:Minnesota (2.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7252 - Qualitative Research Methods: Discovering the Value of Voice in Words, Stories and Photographs (1.0 cr)
- PUBH 7253 - Introduction to GIS (1.0 cr)
- PUBH 7257 - Qualitative Data Analysis (1.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)
- PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 7541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 7556 - Health and Health Systems (2.0 cr)
- PUBH 7562 - Information Technology in Health Care (2.0 cr)
- PUBH 7564 - Private Purchasers of Health Care (2.0 cr)
- PUBH 7565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 7568 - Interdisciplinary Teamwork in Health Care (2.0 cr)
- PUBH 7569 - Health Care Policy (1.0 cr)

-OR-

### **Injury and Violence Epidemiology and Prevention (24 credits)**

#### **Required Coursework (8 credits)**

Students taking electives from the Injury and Violence Epidemiology and Prevention emphasis must have taken PUBH 6341 and PUBH 6450.



- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 8120 - Occupational Health and Safety Research Seminar (1.0 cr)

**Environmental Health Requirement (4 credits)**

Take one course from each of the following lists. A minimum grade of B- is required.

**Integrated Exposure & Health Effects**

Take one course from the following list. If Topics, must select PubH 6100 GIS & Spatial Analysis (3 cr).

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

**Risk Management**

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)

**Electives (12 credits)**

Choose electives in consultation with the advisor to meet the 42-credit minimum.

- HUMF 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)
- IE 5513 - Engineering Safety (4.0 cr)
- KIN 5122 - Applied Exercise Physiology (3.0 cr)
- KIN 5723 - Psychology of Sport Injury and Rehabilitation (3.0 cr)
- PSY 5501 - Vocational and Occupational Health Psychology (3.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)
- PUBH 6636 - Qualitative Research Methods in Public Health Practice (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)
- PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)
- PUBH 7405 - Biostatistics: Regression (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
- PUBH 7450 - Survival Analysis (3.0 cr)
- PUBH 7460 - Advanced Statistical Computing (3.0 cr)
- PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)
- PUBH 8342 - Advanced Epidemiologic Methods: Applications (3.0 cr)
- PUBH 8343 - Synthesis and Application of Methods in Epidemiologic Research (4.0 cr)
- PUBH 8813 - Measurement of Health-Related Social Factors (3.0 cr)

-OR-

**Food Safety (24 credits)****Required Coursework (15 credits)**

Take the following courses. PUBH 7210 must be taken twice for a total of 1 credit.

- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)
- PUBH 6183 - Theory and Practice in Foodborne Disease Outbreak Detection, Investigation and Control (1.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- VMED 5180 - Ecology of Infectious Disease (3.0 cr)
- FSCN 5131 - Food Quality for Graduate Credit (3.0 cr)

**Environmental Health Requirement (4 credits)**

Take one course from each of the following lists. A minimum grade of B- is required.

**Integrated Exposure & Health Effects**

Take one course from the following list. If Topics, must select PubH 6100 GIS & Spatial Analysis (3 cr).

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)



- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

#### **Risk Management**

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

#### **Electives (5 credits)**

Choose electives in consultation with the advisor to meet the 42-credit minimum.

- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)
- MICB 4131 - Immunology (3.0 cr)
- MICB 4151 - Molecular and Genetic Bases for Microbial Diseases (3.0 cr)
- MICB 4171 - Biology, Genetics, and Pathogenesis of Viruses (3.0 cr)

**Joint- or Dual-degree Coursework:** MPH-Environmental Health/JD Student may take a total of 12 credits in common among the academic programs.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Industrial Hygiene

The Industrial Hygiene (IH) sub-plan, accredited by the Applied Science Accreditation Commission of ABET, focuses on the health and safety of people at work and the community at large. Specific concerns are with the recognition, evaluation and control of potential workplace hazards, including chemical, physical, and biological agents; and the potential health threats to the community and the environment. This sub-plan prepares well-qualified practitioners and researchers for an exciting career in industry, government organizations, and academic and research institutions.

Students pursuing the Industrial Hygiene track must complete the following in addition to the Public Health Core, Environmental Health, Applied Practice Experience, and Integrated Learning Experience coursework required of all Environmental Health MPH students.

#### **Industrial Hygiene Requirements (21 credits)**

Take the following courses:

- PUBH 6172 - Industrial Hygiene Applications (2.0 cr)
- PUBH 6174 - Control of Workplace Exposure (3.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6175 - Environmental Measurements Laboratory (2.0 cr)
- PUBH 6192 - Measurement and Properties of Air Contaminants (2.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)

#### **Environmental Health Requirement (4 credits)**

Take one course from each of the following lists. A minimum grade of B- is required.

##### **Integrated Exposure & Health Effects**

Take one course from the following list.

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

##### **Risk Management**

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)



### Electives (5 credits)

Select electives in consultation with the advisor to complete the 52-credit minimum.

[PUBH 6131](#) - Working in Global Health (2.0 cr)

[PUBH 6132](#) - Air, Water, and Health (2.0 cr)

[PUBH 6140](#) - Occupational and Environmental Epidemiology (2.0 cr)

[PUBH 6161](#) - Regulatory Toxicology (2.0 cr)

[PUBH 6177](#) - Nanotechnology Health and Safety (3.0 cr)

[PUBH 6182](#) - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)

[PUBH 6451](#) - Biostatistics II (4.0 cr)

[CEGE 4561](#) - Solids and Hazardous Wastes (3.0 cr)

[CEGE 5551](#) - Environmental Microbiology (3.0 cr)

[IE 5511](#) - Human Factors and Work Analysis (4.0 cr)

[IE 5513](#) - Engineering Safety (4.0 cr)

[KIN 5001](#) - Foundations of Human Factors/Ergonomics (3.0 cr)

[ME 5113](#) - Aerosol/Particle Engineering (4.0 cr)

[PA 5721](#) - Energy Systems and Policy (3.0 cr)

### Integrated BS-Biochemistry/MPH-Environmental Health

This sub-plan is limited to students completing the program under Plan C.

The School of Public Health (SPH) and the College of Biological Sciences (CBS) offer an early-admission opportunity for eligible Biochemistry BS students interested in pursuing the Environmental Health MPH degree. Students admitted to the Integrated BS-Biochemistry/MPH-Environmental Health sub-plan take 12 MPH credits during their senior (fourth) year, and complete the MPH by taking remaining credits as a full-time graduate student their fifth year and following summer. Graduate courses cannot be applied toward both BS and MPH credit and degree requirements. Admitted students must maintain timely degree progress to ensure that the BS degree is awarded no later than the end of the senior (fourth) year. The application deadline for the Integrated BS-Biochemistry/MPH-Environmental Health opportunity is the spring of the applicant's junior (third) year. Confer with the CBS advising office and the School of Public Health for application instructions.

### Integrated BS-Biology/MPH-Environmental Health

This sub-plan is limited to students completing the program under Plan C.

The School of Public Health (SPH) and the College of Biological Sciences (CBS) offer an early-admission opportunity for eligible Biology BS students interested in pursuing the Environmental Health MPH degree. Students admitted to the Integrated BS-Biology/MPH Environmental Health sub-plan take 12 MPH credits during their senior (fourth) year, and complete the MPH by taking remaining credits as a full-time graduate student their fifth year and following summer. Graduate courses cannot be applied toward both BS and MPH credit and degree requirements. Admitted students must maintain timely degree progress to ensure that the BS degree is awarded no later than the end of the senior (fourth) year. The application deadline for the Integrated BS-Biology/MPH-Environmental Health opportunity is the spring of the applicant's junior (third) year. Confer with the CBS advising office and the School of Public Health for application instructions.

### Integrated BS-Cellular and Organismal Physiology/MPH-Environmental Health

This sub-plan is limited to students completing the program under Plan C.

The School of Public Health (SPH) and the College of Biological Sciences (CBS) offer an early-admission opportunity for eligible Cellular and Organismal Physiology BS students interested in pursuing the Environmental Health MPH degree. Students admitted to the Integrated BS- Cellular and Organismal Physiology/MPH-Environmental Health sub-plan take 12 MPH credits during their senior (fourth) year, and complete the MPH by taking remaining credits as a full-time graduate student their fifth year and following summer. Graduate courses cannot be applied toward both BS and MPH credit and degree requirements. Admitted students must maintain timely degree progress to ensure that the BS degree is awarded no later than the end of the senior (fourth) year. The application deadline for the Integrated BS- Cellular and Organismal Physiology/MPH-Environmental Health opportunity is the spring of the applicant's junior (third) year. Confer with the CBS advising office and the School of Public Health for application instructions.

### Integrated BS-Ecology, Evolution and Behavior/MPH-Environmental Health

This sub-plan is limited to students completing the program under Plan C.

The School of Public Health (SPH) and the College of Biological Sciences (CBS) offer an early-admission opportunity for eligible



Ecology, Evolution and Behavior BS students interested in pursuing the Environmental Health MPH degree. Students admitted to the Integrated BS- Ecology, Evolution and Behavior/MPH Environmental Health sub-plan take 12 MPH credits during their senior (fourth) year, and complete the MPH by taking remaining credits as a full-time graduate student their fifth year and following summer. Graduate courses cannot be applied toward both BS and MPH credit and degree requirements. Admitted students must maintain timely degree progress to ensure that the BS degree is awarded no later than the end of the senior (fourth) year. The application deadline for the Integrated BS- Ecology, Evolution and Behavior /MPH-Environmental Health opportunity is the spring of the applicant's junior (third) year. Confer with the CBS advising office and the School of Public Health for application instructions.

#### **Integrated BS-Genetics, Cell Biology and Development/MPH-Environmental Health**

This sub-plan is limited to students completing the program under Plan C.

The School of Public Health (SPH) and the College of Biological Sciences (CBS) offer an early-admission opportunity for eligible Genetics, Cell Biology and Development BS students interested in pursuing the Environmental Health MPH degree. Students admitted to the Integrated BS- Genetics, Cell Biology and Development MPH-Environmental Health sub-plan take 12 MPH credits during their senior (fourth) year, and complete the MPH by taking remaining credits as a full-time graduate student their fifth year and following summer. Graduate courses cannot be applied toward both BS and MPH credit and degree requirements. Admitted students must maintain timely degree progress to ensure that the BS degree is awarded no later than the end of the senior (fourth) year. The application deadline for the Integrated BS- Genetics, Cell Biology and Development/MPH Environmental Health opportunity is the spring of the applicant's junior (third) year. Confer with the CBS advising office and the School of Public Health for application instructions.

#### **Integrated BS-Microbiology/MPH-Environmental Health**

This sub-plan is limited to students completing the program under Plan C.

The School of Public Health (SPH) and the College of Biological Sciences (CBS) offer an early-admission opportunity for eligible Microbiology BS students interested in pursuing the Environmental Health MPH degree. Students admitted to the Integrated BS- Microbiology/MPH-Environmental Health sub-plan take 12 MPH credits during their senior (fourth) year, and complete the MPH by taking remaining credits as a full-time graduate student their fifth year and following summer. Graduate courses cannot be applied toward both BS and MPH credit and degree requirements. Admitted students must maintain timely degree progress to ensure that the BS degree is awarded no later than the end of the senior (fourth) year. The application deadline for the Integrated BS- Microbiology/MPH-Environmental Health opportunity is the spring of the applicant's junior (third) year. Confer with the CBS advising office and the School of Public Health for application instructions.

#### **Integrated BS-Neuroscience/MPH-Environmental Health**

This sub-plan is limited to students completing the program under Plan C.

The School of Public Health (SPH) and the College of Biological Sciences (CBS) offer an early-admission opportunity for eligible Neuroscience BS students interested in pursuing the Environmental Health MPH degree. Students admitted to the Integrated BS- Neuroscience/MPH-Environmental Health sub-plan take 12 MPH credits during their senior (fourth) year, and complete the MPH by taking remaining credits as a full-time graduate student their fifth year and following summer. Graduate courses cannot be applied toward both BS and MPH credit and degree requirements. Admitted students must maintain timely degree progress to ensure that the BS degree is awarded no later than the end of the senior (fourth) year. The application deadline for the Integrated BS- Neuroscience/MPH-Environmental Health opportunity is the spring of the applicant's junior (third) year. Confer with the CBS advising office and the School of Public Health for application instructions.

#### **Integrated BS-Plant and Microbial Biology/MPH-Environmental Health**

This sub-plan is limited to students completing the program under Plan C.

The School of Public Health (SPH) and the College of Biological Sciences (CBS) offer an early-admission opportunity for eligible Plant and Microbial Biology BS students interested in pursuing the Environmental Health MPH degree. Students admitted to the Integrated BS- Plant and Microbial Biology/MPH-Environmental Health sub-plan take 12 MPH credits during their senior (fourth) year, and complete the MPH by taking remaining credits as a full-time graduate student their fifth year and following summer. Graduate courses cannot be applied toward both BS and MPH credit and degree requirements. Admitted students must maintain timely degree progress to ensure that the BS degree is awarded no later than the end of the senior (fourth) year. The application deadline for the Integrated BS- Plant and Microbial Biology/MPH-Environmental Health opportunity is the spring of the applicant's junior (third) year. Confer with the CBS advising office and the School of Public Health for application instructions.



### ***Twin Cities Campus***

## **Environmental Health M.S.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 52
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Environmental health is the study of how exposures to external hazards, including chemical, physical, and biological agents, affect human health. Environmental health researchers and professionals seek to understand how to evaluate exposures that create risk to human health, how those exposures elicit biological responses that lead to disease and injury, and how policy is developed and used to prevent adverse health effects. Environmental Health at the University of Minnesota offers master's and doctoral degrees, conducts research in diverse areas of environmental health, offers continuing education, and conducts outreach. Students are prepared to be leaders in environmental health in academia, industry, consulting groups, and government agencies. The program's training and research emphasizes the importance of translating basic scientific knowledge into solutions for current societal problems and concerns.

The MS program offers students a wide range of coursework and research opportunities in areas such as environmental infectious diseases; environmental and occupational epidemiology; environmental chemistry; exposure science; food safety; injury and violence epidemiology and prevention; global environmental health; and regulatory toxicology and risk assessment to prepare them for careers in their chosen area of environmental health. A generalist emphasis area and a specialized track in industrial hygiene are also available. The industrial hygiene track is accredited by ABET.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Minimum requirements include a baccalaureate degree with coursework in the basic sciences.

Other requirements to be completed before admission:

Prerequisites for the regulatory toxicology and risk management emphasis include a bachelor's degree in the basic sciences, including completion of courses in organic chemistry, biochemistry, cell biology and physiology. Students who have not completed at least two prerequisites must do so upon admission to the MS program and in consultation with the advisor. Prerequisite coursework cannot be applied to MS credit requirements.

The Industrial Hygiene track requires additional preparation. For more information refer to <http://www.sph.umn.edu/programs/ehs/tracks/index.asp>.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 150
  - General Test - Quantitative Reasoning: 150
  - General Test - Analytical Writing: 3.5



- GMAT
- MCAT
- LSAT
- DAT
- Score: 18

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, GMAT, MCAT, LSAT, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 24 to 28 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 30 to 52 major credits and 0 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The Plan B project is a master's capstone project selected in consultation with the advisor.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

### Public Health Core Requirements (11 credits)

All Public Health Core coursework must be taken on the A-F grade basis, with a minimum grade of B- earned for each course.

#### Epidemiology (3 credits)

Select one of the following courses in consultation with the advisor. Students pursuing either the Environmental and Occupational Epidemiology emphasis or the Injury and Violence Epidemiology and Prevention emphasis must take PUBH 6341. Students pursuing the Industrial Hygiene track must take PUBH 6320.

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

#### Environmental Health (2 credits)

Take the following course:

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

#### Foundations of Public Health (2 credits)

Take the following course:

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

#### Biostatistics (3-4 credits)

Select one of the following courses in consultation with the advisor. Students pursuing either the Environmental and Occupational Epidemiology emphasis, the Injury and Violence Epidemiology and Prevention emphasis, or the Industrial Hygiene track must take PUBH 6450. Only students pursuing the Environmental Chemistry emphasis can take STAT 5021 and are encouraged to take STAT 5021.

[PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

or [PUBH 6450](#) - Biostatistics I (4.0 cr)

or [STAT 5021](#) - Statistical Analysis (4.0 cr)

#### Ethics (1 credit)

Take the following course:

[PUBH 6742](#) - Ethics in Public Health: Research and Policy (1.0 cr)





## Plan Options

### Plan A Thesis (10 credits)

Plan A students must take at least 10 master's thesis credits.

[PUBH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

### or Plan B Project (3 credits)

Plan B students must take at least 3 Plan B Project credits in consultation with the advisor.

[PUBH 7195](#) - MS in Environmental Health Sciences Plan B Project (1.0 - 5.0 cr)

## Concentration Areas

### Generalist (15-16 credits)

The Generalist emphasis is restricted to Plan B only.

#### Environmental Health Requirement (4 credits)

Select at least one course from each of the following two course lists, in consultation with the advisor, to meet the 4-credit Environment Health requirement. A minimum grade of B- is required.

#### Integrated Exposure & Health Effects

Take one course from the following list. If Topics, must select [PubH 6100 GIS & Spatial Analysis](#) (3 cr).

[PUBH 6112](#) - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)

[PUBH 6141](#) - GIS & Spatial Analysis for Public Health (3.0 cr)

[PUBH 6154](#) - Climate Change and Global Health (3.0 cr)

[PUBH 6162](#) - Biomarkers (2.0 cr)

[PUBH 6181](#) - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)

[PUBH 6190](#) - Environmental Chemistry (3.0 cr)

[PUBH 6193](#) - Advanced Topics in Human Exposure Science (2.0 cr)

#### Risk Management

Take one course from the following list:

[PUBH 6115](#) - Worker Protection Law (1.0 cr)

[PUBH 6116](#) - Environmental Law (1.0 cr)

[PUBH 6120](#) - Injury Prevention in the Workplace, Community, and Home (2.0 cr)

[PUBH 6123](#) - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

#### Elective Coursework

Select electives, in consultation with the advisor, from the following list to satisfy the 30-credit minimum. Other courses may be substituted with approval of the advisor and director of graduate studies.

[PA 5451](#) - Immigration, Health and Public Policy (3.0 cr)

[PUBH 5231](#) - Emergency Preparedness: A Public Health Perspective (2.0 cr)

[PUBH 6010](#) - Public Health Approaches to HIV/AIDS (3.0 cr)

[PUBH 6034](#) - Evaluation (3.0 cr)

[PUBH 6035](#) - Applied Research Methods (3.0 cr)

[PUBH 6045](#) - Skills for Policy Development (1.0 cr)

[PUBH 6049](#) - Legislative Advocacy Skills for Public Health (3.0 cr)

[PUBH 6055](#) - Social Inequalities in Health (2.0 cr)

[PUBH 6060](#) - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)

[PUBH 6066](#) - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)

[PUBH 6078](#) - Public Health Policy as a Prevention Strategy (2.0 cr)

[PUBH 6085](#) *{Inactive}*(2.0 cr)

[PUBH 6094](#) - Obesity and Eating Disorder Interventions (2.0 cr)

[PUBH 6134](#) - Sustainable Development and Global Public Health (2.0 cr)

[PUBH 6210](#) - Public Health Medicine Seminar (1.0 cr)

[PUBH 6325](#) - Data Processing with PC-SAS (1.0 cr)

[PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

[PUBH 6342](#) - Epidemiologic Methods II (3.0 cr)

[PUBH 6348](#) - Writing Research Grants (2.0 cr)

[PUBH 6385](#) - Epidemiology and Control of Infectious Diseases (2.0 cr)

[PUBH 6386](#) - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)

[PUBH 6387](#) - Cancer Epidemiology (2.0 cr)

[PUBH 6420](#) - Introduction to SAS Programming (1.0 cr)

[PUBH 6431](#) - Topics in Hierarchical Bayesian Analysis (1.0 cr)

[PUBH 6451](#) - Biostatistics II (4.0 cr)

[PUBH 6527](#) - Healthcare Leadership and Effecting Change (2.0 cr)

[PUBH 6556](#) - Health and Health Systems (3.0 cr)

[PUBH 6557](#) - Health Finance I (3.0 cr)

[PUBH 6558](#) - Health Finance II (3.0 cr)

[PUBH 6560](#) - Operations Research and Quality in Health Care (3.0 cr)

[PUBH 6562](#) - Information Technology in Health Care (2.0 cr)

[PUBH 6563](#) - Integrated Delivery Systems (2.0 cr)



- PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)
- PUBH 6565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 6568 - Interprofessional Teamwork in Health Care (2.0 cr)
- PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)
- PUBH 6577 - Advanced Problem Solving in Health Services Administration (2.0 cr)
- PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)
- PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)
- PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)
- PUBH 6730 - International Comparative Health Systems (2.0 cr)
- PUBH 6732 - Topics and Methods in Global Health Assessment (2.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)

-OR-

#### **Environmental and Occupational Epidemiology (15 credits)**

The Environmental and Occupational Epidemiology emphasis is restricted to Plan B only.

##### **Required Coursework (9 credits)**

Take the following courses:

- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)

##### **Environmental Health Requirement (4 credits)**

Select at least one course from each of the following two course lists, in consultation with the advisor, to meet the 4-credit Environment Health requirement. A minimum grade of B- is required.

##### **Integrated Exposure & Health Effects**

Take one course from the following list.

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

##### **Risk Management**

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

##### **Electives (2 credits)**

Select coursework, in consultation with the advisor, from the following list to satisfy the 30-credit minimum. Other courses may be substituted with approval of the advisor and director of graduate studies.

- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)
- PUBH 6010 - Public Health Approaches to HIV/AIDS (3.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)
- PUBH 6035 - Applied Research Methods (3.0 cr)
- PUBH 6045 - Skills for Policy Development (1.0 cr)
- PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6085 (*Inactive*)(2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)
- PUBH 6210 - Public Health Medicine Seminar (1.0 cr)
- PUBH 6325 - Data Processing with PC-SAS (1.0 cr)
- PUBH 6341 - Epidemiologic Methods I (3.0 cr)
- PUBH 6348 - Writing Research Grants (2.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6387 - Cancer Epidemiology (2.0 cr)



PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)  
PUBH 6527 - Healthcare Leadership and Effecting Change (2.0 cr)  
PUBH 6556 - Health and Health Systems (3.0 cr)  
PUBH 6557 - Health Finance I (3.0 cr)  
PUBH 6558 - Health Finance II (3.0 cr)  
PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)  
PUBH 6562 - Information Technology in Health Care (2.0 cr)  
PUBH 6563 - Integrated Delivery Systems (2.0 cr)  
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)  
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 6568 - Interprofessional Teamwork in Health Care (2.0 cr)  
PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)  
PUBH 6577 - Advanced Problem Solving in Health Services Administration (2.0 cr)  
PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)  
PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)  
PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)  
PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)  
PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)  
PUBH 6730 - International Comparative Health Systems (2.0 cr)  
PUBH 6732 - Topics and Methods in Global Health Assessment (2.0 cr)  
PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)  
PUBH 6906 - Global Nutrition (2.0 cr)

-OR-

#### **Environmental Infectious Diseases (15-16 credits)**

The Environmental Infectious Diseases emphasis is restricted to Plan B only.

##### **Required Coursework (10 credits)**

Take the following courses:

PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)  
PUBH 6184 - Field and laboratory methods in public health entomology (2.0 cr)  
PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)  
VMED 5180 - Ecology of Infectious Disease (3.0 cr)

##### **Environmental Health Requirement (4 credits)**

Select at least one course from each of the following two course lists, in consultation with the advisor, to meet the 4-credit Environment Health requirement. A minimum grade of B- is required.

##### **Integrated Exposure & Health Effects**

Take one course from the following list.

PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)  
PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)  
PUBH 6154 - Climate Change and Global Health (3.0 cr)  
PUBH 6162 - Biomarkers (2.0 cr)  
PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)  
PUBH 6190 - Environmental Chemistry (3.0 cr)  
PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

##### **Risk Management**

Take one course from the following list:

PUBH 6115 - Worker Protection Law (1.0 cr)  
PUBH 6116 - Environmental Law (1.0 cr)  
PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)  
PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

##### **Electives (1-2 credits)**

Select coursework, in consultation with the advisor, from the following list to satisfy the 30-credit minimum. Other courses may be substituted with approval of the advisor and director of graduate studies.

PA 5451 - Immigration, Health and Public Policy (3.0 cr)  
PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)  
PUBH 6010 - Public Health Approaches to HIV/AIDS (3.0 cr)  
PUBH 6034 - Evaluation (3.0 cr)  
PUBH 6035 - Applied Research Methods (3.0 cr)  
PUBH 6045 - Skills for Policy Development (1.0 cr)  
PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)  
PUBH 6055 - Social Inequalities in Health (2.0 cr)  
PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)  
PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)  
PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)



PUBH 6085 (*Inactive*)(2.0 cr)  
PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)  
PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)  
PUBH 6210 - Public Health Medicine Seminar (1.0 cr)  
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6348 - Writing Research Grants (2.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6387 - Cancer Epidemiology (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)  
PUBH 6527 - Healthcare Leadership and Effecting Change (2.0 cr)  
PUBH 6556 - Health and Health Systems (3.0 cr)  
PUBH 6557 - Health Finance I (3.0 cr)  
PUBH 6558 - Health Finance II (3.0 cr)  
PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)  
PUBH 6562 - Information Technology in Health Care (2.0 cr)  
PUBH 6563 - Integrated Delivery Systems (2.0 cr)  
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)  
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 6568 - Interprofessional Teamwork in Health Care (2.0 cr)  
PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)  
PUBH 6577 - Advanced Problem Solving in Health Services Administration (2.0 cr)  
PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)  
PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)  
PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)  
PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)  
PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)  
PUBH 6730 - International Comparative Health Systems (2.0 cr)  
PUBH 6732 - Topics and Methods in Global Health Assessment (2.0 cr)  
PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)  
PUBH 6906 - Global Nutrition (2.0 cr)

-OR-

#### **Exposure Science (17 credits)**

The Exposure Science emphasis is restricted to Plan B only.

##### **Required Coursework (13 credits)**

Take the following courses to complete the 31 total credits required for this emphasis.

PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)  
PUBH 6162 - Biomarkers (2.0 cr)  
PUBH 6175 - Environmental Measurements Laboratory (2.0 cr)  
PUBH 6190 - Environmental Chemistry (3.0 cr)  
PUBH 6192 - Measurement and Properties of Air Contaminants (2.0 cr)  
PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

##### **Environmental Health Requirement (4 credits)**

Select at least one course from each of the following two course lists, in consultation with the advisor, to meet the 4-credit Environment Health requirement. A minimum grade of B- is required.

##### **Integrated Exposure & Health Effects**

Take one course from the following list.

PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)  
PUBH 6154 - Climate Change and Global Health (3.0 cr)  
PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)

##### **Risk Management**

Take one course from the following list:

PUBH 6115 - Worker Protection Law (1.0 cr)  
PUBH 6116 - Environmental Law (1.0 cr)  
PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)  
PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

-OR-

#### **Regulatory Toxicology and Risk Assessment (18 credits)**

The Regulatory Toxicology and Risk Assessment emphasis is restricted to Plan B only.

##### **Required Coursework (14 credits)**



Take the following courses to meet the 32 credits required for this emphasis.

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6159 - Principles of Toxicology I (2.0 cr)
- PUBH 6160 - Principles of Toxicology II (3.0 cr)
- PUBH 6161 - Regulatory Toxicology (2.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 8160 - Advanced Toxicology (2.0 cr)
- PUBH 8161 - Current Literature in Toxicology (1.0 cr)

**Environmental Health Requirement (4 credits)**

Select at least one course from each of the following two course lists, in consultation with the advisor, to meet the 4-credit Environment Health requirement. A minimum grade of B- is required.

**Integrated Exposure & Health Effects**

Take one course from the following list.

- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

**Risk Management**

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

-OR-

**Food Safety (19 credits)**

Take the following courses to meet the 33 credits required for this emphasis. Take PUBH 7210 twice for a total of one credit.

**Required Coursework (15 credits)**

Students complete the following required courses. Students take PUBH 7210 two times.

- FSCN 5131 - Food Quality for Graduate Credit (3.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)
- PUBH 6183 - Theory and Practice in Foodborne Disease Outbreak Detection, Investigation and Control (1.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- VMED 5180 - Ecology of Infectious Disease (3.0 cr)

**Environmental Health Requirement (4 credits)**

Select at least one course from each of the following two course lists, in consultation with the advisor, to meet the 4-credit Environment Health requirement. A minimum grade of B- is required.

**Integrated Exposure & Health Effects**

Take one course from the following list.

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

**Risk Management**

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

-OR-

**Environmental Chemistry (13-16 credits)**

The Environmental Chemistry emphasis can be completed as Plan A or Plan B.

**Required Coursework (9 credits)**

All students pursuing this emphasis take the following courses:

- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)

**Environmental Health Requirement (4 credits)**

Select at least one course from each of the following two course lists, in consultation with the advisor, to meet the 4-credit



Environment Health requirement. A minimum grade of B- is required.

**Integrated Exposure & Health Effects**

Take one course from the following list.

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

**Risk Management**

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

**Electives (0-3 credits)**

Students pursuing the Plan B must take electives in addition to the required emphasis coursework to meet the 30-credit minimum. Select courses in consultation with the advisor. Other courses may be substituted with approval of the advisor and director of graduate studies.

- CEGE 4561 - Solids and Hazardous Wastes (3.0 cr)
- CEGE 8503 - Environmental Mass Transport (4.0 cr)
- CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)
- CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)

-OR-

**Injury and Violence Epidemiology and Prevention (16 credits)**

The Injury and Violence Epidemiology and Prevention emphasis can be completed as Plan A or Plan B.

**Required Coursework (12 credits)**

All students pursuing this emphasis take the following courses:

- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)
- PUBH 8120 - Occupational Health and Safety Research Seminar (1.0 cr)

**Environmental Health Requirement (4 credits)**

Select at least one course from each of the following two course lists, in consultation with the advisor, to meet the 4-credit Environment Health requirement. A minimum grade of B- is required.

**Integrated Exposure & Health Effects**

Take one course from the following list.

- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6141 - GIS & Spatial Analysis for Public Health (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

**Risk Management**

Take one course from the following list:

- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)

**Program Sub-plans**

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

**Industrial Hygiene**

The Environmental Health MS with the Industrial Hygiene (IH) track is a 52-credit program that focuses on the recognition, evaluation and control of potential workplace hazards -- including chemical, physical, and biological agents -- and the potential health threats to the community and the environment.

The MS-IH track program is accredited by the Applied Science Accreditation Commission of ABET, <http://www.abet.org>.

The Industrial Hygiene track is restricted to Plan B only.

**Industrial Hygiene Required Courses (21 credits)**



Take the following courses:

- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6172 - Industrial Hygiene Applications (2.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6174 - Control of Workplace Exposure (3.0 cr)
- PUBH 6175 - Environmental Measurements Laboratory (2.0 cr)
- PUBH 6192 - Measurement and Properties of Air Contaminants (2.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)

**Applied Practice Experience (3 credits)**

Take the following course in consultation with the advisor.

- PUBH 7196 - Applied Practice Experience: Environmental Health (1.0 - 5.0 cr)

**Electives (9 credits)**

Select electives from the following list, in consultation with the advisor, to complete the 52-credit minimum. Other courses may be substituted with approval of the advisor and director of graduate studies.

- PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)
- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)
- PUBH 6132 - Air, Water, and Health (2.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6161 - Regulatory Toxicology (2.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6177 - Nanotechnology Health and Safety (3.0 cr)
- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)
- PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)
- CEGE 4561 - Solids and Hazardous Wastes (3.0 cr)
- CEGE 5551 - Environmental Microbiology (3.0 cr)
- IE 5511 - Human Factors and Work Analysis (4.0 cr)
- IE 5513 - Engineering Safety (4.0 cr)
- KIN 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)
- ME 5113 - Aerosol/Particle Engineering (4.0 cr)
- PA 5721 - Energy Systems and Policy (3.0 cr)
- CMGT 4031 - Construction Safety and Loss Control (3.0 cr)



### *Twin Cities Campus*

## Environmental Health Minor

School of Public Health - Adm

### School of Public Health

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The environmental health minor is designed for students who wish to understand how our physical and social environment affects public health. Students will learn about exposure to physical and social stressors, such as chemicals, infectious agents, stress, and violence; how stressors affect health; and how decisions are made to protect health.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Students enrolled in University master's or doctoral programs are eligible for the minor.

Other requirements to be completed before admission:

Prior consultation with the major field academic advisor regarding pursuit of the Environmental Health minor is expected. For more information regarding the Environmental Health minor, contact [sph-ask@umn.edu](mailto:sph-ask@umn.edu).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Courses offered on both the A/F and S/N grade basis must be taken A/F. A minimum grade of B- is required for all courses.

The minimum cumulative GPA for the minor is 3.00.

#### **Coursework (6-12 credits)**

##### **Required Course (2 credits)**

Take the following course.

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

##### **Electives**

Master's students must select 4 credits from the following list and doctoral students must select 10 credits, in consultation with the Environmental Health director of graduate studies.





PubH 6100 Topics must be GIS and Spatial Analysis (3 cr).

[PUBH 6100](#) - Topics: Environmental Health (1.0 - 4.0 cr)

[PUBH 6112](#) - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)

[PUBH 6115](#) - Worker Protection Law (1.0 cr)

[PUBH 6116](#) - Environmental Law (1.0 cr)

[PUBH 6120](#) - Injury Prevention in the Workplace, Community, and Home (2.0 cr)

[PUBH 6123](#) - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

[PUBH 6154](#) - Climate Change and Global Health (3.0 cr)

[PUBH 6161](#) - Regulatory Toxicology (2.0 cr)

[PUBH 6162](#) - Biomarkers (2.0 cr)

[PUBH 6173](#) - Exposure to Physical Agents (2.0 cr)

[PUBH 6174](#) - Control of Workplace Exposure (3.0 cr)

[PUBH 6181](#) - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)

[PUBH 6190](#) - Environmental Chemistry (3.0 cr)

[PUBH 6192](#) - Measurement and Properties of Air Contaminants (2.0 cr)

[PUBH 6193](#) - Advanced Topics in Human Exposure Science (2.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### *Twin Cities Campus*

## Environmental Health Ph.D.

*School of Public Health - Adm*

### School of Public Health

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48 to 82
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Environmental health is the study of how exposures to external hazards, including chemical, physical, and biological agents, affect human health. Environmental health researchers and professionals seek to understand how to evaluate exposures that create risk to human health, how those exposures elicit biological responses that lead to disease and injury, and how policy is developed and used to prevent adverse health effects. This program offers academic programs at the master's and doctoral levels, conducts research in diverse areas of environmental health, offers continuing education, and conducts outreach. The academic programs prepare students to be leaders in environmental health in academia, industry, consulting groups, and government agencies. The program's training and research emphasizes the importance of translating basic scientific knowledge into solutions for current societal problems and concerns.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A baccalaureate degree with coursework in the basic sciences. Each specialty requires slightly different preparation. Industrial Hygiene requires physics, biology, chemistry, organic, and calculus.

Other requirements to be completed before admission:

Applicants to the industrial hygiene track must meet the following additional criteria:

For students with undergraduate degrees in a relevant discipline, good academic performance (preferably science or engineering, but other disciplines will be considered), and a minimum level of coursework in biology, chemistry (including organic), physics, and mathematics (including calculus) are required. Students with undergraduate degrees in non-science fields with appropriate additional coursework and work experience may also apply, but must demonstrate strengths in physics, chemistry (including organic), biology, and mathematics (including calculus); complementary courses in non-science disciplines (e.g., social sciences, languages) that reflect a well-rounded education; a clear motivation toward occupational and environmental health as articulated by the written statement, and strong letters of recommendation. Success in prior industrial hygiene-related work is preferred.

Applicants must submit their test score(s) from the following:

- MCAT
  - Verbal Reasoning score: 10
  - Physical Science score: 10
  - Biological Reasoning score: 10
- LSAT

International applicants must submit score(s) from one of the following tests:

- TOEFL



- Internet Based - Total Score: 100
- Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(MCAT, LSAT, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 to 58 credits are required in the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

### Core Coursework (3 credits)

Take the following courses:

[PUBH 6742](#) - Ethics in Public Health: Research and Policy (1.0 cr)

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

### Thesis Credits (24 credits)

Take at least 24 doctoral thesis credits.

[PUBH 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

### Concentration Areas

#### Generalist (48 credits)

##### Coursework (48 credits)

Select courses in consultation with the advisor.

[PUBH 6385](#) - Epidemiology and Control of Infectious Diseases (2.0 cr)

[PUBH 6601](#) - Born a Girl: Global Women's Health (1.0 cr)

[PUBH 6852](#) - Program Evaluation in Health and Mental Health Settings (2.0 cr)

[PUBH 6034](#) - Evaluation (3.0 cr)

[PUBH 6055](#) - Social Inequalities in Health (2.0 cr)

[PUBH 6045](#) - Skills for Policy Development (1.0 cr)

[PUBH 6066](#) - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)

[PUBH 6572](#) - Management for Clinical Research (2.0 cr)

[PUBH 6655](#) - Principles and Programs in Maternal and Child Health (2.0 cr)

[PUBH 6906](#) - Global Nutrition (2.0 cr)

[PUBH 6730](#) - International Comparative Health Systems (2.0 cr)

[PUBH 6605](#) - Reproductive and Perinatal Health (2.0 cr)

[PUBH 6112](#) - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)

[PUBH 6120](#) - Injury Prevention in the Workplace, Community, and Home (2.0 cr)

[PUBH 6123](#) - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

[PUBH 6130](#) - Occupational Medicine: Principles and Practice (2.0 cr)

[PUBH 6140](#) - Occupational and Environmental Epidemiology (2.0 cr)

[PUBH 6150](#) - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)

[PUBH 6154](#) - Climate Change and Global Health (3.0 cr)

[PUBH 6160](#) - Principles of Toxicology II (3.0 cr)

[PUBH 6162](#) - Biomarkers (2.0 cr)

[PUBH 6170](#) - Introduction to Occupational Health and Safety (3.0 cr)

[PUBH 6181](#) - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)

[PUBH 6173](#) - Exposure to Physical Agents (2.0 cr)



- PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)  
PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6035 - Evaluation II: Applications (3.0 cr)  
PUBH 6190 - Environmental Chemistry (3.0 cr)  
PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)  
PUBH 6210 - Public Health Medicine Seminar (1.0 cr)  
PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)  
PUBH 6074 - Mass Communication and Public Health (3.0 cr)  
PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)  
PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6343 - Epidemiologic Methods III (4.0 cr)  
PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)  
PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)  
PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)  
PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)  
PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 6542 - Management of Health Care Organizations (3.0 cr)  
PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)  
PUBH 6547 - Health Care Human Resources Management (2.0 cr)  
PUBH 6555 - Topics in Health Economics (2.0 cr)  
PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)  
PUBH 6562 - Information Technology in Health Care (2.0 cr)  
PUBH 6563 - Integrated Delivery Systems (2.0 cr)  
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)  
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)  
PUBH 6589 - Medical Technology Evaluation and Market Research (2.0 cr)  
PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)  
PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)  
PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)  
PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)  
PUBH 6702 - Integrative Leadership Seminar (3.0 cr)  
PUBH 6711 - Public Health Law (2.0 cr)  
PUBH 6717 - Decision Analysis for Health Care (2.0 cr)  
PUBH 6724 - The Health Care System and Public Health (3.0 cr)  
PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)  
PUBH 6729 - Public Health Leadership (1.0 cr)  
PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)  
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)  
PUBH 6806 - Principles of Public Health Research (2.0 cr)  
PUBH 6832 - Economics of the Health Care System (3.0 cr)  
PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)  
PUBH 6810 - Survey Research Methods (3.0 cr)  
PUBH 6812 - Applied Projects in Health Intelligence and Analytics (2.0 cr)  
PUBH 6813 - Managing Electronic Health Information (2.0 cr)  
PUBH 6814 - Data and Information for Population Health Management (2.0 cr)  
PUBH 7214 - Principles of Risk Communication (1.0 cr)  
PUBH 6835 - Principles of Health Policy (2.0 cr)  
PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)  
PUBH 7222 - Best Practices in Emergency Response (1.0 cr)  
PUBH 6855 - Medical Sociology (3.0 cr)  
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)  
PUBH 6863 - Understanding Health Care Quality (2.0 cr)  
PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)  
PUBH 6920 - Foundations of Interprofessional Professional Communication and Collaboration (1.0 cr)  
PUBH 7210 - Topics: Global Food Systems (0.5 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)



PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)  
PUBH 7236 - Farm to Table Program:Minnesota (2.0 cr)  
PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)  
PUBH 7253 - Introduction to GIS (1.0 cr)  
PUBH 7257 - Qualitative Data Analysis (1.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)  
PUBH 7541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 7556 - Health and Health Systems (2.0 cr)  
PUBH 7562 - Information Technology in Health Care (2.0 cr)  
PUBH 7564 - Private Purchasers of Health Care (2.0 cr)  
PUBH 7565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 7568 - Interdisciplinary Teamwork in Health Care (2.0 cr)  
PUBH 7569 - Health Care Policy (1.0 cr)

-OR-

### **Environmental Chemistry (21 credits)**

#### **Required Coursework (16 credits)**

Take the following courses:

CEGE 5541 - Environmental Water Chemistry (3.0 cr)  
CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)  
EEB 5601 - Limnology (3.0 cr)  
PUBH 6190 - Environmental Chemistry (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)

#### **Electives (5 credits)**

Choose electives in consultation with the advisor.

CONS 8004 - Economic and Social Aspects of Conservation Biology (3.0 cr)  
CEGE 4561 - Solids and Hazardous Wastes (3.0 cr)  
CEGE 8503 - Environmental Mass Transport (4.0 cr)  
CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)  
EEB 4611 - Biogeochemical Processes (3.0 cr)  
EEB 5609 - Ecosystem Ecology (3.0 cr)

-OR-

### **Environmental and Occupational Epidemiology (27 credits)**

#### **Required Coursework (16 credits)**

Take the following courses. Take 4 credits of PUBH 8120.

PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)  
PUBH 8120 - Occupational Health and Safety Research Seminar (1.0 cr)  
PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)  
PUBH 8342 - Advanced Epidemiologic Methods: Applications (3.0 cr)  
PUBH 8343 - Synthesis and Application of Methods in Epidemiologic Research (4.0 cr)

#### **Electives (11 credits)**

Choose electives in consultation with the advisor.

PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)  
PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)  
PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)  
PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)  
PUBH 6173 - Exposure to Physical Agents (2.0 cr)  
PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)  
PUBH 6343 - Epidemiologic Methods III (4.0 cr)  
PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)  
PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)  
PUBH 6387 - Cancer Epidemiology (2.0 cr)  
PUBH 6806 - Principles of Public Health Research (2.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7460 - Advanced Statistical Computing (3.0 cr)  
PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)  
PUBH 6162 - Biomarkers (2.0 cr)  
PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 6915 - Nutrition Assessment (2.0 cr)  
VMED 8090 - Epidemiology of Zoonoses and Diseases Common to Animals and Humans (3.0 cr)  
VMED 5180 - Ecology of Infectious Disease (3.0 cr)



PUBH 6192 - Measurement and Properties of Air Contaminants (2.0 cr)  
PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)  
PUBH 6880 - Introduction to Public Health Informatics (2.0 cr)  
PUBH 6813 - Managing Electronic Health Information (2.0 cr)  
PUBH 6814 - Data and Information for Population Health Management (2.0 cr)  
HINF 5430 - Foundations of Health Informatics I (3.0 cr)

-OR-

### Environmental Infectious Diseases (30 credits)

#### Required Coursework

Take the following courses for a total of 12 credits:

PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)  
PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)  
PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)  
VMED 5180 - Ecology of Infectious Disease (3.0 cr)  
PUBH 6102 - Issues in Environmental Health (2.0 cr)

#### Epidemiology (10 credits)

Take the following courses:

PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6343 - Epidemiologic Methods III (4.0 cr)

#### Biostatistics (8 credits)

Take the following courses:

PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)

-OR-

### Occupational and Environmental Health Nursing (35 credits)

#### Required Coursework

Take the following courses. Take 2 credits of PUBH 8120.

PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)  
PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)  
PUBH 8120 - Occupational Health and Safety Research Seminar (1.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6343 - Epidemiologic Methods III (4.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)  
PUBH 6102 - Issues in Environmental Health (2.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)  
PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)

-OR-

### Environmental Toxicology (21 credits)

#### Required Coursework (20 credits)

Take the following courses:

PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)  
PUBH 6414 - Biostatistical Literacy (3.0 cr)  
PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)  
PUBH 6159 - Principles of Toxicology I (2.0 cr)  
PUBH 6160 - Principles of Toxicology II (3.0 cr)  
PUBH 6161 - Regulatory Toxicology (2.0 cr)  
PUBH 6162 - Biomarkers (2.0 cr)  
PUBH 8160 - Advanced Toxicology (2.0 cr)  
PUBH 8161 - Current Literature in Toxicology (1.0 cr)

#### Electives (1 credit)

Select one of the following courses, in consultation with the advisor, to complete the 21-credit minimum for this concentration.

ANSC 8344 - Mechanisms of Hormone Action (2.0 cr)  
PHCL 5111 - Pharmacogenomics (3.0 cr)  
BIOC 8216 - Signal Transduction and Gene Expression (3.0 cr)  
CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)



GRAD 8101 - Teaching in Higher Education (3.0 cr)

GRAD 8102 - Practicum for Future Faculty (3.0 cr)

-OR-

### Occupational Injury Prevention Research Training (53 credits)

#### Required Coursework

Take the following courses. Take 4 credits of PUBH 8120.

PUBH 6341 - Epidemiologic Methods I (3.0 cr)

PUBH 6342 - Epidemiologic Methods II (3.0 cr)

PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)

PUBH 8342 - Advanced Epidemiologic Methods: Applications (3.0 cr)

PUBH 8343 - Synthesis and Application of Methods in Epidemiologic Research (4.0 cr)

PUBH 6450 - Biostatistics I (4.0 cr)

PUBH 6451 - Biostatistics II (4.0 cr)

PUBH 6102 - Issues in Environmental Health (2.0 cr)

PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)

PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)

PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)

PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)

PUBH 8120 - Occupational Health and Safety Research Seminar (1.0 cr)

GRAD 8101 - Teaching in Higher Education (3.0 cr)

IE 5511 - Human Factors and Work Analysis (4.0 cr)

PUBH 6343 - Epidemiologic Methods III (4.0 cr)

-OR-

### Food Safety (35 credits)

Take the following courses. Take PUBH 7210 twice for a total of 1 credit.

PUBH 6102 - Issues in Environmental Health (2.0 cr)

PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)

PUBH 6183 - Theory and Practice in Foodborne Disease Outbreak Detection, Investigation and Control (1.0 cr)

PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)

PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)

PUBH 7210 - Topics: Global Food Systems (0.5 cr)

VMED 5180 - Ecology of Infectious Disease (3.0 cr)

FSCN 5131 - Food Quality for Graduate Credit (3.0 cr)

#### Epidemiology (10 credits)

PUBH 6341 - Epidemiologic Methods I (3.0 cr)

PUBH 6342 - Epidemiologic Methods II (3.0 cr)

PUBH 6343 - Epidemiologic Methods III (4.0 cr)

#### Biostatistics (8 credits)

PUBH 6450 - Biostatistics I (4.0 cr)

PUBH 6451 - Biostatistics II (4.0 cr)

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Industrial Hygiene

The Industrial Hygiene program focuses on the health and safety of people at work, the community at large, and the environment. Specific concerns are with the recognition, evaluation and control of potential workplace hazards, including chemical, physical, and biological agents.

### Industrial Hygiene (23 credits)

Take the following courses:

PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)

PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)

PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)

PUBH 6172 - Industrial Hygiene Applications (2.0 cr)

PUBH 6173 - Exposure to Physical Agents (2.0 cr)

PUBH 6174 - Control of Workplace Exposure (3.0 cr)



- [PUBH 6175](#) - Environmental Measurements Laboratory (2.0 cr)
- [PUBH 6192](#) - Measurement and Properties of Air Contaminants (2.0 cr)
- [PUBH 6193](#) - Advanced Topics in Human Exposure Science (2.0 cr)
- [PUBH 6159](#) - Principles of Toxicology I (2.0 cr)





### ***Twin Cities Campus***

## **Epidemiology M.P.H.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 42 to 48
- This program does not require summer semesters for timely completion.
- Degree: Master of Public Health

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The epidemiology MPH is a 48-credit program that prepares future leaders in epidemiology to analyze public health trends, design and implement studies, and interpret results for policy and program development. Beyond investigations into the determinants of health and infectious and chronic disease, epidemiologists translate medical and laboratory data into population trends to identify changes in the public health burden of disease. Students with an earned doctorate in a related field may be eligible for the accelerated, 42-credit program.

## **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH).

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A baccalaureate degree, with coursework in the basic sciences, from an accredited institution.

Admission to the accelerated program requires an earned doctorate (e.g., MD, PhD, DVM, DC, DDS), in a related field, from an accredited institution.

Other requirements to be completed before admission:

For more information visit [www.sph.umn.edu](http://www.sph.umn.edu)

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan C:** Plan C requires 42 to 48 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The capstone project comprises an integrative learning experience. Students complete either PUBH 7394 or PUBH 6344, selected in consultation with the advisor, to meet this requirement.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Public Health Core Requirements (14 credits)

A minimum grade of B- must be earned for each of the following PUBH core courses:

[PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

[PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

### Epidemiology Core Requirements (9 credits)

Take the following courses. Select PUBH 6325 or PUBH 6420 in consultation with the advisor. A minimum grade of B- must be earned for PUBH 6342, 6343, and 6350. All courses must be completed A-F.

[PUBH 6342](#) - Epidemiologic Methods II (3.0 cr)

[PUBH 6343](#) - Epidemiologic Methods III (4.0 cr)

[PUBH 6350](#) - Epidemiologic Methods III: Lab (1.0 cr)

[PUBH 6325](#) - Data Processing with PC-SAS (1.0 cr)

or [PUBH 6420](#) - Introduction to SAS Programming (1.0 cr)

### Epidemiology Content Courses (2 credits)

Select at least 1 course from the following, in consultation with the advisor. All courses must be completed A-F with a minimum grade of B-.

[PUBH 6381](#) - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)

[PUBH 6385](#) - Epidemiology and Control of Infectious Diseases (2.0 cr)

[PUBH 6386](#) - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)

[PUBH 6387](#) - Cancer Epidemiology (2.0 cr)

[PUBH 6389](#) - Nutritional Epidemiology (2.0 cr)

[PUBH 6605](#) - Reproductive and Perinatal Health (2.0 cr)

### Biostatistics (4 credits)

A minimum grade of B- must be earned for the following course:

[PUBH 6451](#) - Biostatistics II (4.0 cr)

### Basic Science Requirement (4 credits)

PUBH 6355 is not required for students in the accelerated program, or for standard-program students who obtain prior approval from the program director and course instructor.

[PUBH 6355](#) - Pathophysiology of Human Disease (4.0 cr)

### Applied Practice Experience (1-2 credits)

Take 1-2 credits of PUBH 7396, in consultation with the advisor.

[PUBH 7396](#) - Applied Practice Experience: Epidemiology (1.0 - 5.0 cr)

### Integrated Learning Experience (2 credits)

Take 1 of the following courses, in consultation with the advisor. If PUBH 7394 is selected, take at least 2 credits.

[PUBH 7394](#) - Integrative Learning Experience: Epidemiology (1.0 - 6.0 cr)

or [PUBH 6344](#) - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)

### Electives (10-12 credits)

Students pursuing the standard program select at least 10 elective credits, and students pursuing the accelerated program select at least 8 elective credits in consultation with the advisor.

[CSPH 5111](#) - Ways of Thinking about Health (2.0 cr)

[CSPH 5115](#) - Cultural Awareness, Knowledge and Health (3.0 cr)

[CSPH 5118](#) - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)

[CSPH 5215](#) - Forgiveness and Healing: A Journey Toward Wholeness (3.0 cr)



CSPH 5303 - Pain Management and Evidence Based Complementary Health Approaches (3.0 cr)  
CSPH 5305 - Introduction to Integrative Mental Health (2.0 cr)  
CSPH 5701 - Fundamentals of Health Coaching I (4.0 cr)  
CSPH 5702 - Fundamentals of Health Coaching II (4.0 cr)  
CSPH 5703 - Advanced Health Coaching Practicum (3.0 cr)  
CSPH 5704 - Business of Health Coaching (2.0 cr)  
CSPH 5706 - Lifestyle Medicine (2.0 cr)  
CSPH 5707 - Coaching People with Clinical Conditions (2.0 cr)  
CSPH 5708 - Mind-Body Science and the Art of Transformation (1.0 cr)  
CSPH 5709 - Health and Wellbeing Group Coaching (2.0 cr)  
CSPH 5713 - Health Coaching for Health Professionals (2.0 cr)  
CSPH 5805 - Wellbeing in the Workplace (3.0 cr)  
CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)  
CSPH 5807 - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)  
CSPH 5905 - Food Matters: Cook Like Your Life Depends On It (1.0 cr)  
EPSY 5114 - Psychology of Student Learning (3.0 cr)  
EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)  
EPSY 5609 - Family-centered Services (3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)  
FSCN 4612W - Advanced Human Nutrition [WI] (4.0 cr)  
FSCN 4614W - Community Nutrition [SOCS, DSJ, WI] (3.0 cr)  
FSCN 4621 - Nutrition and Metabolism (4.0 cr)  
FSCN 4622 - Nutritional Toxicology, the basic science of diet-related toxicants (3.0 cr)  
FSCN 4665 - Medical Nutrition Therapy I (3.0 cr)  
FSCN 4666 - Medical Nutrition Therapy II (3.0 cr)  
FSCN 4732 - Food and Nutrition Management (3.0 cr)  
FSCN 5131 - Food Quality for Graduate Credit (3.0 cr)  
FSCN 5312 - Food Analysis (4.0 cr)  
FSCN 5601 - Management of Eating Disorders (3.0 cr)  
FSOS 5014 - Quantitative Family Research Methods I (3.0 cr)  
FSOS 5015 - Family Research Laboratory (1.0 cr)  
FSOS 5111 - Introduction to Family Therapy (3.0 cr)  
FSOS 5701 - Prevention Science: Principles and Practices (3.0 cr)  
FSOS 5937 - Parent-Child Interaction (3.0 cr)  
FSOS 5942 - Diverse Family Experiences (3.0 cr)  
FSOS 5944 - Curricular Design in Parent Education (3.0 cr)  
FSOS 5945 - Teaching and Learning in Parent Education (3.0 cr)  
FSOS 5946 - Assessment and Evaluation in Parent Education (3.0 cr)  
FSOS 8001 - Conceptual Frameworks in the Family (3.0 cr)  
FSOS 8002 - Advanced Family Conceptual Frameworks (3.0 cr)  
FSOS 8014 - Quantitative Family Research Methods II (3.0 cr)  
FSOS 8036 - Couple/Marriage and Family Therapy Research (3.0 cr)  
FSOS 8101 - Family Stress, Coping, and Adaptation (3.0 cr)  
GCD 8073 - Genetics & Genomics in Human Health (3.0 cr)  
GEOG 5511 - Principles of Cartography (4.0 cr)  
GEOG 5561 - Principles of Geographic Information Science (4.0 cr)  
HINF 5430 - Foundations of Health Informatics I (3.0 cr)  
HINF 5431 - Foundations of Health Informatics II (3.0 cr)  
HINF 5440 - Foundations of Translational Bioinformatics (3.0 cr)  
HINF 5450 - Foundations of Precision Medicine Informatics (3.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
HINF 5510 - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)  
HINF 5520 - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)  
HINF 5531 - Health Data Analytics and Data Science (3.0 cr)  
HINF 5610 - Foundations of Biomedical Natural Language Processing (3.0 cr)  
HINF 5620 - Data Visualization for the Health Sciences (3.0 cr)  
HINF 5630 - Clinical Data Mining (3.0 cr)  
HSEX 6001 - Foundations of Human Sexuality (3.0 cr)  
HSEX 6011 - Policy in Human Sexuality: Cutting Edge Analyses (3.0 cr)  
HSEX 6012 - Sexual Function and Dysfunction (3.0 cr)  
HSEX 6013 - Perspectives and Practices in Sexuality Education (3.0 cr)  
LAW 6036 - Reproductive Rights (3.0 cr)  
LAW 6046 - Human Trafficking (2.0 cr)



LAW 6058 - Human Rights Advocacy (3.0 cr)  
LAW 6621 - Rights in Conflict: Citizenship and Human Rights (2.0 cr)  
LAW 6718 - Immigration and Criminal Law: Immigration Consequences of Crimes and Criminalizing Migration (2.0 cr)  
LAW 6827 - Women's International Human Rights (2.0 cr)  
LAW 6862 - Sexual Orientation, Gender Identity, and Human Rights (2.0 cr)  
MICA 8004 - Cellular and Cancer Biology (4.0 cr)  
NURS 5029 - Introduction to Nursing Interventions (3.0 cr)  
NURS 5031 - Human Response to Health and Illness: Adults and Elders (4.0 cr)  
NURS 5032 - Human Response to Health and Illness: Children and Childbearing Families (5.0 cr)  
NURS 5115 - Interprofessional Health Care Informatics (3.0 cr)  
NURS 5116 - Consumer Health Informatics (1.0 cr)  
NURS 5117 - Consumer Health Informatics Practicum (1.0 cr)  
NURS 5190 - Essentials of Holistic Health Assessment and Foundational Clinical (3.0 cr)  
NURS 5284 - Supporting Physiologic Labor and Childbirth for Nurses (2.0 cr)  
NURS 5505 - Assessment and Support of Women in Labor (2.0 cr)  
NURS 6110 - Epidemiology in Nursing (2.0 cr)  
NURS 6213 - Reproductive Healthcare for Patients with Complex Conditions (2.0 cr)  
NURS 6305 - Reproductive and Sexual Health Care (3.0 cr)  
NURS 6600 - Health Systems and Care Models (3.0 cr)  
NURS 6895 - Adult Acute Care Holistic Health Assessment and Wellness (2.0 cr)  
NURS 6924 - Assessment and Interventions for Children and Youth With Special Health Care Needs (2.0 cr)  
NURS 7100 - Quality Improvement and Implementation Science in Health Care (3.0 cr)  
NURS 7209 - Integrative Nursing I (1.0 cr)  
NURS 7300 - Program Planning and Evaluation (3.0 cr)  
NURS 8134 - Interventions and Outcomes Research (3.0 cr)  
NURS 8171 - Qualitative Research Design and Methods (3.0 - 4.0 cr)  
NURS 8185 - Qualitative Data Analysis for Health Care Research (3.0 - 4.0 cr)  
NUTR 5624 - Nutrition and Genetics (2.0 cr)  
NUTR 5626 - Nutritional Physiology (3.0 cr)  
NUTR 5627 - Nutritional and Food Toxicology (3.0 cr)  
NUTR 8620 - Advances in Nutrition (2.0 cr)  
OLPD 5011 - Leading Organizational Change: Theory and Practice (3.0 cr)  
OLPD 5095 - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)  
OLPD 5096 - Internship: Organizational Leadership, Policy, and Development (1.0 - 9.0 cr)  
OLPD 5103 - Comparative Education (3.0 cr)  
OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)  
OLPD 5107 - Gender, Education, and International Development (3.0 cr)  
OLPD 5124 - Critical Issues in International Education and Educational Exchange (3.0 cr)  
OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)  
OLPD 5201 - Strategies for Teaching Adults (3.0 cr)  
OLPD 5202 - Perspectives of Adult Learning and Development (3.0 cr)  
OLPD 5346 - Politics of Education (3.0 cr)  
OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)  
OLPD 5502 - Theory and Models of Evaluation (3.0 cr)  
OLPD 5607 - Organization Development (3.0 cr)  
OLPD 5611 - Facilitation and Meeting Skills (1.0 cr)  
OLPD 5619 - Planning and Decision-Making Skills (1.0 cr)  
OLPD 5819 - Evaluating and Using Research in Organizations and Education (3.0 cr)  
OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)  
PA 5002 - Introduction to Policy Analysis (1.5 cr)  
PA 5003 - Introduction to Financial Analysis and Management (1.5 cr)  
PA 5004 - Introduction to Planning (3.0 cr)  
PA 5011 - Management of Organizations (3.0 cr)  
PA 5012 - The Politics of Public Affairs (3.0 cr)  
PA 5013 - Law and Urban Land Use (1.5 cr)  
PA 5021 - Microeconomics for Policy Analysis (3.0 cr)  
PA 5022 - Applications of Economics for Policy Analysis (1.5 - 3.0 cr)  
PA 5031 - Statistics for Public Affairs (4.0 cr)  
PA 5032 - Applied Regression (2.0 cr)  
PA 5033 - Multivariate Techniques (2.0 cr)  
PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)  
PA 5042 - Urban and Regional Economics (2.0 cr)  
PA 5043 - Economic and Demographic Data Analysis (2.0 cr)  
PA 5044 - Applied Regression, Accelerated (2.0 cr)  
PA 5051 - Public Affairs Leadership (2.0 cr)



- PA 5053 - Policy Analysis in Public Affairs (2.0 cr)
- PA 5054 - Program Design and Implementation Analysis (2.0 cr)
- PA 5055 - Qualitative Research Methods and Analysis (2.0 cr)
- PA 5056 - Quantitative Research Methods and Analysis (2.0 cr)
- PA 5081 - Working in Teams: Crossing Disciplines and Learning from Difference (0.5 cr)
- PA 5101 - Management and Governance of Nonprofit Organizations (3.0 cr)
- PA 5103 - Leadership and Change (1.5 - 3.0 cr)
- PA 5104 - Strategic Human Resource Management (3.0 cr)
- PA 5105 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- PA 5113 - State and Local Public Finance (3.0 cr)
- PA 5114 - Budget Analysis in Public and Nonprofit Orgs (1.5 cr)
- PA 5116 - Financing Public and Nonprofit Organizations (1.5 cr)
- PA 5122 - Law and Public Affairs (3.0 cr)
- PA 5123 - Philanthropy in America: History, Practice, and Trends (1.5 - 3.0 cr)
- PA 5135 - Managing Conflict: Negotiation (3.0 cr)
- PA 5136 - Group Process Facilitation for Organizational and Public/Community Engagement (1.0 cr)
- PA 5137 - Project Management in the Public Arena (1.5 cr)
- PA 5145 - Civic Participation in Public Affairs (3.0 cr)
- PA 5151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)
- PA 5209 - Urban Planning and Health Equity (3.0 cr)
- PA 5211 - Land Use Planning (3.0 cr)
- PA 5212 - Managing Urban Growth and Change (3.0 cr)
- PA 5213 - Introduction to Site Planning (3.0 cr)
- PA 5231 - Transit Planning and Management (3.0 cr)
- PA 5234 - Urban Transportation Planning and Policy (3.0 cr)
- PA 5242 - Environmental Planning, Policy, and Decision Making (3.0 cr)
- PA 5251 - Strategic Planning and Management (3.0 cr)
- PA 5261 - Housing Policy (3.0 cr)
- PA 5262 - Neighborhood Revitalization Theories and Strategies (3.0 cr)
- PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)
- PA 5281 - Immigrants, Urban Planning and Policymaking in the U.S. (3.0 cr)
- PA 5301 - Population Methods & Issues for the United States & Global South (3.0 cr)
- PA 5311 - Program Evaluation (3.0 cr)
- PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)
- PA 5405 - Public Policy Implementation (3.0 cr)
- PA 5413 - Early Childhood and Public Policy (1.5 - 3.0 cr)
- PA 5415 - Economics of Early Childhood Development (1.5 - 3.0 cr)
- PA 5421 - Racial Inequality and Public Policy (3.0 cr)
- PA 5426 - Community-Engaged Research and Policy with Marginalized Groups (3.0 cr)
- PA 5431 - Public Policies on Work and Pay (3.0 cr)
- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PA 5521 - Development Planning and Policy Analysis (4.0 cr)
- PA 5561 - Gender and International Development (3.0 cr)
- PA 5601 - Global Survey of Gender and Public Policy (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5721 - Energy Systems and Policy (3.0 cr)
- PA 5723 - Water Policy (3.0 cr)
- PA 5724 - Climate Change Policy (3.0 cr)
- PA 5741 - Risk, Resilience and Decision Making (1.5 cr)
- PA 5801 - Global Public Policy (3.0 cr)
- PA 5805 - Global Economics (3.0 cr)
- PA 5813 - US Foreign Policy: Issues and Institutions (3.0 cr)
- PA 5814 - Global Diplomacy in a Time of Change (3.0 cr)
- PA 5823 - Managing Humanitarian and Refugee Crises: Challenges for Policymakers & Practitioners (1.0 cr)
- PA 5825 - Crisis Management in Foreign Affairs (1.5 cr)
- PA 5826 - National Security Policy (3.0 cr)
- PA 5885 - Human Rights Policy: Issues and Actors (3.0 cr)
- PA 5927 - Effective Grantwriting for Nonprofit Organizations (1.5 cr)
- PA 5928 - Data Management and Visualization with R (1.0 cr)
- PA 5929 - Data Visualization: Telling Stories with Numbers (2.0 cr)
- PA 5933 - Survey Methods: Designing Effective Questionnaires (2.0 cr)
- PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)
- PUBH 6004 - Global Health Capstone (1.0 cr)
- PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)



- PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)
- PUBH 6035 - Evaluation II: Applications (3.0 cr)
- PUBH 6045 - Skills for Policy Development (1.0 cr)
- PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)
- PUBH 6050 - Community Health Promotion I: Integrating Theory, Evidence, and Context (3.0 cr)
- PUBH 6051 - Community Health Promotion II: Developing, Implementing, and Justifying Interventions (3.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6081 - Sex, Sexuality, and Sexual Health (2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6102 - Issues in Environmental Health (2.0 cr)
- PUBH 6107 - Excel and Access Skills in Public Health Settings (1.0 cr)
- PUBH 6108 - Foundations of Global Health (2.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)
- PUBH 6132 - Air, Water, and Health (2.0 cr)
- PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)
- PUBH 6135 - Job Search Strategies and Career Professional Development (1.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6159 - Principles of Toxicology I (2.0 cr)
- PUBH 6161 - Regulatory Toxicology (2.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6175 - Environmental Measurements Laboratory (2.0 cr)
- PUBH 6177 - Nanotechnology Health and Safety (3.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)
- PUBH 6183 - Theory and Practice in Foodborne Disease Outbreak Detection, Investigation and Control (1.0 cr)
- PUBH 6184 - Field and laboratory methods in public health entomology (2.0 cr)
- PUBH 6192 - Measurement and Properties of Air Contaminants (2.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)
- PUBH 6241 - American Indian Public Health and Wellness, Health Policy, Law, Health Services Administration (2.0 cr)
- PUBH 6242 - Cultural Humility with American Indian Populations (2.0 cr)
- PUBH 6243 - American Indian Research, Evaluation and Collaborations (2.0 cr)
- PUBH 6250 - Foundations of Public Health (2.0 cr)
- PUBH 6261 - Human Centered Design for Public Health Leadership, Practice and Innovation (2.0 cr)
- PUBH 6301 - Fundamentals of Clinical Research (3.0 cr)
- PUBH 6303 - Clinical Research Project Seminar (2.0 cr)
- PUBH 6310 - Clinical Epidemiology 1 (1.0 cr)
- PUBH 6311 - Clinical Epidemiology II (1.0 cr)
- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
- PUBH 6325 - Data Processing with PC-SAS (1.0 cr)
- PUBH 6333 - Principles of Human Behavior I (2.0 cr)
- PUBH 6341 - Epidemiologic Methods I (3.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)
- PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)
- PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)
- PUBH 6365 - Global Challenges in Infectious Disease Epidemiology (2.0 cr)
- PUBH 6370 - Social Epidemiology (2.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6387 - Cancer Epidemiology (2.0 cr)
- PUBH 6389 - Nutritional Epidemiology (2.0 cr)



- PUBH 6396 - Applied Practice Experience Global Health (0.5 - 8.0 cr)
- PUBH 6414 - Biostatistical Literacy (3.0 cr)
- PUBH 6420 - Introduction to SAS Programming (1.0 cr)
- PUBH 6432 - Biostatistical Methods in Translational and Clinical Research (1.0 cr)
- PUBH 6450 - Biostatistics I (4.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)
- PUBH 6525 - Introduction to Population Health: A Health System (2.0 cr)
- PUBH 6535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 6542 - Management of Health Care Organizations (3.0 cr)
- PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)
- PUBH 6553 - Health Care Management Ethics (1.0 cr)
- PUBH 6554 - Healthcare Strategy and Marketing (2.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6558 - Health Finance II (3.0 cr)
- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 6562 - Information Technology in Health Care (2.0 cr)
- PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)
- PUBH 6565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 6570 - Healthcare Administration (1.0 - 4.0 cr)
- PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)
- PUBH 6576 - Understanding Clinical Quality Using Administrative Data (2.0 cr)
- PUBH 6577 - Advanced Problem Solving in Health Services Administration (2.0 cr)
- PUBH 6578 - Negotiation Strategies (2.0 cr)
- PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)
- PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)
- PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)
- PUBH 6607 - Adolescent Health: Issues, Programs, and Policies (2.0 cr)
- PUBH 6613 - Children and Youth With Special Health Care Needs (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)
- PUBH 6636 - Qualitative Research Methods in Public Health Practice (2.0 cr)
- PUBH 6673 - Grant Writing for Public Health (1.0 cr)
- PUBH 6675 - Women's Health (2.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6713 - Global Health in a Local Context (3.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6780 - Topics: Public Health Administration and Policy (1.0 - 3.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6864 - Conducting Health Outcomes Research (3.0 cr)
- PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)
- PUBH 6904 - Nutrition and Aging (2.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)
- PUBH 6907 - Maternal, Infant, Child and Adolescent Nutrition (3.0 cr)
- PUBH 6914 - Community Nutrition Intervention (3.0 cr)
- PUBH 6915 - Nutrition Assessment (2.0 cr)
- PUBH 6933 - Nutrition and Chronic Diseases (2.0 cr)
- PUBH 6954 - Personal, Social and Environmental Influences on the Weight-Related Health of Pediatric Populations (2.0 cr)
- PUBH 6955 - Using Policy to Address the Weight-Related Health of Child and Adolescent Populations (1.0 cr)
- PUBH 6995 - Community Nutrition Practicum (6.0 - 7.0 cr)



- PUBH 6996 - Clinical Nutrition Practicum (7.0 cr)
- PUBH 7091 - Independent Study: Community Health Promotion (1.0 - 4.0 cr)
- PUBH 7193 - Directed Study: Environmental Health (1.0 - 4.0 cr)
- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7221 - Planning for Urgent Threats (1.0 cr)
- PUBH 7230 - Topics in Infectious Disease (0.5 - 4.0 cr)
- PUBH 7231 - Surveillance of Foodborne Diseases in Humans (1.0 cr)
- PUBH 7235 - Surveillance of Zoonotic Pathogens in Animals (1.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7252 - Qualitative Research Methods: Discovering the Value of Voice in Words, Stories and Photographs (1.0 cr)
- PUBH 7253 - Introduction to GIS (1.0 cr)
- PUBH 7257 - Qualitative Data Analysis (1.0 cr)
- PUBH 7262 - Globalization and Health (1.0 cr)
- PUBH 7391 - Independent Study: Epidemiology (1.0 - 4.0 cr)
- PUBH 7392 - Readings in Epidemiology (1.0 - 4.0 cr)
- PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)
- PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 7415 - Introduction to Clinical Trials (3.0 cr)
- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
- PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- PUBH 7450 - Survival Analysis (3.0 cr)
- PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)
- PUBH 7462 - Advanced Programming and Data Analysis in R (2.0 cr)
- PUBH 7465 - Biostatistics Consulting (3.0 cr)
- PUBH 7470 - Study Designs in Biomedical Research (3.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 7485 - Methods for Causal Inference (3.0 cr)
- PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)
- PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 7536 - Health Finance I (3.0 cr)
- PUBH 7537 - Health Finance II (3.0 cr)
- PUBH 7542 - Quality Improvement and Patient Safety (2.0 cr)
- PUBH 7547 - Health Care Human Resource Management (2.0 cr)
- PUBH 7551 - Principles of Management in Health Services Organizations (2.0 cr)
- PUBH 7553 - Health Care Management Ethics (1.0 cr)
- PUBH 7554 - Health Care Strategy and Marketing (3.0 cr)
- PUBH 7555 - Topics in Health Economics (2.0 cr)
- PUBH 7556 - Health and Health Systems (2.0 cr)
- PUBH 7560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 7562 - Information Technology in Health Care (2.0 cr)
- PUBH 7564 - Private Purchasers of Health Care (2.0 cr)
- PUBH 7565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 7569 - Health Care Policy (1.0 cr)
- PUBH 7570 - Topics: Healthcare Administration (1.0 cr)
- PUBH 7576 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 7590 - Gerontology for Healthcare Managers (1.0 cr)
- PUBH 7591 - Independent Study: Health Care Administration (1.0 - 4.0 cr)
- PUBH 7691 - Independent Study: Maternal and Child Health (1.0 - 4.0 cr)
- PUBH 7720 - Data to Drive Public Health (2.0 cr)
- PUBH 7791 - Independent Study: Public Health Administration and Policy (1.0 - 6.0 cr)
- PUBH 8120 - Occupational Health and Safety Research Seminar (1.0 cr)
- PUBH 8160 - Advanced Toxicology (2.0 cr)
- PUBH 8166 - Experiences in Toxicology Research (3.0 cr)
- PUBH 8194 - Directed Research: Environmental Health (1.0 - 6.0 cr)
- PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)
- PUBH 8342 - Advanced Epidemiologic Methods: Applications (3.0 cr)
- PUBH 8344 - Advanced Epidemiologic Methods Workshop (1.0 cr)
- PUBH 8393 - Directed Study: Clinical Research (1.0 - 4.0 cr)
- PUBH 8401 - Linear Models (4.0 cr)
- PUBH 8403 - Research Skills in Biostatistics (1.0 cr)





PUBH 8432 - Probability Models for Biostatistics (3.0 cr)  
PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 8446 - Advanced Statistical Genetics and Genomics (3.0 cr)  
PUBH 8475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 8482 - Sequential and Adaptive Methods for Clinical Trials (3.0 cr)  
PUBH 8485 - Methods for Causal Inference (3.0 cr)  
PUBH 8492 - Theories of Hierarchical and Other Richly Parametrized Linear Models (3.0 cr)  
PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)  
PUBH 8810 - Research Studies in Health Care (3.0 cr)  
PUBH 8811 - Research Methods in Health Care (3.0 cr)  
PUBH 8814 - Mixed Methods: Quantitative and Qualitative Strategies in Research (2.0 cr)  
PUBH 8816 - Implementation Science in Public Health (2.0 cr)  
PUBH 8821 - Health Economics II (3.0 cr)  
PUBH 8830 - Writing for Research (2.0 cr)  
PUBH 8831 - Writing for Research (2.0 cr)  
SW 5051 - Human Behavior and the Social Environment (2.0 cr)  
SW 5101 - Historical Origins and Contemporary Policies in Social Welfare (3.0 cr)  
SW 5562 - Global Social Work and Social Development (3.0 cr)  
SW 5904 - Facilitation and Conflict Management: Humanistic Approach (2.0 cr)  
SW 5906 - Advanced Ethical Decision Making (1.0 cr)  
SW 5912 - Grief and Loss in Social Work Practice (1.0 cr)  
SW 8151 - Social Work Methods: Practice With Individuals and Systems (2.0 cr)  
SW 8152 - Social Work Practice Methods: Families and Groups (2.0 cr)  
SW 8153 - Social Work Practice Methods: Macro Practice and Organizations (2.0 cr)  
SW 8251 - Social Work Practice in Health, Disabilities, and Aging (3.0 cr)  
SW 8262 - Empowerment Practice With Persons With Disabilities (3.0 cr)  
SW 8263 - Advanced Direct Practice and Community-Based Interventions in Gerontology (3.0 cr)  
SW 8351 - Assessment and Engagement with Families and Children (3.0 cr)  
SW 8352 - Intervention Methods with Families (3.0 cr)  
SW 8363 - Social Work in Child Welfare (3.0 cr)  
SW 8461 - Advanced Clinical Social Work Practice with Adults (3.0 cr)  
SW 8551 - Advanced Community Practice: Assessment, Organizing, and Advocacy (3.0 cr)  
SW 8552 - Advanced Community Practice: Leadership, Planning, and Program Development (3.0 cr)  
SW 8563 - Advanced Policy Advocacy (3.0 cr)  
SW 8804 - Child Welfare Policy (3.0 cr)  
SW 8806 - Health and Mental Health Policy (3.0 cr)  
SW 8807 - International and Comparative Social Welfare Policy (3.0 cr)  
SW 8821 - Social Work and Difference, Diversity and Privilege (2.0 cr)  
SW 8841 - Social Work Research Methods (2.0 cr)  
SW 8842 - Advanced Social Work Evaluation (1.0 - 3.0 cr)  
SW 8843 - Social Work Program Evaluation (1.0 - 2.0 cr)  
SW 8851 - Social Welfare History and Historical Research Methods (3.0 cr)  
SW 8901 - Assessment and Treatment of Trauma (2.0 cr)  
SW 8902 - Social Work Supervision, Consultation, and Leadership (2.0 cr)  
VMED 5101 - Molecular and Cellular Basis of Nanoparticle Toxicity (3.0 cr)  
VMED 5165 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)  
VMED 5180 - Ecology of Infectious Disease (3.0 cr)  
VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)  
VMED 5915 - Essential Statistics for Life Sciences (3.0 cr)  
VMED 8090 - Epidemiology of Zoonoses and Diseases Common to Animals and Humans (3.0 cr)  
VMED 8134 - Ethical Conduct of Animal Research (3.0 cr)



### *Twin Cities Campus*

## Epidemiology M.S.

*School of Public Health - Adm*

### School of Public Health

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636).

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 38
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Note: Students are not admitted directly into the MS Epidemiology program; it is available only by special arrangement. Students interested in a master's degree in epidemiology should apply for the master of public health (MPH) degree through the School of Public Health.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Please visit [www.sph.umn.edu](http://www.sph.umn.edu) for admission requirements.

#### **Special Application Requirements:**

Students are not admitted directly into the MS program.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 38 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** A master's project is required, equivalent to approximately 4 semester credits.

This program may be completed with a minor.



Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

These requirements apply only to students admitted by special arrangement with the program; students are not admitted directly into the Epidemiology MS program.

Courses must be taken A/F, unless offered only S/N. The minimum grade required for each A/F-graded course is B-.

#### **Required Coursework (13 credits)**

Complete the following:

[PUBH 6348](#) - Writing Research Grants (2.0 cr)

[PUBH 6742](#) - Ethics in Public Health: Research and Policy (1.0 cr)

[PUBH 7401](#) - Fundamentals of Biostatistical Inference (4.0 cr)

[PUBH 8341](#) - Advanced Epidemiologic Methods: Concepts (3.0 cr)

[PUBH 8342](#) - Advanced Epidemiologic Methods: Applications (3.0 cr)

#### **Electives (25 credits)**

Select elective courses from the following list, or other electives to meet the 38-credit minimum. All courses must be selected in consultation with the advisor.

[PUBH 6074](#) - Mass Communication and Public Health (3.0 cr)

[PUBH 6078](#) - Public Health Policy as a Prevention Strategy (2.0 cr)

[PUBH 6094](#) - Obesity and Eating Disorder Interventions (2.0 cr)

[PUBH 6140](#) - Occupational and Environmental Epidemiology (2.0 cr)

[PUBH 6333](#) - Principles of Human Behavior I (2.0 cr)

[PUBH 6334](#) - Human Behavior II (2.0 cr)

[PUBH 6355](#) - Pathophysiology of Human Disease (4.0 cr)

[PUBH 6370](#) - Social Epidemiology (2.0 cr)

[PUBH 6381](#) - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)

[PUBH 6385](#) - Epidemiology and Control of Infectious Diseases (2.0 cr)

[PUBH 6386](#) - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)

[PUBH 6387](#) - Cancer Epidemiology (2.0 cr)

[PUBH 6389](#) - Nutritional Epidemiology (2.0 cr)

[PUBH 6915](#) - Nutrition Assessment (2.0 cr)

[PUBH 7391](#) - Independent Study: Epidemiology (1.0 - 4.0 cr)

[PUBH 7392](#) - Readings in Epidemiology (1.0 - 4.0 cr)

[PUBH 7402](#) - Biostatistics Modeling and Methods (4.0 cr)

[PUBH 7405](#) - Biostatistics: Regression (4.0 cr)

[PUBH 7406](#) - Advanced Regression and Design (4.0 cr)

[PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

[PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)

[PUBH 7445](#) - Statistics for Human Genetics and Molecular Biology (3.0 cr)

[PUBH 7450](#) - Survival Analysis (3.0 cr)

[PUBH 8300](#) - Topics: Epidemiology (1.0 - 4.0 cr)

[PUBH 8343](#) - Synthesis and Application of Methods in Epidemiologic Research (4.0 cr)

[PUBH 8804](#) - Advanced Quantitative Methods Seminar (3.0 cr)

[VMED 5180](#) - Ecology of Infectious Disease (3.0 cr)

[VMED 8090](#) - Epidemiology of Zoonoses and Diseases Common to Animals and Humans (3.0 cr)



### ***Twin Cities Campus***

## **Epidemiology Minor**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Epidemiologists investigate the determinants of health and disease, and use data to identify changes in the public health burden of disease. The Epidemiology minor trains students to analyze public health trends, design and implement studies, and interpret results for policy and program development.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Epidemiology director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

All minor field coursework must be taken A/F, with a minimum grade of B- earned for each course unless otherwise stated.

The minimum cumulative GPA for minor field coursework is 3.00.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **Coursework Requirements (8 credits)**

##### **Required Courses (6 credits)**

Students must complete PUBH 6342 plus PUBH 6341 or PUBH 6320. Students choosing PUBH 6320 must earn a minimum grade of A-.



PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)  
or PUBH 6341 - Epidemiologic Methods I (3.0 cr)

**Electives (2 credits)**

Select 2 credits from the following in consultation with the Epidemiology director of graduate studies.

PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6387 - Cancer Epidemiology (2.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)

**Doctoral**

**Doctoral Minor Options**

The doctoral minor can be completed in one of two ways: Option 1 is for students with the necessary background of epidemiology coursework, as determined by the Epidemiology director of graduate studies; Option 2 is for students without that necessary coursework.

**Coursework Requirements (12 credits)**

**Required Courses: Option 1 (10 credits)**

Students with the necessary epidemiology background take the following courses:

PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)  
PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)  
PUBH 8342 - Advanced Epidemiologic Methods: Applications (3.0 cr)

**or Required Courses: Option 2 (10 credits)**

Students without the necessary epidemiology background take the following courses:

PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)

**Electives (2 credits)**

Select 2 credits from the following, or other coursework, in consultation with the Epidemiology director of graduate studies.

PUBH 6365 - Global Challenges in Infectious Disease Epidemiology (2.0 cr)  
PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)  
PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)  
PUBH 6387 - Cancer Epidemiology (2.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 7405 - Biostatistics: Regression (4.0 cr)  
PUBH 7406 - Advanced Regression and Design (4.0 cr)  
PUBH 7415 - Introduction to Clinical Trials (3.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 7450 - Survival Analysis (3.0 cr)  
PUBH 7470 - Study Designs in Biomedical Research (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 7485 - Methods for Causal Inference (3.0 cr)



### *Twin Cities Campus*

## Epidemiology Ph.D.

School of Public Health - Adm

### School of Public Health

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 53 to 63
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Epidemiology PhD program is designed for students interested in research and teaching careers in the health sciences. Students select one of two formal tracks: clinical/biological epidemiology (CBE) or social/behavioral epidemiology (SBE). Each track emphasizes advanced epidemiologic design, methodology, and analytic skills.

The CBE track focuses on the etiology of diseases, particularly cardiovascular, cancer, genetics, and infectious diseases. The SBE track focuses on origins and development of human behavior patterns and how they are influenced and formed by personality, family, culture, and environment.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must be in process, or have completed, a master's degree in a related field.

#### **Special Application Requirements:**

Strong quantitative aptitude, demonstrated by scoring at or above the 70th percentile on the quantitative section of the GRE, along with satisfactory grades in college-level quantitative courses. At least three recommendations (form and separate letter) from faculty and/or work supervisors with knowledge of the applicant's scholastic and professional capabilities and potential; Statement of goals and objectives (letter of intent) for seeking a career in epidemiology.

In addition, applicants must submit a separate essay (statement of research interests) beyond what is required for the SOPHAS application process that provides evidence of their potential to conduct original research in a specific epidemiologic area and, if possible, indicates an interest in particular methodologies or study designs. Serious applicants are encouraged to contact the program coordinator at [epichstu@umn.edu](mailto:epichstu@umn.edu) before applying. Students begin their studies in the fall semester. Applications must be completed by December 1 of the year prior to beginning the doctoral program for scholarship consideration; the final deadline is February 1.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Analytical Writing: 4

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7



- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

29 to 39 credits are required in the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.25 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B- earned for each course.

### Core Coursework (15 credits)

Take the following courses:

- [PUBH 6348](#) - Writing Research Grants (2.0 cr)
- [PUBH 6742](#) - Ethics in Public Health: Research and Policy (1.0 cr)
- [PUBH 7401](#) - Fundamentals of Biostatistical Inference (4.0 cr)
- [PUBH 8341](#) - Advanced Epidemiologic Methods: Concepts (3.0 cr)
- [PUBH 8342](#) - Advanced Epidemiologic Methods: Applications (3.0 cr)
- [PUBH 6250](#) - Foundations of Public Health (2.0 cr)

### Teaching Course (1-3 credits)

Select one of the following, in consultation with the advisor. Students choosing GRAD 8200 must complete it with the following topic, 'Teaching & Learning: An Online Course'.

- [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)
- or [GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)

### Thesis Credits

Take at least 24 doctoral thesis credits.

- [PUBH 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Joint- or Dual-degree Coursework:**MD/PhD-Epidemiology

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Clinical/Biological Epidemiology

#### Clinical/Biological Track (13-23 credits)

##### Biological Methods/Statistics Course (3 credits)

Take the following course:

- [PUBH 7420](#) - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

##### Additional Biostatistics Course (3 credits)

Select at least 3 credits from the following in consultation with the advisor:

- [PUBH 6915](#) - Nutrition Assessment (2.0 cr)
- [PUBH 7402](#) - Biostatistics Modeling and Methods (4.0 cr)
- [PUBH 7405](#) - Biostatistics: Regression (4.0 cr)
- [PUBH 7406](#) - Advanced Regression and Design (4.0 cr)
- [PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)
- [PUBH 8343](#) - Synthesis and Application of Methods in Epidemiologic Research (4.0 cr)



- PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)
- PUBH 8344 - Advanced Epidemiologic Methods Workshop (1.0 cr)
- PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)

**Content Area Courses (2-4 credits)**

Students pursuing the joint MD/PhD degree select at least 2 credits in consultation with the advisor. All other students complete at least 4 credits.

- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6387 - Cancer Epidemiology (2.0 cr)
- PUBH 6389 - Nutritional Epidemiology (2.0 cr)

**Electives (5-13 credits)**

Students pursuing the joint MD/PhD degree select at least 5 elective credits in consultation with the advisor. All other students complete at least 13 elective credits.

- PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)
- PUBH 7391 - Independent Study: Epidemiology (1.0 - 4.0 cr)
- PUBH 7405 - Biostatistics: Regression (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- PUBH 7450 - Survival Analysis (3.0 cr)
- PUBH 8343 - Synthesis and Application of Methods in Epidemiologic Research (4.0 cr)
- VMED 5180 - Ecology of Infectious Disease (3.0 cr)
- VMED 8090 - Epidemiology of Zoonoses and Diseases Common to Animals and Humans (3.0 cr)
- PUBH 8344 - Advanced Epidemiologic Methods Workshop (1.0 cr)
- PUBH 7392 - Readings in Epidemiology (1.0 - 4.0 cr)

**Social/Behavioral Epidemiology**

**Social/Behavioral Track (13-23 credits)**

**Behavioral Methods/Statistics Course (3 credits)**

Take the following course:

- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

**Additional Biostatistics Course (3 credits)**

Select at least 3 credits from the following in consultation with the advisor:

- PUBH 6915 - Nutrition Assessment (2.0 cr)
- PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)
- PUBH 7405 - Biostatistics: Regression (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 8343 - Synthesis and Application of Methods in Epidemiologic Research (4.0 cr)
- PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)
- PUBH 8344 - Advanced Epidemiologic Methods Workshop (1.0 cr)

**Content Area Courses (4 credits)**

Take the following courses:

- PUBH 6333 - Principles of Human Behavior I (2.0 cr)
- PUBH 6334 - Human Behavior II (2.0 cr)

**Electives (3-13 credits)**

Students pursuing the joint MD/PhD degree select at least 3 elective credits in consultation with the advisor. All other students complete at least 13 elective credits.

- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6370 - Social Epidemiology (2.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6387 - Cancer Epidemiology (2.0 cr)
- PUBH 7392 - Readings in Epidemiology (1.0 - 4.0 cr)
- PUBH 7405 - Biostatistics: Regression (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 8344 - Advanced Epidemiologic Methods Workshop (1.0 cr)
- PUBH 8343 - Synthesis and Application of Methods in Epidemiologic Research (4.0 cr)
- PUBH 7391 - Independent Study: Epidemiology (1.0 - 4.0 cr)





### **Twin Cities Campus**

## **Gerontology Minor**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636, Fax: 612-624-4498)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The gerontology minor is not currently available.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

The gerontology minor is not currently available.

Declaring the gerontology minor is contingent upon enrollment in a University master's or doctoral degree-granting program. Students should first consult with their program advisor about the advisability of a minor in gerontology, then contact the Gerontology director of graduate studies for minor information and to design their course program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

The master's and doctoral minors are developed in consultation with, and should be approved in advance by, the Gerontology director of graduate studies.

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Master's**

### **Doctoral**



### *Twin Cities Campus*

## Global Health Postbaccalaureate Certificate

School of Public Health - Adm

### School of Public Health

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street SE, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 15
- This program does not require summer semesters for timely completion.
- Degree: Global Health PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Global Health Certificate focuses on knowledge, skills, and attitudes to address health issues that transcend national boundaries, and that develop and implement solutions to health problems that requires global cooperation.

The Global Health Certificate is designed for students who have a strong interest in global health, who have a desire to understand cultures, and who want to experience first-hand a global field experience which may prepare them for work in a global setting. Many students may want to complete the Certificate to complement their graduate degree.

It is increasingly recognized that issues that affect health transcend national boundaries, and that development and implementation of solutions to such health problems requires global cooperation. Global health represents an interdisciplinary approach that embraces both disease prevention in populations and clinical care of individuals, with a strong emphasis on health equity and health as a public good.

### Accreditation

This program is accredited by Council on Education for Public Health (CEPH)

### Program Delivery

This program is available:

- partially online (between 50% to 80% of instruction is online)

### Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants must hold a baccalaureate degree.

#### **Special Application Requirements:**

Applicants must submit to SOPHAS Express, a centralized online application service:

- Completed SOPHAS Express application and application fee, designating the University of Minnesota School of Public Health

- Personal statement describing the applicant's reason for applying, career goals, and how the certificate will help them achieve their goals

- One letter of recommendation

- Unofficial transcripts of record from each college/university where a degree was earned. (If admitted, official transcripts will need to be sent directly to the School of Public Health.)

- Resume or C.V.

For detailed application instructions and requirements visit [www.sph.umn.edu](http://www.sph.umn.edu).

International applicants must submit score(s) from one of the following tests:



- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grade basis must be taken A/F, with a minimum grade of B- earned for each.

### Coursework (15 credits)

#### Required Courses (5 credits)

Take at least 5 credits, in consultation with the director of graduate studies, from the following:

[PUBH 6004](#) - Global Health Capstone (1.0 cr)

[PUBH 6131](#) - Working in Global Health (2.0 cr)

[PUBH 6108](#) - Foundations of Global Health (2.0 cr)

or [PUBH 6134](#) - Sustainable Development and Global Public Health (2.0 cr)

#### Applied Practice Experience (2 credits)

Take 2 APE credits, in consultation with the director of graduate studies.

[PUBH 6396](#) - Applied Practice Experience Global Health (0.5 - 8.0 cr)

#### Electives (8 credits)

Select at least 8 elective credits, in consultation with the director of graduate studies.

[GCC 5003](#) - Seeking Solutions to Global Health Issues [GP] (3.0 cr)

[PA 5451](#) - Immigration, Health and Public Policy (3.0 cr)

[PUBH 6011](#) - Public Health Approaches to HIV/AIDS (3.0 cr)

[PUBH 6055](#) - Social Inequalities in Health (2.0 cr)

[PUBH 6132](#) - Air, Water, and Health (2.0 cr)

[PUBH 6154](#) - Climate Change and Global Health (3.0 cr)

[PUBH 6365](#) - Global Challenges in Infectious Disease Epidemiology (2.0 cr)

[PUBH 6385](#) - Epidemiology and Control of Infectious Diseases (2.0 cr)

[PUBH 6600](#) - Topics: Maternal and Child Health (0.5 - 4.0 cr)

[PUBH 6605](#) - Reproductive and Perinatal Health (2.0 cr)

[PUBH 6713](#) - Global Health in a Local Context (3.0 cr)

[PUBH 6715](#) - India: Global Health, Globalization, & Leadership (3.0 cr)

[PUBH 6719](#) - International Humanitarian Crisis Simulation (1.0 cr)

[PUBH 6730](#) - International Comparative Health Systems (2.0 cr)

[PUBH 6732](#) - Topics and Methods in Global Health Assessment (2.0 cr)

[PUBH 6815](#) - Community-based Participatory Research (2.0 cr)

[PUBH 6906](#) - Global Nutrition (2.0 cr)

[PUBH 7262](#) - Globalization and Health (1.0 cr)



### **Twin Cities Campus**

## **Global Public Health Minor**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 7
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The global public health minor provides students with the knowledge, skills and attitudes to address health issues that transcend national boundaries and prepare them to develop and implement solutions to health problems that require global cooperation. Students take public health courses that focus on the population health skills necessary to promote the health, well-being, and safety of global and local populations.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH)

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Admission to the global public health minor is contingent upon enrollment in a University master's or doctoral degree-granting program. Students should consult with their program advisor prior to contacting the Global Public Health director of graduate studies regarding requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

All required courses must be taken A/F with a minimum grade of B- earned.  
The minimum cumulative GPA for minor field coursework is 3.00.

#### **Required Coursework (5 credits)**

Take the following courses:

[PUBH 6004](#) - Global Health Capstone (1.0 cr)

[PUBH 6131](#) - Working in Global Health (2.0 cr)



### Subgroup 0

Select 1 of the following courses in consultation with the Global Public Health director of graduate studies:

[PUBH 6108](#) - Foundations of Global Health (2.0 cr)

or [PUBH 6134](#) - Sustainable Development and Global Public Health (2.0 cr)

### Electives (2-7 credits)

Select electives in consultation with the Global Public Health director of graduate studies to meet the masters 7-credit or the doctoral 12-credit minimum.

[GCC 5003](#) - Seeking Solutions to Global Health Issues [GP] (3.0 cr)

[PA 5451](#) - Immigration, Health and Public Policy (3.0 cr)

[PUBH 6011](#) - Public Health Approaches to HIV/AIDS (3.0 cr)

[PUBH 6055](#) - Social Inequalities in Health (2.0 cr)

[PUBH 6132](#) - Air, Water, and Health (2.0 cr)

[PUBH 6154](#) - Climate Change and Global Health (3.0 cr)

[PUBH 6290](#) - International Humanitarian Crisis Simulation (1.0 cr)

[PUBH 6365](#) - Global Challenges in Infectious Disease Epidemiology (2.0 cr)

[PUBH 6385](#) - Epidemiology and Control of Infectious Diseases (2.0 cr)

[PUBH 6605](#) - Reproductive and Perinatal Health (2.0 cr)

[PUBH 6713](#) - Global Health in a Local Context (3.0 cr)

[PUBH 6715](#) - India: Global Health, Globalization, & Leadership (3.0 cr)

[PUBH 6730](#) - International Comparative Health Systems (2.0 cr)

[PUBH 6732](#) - Topics and Methods in Global Health Assessment (2.0 cr)

[PUBH 6815](#) - Community-based Participatory Research (2.0 cr)

[PUBH 6906](#) - Global Nutrition (2.0 cr)

[PUBH 7262](#) - Globalization and Health (1.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### ***Twin Cities Campus***

## **Health Care Administration M.H.A.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 42 to 60
- This program requires summer semesters for timely completion.
- Degree: Master of Healthcare Administration

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The full-time master of healthcare administration (MHA) program is appropriate for applicants with limited or no healthcare work experience, or individuals who wish to make a career change from industries other than health care. Now ranked third in the nation by U.S. News & World Report, the program is accredited by the CAHME.

The program's consistently high rankings are a reflection of many factors--an outstanding faculty of researchers and practitioners, location in one of the nation's centers of healthcare innovation, an extraordinary alumni association, and a track record of educating outstanding leaders for the healthcare industries.

### **Accreditation**

This program is accredited by Commission on Accreditation of Healthcare Management Education (CAHME)

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Full-time program applicants should have a strong commitment to managing people and resources to create and sustain outstanding healthcare services and organizations. Strong quantitative and communication skills are essential; prior experience in health care is not required.

Visit SPH for detailed application requirements at [www.sph.umn.edu](http://www.sph.umn.edu)

#### **Special Application Requirements:**

For the executive program: At least three years of management or clinical leadership experience in a healthcare organization is required. The program reserves the right to require the Graduate Record Examination (GRE) or the Graduate Management Admission Test (GMAT) as a part of the admissions process.

For the full-time program: To prepare for the program's rigorous curriculum, the faculty highly recommends the following coursework prior to matriculation:

- Statistics
- Accounting
- Microeconomics
- Finance



Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 150
  - General Test - Quantitative Reasoning: 150
  - General Test - Analytical Writing: 3.5
- GMAT
  - Total score: 500

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#) (GRE, GMAT, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 42 to 60 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Advanced Problem Solving in Healthcare Administration, PubH 6577, 2 credits.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 3 semesters must be completed before filing a Degree Program Form.

### Full-time MHA program (60 credits)

#### Required Courses (47 credits)

Take the following courses:

- PUBH 6525 - Introduction to Population Health: A Health System (2.0 cr)
- PUBH 6535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 6542 - Management of Health Care Organizations (3.0 cr)
- PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)
- PUBH 6547 - Health Care Human Resources Management (2.0 cr)
- PUBH 6553 - Health Care Management Ethics (1.0 cr)
- PUBH 6554 - Healthcare Strategy and Marketing (2.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6557 - Health Finance I (3.0 cr)
- PUBH 6558 - Health Finance II (3.0 cr)
- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 6562 - Information Technology in Health Care (2.0 cr)
- PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)
- PUBH 6565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)
- PUBH 6577 - Advanced Problem Solving in Health Services Administration (2.0 cr)
- PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 7596 - Clerkship in Health Care Administration (2.0 cr)

#### Leadership or Change Management (2 credits)

Select one of the following courses in consultation with the advisor. If PUBH 6570 is selected it must be for 2 credits of Change Management.

- PUBH 6570 - Healthcare Administration (1.0 - 4.0 cr)



or PUBH 6527 - Healthcare Leadership and Effecting Change (2.0 cr)

**Electives (11 credits)**

Select coursework from the following in consultation with the advisor:

- ACCT 6605 - Negotiations for Financial Executives (2.0 cr)
- ANTH 5009 - Human Behavioral Biology (3.0 cr)
- CSPH 5000 - Explorations in Integrative Therapies and Healing Practices (1.0 - 4.0 cr)
- CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)
- CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)
- CSPH 5513 - Living Well, Dying Well: Empowering Patient Communication at the End of Life (2.0 cr)
- CSPH 5711 - Optimal Healing Environments (3.0 cr)
- CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)
- ENTR 6020 - Business Formation (4.0 cr)
- FINA 6222 - Mergers and Acquisitions (2.0 cr)
- FINA 6241 - Corporate Financial Decisions and Analysis (4.0 cr)
- HINF 5430 - Foundations of Health Informatics I (3.0 cr)
- HINF 5531 - Health Data Analytics and Data Science (3.0 cr)
- MBA 6110 - Leading Others (2.0 cr)
- MBA 6112 - Leading Organizations (0.0 - 1.0 cr)
- MBA 6230 - Financial Management (3.0 cr)
- MBA 6300 - Strategic Management (3.0 cr)
- MBA 6504 - Carlson Consulting Enterprise (2.0 - 4.0 cr)
- MGMT 6004 - Negotiation Strategies (2.0 cr)
- MGMT 6032 - Strategic Alliances (2.0 cr)
- MGMT 6033 - Managing the Strategy Process (2.0 cr)
- MGMT 6034 - Strategic Leadership (2.0 cr)
- MGMT 6050 - Management of Innovation and Change (2.0 cr)
- MGMT 6084 - Management of Teams (2.0 cr)
- MGMT 6085 - Corporate Strategy (4.0 cr)
- MILI 6235 - Pharmaceutical Industry: Business and Policy (2.0 cr)
- MILI 6726 - Medical Device Industry: Business and Public Policy (2.0 cr)
- MILI 6963 - Healthcare Analytics (2.0 cr)
- MILI 6990 - The Health Care Marketplace (2.0 cr)
- MILI 6991 - Anatomy and Physiology for Managers (2.0 cr)
- MILI 6992 - Healthcare Delivery Innovations: Optimizing Cost and Quality (2.0 cr)
- MILI 6996 - Medical Industry Valuation Laboratory II (2.0 - 4.0 cr)
- MKTG 6088 - Strategic Marketing (2.0 cr)
- NURS 7606 - Relationship-Based Leadership and Management (3.0 cr)
- PA 5108 - Board leadership development (1.0 cr)
- PA 5926 - Presentation Skills: How to Inspire Your Audience and Change the World (1.0 cr)
- PHAR 5201 - Applied Medical Terminology (2.0 cr)
- PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6107 - Excel and Access Skills in Public Health Settings (1.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)
- PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)
- PUBH 6370 - Social Epidemiology (2.0 cr)
- PUBH 6578 - Negotiation Strategies (2.0 cr)
- PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6735 - Principles of Health Policy (3.0 cr)
- PUBH 6744 - State Health Policy and Politics (2.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 6772 - Health Disparities Capstone Seminar (1.0 cr)
- PUBH 6804 - Mental Health Policy (2.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- PUBH 6814 - Data and Information for Population Health Management (2.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6863 - Understanding Health Care Quality (2.0 cr)
- PUBH 6880 - Introduction to Public Health Informatics (2.0 cr)





PUBH 6904 - Nutrition and Aging (2.0 cr)  
PUBH 6955 - Using Policy to Address the Weight-Related Health of Child and Adolescent Populations (1.0 cr)  
PUBH 7565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 7584 - Health Care and Medical Needs (1.0 cr)  
PUBH 7590 - Gerontology for Healthcare Managers (1.0 cr)  
PUBH 7591 - Independent Study: Health Care Administration (1.0 - 4.0 cr)  
SCO 6041 - Project Management (2.0 cr)  
SCO 6045 - Strategic Sourcing (2.0 cr)  
SCO 6051 - Service Management (2.0 cr)  
SCO 6091 - Process Improvement Methods (2.0 cr)  
SCO 6092 - Supply Chain Risk and Security (2.0 cr)  
SCO 6096 - Supply Chain Management in the Health Care and Medical Devices Sector (2.0 cr)  
SCO 6098 - Operations Excellence via Lean Thinking (2.0 cr)

### Dual Degree MBA/MHA Electives

#### Dual Degree MBA/MHA Electives

Dual degree students may choose from the following list of electives.

##### Electives (11 credits)

Select coursework from the following in consultation with the advisor:

ANTH 5009 - Human Behavioral Biology (3.0 cr)  
CSPH 5000 - Explorations in Integrative Therapies and Healing Practices (1.0 - 4.0 cr)  
CSPH 5101 - Introduction to Integrative Healing Practices (3.0 cr)  
CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)  
CSPH 5513 - Living Well, Dying Well: Empowering Patient Communication at the End of Life (2.0 cr)  
CSPH 5711 - Optimal Healing Environments (3.0 cr)  
HINF 5430 - Foundations of Health Informatics I (3.0 cr)  
HINF 5531 - Health Data Analytics and Data Science (3.0 cr)  
NURS 7606 - Relationship-Based Leadership and Management (3.0 cr)  
PA 5108 - Board leadership development (1.0 cr)  
PA 5926 - Presentation Skills: How to Inspire Your Audience and Change the World (1.0 cr)  
PHAR 5201 - Applied Medical Terminology (2.0 cr)  
PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)  
PUBH 6055 - Social Inequalities in Health (2.0 cr)  
PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)  
PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)  
PUBH 6107 - Excel and Access Skills in Public Health Settings (1.0 cr)  
PUBH 6131 - Working in Global Health (2.0 cr)  
PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)  
PUBH 6370 - Social Epidemiology (2.0 cr)  
PUBH 6578 - Negotiation Strategies (2.0 cr)  
PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)  
PUBH 6702 - Integrative Leadership Seminar (3.0 cr)  
PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)  
PUBH 6735 - Principles of Health Policy (3.0 cr)  
PUBH 6744 - State Health Policy and Politics (2.0 cr)  
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
PUBH 6772 - Health Disparities Capstone Seminar (1.0 cr)  
PUBH 6804 - Mental Health Policy (2.0 cr)  
PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)  
PUBH 6813 - Managing Electronic Health Information (2.0 cr)  
PUBH 6814 - Data and Information for Population Health Management (2.0 cr)  
PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)  
PUBH 6855 - Medical Sociology (3.0 cr)  
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)  
PUBH 6863 - Understanding Health Care Quality (2.0 cr)  
PUBH 6880 - Introduction to Public Health Informatics (2.0 cr)  
PUBH 6904 - Nutrition and Aging (2.0 cr)  
PUBH 6955 - Using Policy to Address the Weight-Related Health of Child and Adolescent Populations (1.0 cr)  
PUBH 7565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 7584 - Health Care and Medical Needs (1.0 cr)  
PUBH 7590 - Gerontology for Healthcare Managers (1.0 cr)  
PUBH 7591 - Independent Study: Health Care Administration (1.0 - 4.0 cr)



## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Executive MHA Program

The Executive Master of Health Care Administration (EMHA) is delivered in a dynamic learning cohort model. Most of the coursework is online; students spend 26 days (five sessions) on campus over 25 months.

### Executive MHA (42 credits)

Take the following courses. In consultation with the advisor, students must complete PubH 7570 Topics courses:

1. Spring term -- Population Health (1 cr); and
  2. Fall term -- Leading with Impact in Healthcare (1cr).
- [PUBH 7535](#) - Managerial Accounting for Health Services (3.0 cr)  
[PUBH 7536](#) - Health Finance I (3.0 cr)  
[PUBH 7537](#) - Health Finance II (3.0 cr)  
[PUBH 7541](#) - Statistics for Health Management Decision Making (3.0 cr)  
[PUBH 7542](#) - Quality Improvement and Patient Safety (2.0 cr)  
[PUBH 7547](#) - Health Care Human Resource Management (2.0 cr)  
[PUBH 7551](#) - Principles of Management in Health Services Organizations (2.0 cr)  
[PUBH 7553](#) - Health Care Management Ethics (1.0 cr)  
[PUBH 7554](#) - Health Care Strategy and Marketing (3.0 cr)  
[PUBH 7555](#) - Topics in Health Economics (2.0 cr)  
[PUBH 7556](#) - Health and Health Systems (2.0 cr)  
[PUBH 7560](#) - Operations Research and Quality in Health Care (3.0 cr)  
[PUBH 7562](#) - Information Technology in Health Care (2.0 cr)  
[PUBH 7564](#) - Private Purchasers of Health Care (2.0 cr)  
[PUBH 7565](#) - Innovation of Healthcare Services (2.0 cr)  
[PUBH 7566](#) - Executive Capstone in Healthcare Leadership (2.0 cr)  
[PUBH 7569](#) - Health Care Policy (1.0 cr)  
[PUBH 7570](#) - Topics: Healthcare Administration (1.0 cr)  
[PUBH 7576](#) - Legal Considerations in Health Services Organizations (2.0 cr)



### **Twin Cities Campus**

## **Health Equity Minor**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, Room A395, 420 Delaware Street SE, Minneapolis, MN 55455 (612-626-3500 or 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 7
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The health equity minor promotes understanding of the root causes of health inequities and explores practice and policy solutions to eliminate health inequities.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Admission to the health equity minor is contingent upon enrollment in a University master's or doctoral degree-granting program.

Students should consult with their program advisor, prior to then contact the Health Equity director of graduate studies regarding requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

All minor coursework must be taken on the A-F grade basis, with a minimum grade of B- earned for each course, and a cumulative GPA of 3.00.

#### **Minor Coursework**

##### **Required (1 credit)**

[PUBH 6772](#) - Health Disparities Capstone Seminar (1.0 cr)

##### **Additional Course (2-3 credits)**

Select at least one course from list below:

[CSPH 5115](#) - Cultural Awareness, Knowledge and Health (3.0 cr)

or [PUBH 6055](#) - Social Inequalities in Health (2.0 cr)

or [PUBH 6066](#) - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)

or [PUBH 6855](#) - Medical Sociology (3.0 cr)

##### **Electives**

Choose coursework to complete 7 credits for the masters minor, and 12 total credits for the doctoral minor. If PubH 6000, Topics:



Urban Health & Social Policy (2 cr).

GCC 5003 - Seeking Solutions to Global Health Issues [GP] (3.0 cr)

GCC 5028 - Harnessing the Power of Research, Community, Clinic and Policy to Build a Culture of Health [DSJ] (3.0 cr)

NURS 5033 - Population-Focused Health in Public Health and Mental Health Nursing (5.0 cr)

PA 5211 - Land Use Planning (3.0 cr)

PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)

PA 5421 - Racial Inequality and Public Policy (3.0 cr)

PA 5451 - Immigration, Health and Public Policy (3.0 cr)

PA 5452 - Immigration and Public Policy (3.0 cr)

PUBH 6131 - Working in Global Health (2.0 cr)

PUBH 6242 - Cultural Humility with American Indian Populations (2.0 cr)

PUBH 6370 - Social Epidemiology (2.0 cr)

PUBH 6525 - Introduction to Population Health: A Health System (1.0 cr)

PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)

PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)

PUBH 6607 - Adolescent Health: Issues, Programs, and Policies (2.0 cr)

PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)

PUBH 6675 - Women's Health (2.0 cr)

PUBH 6703 - Health Impact Assessment: A Tool to Promote Health Equity (1.5 cr)

PUBH 6713 - Global Health in a Local Context (3.0 cr)

PUBH 6804 - Mental Health Policy (2.0 cr)

PUBH 6815 - Community-based Participatory Research (2.0 cr)

PUBH 7242 - War and Public Health (1.0 cr)

SOC 8211 - The Sociology of Race & Racialization (3.0 cr)

SOC 8735 - Sociology of Culture (3.0 cr)

SW 8551 - Advanced Community Practice: Assessment, Organizing, and Advocacy (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Master's

Doctoral



### ***Twin Cities Campus***

## **Health Services Research, Policy, and Administration M.S.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 34
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The MS in health services research, policy, and administration is for people with an analytical focus who enjoy research and data-driven approaches to solving health care problems.

The MS offers specializations that focus on health economics, access, quality, and social determinants of health, disparities, health policy, quality improvement, data science, analytics, and big data.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Good math skills are essential. Previous coursework in algebra, statistics, or other quantitative coursework is recommended.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 153
  - General Test - Quantitative Reasoning: 144
  - General Test - Analytical Writing: 3.5

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan B:** Plan B requires 34 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project comprises either an industry-specific project involving student collaboration with a local organization, or independent research conducted on a relevant topic of interest. The project is selected in consultation with and guided by the advisor.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Good math skills are essential. Previous coursework in algebra, statistics, or other quantitative coursework is recommended.

### Required Coursework (21-22 credits)

In consultation with the advisor, select at least 21 credits from the following list. Students must receive a B- or better for PubH 6450 and 6451. The majority of courses must be taken A/F.

[PUBH 6450](#) - Biostatistics I (4.0 cr)

[PUBH 6451](#) - Biostatistics II (4.0 cr)

[PUBH 6724](#) - The Health Care System and Public Health (3.0 cr)

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

[PUBH 6806](#) - Principles of Public Health Research (2.0 cr)

or [PUBH 6864](#) - Conducting Health Outcomes Research (3.0 cr)

[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

or [PUBH 6742](#) - Ethics in Public Health: Research and Policy (1.0 cr)

### Plan B Project (2 credits)

Take 2 Plan B Project credits in consultation with the advisor.

[PUBH 7894](#) - MS in Health Services Research, Policy, and Administration Plan B Project (1.0 - 5.0 cr)

### Electives

Select remaining coursework from the recommended electives, or courses from any specialization, in consultation with the advisor to meet the 34-credit minimum.

[CSPH 5115](#) - Cultural Awareness, Knowledge and Health (3.0 cr)

or [PUBH 6055](#) - Social Inequalities in Health (2.0 cr)

or [PUBH 6066](#) - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)

or [PUBH 6078](#) - Public Health Policy as a Prevention Strategy (2.0 cr)

or [PUBH 6555](#) - Topics in Health Economics (2.0 cr)

or [PUBH 6560](#) - Operations Research and Quality in Health Care (3.0 cr)

or [PUBH 6627](#) - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)

or [PUBH 6634](#) - Children and Families: Public Health Policy and Advocacy (2.0 cr)

or [PUBH 6675](#) - Women's Health (2.0 cr)

or [PUBH 6702](#) - Integrative Leadership Seminar (3.0 cr)

or [PUBH 6711](#) - Public Health Law (2.0 cr)

or [PUBH 6717](#) - Decision Analysis for Health Care (2.0 cr)

or [PUBH 6727](#) - Health Leadership and Effecting Change (2.0 cr)

or [PUBH 6735](#) - Principles of Health Policy (3.0 cr)

or [PUBH 6765](#) - Continuous Quality Improvement: Methods and Techniques (3.0 cr)

or [PUBH 6803](#) - Conducting a Systematic Literature Review (3.0 cr)

or [PUBH 6804](#) - Mental Health Policy (2.0 cr)

or [PUBH 6805](#) - Introduction to Project Management for Health Professionals (2.0 cr)

or [PUBH 6809](#) - Advanced Methods in Health Decision Science (3.0 cr)

or [PUBH 6810](#) - Survey Research Methods (3.0 cr)

or [PUBH 6832](#) - Economics of the Health Care System (3.0 cr)

or [PUBH 6845](#) - Using Demographic Data for Policy Analysis (3.0 cr)

or [PUBH 6852](#) - Program Evaluation in Health and Mental Health Settings (2.0 cr)

or [PUBH 6855](#) - Medical Sociology (3.0 cr)

or [PUBH 6862](#) - Cost-Effectiveness Analysis in Health Care (3.0 cr)

or [PUBH 6863](#) - Understanding Health Care Quality (2.0 cr)

or [PUBH 8802](#) - Health Services Policy Analysis: Applications (2.0 cr)

### Specialization Areas



Choose coursework in consultation with the advisor to meet the 34-credit minimum.

**Cost Effectiveness**

- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)

-OR-

**Quality Improvement/Operations Research**

- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)

-OR-

**Health Economics**

Take PUBH 6862, and select either PUBH 6832 or PUBH 6555 in consultation with advisor.

- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- or PUBH 6832 - Economics of the Health Care System (3.0 cr)

-OR-

**Health Services Research and Evaluation**

- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6863 - Understanding Health Care Quality (2.0 cr)

-OR-

**Health Policy**

- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6735 - Principles of Health Policy (3.0 cr)
- PUBH 8802 - Health Services Policy Analysis: Applications (2.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- or PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)
- or PUBH 6832 - Economics of the Health Care System (3.0 cr)

-OR-

**Social Determinants of Health**

- CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6675 - Women's Health (2.0 cr)
- PUBH 6804 - Mental Health Policy (2.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)

**Joint- or Dual-degree Coursework:** JD/MS-HSRP&A Students may take a total of 8 credits in common among the academic programs. Student may take a total of 8 credits in common among the academic programs.



### **Twin Cities Campus**

## **Health Services Research, Policy, and Administration Minor**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The health services research, policy, and administration minor is available to students who are interested in the social, political, and economic forces that affect the operations, financing, and delivery of health care. The minor offers a high degree of flexibility in course selection, tailored to students' individual interests and goals.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

The health services research, policy, and administration graduate minor is contingent upon enrollment and good academic standing in a University master's or doctoral degree-granting program.

Students should confer with their program advisor about the advisability of an HSRP&A minor before contacting the HSRP&A director of graduate studies or graduate program coordinator. Approval of the HSRP&A director of graduate studies is required.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Coursework must be completed A-F with a minimum grade of B-.

Minimum GPA is 3.00 to graduate with the HSRPA Minor.

### **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

#### **Masters**

##### **Required Coursework (3 credits)**

Take one of the following courses in consultation with the HSRP&A director of graduate studies:

[PUBH 6556](#) - Health and Health Systems (3.0 cr)





[PUBH 6724](#) - The Health Care System and Public Health (3.0 cr)

**Electives (3 credits)**

[PUBH 6560](#) - Operations Research and Quality in Health Care (3.0 cr)  
[PUBH 6717](#) - Decision Analysis for Health Care (2.0 cr)  
[PUBH 6727](#) - Health Leadership and Effecting Change (2.0 cr)  
[PUBH 6735](#) - Principles of Health Policy (3.0 cr)  
[PUBH 6744](#) - State Health Policy and Politics (2.0 cr)  
[PUBH 6765](#) - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
[PUBH 6803](#) - Conducting a Systematic Literature Review (3.0 cr)  
[PUBH 6804](#) - Mental Health Policy (2.0 cr)  
[PUBH 6806](#) - Principles of Public Health Research (2.0 cr)  
[PUBH 6809](#) - Advanced Methods in Health Decision Science (3.0 cr)  
[PUBH 6810](#) - Survey Research Methods (3.0 cr)  
[PUBH 6815](#) - Community-based Participatory Research (2.0 cr)  
[PUBH 6832](#) - Economics of the Health Care System (3.0 cr)  
[PUBH 6845](#) - Using Demographic Data for Policy Analysis (3.0 cr)  
[PUBH 6852](#) - Program Evaluation in Health and Mental Health Settings (2.0 cr)  
[PUBH 6855](#) - Medical Sociology (3.0 cr)  
[PUBH 6862](#) - Cost-Effectiveness Analysis in Health Care (3.0 cr)  
[PUBH 6863](#) - Understanding Health Care Quality (2.0 cr)  
[PUBH 6864](#) - Conducting Health Outcomes Research (3.0 cr)  
[PUBH 6730](#) - International Comparative Health Systems (2.0 cr)  
[PUBH 6737](#) - Structural Racism and Health (2.0 cr)  
[PUBH 6805](#) - Introduction to Project Management for Health Professionals (2.0 cr)  
[PUBH 6713](#) - Global Health in a Local Context (3.0 cr)  
[PUBH 6745](#) - Rural Health (2.0 cr)

**Doctoral**

**Required Coursework (12 credits)**

Students choose, in consultation with the HSRP&A director of graduate studies, the minors standard curriculum or the health economics curriculum.

**Option 1 Standard Curriculum**

**Required Coursework (5-6 credits)**

Students completing the minors standard curriculum must take at least 5 credits from the following, in consultation with the HSRP&A director of graduate studies:

[PUBH 6724](#) - The Health Care System and Public Health (3.0 cr)  
or [PUBH 6556](#) - Health and Health Systems (3.0 cr)  
[PUBH 8801](#) - Health Services Policy Analysis: Theory (1.0 cr)  
or [PUBH 8802](#) - Health Services Policy Analysis: Applications (2.0 cr)

**Electives (6-7 credits)**

[PUBH 6717](#) - Decision Analysis for Health Care (2.0 cr)  
[PUBH 6744](#) - State Health Policy and Politics (2.0 cr)  
[PUBH 6803](#) - Conducting a Systematic Literature Review (3.0 cr)  
[PUBH 6804](#) - Mental Health Policy (2.0 cr)  
[PUBH 6809](#) - Advanced Methods in Health Decision Science (3.0 cr)  
[PUBH 6810](#) - Survey Research Methods (3.0 cr)  
[PUBH 6815](#) - Community-based Participatory Research (2.0 cr)  
[PUBH 6832](#) - Economics of the Health Care System (3.0 cr)  
[PUBH 6845](#) - Using Demographic Data for Policy Analysis (3.0 cr)  
[PUBH 6855](#) - Medical Sociology (3.0 cr)  
[PUBH 6862](#) - Cost-Effectiveness Analysis in Health Care (3.0 cr)  
[PUBH 6863](#) - Understanding Health Care Quality (2.0 cr)  
[PUBH 6864](#) - Conducting Health Outcomes Research (3.0 cr)  
[PUBH 8804](#) - Advanced Quantitative Methods Seminar (3.0 cr)  
[PUBH 8805](#) - Sociological Theory in Health Services Research (3.0 cr)  
[PUBH 8810](#) - Research Studies in Health Care (3.0 cr)  
[PUBH 8811](#) - Research Methods in Health Care (3.0 cr)  
[PUBH 8813](#) - Measurement of Health-Related Social Factors (3.0 cr)  
[PUBH 8821](#) - Health Economics II (3.0 cr)  
[PUBH 6737](#) - Structural Racism and Health (2.0 cr)  
[PUBH 8816](#) - Implementation Science in Public Health (2.0 cr)

or **Option 2 Health Economics Curriculum**

**Required Coursework (6 credits)**

Students completing the minors health economics curriculum take the following courses:

[PUBH 6832](#) - Economics of the Health Care System (3.0 cr)



[PUBH 8821](#) - Health Economics II (3.0 cr)

**Electives (6 credits)**

In consultation with the HSRP&A director of graduate studies, select at least 6 credits to meet the 12-credit minimum. PubH 8821 is not an option for students who have, or are currently taking ECON 8101, 8102, 8103 or 8104.

[PUBH 6862](#) - Cost-Effectiveness Analysis in Health Care (3.0 cr)

[PUBH 8801](#) - Health Services Policy Analysis: Theory (1.0 cr)

[PUBH 8811](#) - Research Methods in Health Care (3.0 cr)



### ***Twin Cities Campus***

## **Health Services Research, Policy, and Administration Ph.D.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 71 to 88
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The health services research, policy, and administration doctoral program offers a multidisciplinary examination of the social, political, and economic forces that affect the organization, financing, and delivery of health care. Graduates will be in a position to apply learned research skills to influence policy and positively impact health care systems in various sectors, including universities, government agencies, think tanks, health insurance providers, managed care organizations, and consulting firms.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

The PhD program requires prerequisites in calculus and statistics. Applicants who have not completed the prerequisites, but are otherwise qualified for admission, are required to take relevant courses at the University or another accredited institution before beginning the program.

#### **Special Application Requirements:**

Students who wish to pursue the Health Policy and Analysis concentration area must complete PubH 6724 or PubH 6556 either before enrollment by the end of the first year of the doctoral program.

See [www.sph.umn.edu](http://www.sph.umn.edu) for additional admission requirements.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 153
  - General Test - Quantitative Reasoning: 144
  - General Test - Analytical Writing: 3.5

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language



Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

47 to 64 credits are required in the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

All coursework must be completed A-F.

### Core Coursework (25 credits)

Courses must be completed with a minimum B- grade.

Take all of the following core courses:

- [PUBH 6250](#) - Foundations of Public Health (2.0 cr)
- [PUBH 6742](#) - Ethics in Public Health: Research and Policy (1.0 cr)
- [PUBH 6832](#) - Economics of the Health Care System (3.0 cr)
- [PUBH 6855](#) - Medical Sociology (3.0 cr)
- [PUBH 8341](#) - Advanced Epidemiologic Methods: Concepts (3.0 cr)
- [PUBH 8801](#) - Health Services Policy Analysis: Theory (1.0 cr)
- [PUBH 8810](#) - Research Studies in Health Care (3.0 cr)
- [PUBH 8811](#) - Research Methods in Health Care (3.0 cr)
- [PUBH 8830](#) - Writing for Research (2.0 cr)
- [PUBH 8831](#) - Writing for Research (2.0 cr)

### Econometrics and Biostatistics Requirement (8 credits)

Select APEC 8211 and 8212 or PUBH 7401 and 7402 in consultation with the advisor.

#### Econometrics

- [APEC 8211](#) - Econometric Analysis I (2.0 cr)
- [APEC 8212](#) - Econometric Analysis II (2.0 cr)

#### or Biostatistics

- [PUBH 7401](#) - Fundamentals of Biostatistical Inference (4.0 cr)
- [PUBH 7402](#) - Biostatistics Modeling and Methods (4.0 cr)

### Thesis Credits (24 credits)

Take at least 24 doctoral thesis credits.

- [PUBH 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)

### Concentration Areas

#### Multidisciplinary Social Sciences (20-22 credits)

The Multidisciplinary Social Science concentration area is designed for doctoral students who want a broad introduction to analytic perspectives from economics, sociology, and political science, along with statistics and econometrics.

#### Required Coursework (6 credits)

Take the following courses:

- [APEC 5151](#) - Applied Microeconomics: Firm and Household (3.0 cr)
- [PUBH 8805](#) - Sociological Theory in Health Services Research (3.0 cr)

#### Required Theory Coursework (2-4 credits)

Select one of the following courses in consultation with the advisor:

- [APEC 8203](#) - Applied Welfare Economics and Public Policy (3.0 cr)
- [PUBH 6717](#) - Decision Analysis for Health Care (2.0 cr)
- [PUBH 6809](#) - Advanced Methods in Health Decision Science (3.0 cr)
- [PUBH 6862](#) - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- [PUBH 8804](#) - Advanced Quantitative Methods Seminar (3.0 cr)
- [PUBH 8821](#) - Health Economics II (3.0 cr)



SOC 8701 - Sociological Theory (4.0 cr)

SOC 8721 - Social Psychology: Micro-Sociological Approaches to Inequalities and Identities (3.0 cr)

**Electives (12 credits)**

Select electives from the following list in consultation with the advisor:

APEC 8202 - Mathematical Optimization in Applied Economics (3.0 cr)

APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)

ECON 8181 - Advanced Topics in Microeconomics (2.0 cr)

ECON 8182 - Advanced Topics in Microeconomics (2.0 cr)

ECON 8205 - Applied Econometrics (2.0 cr)

ECON 8206 - Applied Econometrics (2.0 cr)

ECON 8207 - Applied Econometrics (2.0 cr)

ECON 8208 - Applied Econometrics (2.0 cr)

IDSC 8511 - Conceptual Topics and Research Methods in Information and Decision Sciences (3.0 cr)

IDSC 8721 - Behavioral Decision Theory (3.0 cr)

MGMT 8302 - Seminar in Organizations Theory (4.0 cr)

PA 8302 - Applied Policy Analysis (4.0 cr)

PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)

PUBH 6810 - Survey Research Methods (3.0 cr)

PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)

PUBH 6863 - Understanding Health Care Quality (2.0 cr)

PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)

PUBH 7450 - Survival Analysis (3.0 cr)

PUBH 8802 - Health Services Policy Analysis: Applications (2.0 cr)

PUBH 8813 - Measurement of Health-Related Social Factors (3.0 cr)

SOC 8101 - Sociology of Law (3.0 cr)

SOC 8211 - The Sociology of Race & Racialization (3.0 cr)

SOC 8290 - Topics in Race, Class, Gender and other forms of Durable Inequality (3.0 cr)

SOC 8311 - Political Sociology (3.0 cr)

SOC 8390 - Topics in Political Sociology (3.0 cr)

SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)

SOC 8501 - Sociology of the Family (3.0 cr)

SOC 8551 - Life Course Inequality & Health (3.0 cr)

SOC 8731 - Sociology of Knowledge (3.0 cr)

SOC 8735 - Sociology of Culture (3.0 cr)

-OR-

**Sociology of Health and Illness (18 credits)**

The Sociology of Health and Illness concentration area emphasizes fundamental issues in medical sociology, such as social stratification, the social construction of health and illness, population dynamics, and demographic forces.

**Required Coursework (6 credits)**

Select at least 6 credits from the following list in consultation with the advisor:

MGMT 8302 - Seminar in Organizations Theory (4.0 cr)

PUBH 8805 - Sociological Theory in Health Services Research (3.0 cr)

SOC 8211 - The Sociology of Race & Racialization (3.0 cr)

SOC 8701 - Sociological Theory (4.0 cr)

SOC 8731 - Sociology of Knowledge (3.0 cr)

**Electives (12 credits)**

**Specialization Coursework (9 credits)**

Select at least 9 credits from the following list in consultation with the advisor:

IDSC 8721 - Behavioral Decision Theory (3.0 cr)

SOC 8101 - Sociology of Law (3.0 cr)

SOC 8290 - Topics in Race, Class, Gender and other forms of Durable Inequality (3.0 cr)

SOC 8311 - Political Sociology (3.0 cr)

SOC 8390 - Topics in Political Sociology (3.0 cr)

SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)

SOC 8501 - Sociology of the Family (3.0 cr)

SOC 8551 - Life Course Inequality & Health (3.0 cr)

SOC 8735 - Sociology of Culture (3.0 cr)

**Advanced Methodology Coursework (3 credits)**

Select at least 3 credits from the following list in consultation with the advisor:

EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)

POL 8126 - Qualitative Methods (3.0 cr)

PSY 8881 - Seminar: Quantitative and Psychometric Methods (3.0 cr)



PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)  
PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)  
PUBH 8813 - Measurement of Health-Related Social Factors (3.0 cr)

-OR-

#### Health Decision Science (23 credits)

The Health Decision Science concentration area consists of a collection of quantitative methods used to evaluate decision making under uncertainty. There are many areas relevant to medical decision-making including decision analysis, cost-effectiveness analysis, disease simulation modeling, infectious disease modeling, quality-of-life assessment, utility elicitation, health outcomes assessment, and pharmacoeconomics.

#### Required Coursework (11 credits)

Take the following courses:

PUBH 6717 - Decision Analysis for Health Care (2.0 cr)  
PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)  
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)

Select one of the following courses in consultation with the advisor:

IDSC 8511 - Conceptual Topics and Research Methods in Information and Decision Sciences (3.0 cr)  
or IDSC 8721 - Behavioral Decision Theory (3.0 cr)

#### Electives (12 credits)

Select electives from the following list in consultation with the advisor. If PubH 7401, 7402, 6809, or 6862 are completed as part of the required coursework, students will need to choose different course credits for electives.

IE 5080 - Topics in Industrial Engineering (1.0 - 4.0 cr)  
IE 5111 - Systems Engineering I (2.0 cr)  
IE 5113 - Systems Engineering II (4.0 cr)  
IE 5441 - Financial Decision Making (4.0 cr)  
IE 5511 - Human Factors and Work Analysis (4.0 cr)  
IE 5522 - Quality Engineering and Reliability (4.0 cr)  
IE 5524 - Process Transformation through Lean Tools (2.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 5551 - Production Planning and Inventory Control (4.0 cr)  
IE 5553 - Simulation (4.0 cr)  
IE 5561 - Analytics and Data-Driven Decision Making (4.0 cr)  
IE 5773 - Practice-focused Seminar (1.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6804 - Mental Health Policy (2.0 cr)  
PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)  
PUBH 6806 - Principles of Public Health Research (2.0 cr)  
PUBH 6810 - Survey Research Methods (3.0 cr)  
PUBH 6813 - Managing Electronic Health Information (2.0 cr)  
PUBH 6815 - Community-based Participatory Research (2.0 cr)  
PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)  
PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)  
PUBH 6863 - Understanding Health Care Quality (2.0 cr)  
PUBH 6864 - Conducting Health Outcomes Research (3.0 cr)  
PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)  
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)  
PUBH 7405 - Biostatistics: Regression (4.0 cr)  
PUBH 7406 - Advanced Regression and Design (4.0 cr)  
PUBH 7415 - Introduction to Clinical Trials (3.0 cr)  
PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 7450 - Survival Analysis (3.0 cr)  
PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)  
PUBH 7462 - Advanced Programming and Data Analysis in R (2.0 cr)  
PUBH 7465 - Biostatistics Consulting (3.0 cr)  
PUBH 7470 - Study Designs in Biomedical Research (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 7485 - Methods for Causal Inference (3.0 cr)

-OR-



### Clinical Outcomes Research (31 credits)

The Clinical Outcomes Research concentration area is designed to train health services researchers who wish to study clinical care, costs and outcomes. Their research may be conducted using observational (quasi-experimental) studies, randomized clinical trials, or analyses of secondary data sets, including administrative data.

#### Required Coursework (19 credits)

Take the following courses:

- [PUBH 6810](#) - Survey Research Methods (3.0 cr)
- [PUBH 6864](#) - Conducting Health Outcomes Research (3.0 cr)
- [PUBH 7430](#) - Statistical Methods for Correlated Data (3.0 cr)
- [PUBH 7450](#) - Survival Analysis (3.0 cr)
- [PUBH 8342](#) - Advanced Epidemiologic Methods: Applications (3.0 cr)
- [PUBH 8343](#) - Synthesis and Application of Methods in Epidemiologic Research (4.0 cr)

#### Electives (12 credits)

Select at least 12 credits from the following list in consultation with the advisor:

- [PUBH 6717](#) - Decision Analysis for Health Care (2.0 cr)
- [PUBH 6803](#) - Conducting a Systematic Literature Review (3.0 cr)
- [PUBH 6862](#) - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- [PUBH 6863](#) - Understanding Health Care Quality (2.0 cr)
- [PUBH 8813](#) - Measurement of Health-Related Social Factors (3.0 cr)
- [PUBH 6576](#) - Understanding Clinical Quality Using Administrative Data (2.0 cr)

-OR-

### Health Policy and Analysis (14 credits)

The Health Policy concentration area prepares students for careers in research, teaching, and public service in academic, governmental and public policy settings. The focus of this area includes multi-disciplinary training in the social sciences; application of quantitative research methods; rigorous writing and communication skill-based training.

#### Required Coursework (2 credits)

Take the following course:

- [PUBH 8802](#) - Health Services Policy Analysis: Applications (2.0 cr)

#### Electives (12 credits)

Select at least 12 credits from the following list in consultation with the advisor. PUBH 6845 and 8804 are strongly recommended.

- [PUBH 6717](#) - Decision Analysis for Health Care (2.0 cr)
- [PUBH 6810](#) - Survey Research Methods (3.0 cr)
- [PUBH 6845](#) - Using Demographic Data for Policy Analysis (3.0 cr)
- [PUBH 6862](#) - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- [PUBH 8804](#) - Advanced Quantitative Methods Seminar (3.0 cr)
- [PUBH 8813](#) - Measurement of Health-Related Social Factors (3.0 cr)

-OR-

### Health Economics (31 credits)

Health Economics trains health economists who will rival PhDs from the top economics departments in competing for jobs in universities and research institutions. The curriculum includes a broad menu of health economics courses in addition to the multidisciplinary core courses. A minimum 78 credits is required for this emphasis area.

#### Required Course (3 credits)

Take the following course:

- [PUBH 8821](#) - Health Economics II (3.0 cr)

#### Required Microeconomics Series (8 credits)

Select four courses from one of the following series, in consultation with the advisor, for a total of 8 credits:

##### Applied Microeconomics

- [APEC 8001](#) - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)
- [APEC 8002](#) - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)
- [APEC 8003](#) - Applied Microeconomic Analysis of Game Theory and Information (2.0 cr)
- [APEC 8004](#) - Applied Microeconomic Analysis of Social Choice and Welfare (2.0 cr)

##### or Required Microeconomic Theory Series

- [ECON 8101](#) - Microeconomic Theory (2.0 cr)
- [ECON 8102](#) - Microeconomic Theory (2.0 cr)
- [ECON 8103](#) - Microeconomic Theory (2.0 cr)
- [ECON 8104](#) - Microeconomic Theory (2.0 cr)

#### Required Coursework (8 credits)

Choose one of the following sequences in consultation with the advisor for a total of 8 credits:

##### Econometric Analysis

APEC 8211 & 8212 are recommended.

- [APEC 8211](#) - Econometric Analysis I (2.0 cr)
- [APEC 8212](#) - Econometric Analysis II (2.0 cr)

or **Fundamentals of Biostatistical Inference**



[PUBH 7401](#) - Fundamentals of Biostatistical Inference (4.0 cr)

[PUBH 7402](#) - Biostatistics Modeling and Methods (4.0 cr)

#### Electives (12 credits)

In consultation with academic advisor, students select minimum 12 total credits from the following list.

[APEC 8202](#) - Mathematical Optimization in Applied Economics (3.0 cr)

[APEC 8206](#) - Dynamic Optimization: Applications in Economics and Management (3.0 cr)

[PUBH 8804](#) - Advanced Quantitative Methods Seminar (3.0 cr)

#### Econometric Analysis

If APEC 8211 & 8212 were completed as required courses, credits cannot count toward electives.

[APEC 8211](#) - Econometric Analysis I (2.0 cr)

[APEC 8212](#) - Econometric Analysis II (2.0 cr)

#### Applied Economics

[ECON 8205](#) - Applied Econometrics (2.0 cr)

[ECON 8206](#) - Applied Econometrics (2.0 cr)

[ECON 8207](#) - Applied Econometrics (2.0 cr)

[ECON 8208](#) - Applied Econometrics (2.0 cr)

#### Fundamentals of Biostatistical Inference

If PubH 7401 & 7402 were completed as required courses, credits cannot count toward electives.

[PUBH 7401](#) - Fundamentals of Biostatistical Inference (4.0 cr)

[PUBH 7402](#) - Biostatistics Modeling and Methods (4.0 cr)

#### Other Electives

Select courses from the following list in consultation with the advisor, to complete the credit minimum:

[APEC 8341](#) - Applied Public Finance (3.0 cr)

[APEC 8501](#) - Labor Economics I (2.0 cr)

[APEC 8502](#) - Labor Economics II (2.0 cr)

[APEC 8602](#) - Economics of the Environment (3.0 cr)

[APEC 8701](#) - Trade and Development I (2.0 cr)

[APEC 8703](#) - Trade and Development III (2.0 cr)

[APEC 8803](#) - Marketing Economics (3.0 cr)

[ECON 8103](#) - Microeconomic Theory (2.0 cr)

[ECON 8104](#) - Microeconomic Theory (2.0 cr)

[ECON 8107](#) - Macroeconomic Theory (2.0 cr)

[ECON 8108](#) - Macroeconomic Theory (2.0 cr)

[ECON 8117](#) - Noncooperative Game Theory (2.0 cr)

[ECON 8118](#) - Noncooperative Game Theory (2.0 cr)

[ECON 8182](#) - Advanced Topics in Microeconomics (2.0 cr)

[ECON 8186](#) - Advanced Topics in Macroeconomics (2.0 cr)

[ECON 8192](#) - Workshop in Mathematical Economics (1.0 cr)

[ECON 8312](#) - Economic Growth and Development (2.0 cr)

[ECON 8391](#) - Workshop in Economic Growth and Development (1.0 cr)

[ECON 8392](#) - Workshop in Economic Growth and Development (1.0 cr)

[ECON 8401](#) - International Trade and Payments Theory (2.0 cr)

[ECON 8402](#) - International Trade and Payments Theory (2.0 cr)

[ECON 8403](#) - International Trade and Payments Theory (2.0 cr)

[ECON 8491](#) - Workshop in Trade and Development (1.0 cr)

[ECON 8492](#) - Workshop in Trade and Development (1.0 - 3.0 cr)

[ECON 8501](#) - Wages and Employment (2.0 cr)

[ECON 8502](#) - Wages and Employment (2.0 cr)

[ECON 8503](#) - Wages and Employment (2.0 cr)

[ECON 8581](#) - Advanced Topics in Labor Economics (2.0 cr)

[ECON 8582](#) - Advanced Topics in Labor Economics (2.0 cr)

[ECON 8601](#) - Industrial Organization and Government Regulation (2.0 cr)

[ECON 8602](#) - Industrial Organization and Government Regulation (2.0 cr)

[ECON 8603](#) - Industrial Organization and Government Regulation (2.0 cr)

[ECON 8691](#) - Workshop in Applied Microeconomics (1.0 cr)

[ECON 8692](#) - Workshop in Applied Microeconomics (1.0 cr)

[ECON 8702](#) - Monetary Economics (2.0 cr)

[ECON 8703](#) - Monetary Economics (2.0 cr)

[ECON 8704](#) - Financial Economics (2.0 cr)

[ECON 8705](#) - Financial Economics (2.0 cr)

[ECON 8791](#) - Workshop in Macroeconomics (1.0 cr)

[ECON 8792](#) - Workshop in Macroeconomics (1.0 cr)

[ECON 8801](#) - Public Economics (2.0 cr)

[ECON 8802](#) - Public Economics (2.0 cr)

[ECON 8803](#) - Public Economics (2.0 cr)





[PUBH 6862](#) - Cost-Effectiveness Analysis in Health Care (3.0 cr)

**Joint- or Dual-degree Coursework:** JD/PhD-Health Services Research Policy & Administration Student may take a total of 12 credits in common among the academic programs.



### **Twin Cities Campus**

## **Management Fundamentals Postbaccalaureate Certificate**

School of Public Health - Adm

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 14
- This program does not require summer semesters for timely completion.
- Degree: Management Fundamentals PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Management Fundamentals Certificate program provides students with the fundamentals of health care management. It includes coursework in the design of health care delivery systems, health economics, cost accounting in health care, introduction to health care finance, teamwork in health care, and an introduction to management principles in health care. The certificate includes select coursework from the School of Public Health's health care administration MHA degree - executive track, and is designed for individuals working in health care organizations and interested in developing a better understanding of management.

### **Accreditation**

This program is accredited by Commission on Accreditation of Healthcare Management.

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Admission to the certificate is decided by the MHA faculty with the advice and counsel of an admissions committee. Admission to the certificate requires the following:

- a bachelor's degree from an accredited college or university
- at least three years of experience in a healthcare organization
- current employment in a healthcare organization which affords the opportunity to apply the assignments in the coursework, or an agreement with such an organization in which the applicant is not employed
- a letter of intent describing career interests and the relevance of the certificate to the applicant's personal development

Note: Students are expected to bring a personal computer to the on-campus sessions.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

All courses must be taken for an A-F grade.

### Required Coursework (14 credits)

- [PUBH 7565](#) - Innovation of Healthcare Services (2.0 cr)
- [PUBH 7535](#) - Managerial Accounting for Health Services (3.0 cr)
- [PUBH 7556](#) - Health and Health Systems (2.0 cr)
- [PUBH 7551](#) - Principles of Management in Health Services Organizations (2.0 cr)
- [PUBH 7536](#) - Health Finance I (3.0 cr)
- [PUBH 7542](#) - Quality Improvement and Patient Safety (2.0 cr)



### ***Twin Cities Campus***

## **Maternal and Child Health M.P.H.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 42 to 48
- This program requires summer semesters for timely completion.
- Degree: Master of Public Health

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The maternal and child health MPH program is a 48-credit program rooted in the principles of social justice and the programmatic and policy development needed to improve the health of women, children, fathers, and families around the world. The program focuses on public health skills development (program design and evaluation, advocacy, epidemiology) and maternal and child health (MCH) content (family health, reproductive health, infant and child health, adolescent health, social disparities, family systems, and women's health). Eligible students can complete an advanced-standing, 42-credit curriculum entirely online.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

At least one year of work or volunteer experience in a clinical, community-based, public health or managed-care agency/program that focuses on women, children, adolescents, and/or families.

Basic understanding of physiological and/or psychological human development as demonstrated by coursework, experience, and/or referenced readings.

#### **Special Application Requirements:**

Applicants to the advanced-standing option must hold either an advanced degree (e.g., MS,MD, MA, MSW) or have 3-5 years of experience directly related to maternal and child health.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS



- Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 42 to 48 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Students complete an Integrated Learning Experience (ILE) in consultation with the advisor.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses offered both A/F and S/N must be taken A/F, with a minimum grade of B- earned.

### Public Health Core Requirements (16 credits)

#### Biostatistics (4 credits)

Select PUBH 6450 (4 credits) or PUBH 6414 (3 credits) plus one biostatistics programming course, in consultation with the advisor.

[PUBH 6450](#) - Biostatistics I (4.0 cr)

or [PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

#### Biostatistics Programming

Students who take PUBH 6414 must select an additional course for at least 1 credit, in consultation with the advisor, from the following list:

[PUBH 6107](#) - Excel and Access Skills in Public Health Settings (1.0 cr)

[PUBH 6325](#) - Data Processing with PC-SAS (1.0 cr)

[PUBH 6420](#) - Introduction to SAS Programming (1.0 cr)

[PA 5929](#) - Data Visualization: Telling Stories with Numbers (2.0 cr)

[PUBH 6123](#) - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

#### Epidemiology (3 credits)

Select one of the following courses in consultation with the advisor:

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

#### Administration/Management (2 credits)

Take the following course:

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

#### Environmental Health (2 credits)

Take the following course:

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

#### Social and Behavioral Health (2 credits)

Take the following course:

[PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)

#### Ethics (1 credit)

Take the following course:

[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

#### Foundations of Public Health (2 credits)

Take the following course:

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

### Maternal and Child Health Core Requirements (9-11 credits)

[PUBH 6630](#) - Foundations of Maternal and Child Health Leadership (3.0 cr)

#### MCH Coursework (6-8 credits)

Students completing the standard program select 8 credits from the following list to meet the 11-credit MCH core requirement.

Advanced-standing students select 6 credits to meet the 9-credit minimum required. Courses are selected in consultation with the advisor. PubH 6600 Topics, if selected, must be for 2 credits of Global Maternal and Child Health.

[PUBH 6600](#) - Topics: Maternal and Child Health (0.5 - 4.0 cr)

[PUBH 6605](#) - Reproductive and Perinatal Health (2.0 cr)

[PUBH 6606](#) - Children's Health: Life Course and Equity Perspectives (2.0 cr)

[PUBH 6607](#) - Adolescent Health: Issues, Programs, and Policies (2.0 cr)



PUBH 6613 - Children and Youth With Special Health Care Needs (2.0 cr)  
PUBH 6675 - Women's Health (2.0 cr)  
PUBH 6907 - Maternal, Infant, Child and Adolescent Nutrition (3.0 cr)

#### **Methods and Analysis (5-8 credits)**

##### **Methods Required Course (2-3 credits)**

Select one of the following courses in consultation with the advisor:

PUBH 6034 - Evaluation (3.0 cr)  
or PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)

##### **Methods Coursework (3-5 credits)**

Students completing the standard program select 5 credits, and advanced-standing students select at least 3 credits from the following list. PUBH 6107, PUBH 6325, and PUBH 6420 may not be appropriate for students taking PUBH 6414 to complete the biostatistics programming requirement. Courses are selected in consultation with the advisor.

PUBH 6035 - Evaluation II: Applications (3.0 cr)  
PUBH 6107 - Excel and Access Skills in Public Health Settings (1.0 cr)  
PUBH 6310 - Clinical Epidemiology 1 (1.0 cr)  
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)  
PUBH 6636 - Qualitative Research Methods in Public Health Practice (2.0 cr)  
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6806 - Principles of Public Health Research (2.0 cr)  
PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)  
PUBH 6311 - Clinical Epidemiology II (1.0 cr)  
PA 5929 - Data Visualization: Telling Stories with Numbers (2.0 cr)  
PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

#### **Management, Communication, Policy and Advocacy Skills (4-6 credits)**

##### **Grant Writing (1 credit)**

Take the following course:

PUBH 6673 - Grant Writing for Public Health (1.0 cr)

##### **Management, Communications, Policy and Advocacy (3 to 5 credits)**

Students in the standard track should select a minimum of 5 credits from the following list. Students in the advanced-standing track should select a minimum of 3 credits from the following list.

PUBH 6045 - Skills for Policy Development (1.0 cr)  
PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)  
PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)  
PUBH 6074 - Mass Communication and Public Health (3.0 cr)  
PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)  
PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)  
PUBH 6711 - Public Health Law (2.0 cr)  
PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)  
PUBH 6735 - Principles of Health Policy (3.0 cr)  
PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)  
PUBH 6955 - Using Policy to Address the Weight-Related Health of Child and Adolescent Populations (1.0 cr)  
PUBH 7691 - Independent Study: Maternal and Child Health (1.0 - 4.0 cr)  
PUBH 6055 - Social Inequalities in Health (2.0 cr)  
PUBH 6737 - Structural Racism and Health (2.0 cr)  
PUBH 6914 - Community Nutrition Intervention (3.0 cr)  
PUBH 6954 - Personal, Social and Environmental Influences on the Weight-Related Health of Pediatric Populations (2.0 cr)

#### **Applied Practice (AP) Experience (1 credit)**

Take at least one AP credit in consultation with the advisor.

PUBH 7696 - Applied Practice Experience: Maternal and Child Health (1.0 - 5.0 cr)

#### **Integrated Learning Experience (ILE) (1 credit)**

Take at least one ILE credit in consultation with the advisor.

PUBH 7694 - Integrative Learning Experience: Maternal and Child Health (1.0 - 4.7 cr)

#### **Electives**

Select electives in consultation with the advisor to complete 48-credit minimum for the standard program or the 42-credit minimum for the advanced-standing program.



CSPH 5111 - Ways of Thinking about Health (2.0 cr)  
CSPH 5115 - Cultural Awareness, Knowledge and Health (3.0 cr)  
CSPH 5118 - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)  
CSPH 5215 - Forgiveness and Healing: A Journey Toward Wholeness (3.0 cr)  
CSPH 5303 - Pain Management and Evidence Based Complementary Health Approaches (3.0 cr)  
CSPH 5305 - Introduction to Integrative Mental Health (2.0 cr)  
CSPH 5701 - Fundamentals of Health Coaching I (4.0 cr)  
CSPH 5702 - Fundamentals of Health Coaching II (4.0 cr)  
CSPH 5703 - Advanced Health Coaching Practicum (3.0 cr)  
CSPH 5704 - Business of Health Coaching (2.0 cr)  
CSPH 5706 - Lifestyle Medicine (2.0 cr)  
CSPH 5707 - Coaching People with Clinical Conditions (2.0 cr)  
CSPH 5708 - Mind-Body Science and the Art of Transformation (1.0 cr)  
CSPH 5709 - Health and Wellbeing Group Coaching (2.0 cr)  
CSPH 5713 - Health Coaching for Health Professionals (2.0 cr)  
CSPH 5805 - Wellbeing in the Workplace (3.0 cr)  
CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)  
CSPH 5807 - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)  
CSPH 5905 - Food Matters: Cook Like Your Life Depends On It (1.0 cr)  
EPSY 5114 - Psychology of Student Learning (3.0 cr)  
EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)  
EPSY 5609 - Family-centered Services (3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)  
FSCN 4612W - Advanced Human Nutrition [WI] (4.0 cr)  
FSCN 4614W - Community Nutrition [SOCS, DSJ, WI] (3.0 cr)  
FSCN 4621 - Nutrition and Metabolism (4.0 cr)  
FSCN 4622 - Nutritional Toxicology, the basic science of diet-related toxicants (3.0 cr)  
FSCN 4665 - Medical Nutrition Therapy I (3.0 cr)  
FSCN 4666 - Medical Nutrition Therapy II (3.0 cr)  
FSCN 4732 - Food and Nutrition Management (3.0 cr)  
FSCN 5131 - Food Quality for Graduate Credit (3.0 cr)  
FSCN 5312 - Food Analysis (4.0 cr)  
FSCN 5601 - Management of Eating Disorders (3.0 cr)  
FSOS 5014 - Quantitative Family Research Methods I (3.0 cr)  
FSOS 5015 - Family Research Laboratory (1.0 cr)  
FSOS 5111 - Introduction to Family Therapy (3.0 cr)  
FSOS 5701 - Prevention Science: Principles and Practices (3.0 cr)  
FSOS 5937 - Parent-Child Interaction (3.0 cr)  
FSOS 5942 - Diverse Family Experiences (3.0 cr)  
FSOS 5944 - Curricular Design in Parent Education (3.0 cr)  
FSOS 5945 - Teaching and Learning in Parent Education (3.0 cr)  
FSOS 5946 - Assessment and Evaluation in Parent Education (3.0 cr)  
FSOS 8001 - Conceptual Frameworks in the Family (3.0 cr)  
FSOS 8002 - Advanced Family Conceptual Frameworks (3.0 cr)  
FSOS 8014 - Quantitative Family Research Methods II (3.0 cr)  
FSOS 8036 - Couple/Marriage and Family Therapy Research (3.0 cr)  
FSOS 8101 - Family Stress, Coping, and Adaptation (3.0 cr)  
HINF 5430 - Foundations of Health Informatics I (3.0 cr)  
HINF 5431 - Foundations of Health Informatics II (3.0 cr)  
HINF 5440 - Foundations of Translational Bioinformatics (3.0 cr)  
HINF 5450 - Foundations of Precision Medicine Informatics (3.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
HINF 5510 - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)  
HINF 5520 - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)  
HINF 5531 - Health Data Analytics and Data Science (3.0 cr)  
HINF 5610 - Foundations of Biomedical Natural Language Processing (3.0 cr)  
HINF 5620 - Data Visualization for the Health Sciences (3.0 cr)  
HINF 5630 - Clinical Data Mining (3.0 cr)  
HSEX 6001 - Foundations of Human Sexuality (3.0 cr)  
HSEX 6011 - Policy in Human Sexuality: Cutting Edge Analyses (3.0 cr)  
HSEX 6012 - Sexual Function and Dysfunction (3.0 cr)  
HSEX 6013 - Perspectives and Practices in Sexuality Education (3.0 cr)  
LAW 6036 - Reproductive Rights (3.0 cr)



LAW 6046 - Human Trafficking (2.0 cr)  
LAW 6058 - Human Rights Advocacy (3.0 cr)  
LAW 6621 - Rights in Conflict: Citizenship and Human Rights (2.0 cr)  
LAW 6718 - Immigration and Criminal Law: Immigration Consequences of Crimes and Criminalizing Migration (2.0 cr)  
LAW 6827 - Women's International Human Rights (2.0 cr)  
LAW 6862 - Sexual Orientation, Gender Identity, and Human Rights (2.0 cr)  
NURS 5029 - Introduction to Nursing Interventions (3.0 cr)  
NURS 5031 - Human Response to Health and Illness: Adults and Elders (4.0 cr)  
NURS 5032 - Human Response to Health and Illness: Children and Childbearing Families (5.0 cr)  
NURS 5115 - Interprofessional Health Care Informatics (3.0 cr)  
NURS 5116 - Consumer Health Informatics (1.0 cr)  
NURS 5117 - Consumer Health Informatics Practicum (1.0 cr)  
NURS 5190 - Essentials of Holistic Health Assessment and Foundational Clinical (3.0 cr)  
NURS 5284 - Supporting Physiologic Labor and Childbirth for Nurses (2.0 cr)  
NURS 5505 - Assessment and Support of Women in Labor (2.0 cr)  
NURS 6110 - Epidemiology in Nursing (2.0 cr)  
NURS 6213 - Reproductive Healthcare for Patients with Complex Conditions (2.0 cr)  
NURS 6305 - Reproductive and Sexual Health Care (3.0 cr)  
NURS 6600 - Health Systems and Care Models (3.0 cr)  
NURS 6895 - Adult Acute Care Holistic Health Assessment and Wellness (2.0 cr)  
NURS 7100 - Quality Improvement and Implementation Science in Health Care (3.0 cr)  
NURS 7108 - Population Health Informatics (2.0 cr)  
NURS 7209 - Integrative Nursing I (1.0 cr)  
NURS 7300 - Program Planning and Evaluation (3.0 cr)  
NURS 8134 - Interventions and Outcomes Research (3.0 cr)  
NURS 8171 - Qualitative Research Design and Methods (3.0 - 4.0 cr)  
NURS 8185 - Qualitative Data Analysis for Health Care Research (3.0 - 4.0 cr)  
NUTR 5624 - Nutrition and Genetics (2.0 cr)  
NUTR 5626 - Nutritional Physiology (3.0 cr)  
NUTR 5627 - Nutritional and Food Toxicology (3.0 cr)  
NUTR 8620 - Advances in Nutrition (2.0 cr)  
OLPD 5011 - Leading Organizational Change: Theory and Practice (3.0 cr)  
OLPD 5095 - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)  
OLPD 5096 - Internship: Organizational Leadership, Policy, and Development (1.0 - 9.0 cr)  
OLPD 5103 - Comparative Education (3.0 cr)  
OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)  
OLPD 5107 - Gender, Education, and International Development (3.0 cr)  
OLPD 5124 - Critical Issues in International Education and Educational Exchange (3.0 cr)  
OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)  
OLPD 5201 - Strategies for Teaching Adults (3.0 cr)  
OLPD 5202 - Perspectives of Adult Learning and Development (3.0 cr)  
OLPD 5346 - Politics of Education (3.0 cr)  
OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)  
OLPD 5502 - Theory and Models of Evaluation (3.0 cr)  
OLPD 5607 - Organization Development (3.0 cr)  
OLPD 5611 - Facilitation and Meeting Skills (1.0 cr)  
OLPD 5619 - Planning and Decision-Making Skills (1.0 cr)  
OLPD 5819 - Evaluating and Using Research in Organizations and Education (3.0 cr)  
OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)  
PA 5002 - Introduction to Policy Analysis (1.5 cr)  
PA 5003 - Introduction to Financial Analysis and Management (1.5 cr)  
PA 5004 - Introduction to Planning (3.0 cr)  
PA 5011 - Management of Organizations (3.0 cr)  
PA 5012 - The Politics of Public Affairs (3.0 cr)  
PA 5013 - Law and Urban Land Use (1.5 cr)  
PA 5021 - Microeconomics for Policy Analysis (3.0 cr)  
PA 5022 - Applications of Economics for Policy Analysis (1.5 - 3.0 cr)  
PA 5031 - Statistics for Public Affairs (4.0 cr)  
PA 5032 - Applied Regression (2.0 cr)  
PA 5033 - Multivariate Techniques (2.0 cr)  
PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)  
PA 5042 - Urban and Regional Economics (2.0 cr)  
PA 5043 - Economic and Demographic Data Analysis (2.0 cr)  
PA 5044 - Applied Regression, Accelerated (2.0 cr)  
PA 5051 - Public Affairs Leadership (2.0 cr)





- PA 5053 - Policy Analysis in Public Affairs (2.0 cr)
- PA 5054 - Program Design and Implementation Analysis (2.0 cr)
- PA 5055 - Qualitative Research Methods and Analysis (2.0 cr)
- PA 5056 - Quantitative Research Methods and Analysis (2.0 cr)
- PA 5081 - Working in Teams: Crossing Disciplines and Learning from Difference (0.5 cr)
- PA 5101 - Management and Governance of Nonprofit Organizations (3.0 cr)
- PA 5103 - Leadership and Change (1.5 - 3.0 cr)
- PA 5104 - Strategic Human Resource Management (3.0 cr)
- PA 5105 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- PA 5113 - State and Local Public Finance (3.0 cr)
- PA 5114 - Budget Analysis in Public and Nonprofit Orgs (1.5 cr)
- PA 5116 - Financing Public and Nonprofit Organizations (1.5 cr)
- PA 5122 - Law and Public Affairs (3.0 cr)
- PA 5123 - Philanthropy in America: History, Practice, and Trends (1.5 - 3.0 cr)
- PA 5135 - Managing Conflict: Negotiation (3.0 cr)
- PA 5136 - Group Process Facilitation for Organizational and Public/Community Engagement (1.0 cr)
- PA 5137 - Project Management in the Public Arena (1.5 cr)
- PA 5145 - Civic Participation in Public Affairs (3.0 cr)
- PA 5151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)
- PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)
- PA 5209 - Urban Planning and Health Equity (3.0 cr)
- PA 5211 - Land Use Planning (3.0 cr)
- PA 5212 - Managing Urban Growth and Change (3.0 cr)
- PA 5213 - Introduction to Site Planning (3.0 cr)
- PA 5231 - Transit Planning and Management (3.0 cr)
- PA 5234 - Urban Transportation Planning and Policy (3.0 cr)
- PA 5242 - Environmental Planning, Policy, and Decision Making (3.0 cr)
- PA 5251 - Strategic Planning and Management (3.0 cr)
- PA 5261 - Housing Policy (3.0 cr)
- PA 5262 - Neighborhood Revitalization Theories and Strategies (3.0 cr)
- PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)
- PA 5281 - Immigrants, Urban Planning and Policymaking in the U.S. (3.0 cr)
- PA 5290 - Topics in Planning (0.5 - 4.0 cr)
- PA 5301 - Population Methods & Issues for the United States & Global South (3.0 cr)
- PA 5311 - Program Evaluation (3.0 cr)
- PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)
- PA 5405 - Public Policy Implementation (3.0 cr)
- PA 5413 - Early Childhood and Public Policy (1.5 - 3.0 cr)
- PA 5415 - Economics of Early Childhood Development (1.5 - 3.0 cr)
- PA 5421 - Racial Inequality and Public Policy (3.0 cr)
- PA 5426 - Community-Engaged Research and Policy with Marginalized Groups (3.0 cr)
- PA 5431 - Public Policies on Work and Pay (3.0 cr)
- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PA 5521 - Development Planning and Policy Analysis (4.0 cr)
- PA 5561 - Gender and International Development (3.0 cr)
- PA 5601 - Global Survey of Gender and Public Policy (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5721 - Energy Systems and Policy (3.0 cr)
- PA 5723 - Water Policy (3.0 cr)
- PA 5724 - Climate Change Policy (3.0 cr)
- PA 5741 - Risk, Resilience and Decision Making (1.5 cr)
- PA 5801 - Global Public Policy (3.0 cr)
- PA 5805 - Global Economics (3.0 cr)
- PA 5813 - US Foreign Policy: Issues and Institutions (3.0 cr)
- PA 5814 - Global Diplomacy in a Time of Change (3.0 cr)
- PA 5823 - Managing Humanitarian and Refugee Crises: Challenges for Policymakers & Practitioners (1.0 cr)
- PA 5825 - Crisis Management in Foreign Affairs (1.5 cr)
- PA 5826 - National Security Policy (3.0 cr)
- PA 5885 - Human Rights Policy: Issues and Actors (3.0 cr)
- PA 5927 - Effective Grantwriting for Nonprofit Organizations (1.5 cr)
- PA 5928 - Data Management and Visualization with R (1.0 cr)
- PA 5929 - Data Visualization: Telling Stories with Numbers (2.0 cr)
- PA 5933 - Survey Methods: Designing Effective Questionnaires (2.0 cr)
- PUBH 6004 - Global Health Capstone (1.0 cr)
- PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)



- PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)
- PUBH 6034 - Evaluation (3.0 cr)
- PUBH 6035 - Evaluation II: Applications (3.0 cr)
- PUBH 6045 - Skills for Policy Development (1.0 cr)
- PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)
- PUBH 6050 - Community Health Promotion I: Integrating Theory, Evidence, and Context (3.0 cr)
- PUBH 6051 - Community Health Promotion II: Developing, Implementing, and Justifying Interventions (3.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6081 - Sex, Sexuality, and Sexual Health (2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6102 - Issues in Environmental Health (2.0 cr)
- PUBH 6107 - Excel and Access Skills in Public Health Settings (1.0 cr)
- PUBH 6108 - Foundations of Global Health (2.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)
- PUBH 6132 - Air, Water, and Health (2.0 cr)
- PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)
- PUBH 6135 - Job Search Strategies and Career Professional Development (1.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6151 - Occupational and Environmental Health Nursing Seminar (1.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6159 - Principles of Toxicology I (2.0 cr)
- PUBH 6161 - Regulatory Toxicology (2.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6175 - Environmental Measurements Laboratory (2.0 cr)
- PUBH 6177 - Nanotechnology Health and Safety (3.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)
- PUBH 6183 - Theory and Practice in Foodborne Disease Outbreak Detection, Investigation and Control (1.0 cr)
- PUBH 6184 - Field and laboratory methods in public health entomology (2.0 cr)
- PUBH 6192 - Measurement and Properties of Air Contaminants (2.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)
- PUBH 6241 - American Indian Public Health and Wellness, Health Policy, Law, Health Services Administration (2.0 cr)
- PUBH 6242 - Cultural Humility with American Indian Populations (2.0 cr)
- PUBH 6243 - American Indian Research, Evaluation and Collaborations (2.0 cr)
- PUBH 6250 - Foundations of Public Health (2.0 cr)
- PUBH 6261 - Human Centered Design for Public Health Leadership, Practice and Innovation (2.0 cr)
- PUBH 6301 - Fundamentals of Clinical Research (3.0 cr)
- PUBH 6303 - Clinical Research Project Seminar (2.0 cr)
- PUBH 6310 - Clinical Epidemiology 1 (1.0 cr)
- PUBH 6311 - Clinical Epidemiology II (1.0 cr)
- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
- PUBH 6325 - Data Processing with PC-SAS (1.0 cr)
- PUBH 6333 - Principles of Human Behavior I (2.0 cr)
- PUBH 6341 - Epidemiologic Methods I (3.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6343 - Epidemiologic Methods III (4.0 cr)
- PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)
- PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)
- PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)
- PUBH 6365 - Global Challenges in Infectious Disease Epidemiology (2.0 cr)
- PUBH 6370 - Social Epidemiology (2.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)



PUBH 6387 - Cancer Epidemiology (2.0 cr)  
PUBH 6389 - Nutritional Epidemiology (2.0 cr)  
PUBH 6396 - Applied Practice Experience Global Health (0.5 - 8.0 cr)  
PUBH 6414 - Biostatistical Literacy (3.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6432 - Biostatistical Methods in Translational and Clinical Research (1.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)  
PUBH 6525 - Introduction to Population Health: A Health System (2.0 cr)  
PUBH 6535 - Managerial Accounting for Health Services (3.0 cr)  
PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)  
PUBH 6542 - Management of Health Care Organizations (3.0 cr)  
PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)  
PUBH 6553 - Health Care Management Ethics (1.0 cr)  
PUBH 6554 - Healthcare Strategy and Marketing (2.0 cr)  
PUBH 6555 - Topics in Health Economics (2.0 cr)  
PUBH 6556 - Health and Health Systems (3.0 cr)  
PUBH 6558 - Health Finance II (3.0 cr)  
PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)  
PUBH 6562 - Information Technology in Health Care (2.0 cr)  
PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)  
PUBH 6565 - Innovation of Healthcare Services (2.0 cr)  
PUBH 6570 - Healthcare Administration (1.0 - 4.0 cr)  
PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)  
PUBH 6576 - Understanding Clinical Quality Using Administrative Data (2.0 cr)  
PUBH 6577 - Advanced Problem Solving in Health Services Administration (2.0 cr)  
PUBH 6578 - Negotiation Strategies (2.0 cr)  
PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)  
PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)  
PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)  
PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)  
PUBH 6607 - Adolescent Health: Issues, Programs, and Policies (2.0 cr)  
PUBH 6613 - Children and Youth With Special Health Care Needs (2.0 cr)  
PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)  
PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)  
PUBH 6636 - Qualitative Research Methods in Public Health Practice (2.0 cr)  
PUBH 6673 - Grant Writing for Public Health (1.0 cr)  
PUBH 6675 - Women's Health (2.0 cr)  
PUBH 6702 - Integrative Leadership Seminar (3.0 cr)  
PUBH 6711 - Public Health Law (2.0 cr)  
PUBH 6713 - Global Health in a Local Context (3.0 cr)  
PUBH 6717 - Decision Analysis for Health Care (2.0 cr)  
PUBH 6724 - The Health Care System and Public Health (3.0 cr)  
PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)  
PUBH 6730 - International Comparative Health Systems (2.0 cr)  
PUBH 6735 - Principles of Health Policy (3.0 cr)  
PUBH 6737 - Structural Racism and Health (2.0 cr)  
PUBH 6741 - Ethics in Public Health: Professional Practice and Policy (1.0 cr)  
PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)  
PUBH 6745 - Rural Health (2.0 cr)  
PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)  
PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)  
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
PUBH 6772 - Health Disparities Capstone Seminar (1.0 cr)  
PUBH 6780 - Topics: Public Health Administration and Policy (1.0 - 3.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)  
PUBH 6806 - Principles of Public Health Research (2.0 cr)  
PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)  
PUBH 6813 - Managing Electronic Health Information (2.0 cr)  
PUBH 6815 - Community-based Participatory Research (2.0 cr)  
PUBH 6832 - Economics of the Health Care System (3.0 cr)  
PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)  
PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)  
PUBH 6855 - Medical Sociology (3.0 cr)



- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6864 - Conducting Health Outcomes Research (3.0 cr)
- PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)
- PUBH 6904 - Nutrition and Aging (2.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)
- PUBH 6907 - Maternal, Infant, Child and Adolescent Nutrition (3.0 cr)
- PUBH 6914 - Community Nutrition Intervention (3.0 cr)
- PUBH 6915 - Nutrition Assessment (2.0 cr)
- PUBH 6933 - Nutrition and Chronic Diseases (2.0 cr)
- PUBH 6954 - Personal, Social and Environmental Influences on the Weight-Related Health of Pediatric Populations (2.0 cr)
- PUBH 6955 - Using Policy to Address the Weight-Related Health of Child and Adolescent Populations (1.0 cr)
- PUBH 6995 - Community Nutrition Practicum (6.0 - 7.0 cr)
- PUBH 6996 - Clinical Nutrition Practicum (7.0 cr)
- PUBH 7091 - Independent Study: Community Health Promotion (1.0 - 4.0 cr)
- PUBH 7193 - Directed Study: Environmental Health (1.0 - 4.0 cr)
- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7221 - Planning for Urgent Threats (1.0 cr)
- PUBH 7230 - Topics in Infectious Disease (0.5 - 4.0 cr)
- PUBH 7231 - Surveillance of Foodborne Diseases in Humans (1.0 cr)
- PUBH 7235 - Surveillance of Zoonotic Pathogens in Animals (1.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7252 - Qualitative Research Methods: Discovering the Value of Voice in Words, Stories and Photographs (1.0 cr)
- PUBH 7253 - Introduction to GIS (1.0 cr)
- PUBH 7257 - Qualitative Data Analysis (1.0 cr)
- PUBH 7262 - Globalization and Health (1.0 cr)
- PUBH 7391 - Independent Study: Epidemiology (1.0 - 4.0 cr)
- PUBH 7392 - Readings in Epidemiology (1.0 - 4.0 cr)
- PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)
- PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)
- PUBH 7405 - Biostatistics: Regression (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 7415 - Introduction to Clinical Trials (3.0 cr)
- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
- PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- PUBH 7450 - Survival Analysis (3.0 cr)
- PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)
- PUBH 7462 - Advanced Programming and Data Analysis in R (2.0 cr)
- PUBH 7465 - Biostatistics Consulting (3.0 cr)
- PUBH 7470 - Study Designs in Biomedical Research (3.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 7485 - Methods for Causal Inference (3.0 cr)
- PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)
- PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 7536 - Health Finance I (3.0 cr)
- PUBH 7537 - Health Finance II (3.0 cr)
- PUBH 7542 - Quality Improvement and Patient Safety (2.0 cr)
- PUBH 7547 - Health Care Human Resource Management (2.0 cr)
- PUBH 7551 - Principles of Management in Health Services Organizations (2.0 cr)
- PUBH 7553 - Health Care Management Ethics (1.0 cr)
- PUBH 7554 - Health Care Strategy and Marketing (3.0 cr)
- PUBH 7555 - Topics in Health Economics (2.0 cr)
- PUBH 7556 - Health and Health Systems (2.0 cr)
- PUBH 7560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 7562 - Information Technology in Health Care (2.0 cr)
- PUBH 7564 - Private Purchasers of Health Care (2.0 cr)
- PUBH 7565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 7569 - Health Care Policy (1.0 cr)
- PUBH 7570 - Topics: Healthcare Administration (1.0 cr)
- PUBH 7576 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 7590 - Gerontology for Healthcare Managers (1.0 cr)
- PUBH 7591 - Independent Study: Health Care Administration (1.0 - 4.0 cr)



- PUBH 7691 - Independent Study: Maternal and Child Health (1.0 - 4.0 cr)  
PUBH 7720 - Data to Drive Public Health (2.0 cr)  
PUBH 7730 - Public Health Laws, Rules, and Regulations (1.0 cr)  
PUBH 7791 - Independent Study: Public Health Administration and Policy (1.0 - 6.0 cr)  
PUBH 7991 - Independent Study: Public Health Nutrition (1.0 - 4.0 cr)  
PUBH 8120 - Occupational Health and Safety Research Seminar (1.0 cr)  
PUBH 8160 - Advanced Toxicology (2.0 cr)  
PUBH 8166 - Experiences in Toxicology Research (3.0 cr)  
PUBH 8194 - Directed Research: Environmental Health (1.0 - 6.0 cr)  
PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)  
PUBH 8342 - Advanced Epidemiologic Methods: Applications (3.0 cr)  
PUBH 8344 - Advanced Epidemiologic Methods Workshop (1.0 cr)  
PUBH 8392 - Readings in Clinical Research (1.0 - 4.0 cr)  
PUBH 8393 - Directed Study: Clinical Research (1.0 - 4.0 cr)  
PUBH 8401 - Linear Models (4.0 cr)  
PUBH 8403 - Research Skills in Biostatistics (1.0 cr)  
PUBH 8432 - Probability Models for Biostatistics (3.0 cr)  
PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)  
PUBH 8446 - Advanced Statistical Genetics and Genomics (3.0 cr)  
PUBH 8475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 8482 - Sequential and Adaptive Methods for Clinical Trials (3.0 cr)  
PUBH 8485 - Methods for Causal Inference (3.0 cr)  
PUBH 8492 - Theories of Hierarchical and Other Richly Parametrized Linear Models (3.0 cr)  
PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)  
PUBH 8810 - Research Studies in Health Care (3.0 cr)  
PUBH 8811 - Research Methods in Health Care (3.0 cr)  
PUBH 8814 - Mixed Methods: Quantitative and Qualitative Strategies in Research (2.0 cr)  
PUBH 8816 - Implementation Science in Public Health (2.0 cr)  
PUBH 8821 - Health Economics II (3.0 cr)  
PUBH 8830 - Writing for Research (2.0 cr)  
PUBH 8831 - Writing for Research (2.0 cr)  
SW 5051 - Human Behavior and the Social Environment (2.0 cr)  
SW 5101 - Historical Origins and Contemporary Policies in Social Welfare (3.0 cr)  
SW 5562 - Global Social Work and Social Development (3.0 cr)  
SW 5904 - Facilitation and Conflict Management: Humanistic Approach (2.0 cr)  
SW 5906 - Advanced Ethical Decision Making (1.0 cr)  
SW 5912 - Grief and Loss in Social Work Practice (1.0 cr)  
SW 8151 - Social Work Methods: Practice With Individuals and Systems (2.0 cr)  
SW 8152 - Social Work Practice Methods: Families and Groups (2.0 cr)  
SW 8153 - Social Work Practice Methods: Macro Practice and Organizations (2.0 cr)  
SW 8251 - Social Work Practice in Health, Disabilities, and Aging (3.0 cr)  
SW 8262 - Empowerment Practice With Persons With Disabilities (3.0 cr)  
SW 8263 - Advanced Direct Practice and Community-Based Interventions in Gerontology (3.0 cr)  
SW 8351 - Assessment and Engagement with Families and Children (3.0 cr)  
SW 8352 - Intervention Methods with Families (3.0 cr)  
SW 8361 - Identification and Assessment of Family Violence (3.0 cr)  
SW 8363 - Social Work in Child Welfare (3.0 cr)  
SW 8451 - Assessment and Engagement in Clinical Social Work Practice (3.0 cr)  
SW 8452 - Core Concepts in Clinical Social Work Practice (3.0 cr)  
SW 8461 - Advanced Clinical Social Work Practice with Adults (3.0 cr)  
SW 8462 - Advanced Clinical Practice With Children and Adolescents (3.0 cr)  
SW 8463 - Social Work Practice With Severe and Persistent Mental Illness and Severe Emotional Disturbance (3.0 cr)  
SW 8551 - Advanced Community Practice: Assessment, Organizing, and Advocacy (3.0 cr)  
SW 8552 - Advanced Community Practice: Leadership, Planning, and Program Development (3.0 cr)  
SW 8563 - Advanced Policy Advocacy (3.0 cr)  
SW 8804 - Child Welfare Policy (3.0 cr)  
SW 8806 - Health and Mental Health Policy (3.0 cr)  
SW 8807 - International and Comparative Social Welfare Policy (3.0 cr)  
SW 8821 - Social Work and Difference, Diversity and Privilege (2.0 cr)  
SW 8841 - Social Work Research Methods (2.0 cr)  
SW 8842 - Advanced Social Work Evaluation (1.0 - 3.0 cr)  
SW 8843 - Social Work Program Evaluation (1.0 - 2.0 cr)  
SW 8851 - Social Welfare History and Historical Research Methods (3.0 cr)  
SW 8901 - Assessment and Treatment of Trauma (2.0 cr)  
SW 8902 - Social Work Supervision, Consultation, and Leadership (2.0 cr)



- VMED 5101 - Molecular and Cellular Basis of Nanoparticle Toxicity (3.0 cr)
- VMED 5165 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- VMED 5180 - Ecology of Infectious Disease (3.0 cr)
- VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)
- VMED 5915 - Essential Statistics for Life Sciences (3.0 cr)
- VMED 8134 - Ethical Conduct of Animal Research (3.0 cr)



### **Twin Cities Campus**

## **Public Health Administration and Policy M.P.H.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 42 to 44
- This program requires summer semesters for timely completion.
- Degree: Master of Public Health

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The public health administration and policy MPH is a 44-credit program that provides core knowledge about managing organizations and influencing policy to improve population health.

The curriculum emphasizes the skills necessary for population-focused management, policy development, and evidence-based public health. Graduates work in government agencies, nonprofits, health care systems, and for-profit organizations that seek to improve the health of populations.

A 42-credit executive public health administration and policy MPH, designed for working professionals, is available.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Additional Executive PHAP requirements:

at least 3 years removed from the completion of the undergraduate degree  
a minimum 3.00 undergraduate GPA  
employment or volunteer work in a field related to public health

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB



- Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 42 to 44 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Students complete an Integrated Learning Experience (ILE) in consultation with the advisor.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses must be taken A/F unless offered only S/N. Minimum grade of B- must be earned for required courses.

### Public Health Core Requirements (17 credits)

#### Required Coursework (9 credits)

A minimum grade of B- is required.

[PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

#### Biostatistics Requirement

Take a biostatistics course and the biostatistics programming course. A minimum grade of B- is required.

#### Biostatistics Course (3 - 4 credits)

[PUBH 6450](#) - Biostatistics I (4.0 cr)

or [PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

#### Biostatistics Programming Course (2 credits)

[PUBH 6755](#) - Planning and Budgeting for Public Health (2.0 cr)

#### Epidemiology (3 credits)

Take 1 of the following courses. A minimum grade of B- is required.

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

### Applied Practice Experience (2 credits)

Take the following course in consultation with the advisor:

[PUBH 7796](#) - Applied Practice Experience: Public Health Administration and Policy (2.0 cr)

### Integrative Learning Experience (2 credits)

Take 2 ILE credits in consultation with the advisor.

[PUBH 7794](#) - Integrative Learning Experience: Public Health Administration and Policy (2.0 cr)

### PHAP Core Requirements (12 credits)

A minimum grade of B- is required for the following courses:

[PUBH 6724](#) - The Health Care System and Public Health (3.0 cr)

[PUBH 6727](#) - Health Leadership and Effecting Change (2.0 cr)

[PUBH 6735](#) - Principles of Health Policy (3.0 cr)

[PUBH 6806](#) - Principles of Public Health Research (2.0 cr)

#### Seminar (2 credits)

Students take this course twice for a total of two credits.

[PUBH 7784](#) - Master's Project Seminar: PHAP and HSRP&A (1.0 cr)

### Electives (10 to 11 credits)

Take courses from the list below, or other coursework in consultation with the advisor.

[JOUR 5542](#) - Theory-based Health Message Design (3.0 cr)

[LAW 6036](#) - Reproductive Rights (3.0 cr)

[MILI 6421](#) - Healthcare Law: Strategic and Business Implications (2.0 cr)





MILI 6992 - Healthcare Delivery Innovations:Optimizing Cost and Quality (2.0 cr)  
MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)  
PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)  
PA 5451 - Immigration, Health and Public Policy (3.0 cr)  
PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)  
PUBH 6074 - Mass Communication and Public Health (3.0 cr)  
PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)  
PUBH 6107 - Excel and Access Skills in Public Health Settings (1.0 cr)  
PUBH 6108 - Foundations of Global Health (2.0 cr)  
PUBH 6131 - Working in Global Health (2.0 cr)  
PUBH 6135 - Job Search Strategies and Career Professional Development (1.0 cr)  
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)  
PUBH 6365 - Global Challenges in Infectious Disease Epidemiology (2.0 cr)  
PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)  
PUBH 6387 - Cancer Epidemiology (2.0 cr)  
PUBH 6420 - Introduction to SAS Programming (1.0 cr)  
PUBH 6470 - SAS Procedures and Data Analysis (3.0 cr)  
PUBH 6576 - Understanding Clinical Quality Using Administrative Data (2.0 cr)  
PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)  
PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)  
PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)  
PUBH 6702 - Integrative Leadership Seminar (3.0 cr)  
PUBH 6703 - Health Impact Assessment: A Tool to Promote Health Equity (1.5 cr)  
PUBH 6711 - Public Health Law (2.0 cr)  
PUBH 6713 - Global Health in a Local Context (3.0 cr)  
PUBH 6717 - Decision Analysis for Health Care (2.0 cr)  
PUBH 6730 - International Comparative Health Systems (2.0 cr)  
PUBH 6744 - State Health Policy and Politics (2.0 cr)  
PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)  
PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)  
PUBH 6804 - Mental Health Policy (2.0 cr)  
PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)  
PUBH 6810 - Survey Research Methods (3.0 cr)  
PUBH 6813 - Managing Electronic Health Information (2.0 cr)  
PUBH 6815 - Community-based Participatory Research (2.0 cr)  
PUBH 6832 - Economics of the Health Care System (3.0 cr)  
PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)  
PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)  
PUBH 6855 - Medical Sociology (3.0 cr)  
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)  
PUBH 6863 - Understanding Health Care Quality (2.0 cr)  
PUBH 7242 - War and Public Health (1.0 cr)  
PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)  
PUBH 7415 - Introduction to Clinical Trials (3.0 cr)  
PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)  
PUBH 8802 - Health Services Policy Analysis: Applications (2.0 cr)

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Executive Public Health Administration and Policy

This sub-plan is limited to students completing the program under Plan C.

The Executive Public Health Administration & Policy (E-PHAP) MPH program is tailored to working public and population health professionals currently in or seeking leadership roles in government agencies, nonprofits, health systems, and other organizations that aim to improve the health of populations.

The program is designed for early and mid-career professionals who have at least three years of professional experience and who are committed to managing organizations that improve public and population health.

The E-PHAP degree is a 42-credit program designed to be completed in 25 months. Students enrolled in the program will spend 17



days on campus where they will complete four intensive (7 credits total) in-person courses that include an online component. The remainder of the program is delivered in an online environment.

**Public Health Core Requirements (17 to 18 credits)**

Take the following courses. A minimum grade of B- must be earned for each course.

**Required Coursework (12 credits)**

- PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)
- PUBH 6102 - Issues in Environmental Health (2.0 cr)
- PUBH 6250 - Foundations of Public Health (2.0 cr)
- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
- PUBH 6741 - Ethics in Public Health: Professional Practice and Policy (1.0 cr)
- PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)

**Biostatistics Requirement**

Take a biostatistics course and the biostatistics programming course. A minimum grade of B- is required.

**Biostatistics Course (3 - 4 credits)**

- PUBH 6450 - Biostatistics I (4.0 cr)
- or PUBH 6414 - Biostatistical Literacy (3.0 cr)

**Biostatistics Programming Course (2 credits)**

- PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)

**Integrated Learning Experience (2 credits)**

Take 2 ILE credits in consultation with the advisor.

- PUBH 7794 - Integrative Learning Experience: Public Health Administration and Policy (2.0 cr)

**E-PHAP Core Courses (18 credits)**

Take the following courses. A minimum grade of B- must be earned for each course.

- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6735 - Principles of Health Policy (3.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 7710 - Setting Priorities and Framing Public Health Issues (2.0 cr)
- PUBH 7720 - Data to Drive Public Health (2.0 cr)
- PUBH 7730 - Public Health Laws, Rules, and Regulations (1.0 cr)
- PUBH 7740 - Leadership and Leading Change (2.0 cr)

**Applied Practice Experience (2 credits)**

Take 2 credits in consultation with the advisor.

- PUBH 7796 - Applied Practice Experience: Public Health Administration and Policy (2.0 cr)

**Electives**

Select electives in consultation with the advisor as needed to complete the 42-credit requirement.

- LAW 6036 - Reproductive Rights (3.0 cr)
- MILI 6421 - Healthcare Law: Strategic and Business Implications (2.0 cr)
- MILI 6992 - Healthcare Delivery Innovations: Optimizing Cost and Quality (2.0 cr)
- MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)
- PA 5451 - Immigration, Health and Public Policy (3.0 cr)
- PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)
- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6108 - Foundations of Global Health (2.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)
- PUBH 6135 - Job Search Strategies and Career Professional Development (1.0 cr)
- PUBH 6365 - Global Challenges in Infectious Disease Epidemiology (2.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6387 - Cancer Epidemiology (2.0 cr)
- PUBH 6576 - Understanding Clinical Quality Using Administrative Data (2.0 cr)
- PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6730 - International Comparative Health Systems (2.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 6863 - Understanding Health Care Quality (2.0 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7227 - Incident Management Systems: The Public Health Role (1.0 cr)
- PUBH 7235 - Surveillance of Zoonotic Pathogens in Animals (1.0 cr)
- PUBH 7242 - War and Public Health (1.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)



- [PUBH 7253](#) - Introduction to GIS (1.0 cr)
- [PUBH 7257](#) - Qualitative Data Analysis (1.0 cr)
- [PUBH 7262](#) - Globalization and Health (1.0 cr)
- [PUBH 7415](#) - Introduction to Clinical Trials (3.0 cr)
- [PUBH 7784](#) - Master's Project Seminar: PHAP and HSRP&A (1.0 cr)
- [PUBH 8802](#) - Health Services Policy Analysis: Applications (2.0 cr)



### **Twin Cities Campus**

## **Public Health Core Concepts Postbaccalaureate Certificate**

School of Public Health - Adm

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A316 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 15
- This program does not require summer semesters for timely completion.
- Degree: Public Health Core Concepts PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The certificate program offers students the opportunity to gain the expertise in population science that is increasingly valued in public health, health care, and human services settings. Students can apply the knowledge and skills related to understanding, assessing, and managing population health to enhance effectiveness in their current work and expand opportunities for their chosen career path.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH)

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Completed baccalaureate degree required. Strong writing skills, strong math and science grades, and related work experience preferred.

#### **Special Application Requirements:**

Applicants must submit to SOPHAS Express, a centralized online application service:

- Completed SOPHAS Express application and application fee, designating the University of Minnesota School of Public Health
- Personal statement describing the applicant's reason for applying, career goals, and how the certificate will help them achieve their goals
- One letter of recommendation
- Official transcripts will need to be sent directly to the School of Public Health.
- Resume or C.V.

For detailed application requirements and instructions visit [www.sph.umn.edu](http://www.sph.umn.edu).

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS



- Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

A minimum grade of B- is required for all courses taken.

### Required Coursework (15-16 credits)

Public Health Courses (9 credits)

[PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

### Epidemiology Course Options (3 credits)

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

### Biostatistics Course Options (3-4 credits)

[PUBH 6450](#) - Biostatistics I (4.0 cr)

or [PUBH 6414](#) - Biostatistical Literacy (3.0 cr)



### **Twin Cities Campus**

## **Public Health Food Protection Postbaccalaureate Certificate**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 14
- This program requires summer semesters for timely completion.
- Degree: Public Health Food Protection PBacc Certificate

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

NOTE: Applications are not being accepted at this time.

The Public Health Food Protection certificate is designed for professionals working in health or human services. It prepares public health workers and others to respond to incidents of bioterrorism, infectious disease outbreaks, and other emerging public health issues. Many students use the knowledge and skills gained to enhance opportunities in their current work or career path.

The curriculum can be completed by attending at least two sessions of the Public Health Institute, held in May and June every year.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH)

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

NOTE: Applications are not being accepted at this time.

#### **Special Application Requirements:**

Applicants must submit to SOPHAS Express, a centralized online application service:

- Completed SOPHAS Express application and application fee, designating the University of Minnesota School of Public Health
- Personal statement describing the applicant's reason for applying, career goals, and how the certificate will help them achieve their goals
- One letter of recommendation
- Unofficial transcripts of record from each college/university where a degree was earned. (If admitted, official transcripts will need to be sent directly to the School of Public Health.)
- Resume or C.V.

For detailed application instructions and requirements visit [www.sph.umn.edu](http://www.sph.umn.edu).

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS



- Total Score: 7
- MELAB
- Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Coursework

- [PUBH 7210](#) - Topics: Global Food Systems (0.5 cr)
- [PUBH 7213](#) - Applications of Microbiology to Food Systems Monitoring (1.0 cr)
- [PUBH 7214](#) - Principles of Risk Communication (1.0 cr)
- [PUBH 7215](#) - Food Safety: Risk Assessment and Risk Management (1.0 cr)
- [PUBH 7233](#) - Food System Defense: Vulnerabilities in the Food System (1.5 cr)
- [PUBH 6181](#) - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- [PUBH 7231](#) - Surveillance of Foodborne Diseases in Humans (1.0 cr)
- [PUBH 7200](#) - Topics: Public Health Practice (0.5 - 4.0 cr)
- [PUBH 6711](#) - Public Health Law (2.0 cr)
- [PUBH 6182](#) - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)

### Elective Courses

In consultation with academic advisor, students select minimum 5 elective credits.

The pre-approved Topics courses are:

- [PUBH 7200](#) The Politics of Policy, Turning Good Ideas into Better Health (1 cr)
- [PUBH 7200](#) Food Labeling and Nutrition and Law (1 cr)
- [PUBH 7200](#) Epidemiology and Ecology of Mycobacterial Diseases (1 cr)
- [PUBH 7200](#) Global Studies in Infectious Disease (1 cr)
- [PUBH 7200](#) Understanding the Emergence of Zoonotic Diseases (1 cr)
- [PUBH 7217](#) - Advances in Molecular Epidemiological Analysis (1.0 cr)
- or [PUBH 7232](#) - Surveillance of Foodborne Diseases in Animals and Plants (1.0 cr)
- or [PUBH 7230](#) - Topics in Infectious Disease (0.5 - 4.0 cr)
- or [PUBH 7231](#) - Surveillance of Foodborne Diseases in Humans (1.0 cr)
- or [PUBH 7200](#) - Topics: Public Health Practice (0.5 - 4.0 cr)



### **Twin Cities Campus**

## **Public Health Informatics M.P.H.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street SE, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636; fax: 612-624-4498)

Email: [sph-oasr@umn.edu](mailto:sph-oasr@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 43
- This program does not require summer semesters for timely completion.
- Courses are available both on campus and in a hybrid format where students attend classes remotely using WebEx or similar technology.
- Degree: Master of Public Health

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Information is key to effective public health administration. Surveillance systems provide information on infectious disease tracking, disease clusters, food-borne outbreaks, and injuries. Environmental monitoring systems provide information on health risks such as toxic chemicals or airborne pollutants. Registries contain information on vital statistics such as birth, death, and immunization. E-Public Health integrates information from electronic health records to use in improving population health.

Students pursuing the MPH in Public Health Informatics (MPH-PHI) learn how to manage public health information systems, including vital statistics systems, online analytical processing tools, immunization registries, population health surveillance, community health information networks, and more.

The MPH-PHI is offered both in-person and fully online. This program will prepare you to:

Understand the significance of the various public health information systems and how to leverage these systems to improve health of the public

Conceive, design, develop, implement, and use IT by applying informatics skills to population health

Manage information systems within an organization or network of organizations

Create state-of-the-art solutions at the intersection of informatics and global public health

### **Accreditation**

This program is accredited by CEPH (Council on Education for Public Health)

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

All application materials are submitted directly to SOPHAS:

Statement of purpose and objectives: Provide an essay describing your past education, experience, and current professional career objectives. You are encouraged to comment on any or all of the following: plans you have to use your education and training; the needs and/or challenges you perceive as important in your field of study; and any personal qualities, characteristics, and skills you believe will enable you to be successful in your chosen field of study.

Resume or CV

Official post-secondary transcripts from all US institutions attended (must be sent directly from the institutions to SOPHAS). This





includes previous study at the University of Minnesota.

Three letters of recommendation from persons qualified to assess your academic work; clinical, public health, or professional experiences; or leadership potential in public health.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 150
  - General Test - Quantitative Reasoning: 150
  - General Test - Analytical Writing: 3.5

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 43 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The purpose of the master's project is to enable students to demonstrate: familiarity with the tools of research and scholarship in the field of public health informatics; the ability to work independently; the ability to plan and carry out a systematic investigation related to a public health issue; and the ability to effectively present, in written and oral form, the results of their investigation.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

### Required Coursework

#### M.P.H. Core Coursework

Students must satisfy competency requirements in the six core areas of public health - administration, behavioral science, biostatistics, environmental health, epidemiology, and ethics.

Take 15 credits of MPH core courses from the following list:

#### Administration

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

#### Behavioral Science

[PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)

#### Biostatistics

[PUBH 6450](#) - Biostatistics I (4.0 cr)

#### Environmental Health

[PUBH 6101](#) - Environmental Health (2.0 cr)

or [PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

#### Ethics

[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

or [PUBH 6742](#) - Ethics in Public Health: Research and Policy (1.0 cr)

#### Epidemiology

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

#### Public Health Informatics Core Coursework

Take 21 credits of PHI core courses from the following list:

[HINF 5430](#) - Foundations of Health Informatics I (3.0 cr)



- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6876 *{Inactive}*(2.0 cr)
- PUBH 6877 - Public Health Systems Analysis and Design - Practicum (2.0 cr)
- PUBH 6880 - Introduction to Public Health Informatics (2.0 cr)
- PUBH 6881 - Advanced Public Health Informatics Applications (2.0 cr)
- PUBH 6878 - Public Health Systems Analysis and Development Practicum (2.0 cr)
- PUBH 6879 - Public Health Systems Analysis and Development Practicum (2.0 cr)
- PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- PUBH 6814 - Data and Information for Population Health Management (2.0 cr)

#### Elective Credits

Take at least 7 elective credits from the following list. Other graduate-level courses, including courses from outside the School of Public Health, can be taken with prior approval of the program director.

Students are strongly encouraged to take PUBH 6805, as most PHI-related work is related to projects.

Take 7 or more credit(s) from the following:

- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6705 - Community Health Assessment (3.0 cr)
- PUBH 6025 *{Inactive}*(2.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- NURS 7108 - Population Health Informatics (2.0 cr)
- HINF 5431 - Foundations of Health Informatics II (3.0 cr)
- HINF 5520 - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)
- HINF 5540 - Interprofessional Health Informatics (2.0 cr)
- NURS 5116 - Consumer Health Informatics (1.0 cr)

## Program Sub-plans

A sub-plan is not required for this program.

Students may complete the program with more than one sub-plan.

### Health Disparities Interdisciplinary Concentration Area

The Health Disparities Interdisciplinary Concentration (HDIC) addresses the unequal burden of health risks, morbidity, and mortality experienced by minority cultural and social groups in the US, as well as unequal quality of and access to health care. Achieving optimum health for all segments of society is a central goal of Healthy People 2020, and a concern in Minnesota as well. Despite Minnesota's ranking as one of the nation's healthiest states, Minnesota has some of the largest gaps among cultural and social groups in health indicators.

SPH graduate students must complete a formal program plan if they want the HDIC to appear on their transcripts. For more information, contact Carol Francis, interdisciplinary concentrations coordinator, at franc004@umn.edu or 612-624-6952.

### Public Health Policy Interdisciplinary Concentration Area

The School of Public Health's Public Health Policy Interdisciplinary Concentration (PHPIC) focuses on promoting the health of populations and groups through public and organizational policy. PHPIC is open to students pursuing an MPH, includes coursework that explores the way in which federal, state, local, and institutional entities affect the financing, structure, and delivery of public health and medical care. PHPIC coursework provides a better understanding of the health care system as a whole and prevention policy. The challenging curriculum helps MPH majors hone practical skills that are highly sought after in the public health and policy arenas. Students who pursue the concentration can choose courses that emphasize:

- Understanding community dynamics
- Developing advocacy skills for public health
- Analyzing legal and policy structures
- Evaluating and implementing policies and programs
- Influencing community health
- Motivating and educating stakeholders and decision-makers
- Using policy as prevention strategy

Eliminating health disparities through policy SPH graduate students must complete a formal program plan if they want the PHPIC to appear on their transcripts. For more information, contact Carol Francis, interdisciplinary concentrations coordinator, at franc004@umn.edu or 612-624-6952.



### **Twin Cities Campus**

## **Public Health Informatics Post-Baccalaureate Certificate**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819 Mayo Memorial Building, 420 Delaware Street SE, Minneapolis, MN 55455 (612-626-3500 or 1-800-774-8636; fax: 612-624-4498)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 13
- This program does not require summer semesters for timely completion.
- Degree: Public Health Informatics PostBaccalaureate Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

NOTE: Applications to the Public Health Informatics Certificate program are not being accepted at this time. For more information, please contact [sph-ask@umn.edu](mailto:sph-ask@umn.edu).

The certificate in public health informatics (Cert-PHI) is a 9-12 month program designed to prepare professionals for leadership positions that bridge information technology and public health.

Students who complete the certificate will be able to implement and manage public health information systems, including: vital statistics systems, online analytic processing tools that support decision-making, immunization registries, population health surveillance, community health information networks, and electronic public health data interchange.

This certificate is awarded upon successful completion of 12 credits. We expect students who complete the Cert-PHI to have expanded and supplemented their current domain knowledge in a way that opens up new corridors of discovery and employment for them.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Baccalaureate degree or higher

Other requirements to be completed before admission:

Applications to the Public Health Informatics Certificate program are not being accepted at this time. For more information, please contact [sph-ask@umn.edu](mailto:sph-ask@umn.edu).

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

In addition to the required courses specified below, Cert-PHI students are strongly encouraged to take the following course as most work in PHI involves projects:

PUBH 6805 - Project Management for Health Professionals (2.0 cr).

### Required Coursework

[HINF 5430](#) - Foundations of Health Informatics I (3.0 cr)

[PUBH 6813](#) - Managing Electronic Health Information (2.0 cr)

[PUBH 6814](#) - Data and Information for Population Health Management (2.0 cr)

[PUBH 6876](#) *{Inactive}*(2.0 cr)

[PUBH 6877](#) - Public Health Systems Analysis and Design - Practicum (2.0 cr)

[PUBH 6880](#) - Introduction to Public Health Informatics (2.0 cr)



### ***Twin Cities Campus***

## **Public Health Minor**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 14
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate minor in public health is designed to prepare professionals in health and other fields (e.g., law, business, architecture, urban planning, teaching and engineering, including dual-degree students) to understand how their professional activities impact the health of communities, and to work together across disciplines, organizations, and sectors on innovative strategies to improve population health.

## **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH)

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Admission to the public health graduate minor is contingent upon enrollment in a master's or doctoral degree-granting program at the University of Minnesota. Students enrolled in graduate programs within the School of Public Health are not eligible for this minor.

Consult with your advisor and the public health director of graduate studies regarding the option of a minor in public health.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Required courses must be taken A/F, and a minimum grade of B- must be earned.

The overall minimum GPA for coursework applied to the minor is 3.0.

#### **Required Coursework (8 credits)**

All students take 8 credits from the following:

##### **Required Course**

Take the following course:

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)



Take one of the following courses:

- PUBH 6414 - Biostatistical Literacy (3.0 cr)
- or PUBH 6450 - Biostatistics I (4.0 cr)

#### Epidemiology Course

Take one of the following courses:

- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
- or PUBH 6341 - Epidemiologic Methods I (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Masters

### Doctoral

#### Doctoral Electives (6 credits)

Select 6 credits, in consultation with the Public Health director of graduate studies, to complete the 14-credit requirement.

- PUBH 6034 - Evaluation (3.0 cr)
- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6108 - Foundations of Global Health (2.0 cr)
- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)
- PUBH 6132 - Air, Water, and Health (2.0 cr)
- PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6159 - Principles of Toxicology I (2.0 cr)
- PUBH 6160 - Principles of Toxicology II (3.0 cr)
- PUBH 6161 - Regulatory Toxicology (2.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6333 - Principles of Human Behavior I (2.0 cr)
- PUBH 6334 - Human Behavior II (2.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6348 - Writing Research Grants (2.0 cr)
- PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)
- PUBH 6370 - Social Epidemiology (2.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6387 - Cancer Epidemiology (2.0 cr)
- PUBH 6389 - Nutritional Epidemiology (2.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)
- PUBH 6636 - Qualitative Research Methods in Public Health Practice (2.0 cr)
- PUBH 6655 - Principles and Programs in Maternal and Child Health (2.0 cr)
- PUBH 6675 - Women's Health (2.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6735 - Principles of Health Policy (3.0 cr)
- PUBH 6744 - State Health Policy and Politics (2.0 cr)
- PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)



- PUBH 6804 - Mental Health Policy (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6863 - Understanding Health Care Quality (2.0 cr)
- PUBH 6864 - Conducting Health Outcomes Research (3.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)
- PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)
- PUBH 7405 - Biostatistics: Regression (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- PUBH 7450 - Survival Analysis (3.0 cr)
- PUBH 8160 - Advanced Toxicology (2.0 cr)
- PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)
- PUBH 8342 - Advanced Epidemiologic Methods: Applications (3.0 cr)
- PUBH 8801 - Health Services Policy Analysis: Theory (1.0 cr)
- PUBH 8802 - Health Services Policy Analysis: Applications (2.0 cr)
- PUBH 8811 - Research Methods in Health Care (3.0 cr)
- PUBH 8821 - Health Economics II (3.0 cr)



### ***Twin Cities Campus***

## **Public Health Nutrition M.P.H.**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 42 to 58
- This program requires summer semesters for timely completion.
- Degree: Master of Public Health

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The public health nutrition MPH program is designed for students who want graduate training in health promotion disease prevention, program development, and nutrition interventions. The programs faculty are internationally recognized for research in obesity prevention, child and adolescent nutrition, eating disorder prevention, nutrition epidemiology, and nutrition intervention. The public health nutrition MPH also offers a coordinated masters program (CMP) track, which provides additional didactic coursework and supervised practice components for registration eligibility and entry into dietetics practice. The MPH is offered on a full-and part-time basis; however, most of the courses are offered only during the day. The MPH/CMP track is available only as a full-time program.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH) & Commission on Accreditation for Dietetics Education.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

All applicants must have completed the following:

- one general biology course with lab;
- two general chemistry classes with labs;
- one organic chemistry course;
- one biochemistry course;
- one human nutrition course; and
- one social science course.

The application deadline is July 1 for fall admission. All courses must be completed before starting the program. Applicants with outstanding prerequisites must include how those courses will be completed prior to the program.

#### **Special Application Requirements:**

CMP applicants must also complete:

- one physiology course;
- one microbiology course with lab;
- one intro to nutrition course;
- one intro to food science course; and
- one food systems/service management course.





The application deadline for the CMP track is December 1. All courses must be completed before starting the program. Applicants with outstanding prerequisites must include how those courses will be completed prior to the program.

CMP applicants, upon admission to the MPH, undergo an additional email and phone interview process. Students admitted to the MPH but not the CMP track are not eligible to pursue the track at a later date.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 150
  - General Test - Quantitative Reasoning: 150
  - General Test - Analytical Writing: 3.5

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 42 to 58 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Students complete an Integrated Learning Experience (ILE) in consultation with the advisor.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken A/F unless offered only S/N. A minimum grade of B- must be earned for required courses.

4xxx-level coursework not accepted toward the degree, with the exception of courses required for students admitted to the MPH with non-nutrition/dietetics undergraduate degrees.

### Public Health Core Requirements (17 credits)

#### Foundations of Public Health Nutrition Leadership (2 credits)

Take the following course:

[PUBH 6901](#) - Foundations of Public Health Nutrition Leadership (2.0 cr)

#### Biostatistics (4 credits)

Select [PUBH 6450](#) (4 credits) or [PUBH 6414](#) (3 credits) plus one biostatistics programming course, in consultation with the advisor, to meet the 4-credit biostatistics requirement.

[PUBH 6450](#) - Biostatistics I (4.0 cr)

or [PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

#### Biostatistics Programming Course Options

Students who take [PUBH 6414](#) must select an additional course for at least one credit, in consultation with the advisor, from the following list:

[PUBH 6107](#) - Excel and Access Skills in Public Health Settings (1.0 cr)

[PUBH 6325](#) - Data Processing with PC-SAS (1.0 cr)

[PUBH 6420](#) - Introduction to SAS Programming (1.0 cr)

[PA 5929](#) - Data Visualization: Telling Stories with Numbers (2.0 cr)

[PUBH 6123](#) - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

#### Environmental Health (2 credits)

Take the following course:



[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

**Epidemiology (3 credits)**

Select one of the following courses in consultation with the advisor:

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

or [PUBH 6341](#) - Epidemiologic Methods I (3.0 cr)

**Ethics (1 credit)**

Take the following course:

[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

**Administration/Management (2 credits)**

Take the following course:

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

**Community Soc Intervention & Behavioral Health (3 credits)**

[PUBH 6914](#) - Community Nutrition Intervention (3.0 cr)

**Public Health Nutrition Core (4 credits)**

[PUBH 6915](#) - Nutrition Assessment (2.0 cr)

[PUBH 6933](#) - Nutrition and Chronic Diseases (2.0 cr)

**Lifespan Nutrition (4-5 credits)**

Select two courses from the following list in consultation with the advisor. CMP-track students with non-nutrition/dietetics undergraduate degrees must take [PUBH 6904](#) and [PUBH 6907](#).

[PUBH 6904](#) - Nutrition and Aging (2.0 cr)

[PUBH 6906](#) - Global Nutrition (2.0 cr)

[PUBH 6907](#) - Maternal, Infant, Child and Adolescent Nutrition (3.0 cr)

**Research Methods (4 credits)**

Select at least 4 credits from the following list, in consultation with the advisor:

[NURS 8171](#) - Qualitative Research Design and Methods (3.0 - 4.0 cr)

[PUBH 6034](#) - Evaluation (3.0 cr)

[PUBH 6035](#) - Evaluation II: Applications (3.0 cr)

[PUBH 6107](#) - Excel and Access Skills in Public Health Settings (1.0 cr)

[PUBH 6325](#) - Data Processing with PC-SAS (1.0 cr)

[PUBH 6342](#) - Epidemiologic Methods II (3.0 cr)

[PUBH 6389](#) - Nutritional Epidemiology (2.0 cr)

[PUBH 6420](#) - Introduction to SAS Programming (1.0 cr)

[PUBH 6451](#) - Biostatistics II (4.0 cr)

[PUBH 6636](#) - Qualitative Research Methods in Public Health Practice (2.0 cr)

[PUBH 6803](#) - Conducting a Systematic Literature Review (3.0 cr)

[PUBH 6806](#) - Principles of Public Health Research (2.0 cr)

[PUBH 6852](#) - Program Evaluation in Health and Mental Health Settings (2.0 cr)

[PUBH 7250](#) - Designing and Conducting Focus Group Interviews (1.0 cr)

[PA 5929](#) - Data Visualization: Telling Stories with Numbers (2.0 cr)

**Integrated Learning Experience (1 credit)**

Take 1 credit in consultation with the advisor.

[PUBH 7994](#) - Integrated Learning Experience: Public Health Nutrition (1.0 - 6.0 cr)

**Electives**

Select electives, in consultation with the advisor, as needed to meet minimum credit requirements.

[CSPH 5101](#) - Introduction to Integrative Healing Practices (3.0 cr)

[CSPH 5102](#) - Art of Healing: Self as Healer (1.0 cr)

[CSPH 5111](#) - Ways of Thinking about Health (2.0 cr)

[CSPH 5115](#) - Cultural Awareness, Knowledge and Health (3.0 cr)

[CSPH 5118](#) - Whole Person, Whole Community: The Reciprocity of Wellbeing (3.0 cr)

[CSPH 5215](#) - Forgiveness and Healing: A Journey Toward Wholeness (3.0 cr)

[CSPH 5303](#) - Pain Management and Evidence Based Complementary Health Approaches (3.0 cr)

[CSPH 5305](#) - Introduction to Integrative Mental Health (2.0 cr)

[CSPH 5431](#) - Functional Nutrition: An Expanded View of Nutrition, Chronic Disease, and Optimal Health (2.0 cr)

[CSPH 5701](#) - Fundamentals of Health Coaching I (4.0 cr)

[CSPH 5702](#) - Fundamentals of Health Coaching II (4.0 cr)

[CSPH 5703](#) - Advanced Health Coaching Practicum (3.0 cr)

[CSPH 5704](#) - Business of Health Coaching (2.0 cr)

[CSPH 5706](#) - Lifestyle Medicine (2.0 cr)

[CSPH 5707](#) - Coaching People with Clinical Conditions (2.0 cr)

[CSPH 5708](#) - Mind-Body Science and the Art of Transformation (1.0 cr)

[CSPH 5709](#) - Health and Wellbeing Group Coaching (2.0 cr)



CSPH 5713 - Health Coaching for Health Professionals (2.0 cr)  
CSPH 5805 - Wellbeing in the Workplace (3.0 cr)  
CSPH 5806 - Wellbeing and Resiliency for Health Professionals (1.0 cr)  
CSPH 5807 - Mindfulness in the Workplace: Pause, Practice, Perform (2.0 cr)  
CSPH 5905 - Food Matters: Cook Like Your Life Depends On It (1.0 cr)  
EPSY 5114 - Psychology of Student Learning (3.0 cr)  
EPSY 5247 - Qualitative Methods in Educational Psychology (3.0 cr)  
EPSY 5609 - Family-centered Services (3.0 cr)  
EPSY 8251 - Statistical Methods in Education I (3.0 cr)  
EPSY 8264 - Advanced Multiple Regression Analysis (3.0 cr)  
EPSY 8282 - Statistical Analysis of Longitudinal Data (3.0 cr)  
FSCN 4612W - Advanced Human Nutrition [WI] (4.0 cr)  
FSCN 4614W - Community Nutrition [SOCS, DSJ, WI] (3.0 cr)  
FSCN 4621 - Nutrition and Metabolism (4.0 cr)  
FSCN 4622 - Nutritional Toxicology, the basic science of diet-related toxicants (3.0 cr)  
FSCN 4665 - Medical Nutrition Therapy I (3.0 cr)  
FSCN 4666 - Medical Nutrition Therapy II (3.0 cr)  
FSCN 4732 - Food and Nutrition Management (3.0 cr)  
FSCN 5131 - Food Quality for Graduate Credit (3.0 cr)  
FSCN 5312 - Food Analysis (4.0 cr)  
FSCN 5601 - Management of Eating Disorders (3.0 cr)  
FSOS 5014 - Quantitative Family Research Methods I (3.0 cr)  
FSOS 5015 - Family Research Laboratory (1.0 cr)  
FSOS 5111 - Introduction to Family Therapy (3.0 cr)  
FSOS 5701 - Prevention Science: Principles and Practices (3.0 cr)  
FSOS 5937 - Parent-Child Interaction (3.0 cr)  
FSOS 5942 - Diverse Family Experiences (3.0 cr)  
FSOS 5944 - Curricular Design in Parent Education (3.0 cr)  
FSOS 5945 - Teaching and Learning in Parent Education (3.0 cr)  
FSOS 5946 - Assessment and Evaluation in Parent Education (3.0 cr)  
FSOS 8001 - Conceptual Frameworks in the Family (3.0 cr)  
FSOS 8002 - Advanced Family Conceptual Frameworks (3.0 cr)  
FSOS 8014 - Quantitative Family Research Methods II (3.0 cr)  
FSOS 8036 - Couple/Marriage and Family Therapy Research (3.0 cr)  
FSOS 8101 - Family Stress, Coping, and Adaptation (3.0 cr)  
HINF 5430 - Foundations of Health Informatics I (3.0 cr)  
HINF 5431 - Foundations of Health Informatics II (3.0 cr)  
HINF 5440 - Foundations of Translational Bioinformatics (3.0 cr)  
HINF 5450 - Foundations of Precision Medicine Informatics (3.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
HINF 5510 - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)  
HINF 5520 - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)  
HINF 5531 - Health Data Analytics and Data Science (3.0 cr)  
HINF 5610 - Foundations of Biomedical Natural Language Processing (3.0 cr)  
HINF 5620 - Data Visualization for the Health Sciences (3.0 cr)  
HINF 5630 - Clinical Data Mining (3.0 cr)  
HSEX 6001 - Foundations of Human Sexuality (3.0 cr)  
HSEX 6011 - Policy in Human Sexuality: Cutting Edge Analyses (3.0 cr)  
HSEX 6012 - Sexual Function and Dysfunction (3.0 cr)  
HSEX 6013 - Perspectives and Practices in Sexuality Education (3.0 cr)  
LAW 6036 - Reproductive Rights (3.0 cr)  
LAW 6046 - Human Trafficking (2.0 cr)  
LAW 6058 - Human Rights Advocacy (3.0 cr)  
LAW 6621 - Rights in Conflict: Citizenship and Human Rights (2.0 cr)  
LAW 6718 - Immigration and Criminal Law: Immigration Consequences of Crimes and Criminalizing Migration (2.0 cr)  
LAW 6827 - Women's International Human Rights (2.0 cr)  
LAW 6862 - Sexual Orientation, Gender Identity, and Human Rights (2.0 cr)  
NURS 5029 - Introduction to Nursing Interventions (3.0 cr)  
NURS 5031 - Human Response to Health and Illness: Adults and Elders (4.0 cr)  
NURS 5032 - Human Response to Health and Illness: Children and Childbearing Families (5.0 cr)  
NURS 5115 - Interprofessional Health Care Informatics (3.0 cr)  
NURS 5116 - Consumer Health Informatics (1.0 cr)  
NURS 5117 - Consumer Health Informatics Practicum (1.0 cr)  
NURS 5190 - Essentials of Holistic Health Assessment and Foundational Clinical (3.0 cr)  
NURS 5284 - Supporting Physiologic Labor and Childbirth for Nurses (2.0 cr)



NURS 5505 - Assessment and Support of Women in Labor (2.0 cr)  
NURS 6110 - Epidemiology in Nursing (2.0 cr)  
NURS 6213 - Reproductive Healthcare for Patients with Complex Conditions (2.0 cr)  
NURS 6305 - Reproductive and Sexual Health Care (3.0 cr)  
NURS 6600 - Health Systems and Care Models (3.0 cr)  
NURS 6895 - Adult Acute Care Holistic Health Assessment and Wellness (2.0 cr)  
NURS 6924 - Assessment and Interventions for Children and Youth With Special Health Care Needs (2.0 cr)  
NURS 7100 - Quality Improvement and Implementation Science in Health Care (3.0 cr)  
NURS 7108 - Population Health Informatics (2.0 cr)  
NURS 7209 - Integrative Nursing I (1.0 cr)  
NURS 7300 - Program Planning and Evaluation (3.0 cr)  
NURS 8134 - Interventions and Outcomes Research (3.0 cr)  
NURS 8171 - Qualitative Research Design and Methods (3.0 - 4.0 cr)  
NURS 8185 - Qualitative Data Analysis for Health Care Research (3.0 - 4.0 cr)  
NUTR 5624 - Nutrition and Genetics (2.0 cr)  
NUTR 5626 - Nutritional Physiology (3.0 cr)  
NUTR 5627 - Nutritional and Food Toxicology (3.0 cr)  
NUTR 8620 - Advances in Nutrition (2.0 cr)  
OLPD 5011 - Leading Organizational Change: Theory and Practice (3.0 cr)  
OLPD 5095 - Problems: Organizational Leadership, Policy, and Development (1.0 - 3.0 cr)  
OLPD 5096 - Internship: Organizational Leadership, Policy, and Development (1.0 - 9.0 cr)  
OLPD 5103 - Comparative Education (3.0 cr)  
OLPD 5104 - Strategies for International Development of Education Systems (3.0 cr)  
OLPD 5107 - Gender, Education, and International Development (3.0 cr)  
OLPD 5124 - Critical Issues in International Education and Educational Exchange (3.0 cr)  
OLPD 5132 - Intercultural Education and Training: Theory and Application (3.0 cr)  
OLPD 5201 - Strategies for Teaching Adults (3.0 cr)  
OLPD 5202 - Perspectives of Adult Learning and Development (3.0 cr)  
OLPD 5346 - Politics of Education (3.0 cr)  
OLPD 5501 - Principles and Methods of Evaluation (3.0 cr)  
OLPD 5502 - Theory and Models of Evaluation (3.0 cr)  
OLPD 5607 - Organization Development (3.0 cr)  
OLPD 5611 - Facilitation and Meeting Skills (1.0 cr)  
OLPD 5619 - Planning and Decision-Making Skills (1.0 cr)  
OLPD 5819 - Evaluating and Using Research in Organizations and Education (3.0 cr)  
OLPD 8502 - Program Evaluation Theory and Models: Qualitative and Quantitative Alternatives (3.0 cr)  
PA 5002 - Introduction to Policy Analysis (1.5 cr)  
PA 5003 - Introduction to Financial Analysis and Management (1.5 cr)  
PA 5004 - Introduction to Planning (3.0 cr)  
PA 5011 - Management of Organizations (3.0 cr)  
PA 5012 - The Politics of Public Affairs (3.0 cr)  
PA 5013 - Law and Urban Land Use (1.5 cr)  
PA 5021 - Microeconomics for Policy Analysis (3.0 cr)  
PA 5022 - Applications of Economics for Policy Analysis (1.5 - 3.0 cr)  
PA 5031 - Statistics for Public Affairs (4.0 cr)  
PA 5032 - Applied Regression (2.0 cr)  
PA 5033 - Multivariate Techniques (2.0 cr)  
PA 5041 - Qualitative Methods for Policy Analysts (4.0 cr)  
PA 5042 - Urban and Regional Economics (2.0 cr)  
PA 5043 - Economic and Demographic Data Analysis (2.0 cr)  
PA 5044 - Applied Regression, Accelerated (2.0 cr)  
PA 5051 - Public Affairs Leadership (2.0 cr)  
PA 5053 - Policy Analysis in Public Affairs (2.0 cr)  
PA 5054 - Program Design and Implementation Analysis (2.0 cr)  
PA 5055 - Qualitative Research Methods and Analysis (2.0 cr)  
PA 5056 - Quantitative Research Methods and Analysis (2.0 cr)  
PA 5081 - Working in Teams: Crossing Disciplines and Learning from Difference (0.5 cr)  
PA 5101 - Management and Governance of Nonprofit Organizations (3.0 cr)  
PA 5103 - Leadership and Change (1.5 - 3.0 cr)  
PA 5104 - Strategic Human Resource Management (3.0 cr)  
PA 5105 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)  
PA 5113 - State and Local Public Finance (3.0 cr)  
PA 5114 - Budget Analysis in Public and Nonprofit Orgs (1.5 cr)  
PA 5116 - Financing Public and Nonprofit Organizations (1.5 cr)  
PA 5122 - Law and Public Affairs (3.0 cr)



PA 5123 - Philanthropy in America: History, Practice, and Trends (1.5 - 3.0 cr)  
PA 5135 - Managing Conflict: Negotiation (3.0 cr)  
PA 5136 - Group Process Facilitation for Organizational and Public/Community Engagement (1.0 cr)  
PA 5137 - Project Management in the Public Arena (1.5 cr)  
PA 5145 - Civic Participation in Public Affairs (3.0 cr)  
PA 5151 - Organizational Perspectives on Global Development & Humanitarian Assistance (3.0 cr)  
PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)  
PA 5209 - Urban Planning and Health Equity (3.0 cr)  
PA 5211 - Land Use Planning (3.0 cr)  
PA 5212 - Managing Urban Growth and Change (3.0 cr)  
PA 5213 - Introduction to Site Planning (3.0 cr)  
PA 5216 - Digital Graphics for Planning and Public Policy Makers (1.0 cr)  
PA 5231 - Transit Planning and Management (3.0 cr)  
PA 5234 - Urban Transportation Planning and Policy (3.0 cr)  
PA 5242 - Environmental Planning, Policy, and Decision Making (3.0 cr)  
PA 5251 - Strategic Planning and Management (3.0 cr)  
PA 5261 - Housing Policy (3.0 cr)  
PA 5262 - Neighborhood Revitalization Theories and Strategies (3.0 cr)  
PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)  
PA 5281 - Immigrants, Urban Planning and Policymaking in the U.S. (3.0 cr)  
PA 5301 - Population Methods & Issues for the United States & Global South (3.0 cr)  
PA 5311 - Program Evaluation (3.0 cr)  
PA 5401 - Poverty, Inequality, and Public Policy (3.0 cr)  
PA 5405 - Public Policy Implementation (3.0 cr)  
PA 5413 - Early Childhood and Public Policy (1.5 - 3.0 cr)  
PA 5415 - Economics of Early Childhood Development (1.5 - 3.0 cr)  
PA 5421 - Racial Inequality and Public Policy (3.0 cr)  
PA 5426 - Community-Engaged Research and Policy with Marginalized Groups (3.0 cr)  
PA 5431 - Public Policies on Work and Pay (3.0 cr)  
PA 5451 - Immigration, Health and Public Policy (3.0 cr)  
PA 5521 - Development Planning and Policy Analysis (4.0 cr)  
PA 5561 - Gender and International Development (3.0 cr)  
PA 5601 - Global Survey of Gender and Public Policy (3.0 cr)  
PA 5711 - Science, Technology & Environmental Policy (3.0 cr)  
PA 5721 - Energy Systems and Policy (3.0 cr)  
PA 5723 - Water Policy (3.0 cr)  
PA 5724 - Climate Change Policy (3.0 cr)  
PA 5741 - Risk, Resilience and Decision Making (1.5 cr)  
PA 5801 - Global Public Policy (3.0 cr)  
PA 5805 - Global Economics (3.0 cr)  
PA 5813 - US Foreign Policy: Issues and Institutions (3.0 cr)  
PA 5814 - Global Diplomacy in a Time of Change (3.0 cr)  
PA 5823 - Managing Humanitarian and Refugee Crises: Challenges for Policymakers & Practitioners (1.0 cr)  
PA 5825 - Crisis Management in Foreign Affairs (1.5 cr)  
PA 5826 - National Security Policy (3.0 cr)  
PA 5885 - Human Rights Policy: Issues and Actors (3.0 cr)  
PA 5927 - Effective Grantwriting for Nonprofit Organizations (1.5 cr)  
PA 5928 - Data Management and Visualization with R (1.0 cr)  
PA 5929 - Data Visualization: Telling Stories with Numbers (2.0 cr)  
PA 5933 - Survey Methods: Designing Effective Questionnaires (2.0 cr)  
PREV 8001 - Prevention Science: Principles and Practices (3.0 cr)  
PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)  
PUBH 6004 - Global Health Capstone (1.0 cr)  
PUBH 6011 - Public Health Approaches to HIV/AIDS (3.0 cr)  
PUBH 6020 - Fundamentals of Social and Behavioral Science (2.0 cr)  
PUBH 6034 - Evaluation (3.0 cr)  
PUBH 6035 - Evaluation II: Applications (3.0 cr)  
PUBH 6045 - Skills for Policy Development (1.0 cr)  
PUBH 6049 - Legislative Advocacy Skills for Public Health (3.0 cr)  
PUBH 6050 - Community Health Promotion I: Integrating Theory, Evidence, and Context (3.0 cr)  
PUBH 6051 - Community Health Promotion II: Developing, Implementing, and Justifying Interventions (3.0 cr)  
PUBH 6055 - Social Inequalities in Health (2.0 cr)  
PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)  
PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)  
PUBH 6074 - Mass Communication and Public Health (3.0 cr)



- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6081 - Sex, Sexuality, and Sexual Health (2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6102 - Issues in Environmental Health (2.0 cr)
- PUBH 6107 - Excel and Access Skills in Public Health Settings (1.0 cr)
- PUBH 6108 - Foundations of Global Health (2.0 cr)
- PUBH 6116 - Environmental Law (1.0 cr)
- PUBH 6120 - Injury Prevention in the Workplace, Community, and Home (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)
- PUBH 6132 - Air, Water, and Health (2.0 cr)
- PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)
- PUBH 6135 - Job Search Strategies and Career Professional Development (1.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6159 - Principles of Toxicology I (2.0 cr)
- PUBH 6161 - Regulatory Toxicology (2.0 cr)
- PUBH 6162 - Biomarkers (2.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6173 - Exposure to Physical Agents (2.0 cr)
- PUBH 6175 - Environmental Measurements Laboratory (2.0 cr)
- PUBH 6177 - Nanotechnology Health and Safety (3.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)
- PUBH 6183 - Theory and Practice in Foodborne Disease Outbreak Detection, Investigation and Control (1.0 cr)
- PUBH 6184 - Field and laboratory methods in public health entomology (2.0 cr)
- PUBH 6192 - Measurement and Properties of Air Contaminants (2.0 cr)
- PUBH 6193 - Advanced Topics in Human Exposure Science (2.0 cr)
- PUBH 6241 - American Indian Public Health and Wellness, Health Policy, Law, Health Services Administration (2.0 cr)
- PUBH 6242 - Cultural Humility with American Indian Populations (2.0 cr)
- PUBH 6243 - American Indian Research, Evaluation and Collaborations (2.0 cr)
- PUBH 6250 - Foundations of Public Health (2.0 cr)
- PUBH 6261 - Human Centered Design for Public Health Leadership, Practice and Innovation (2.0 cr)
- PUBH 6301 - Fundamentals of Clinical Research (3.0 cr)
- PUBH 6303 - Clinical Research Project Seminar (2.0 cr)
- PUBH 6310 - Clinical Epidemiology 1 (1.0 cr)
- PUBH 6311 - Clinical Epidemiology II (1.0 cr)
- PUBH 6320 - Fundamentals of Epidemiology (3.0 cr)
- PUBH 6325 - Data Processing with PC-SAS (1.0 cr)
- PUBH 6333 - Principles of Human Behavior I (2.0 cr)
- PUBH 6341 - Epidemiologic Methods I (3.0 cr)
- PUBH 6342 - Epidemiologic Methods II (3.0 cr)
- PUBH 6343 - Epidemiologic Methods III (4.0 cr)
- PUBH 6344 - Completing the Integrated Learning Experience: Secondary Data Analysis (2.0 cr)
- PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)
- PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)
- PUBH 6365 - Global Challenges in Infectious Disease Epidemiology (2.0 cr)
- PUBH 6370 - Social Epidemiology (2.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6387 - Cancer Epidemiology (2.0 cr)
- PUBH 6389 - Nutritional Epidemiology (2.0 cr)
- PUBH 6396 - Applied Practice Experience Global Health (0.5 - 8.0 cr)
- PUBH 6414 - Biostatistical Literacy (3.0 cr)
- PUBH 6420 - Introduction to SAS Programming (1.0 cr)
- PUBH 6432 - Biostatistical Methods in Translational and Clinical Research (1.0 cr)
- PUBH 6450 - Biostatistics I (4.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)
- PUBH 6525 - Introduction to Population Health: A Health System (2.0 cr)
- PUBH 6535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 6542 - Management of Health Care Organizations (3.0 cr)



- PUBH 6544 - Principles of Problem Solving in Health Services Organizations (3.0 cr)
- PUBH 6553 - Health Care Management Ethics (1.0 cr)
- PUBH 6554 - Healthcare Strategy and Marketing (2.0 cr)
- PUBH 6555 - Topics in Health Economics (2.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6558 - Health Finance II (3.0 cr)
- PUBH 6560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 6562 - Information Technology in Health Care (2.0 cr)
- PUBH 6564 - Private Purchasers of Health Care: Roles of Employers and Health Plans in U.S. Health Care System (2.0 cr)
- PUBH 6565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 6570 - Healthcare Administration (1.0 - 4.0 cr)
- PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)
- PUBH 6576 - Understanding Clinical Quality Using Administrative Data (2.0 cr)
- PUBH 6577 - Advanced Problem Solving in Health Services Administration (2.0 cr)
- PUBH 6578 - Negotiation Strategies (2.0 cr)
- PUBH 6596 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)
- PUBH 6605 - Reproductive and Perinatal Health (2.0 cr)
- PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)
- PUBH 6607 - Adolescent Health: Issues, Programs, and Policies (2.0 cr)
- PUBH 6613 - Children and Youth With Special Health Care Needs (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6630 - Foundations of Maternal and Child Health Leadership (3.0 cr)
- PUBH 6636 - Qualitative Research Methods in Public Health Practice (2.0 cr)
- PUBH 6673 - Grant Writing for Public Health (1.0 cr)
- PUBH 6675 - Women's Health (2.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6713 - Global Health in a Local Context (3.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6730 - International Comparative Health Systems (2.0 cr)
- PUBH 6735 - Principles of Health Policy (3.0 cr)
- PUBH 6737 - Structural Racism and Health (2.0 cr)
- PUBH 6741 - Ethics in Public Health: Professional Practice and Policy (1.0 cr)
- PUBH 6742 - Ethics in Public Health: Research and Policy (1.0 cr)
- PUBH 6745 - Rural Health (2.0 cr)
- PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)
- PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 6772 - Health Disparities Capstone Seminar (1.0 cr)
- PUBH 6780 - Topics: Public Health Administration and Policy (1.0 - 3.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6813 - Managing Electronic Health Information (2.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)
- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)
- PUBH 6864 - Conducting Health Outcomes Research (3.0 cr)
- PUBH 6901 - Foundations of Public Health Nutrition Leadership (2.0 cr)
- PUBH 6904 - Nutrition and Aging (2.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)
- PUBH 6907 - Maternal, Infant, Child and Adolescent Nutrition (3.0 cr)
- PUBH 6914 - Community Nutrition Intervention (3.0 cr)
- PUBH 6915 - Nutrition Assessment (2.0 cr)
- PUBH 6933 - Nutrition and Chronic Diseases (2.0 cr)
- PUBH 6954 - Personal, Social and Environmental Influences on the Weight-Related Health of Pediatric Populations (2.0 cr)
- PUBH 6955 - Using Policy to Address the Weight-Related Health of Child and Adolescent Populations (1.0 cr)
- PUBH 6995 - Community Nutrition Practicum (6.0 - 7.0 cr)



- PUBH 6996 - Clinical Nutrition Practicum (7.0 cr)
- PUBH 7091 - Independent Study: Community Health Promotion (1.0 - 4.0 cr)
- PUBH 7193 - Directed Study: Environmental Health (1.0 - 4.0 cr)
- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7221 - Planning for Urgent Threats (1.0 cr)
- PUBH 7230 - Topics in Infectious Disease (0.5 - 4.0 cr)
- PUBH 7231 - Surveillance of Foodborne Diseases in Humans (1.0 cr)
- PUBH 7235 - Surveillance of Zoonotic Pathogens in Animals (1.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7253 - Introduction to GIS (1.0 cr)
- PUBH 7257 - Qualitative Data Analysis (1.0 cr)
- PUBH 7262 - Globalization and Health (1.0 cr)
- PUBH 7391 - Independent Study: Epidemiology (1.0 - 4.0 cr)
- PUBH 7392 - Readings in Epidemiology (1.0 - 4.0 cr)
- PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)
- PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)
- PUBH 7405 - Biostatistics: Regression (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 7415 - Introduction to Clinical Trials (3.0 cr)
- PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
- PUBH 7445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- PUBH 7450 - Survival Analysis (3.0 cr)
- PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)
- PUBH 7462 - Advanced Programming and Data Analysis in R (2.0 cr)
- PUBH 7465 - Biostatistics Consulting (3.0 cr)
- PUBH 7470 - Study Designs in Biomedical Research (3.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 7485 - Methods for Causal Inference (3.0 cr)
- PUBH 7534 - Marketing for Health Care Professionals (1.0 cr)
- PUBH 7535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 7536 - Health Finance I (3.0 cr)
- PUBH 7537 - Health Finance II (3.0 cr)
- PUBH 7542 - Quality Improvement and Patient Safety (2.0 cr)
- PUBH 7547 - Health Care Human Resource Management (2.0 cr)
- PUBH 7551 - Principles of Management in Health Services Organizations (2.0 cr)
- PUBH 7553 - Health Care Management Ethics (1.0 cr)
- PUBH 7554 - Health Care Strategy and Marketing (3.0 cr)
- PUBH 7555 - Topics in Health Economics (2.0 cr)
- PUBH 7556 - Health and Health Systems (2.0 cr)
- PUBH 7560 - Operations Research and Quality in Health Care (3.0 cr)
- PUBH 7562 - Information Technology in Health Care (2.0 cr)
- PUBH 7564 - Private Purchasers of Health Care (2.0 cr)
- PUBH 7565 - Innovation of Healthcare Services (2.0 cr)
- PUBH 7569 - Health Care Policy (1.0 cr)
- PUBH 7576 - Legal Considerations in Health Services Organizations (2.0 cr)
- PUBH 7590 - Gerontology for Healthcare Managers (1.0 cr)
- PUBH 7591 - Independent Study: Health Care Administration (1.0 - 4.0 cr)
- PUBH 7691 - Independent Study: Maternal and Child Health (1.0 - 4.0 cr)
- PUBH 7720 - Data to Drive Public Health (2.0 cr)
- PUBH 7730 - Public Health Laws, Rules, and Regulations (1.0 cr)
- PUBH 7791 - Independent Study: Public Health Administration and Policy (1.0 - 6.0 cr)
- PUBH 8120 - Occupational Health and Safety Research Seminar (1.0 cr)
- PUBH 8160 - Advanced Toxicology (2.0 cr)
- PUBH 8166 - Experiences in Toxicology Research (3.0 cr)
- PUBH 8194 - Directed Research: Environmental Health (1.0 - 6.0 cr)
- PUBH 8341 - Advanced Epidemiologic Methods: Concepts (3.0 cr)
- PUBH 8342 - Advanced Epidemiologic Methods: Applications (3.0 cr)
- PUBH 8344 - Advanced Epidemiologic Methods Workshop (1.0 cr)
- PUBH 8392 - Readings in Clinical Research (1.0 - 4.0 cr)
- PUBH 8393 - Directed Study: Clinical Research (1.0 - 4.0 cr)
- PUBH 8401 - Linear Models (4.0 cr)





- PUBH 8403 - Research Skills in Biostatistics (1.0 cr)
- PUBH 8432 - Probability Models for Biostatistics (3.0 cr)
- PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)
- PUBH 8446 - Advanced Statistical Genetics and Genomics (3.0 cr)
- PUBH 8475 - Statistical Learning and Data Mining (3.0 cr)
- PUBH 8482 - Sequential and Adaptive Methods for Clinical Trials (3.0 cr)
- PUBH 8485 - Methods for Causal Inference (3.0 cr)
- PUBH 8492 - Theories of Hierarchical and Other Richly Parametrized Linear Models (3.0 cr)
- PUBH 8804 - Advanced Quantitative Methods Seminar (3.0 cr)
- PUBH 8810 - Research Studies in Health Care (3.0 cr)
- PUBH 8811 - Research Methods in Health Care (3.0 cr)
- PUBH 8814 - Mixed Methods: Quantitative and Qualitative Strategies in Research (2.0 cr)
- PUBH 8816 - Implementation Science in Public Health (2.0 cr)
- PUBH 8821 - Health Economics II (3.0 cr)
- PUBH 8830 - Writing for Research (2.0 cr)
- PUBH 8831 - Writing for Research (2.0 cr)
- SW 5051 - Human Behavior and the Social Environment (2.0 cr)
- SW 5101 - Historical Origins and Contemporary Policies in Social Welfare (3.0 cr)
- SW 5562 - Global Social Work and Social Development (3.0 cr)
- SW 5904 - Facilitation and Conflict Management: Humanistic Approach (2.0 cr)
- SW 5906 - Advanced Ethical Decision Making (1.0 cr)
- SW 5912 - Grief and Loss in Social Work Practice (1.0 cr)
- SW 8151 - Social Work Methods: Practice With Individuals and Systems (2.0 cr)
- SW 8152 - Social Work Practice Methods: Families and Groups (2.0 cr)
- SW 8153 - Social Work Practice Methods: Macro Practice and Organizations (2.0 cr)
- SW 8251 - Social Work Practice in Health, Disabilities, and Aging (3.0 cr)
- SW 8262 - Empowerment Practice With Persons With Disabilities (3.0 cr)
- SW 8263 - Advanced Direct Practice and Community-Based Interventions in Gerontology (3.0 cr)
- SW 8351 - Assessment and Engagement with Families and Children (3.0 cr)
- SW 8352 - Intervention Methods with Families (3.0 cr)
- SW 8361 - Identification and Assessment of Family Violence (3.0 cr)
- SW 8363 - Social Work in Child Welfare (3.0 cr)
- SW 8451 - Assessment and Engagement in Clinical Social Work Practice (3.0 cr)
- SW 8452 - Core Concepts in Clinical Social Work Practice (3.0 cr)
- SW 8461 - Advanced Clinical Social Work Practice with Adults (3.0 cr)
- SW 8462 - Advanced Clinical Practice With Children and Adolescents (3.0 cr)
- SW 8463 - Social Work Practice With Severe and Persistent Mental Illness and Severe Emotional Disturbance (3.0 cr)
- SW 8551 - Advanced Community Practice: Assessment, Organizing, and Advocacy (3.0 cr)
- SW 8552 - Advanced Community Practice: Leadership, Planning, and Program Development (3.0 cr)
- SW 8563 - Advanced Policy Advocacy (3.0 cr)
- SW 8804 - Child Welfare Policy (3.0 cr)
- SW 8805 - Aging and Disability Policy (3.0 cr)
- SW 8806 - Health and Mental Health Policy (3.0 cr)
- SW 8807 - International and Comparative Social Welfare Policy (3.0 cr)
- SW 8821 - Social Work and Difference, Diversity and Privilege (2.0 cr)
- SW 8841 - Social Work Research Methods (2.0 cr)
- SW 8842 - Advanced Social Work Evaluation (1.0 - 3.0 cr)
- SW 8843 - Social Work Program Evaluation (1.0 - 2.0 cr)
- SW 8851 - Social Welfare History and Historical Research Methods (3.0 cr)
- SW 8901 - Assessment and Treatment of Trauma (2.0 cr)
- SW 8902 - Social Work Supervision, Consultation, and Leadership (2.0 cr)
- VMED 5101 - Molecular and Cellular Basis of Nanoparticle Toxicity (3.0 cr)
- VMED 5165 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- VMED 5180 - Ecology of Infectious Disease (3.0 cr)
- VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)
- VMED 5915 - Essential Statistics for Life Sciences (3.0 cr)
- VMED 8134 - Ethical Conduct of Animal Research (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Standard Track



Courses must be taken A/F unless offered only S/N. Minimum grade of B- must be earned for required courses.

**Applied Practice Experience (1-2 credits)**

Take 1-2 credits in consultation with the advisor.

[PUBH 7996](#) - Applied Practice Experience: Public Health Nutrition (1.0 - 5.0 cr)

**Standard-track students with non-nutrition/dietetics degrees**

**Required Courses (8 credits)**

Standard-track students must also complete the following 8-credit requirement if not taken previously in an undergraduate program:

[FSCN 4621](#) - Nutrition and Metabolism (4.0 cr)

[PUBH 6355](#) - Pathophysiology of Human Disease (4.0 cr)

**Coordinated Masters Program**

This sub-plan is optional and does not fulfill the sub-plan requirement for this program.

The Public Health Nutrition Coordinated Masters Program (CMP) track is a 24-month program that provides additional didactic coursework and supervised practice components for registration eligibility and entry into dietetics practice. Students complete 1,200 hours of supervised practice, utilizing sites within and outside Minnesota, throughout the program. CMP students must provide their own transportation during the course of the program as many sites are not accessible via public transportation. MPH/CMP-track graduates will be provided with an eligibility verification statement for the national registration examination for dietitians.

Courses must be taken A/F unless offered only S/N. Minimum grade of B- must be earned for required courses.

**Applied Practice Experience (22 credits)**

Take the following courses, in consultation with the advisor. PUBH 7991 and PUBH 7996 each must be taken for 4 credits.

[PUBH 6995](#) - Community Nutrition Practicum (6.0 - 7.0 cr)

[PUBH 6996](#) - Clinical Nutrition Practicum (7.0 cr)

[PUBH 7991](#) - Independent Study: Public Health Nutrition (1.0 - 4.0 cr)

[PUBH 7996](#) - Applied Practice Experience: Public Health Nutrition (1.0 - 5.0 cr)

**CMP-track students with non-nutrition/dietetics degrees**

**Required Courses (6 credits)**

CMP-track students with non-nutrition/dietetics undergraduate degrees must also complete the following 6-credit requirement:

[FSCN 4665](#) - Medical Nutrition Therapy I (3.0 cr)

[FSCN 4666](#) - Medical Nutrition Therapy II (3.0 cr)



### ***Twin Cities Campus***

## **Public Health Postbaccalaureate Certificate in Performance Improvement**

*School of Public Health - Adm*

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636, Fax: 612-624-4498)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program requires summer semesters for timely completion.
- Degree: Performance Improvement PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

NOTE: Applications to the Performance Improvement Certificate program are not being accepted at this time. For more information, please contact [sph-ask@umn.edu](mailto:sph-ask@umn.edu).

The public health certificate in performance improvement trains students to understand and apply quality improvement methods at both the systems and organizational level. The program will provide the tools needed in order to achieve and maintain high process performance.

The certificate provides participants with hands-on knowledge about how to improve processes in their respective organizations. By so doing, best practices will be diffused, and process performance will improve public health services.

This certificate addresses concerns voiced by the National Board of Public Health Examiners, the Public Health Accreditation Board, and the Council on Education for Public Health to provide more educational opportunities in performance improvement to working public health professionals.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH)

### **Program Delivery**

This program is available:

- completely online (all program coursework can be completed online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

NOTE: Applications to the Performance Improvement Certificate program are not being accepted at this time. For more information, please contact [sph-ask@umn.edu](mailto:sph-ask@umn.edu).

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Coursework

[PUBH 6765](#) - Continuous Quality Improvement: Methods and Techniques (3.0 cr)

PUBH 6780- Advanced Performance Improvement Methods in Public Health (2 cr)

PUBH 6780 - Public Health Process Improvement Project - Practicum (3 cr)

PUBH 6780 - Performance Management and Transformational Change (2 cr)

Students choose 2 elective credits with their advisor.



### **Twin Cities Campus**

## **Public Health Practice M.P.H.**

School of Public Health - Adm

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A316 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 42
- This program requires summer semesters for timely completion.
- Degree: Master of Public Health

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The public health practice MPH brings together the science and the art of public health, addressing public health as a broad social enterprise that seeks to extend the benefits of current knowledge in ways that will have the maximum impact on the health status of populations.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH)

### **Program Delivery**

This program is available:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

To be eligible for an MPH in public health practice, applicants for the Executive Program are required to have an advanced degree or have completed the Public Health Core Concepts Certificate Program; applicants for dual degrees programs are required to be admitted/enrolled in a DDS, DNP, DVM, JD, MD, MPP, MURP, PharmD program at the University of Minnesota.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan C:** Plan C requires 42 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.  
**Capstone Project:** Students complete 1 Integrated Learning Experience credit in consultation with the advisor.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses must be taken A/F unless offered only S/N. Minimum grade of B- must be earned for required courses.

### Public Health Core Requirements (12 credits)

Courses must be taken A/F, unless offered only S/N. A minimum grade of B- is required.

[PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)

[PUBH 6102](#) - Issues in Environmental Health (2.0 cr)

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

[PUBH 6320](#) - Fundamentals of Epidemiology (3.0 cr)

[PUBH 6741](#) - Ethics in Public Health: Professional Practice and Policy (1.0 cr)

[PUBH 6751](#) - Principles of Management in Health Services Organizations (2.0 cr)

### Biotatistics Requirement (4 credits)

Students select either PubH 6450 Biostatistics I or PubH 6414 Biostatistical Literacy plus a biostatistics programming course.

#### Biostatistics (4 credits)

Courses must be taken A/F, unless offered only S/N. A minimum grade of B- is required.

[PUBH 6450](#) - Biostatistics I (4.0 cr)

or [PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

#### Biostatistics Programming Course Options

[PUBH 6107](#) - Excel and Access Skills in Public Health Settings (1.0 cr)

[PUBH 6325](#) - Data Processing with PC-SAS (1.0 cr)

[PUBH 6420](#) - Introduction to SAS Programming (1.0 cr)

[PUBH 6470](#) - SAS Procedures and Data Analysis (3.0 cr)

[PUBH 6755](#) - Planning and Budgeting for Public Health (2.0 cr)

[PUBH 6813](#) - Managing Electronic Health Information (2.0 cr)

[PUBH 6845](#) - Using Demographic Data for Policy Analysis (3.0 cr)

[PUBH 7461](#) - Exploring and Visualizing Data in R (2.0 cr)

[PA 5929](#) - Data Visualization: Telling Stories with Numbers (2.0 cr)

[PUBH 6123](#) - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)

### Applied Practice Experience (1 credit)

Take at least one credit of the following in consultation with the advisor.

[PUBH 7296](#) - Applied Practice Experience: Public Health Practice (0.5 - 8.0 cr)

### Integrated Learning Experience (1 credit)

Take at least one credit of the following in consultation with the advisor.

[PUBH 7294](#) - Integrative Learning Experience: Public Health Practice (0.5 - 4.0 cr)

### Electives (24 credits)

Select elective courses in consultation with the advisor to complete the 42 credit minimum.

[COMM 5250](#) - Environmental Communication (3.0 cr)

[ENT 5920](#) - Special Lectures in Entomology (1.0 - 4.0 cr)

[MKTG 6090](#) - Marketing Topics (1.0 - 4.0 cr)

[PA 5101](#) - Management and Governance of Nonprofit Organizations (3.0 cr)

[PA 5108](#) - Board leadership development (1.0 cr)

[PA 5421](#) - Racial Inequality and Public Policy (3.0 cr)

[PA 5451](#) - Immigration, Health and Public Policy (3.0 cr)

[PA 5601](#) - Global Survey of Gender and Public Policy (3.0 cr)

[PA 5690](#) - Topics in Women, Gender and Public Policy (0.5 - 3.0 cr)

[PA 5801](#) - Global Public Policy (3.0 cr)

[PA 5929](#) - Data Visualization: Telling Stories with Numbers (2.0 cr)

[PUBH 5231](#) - Emergency Preparedness: A Public Health Perspective (2.0 cr)

[PUBH 6011](#) - Public Health Approaches to HIV/AIDS (3.0 cr)

[PUBH 6034](#) - Evaluation (3.0 cr)

[PUBH 6035](#) - Evaluation II: Applications (3.0 cr)

[PUBH 6049](#) - Legislative Advocacy Skills for Public Health (3.0 cr)



- PUBH 6055 - Social Inequalities in Health (2.0 cr)
- PUBH 6060 - Motivational Interviewing: Strategies to Effect Behavior Change (1.0 cr)
- PUBH 6066 - Building Communities, Increasing Health: Preparing for Community Health Work (2.0 cr)
- PUBH 6074 - Mass Communication and Public Health (3.0 cr)
- PUBH 6078 - Public Health Policy as a Prevention Strategy (2.0 cr)
- PUBH 6081 - Sex, Sexuality, and Sexual Health (2.0 cr)
- PUBH 6094 - Obesity and Eating Disorder Interventions (2.0 cr)
- PUBH 6108 - Foundations of Global Health (2.0 cr)
- PUBH 6115 - Worker Protection Law (1.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)
- PUBH 6130 - Occupational Medicine: Principles and Practice (2.0 cr)
- PUBH 6131 - Working in Global Health (2.0 cr)
- PUBH 6132 - Air, Water, and Health (2.0 cr)
- PUBH 6134 - Sustainable Development and Global Public Health (2.0 cr)
- PUBH 6140 - Occupational and Environmental Epidemiology (2.0 cr)
- PUBH 6150 - Interdisciplinary Evaluation of Occupational Health and Safety Field Problems (3.0 cr)
- PUBH 6151 - Occupational and Environmental Health Nursing Seminar (1.0 cr)
- PUBH 6154 - Climate Change and Global Health (3.0 cr)
- PUBH 6170 - Introduction to Occupational Health and Safety (3.0 cr)
- PUBH 6181 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)
- PUBH 6183 - Theory and Practice in Foodborne Disease Outbreak Detection, Investigation and Control (1.0 cr)
- PUBH 6190 - Environmental Chemistry (3.0 cr)
- PUBH 6325 - Data Processing with PC-SAS (1.0 cr)
- PUBH 6355 - Pathophysiology of Human Disease (4.0 cr)
- PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
- PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)
- PUBH 6386 - Cardiovascular Disease Epidemiology and Prevention (2.0 cr)
- PUBH 6387 - Cancer Epidemiology (2.0 cr)
- PUBH 6389 - Nutritional Epidemiology (2.0 cr)
- PUBH 6420 - Introduction to SAS Programming (1.0 cr)
- PUBH 6535 - Managerial Accounting for Health Services (3.0 cr)
- PUBH 6541 - Statistics for Health Management Decision Making (3.0 cr)
- PUBH 6556 - Health and Health Systems (3.0 cr)
- PUBH 6562 - Information Technology in Health Care (2.0 cr)
- PUBH 6568 - Interprofessional Teamwork in Health Care (2.0 cr)
- PUBH 6573 - The Nature of Clinical Care (2.0 cr)
- PUBH 6601 - Born a Girl: Global Women's Health (1.0 cr)
- PUBH 6606 - Children's Health: Life Course and Equity Perspectives (2.0 cr)
- PUBH 6607 - Adolescent Health: Issues, Programs, and Policies (2.0 cr)
- PUBH 6613 - Children and Youth With Special Health Care Needs (2.0 cr)
- PUBH 6627 - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)
- PUBH 6634 - Children and Families: Public Health Policy and Advocacy (2.0 cr)
- PUBH 6636 - Qualitative Research Methods in Public Health Practice (2.0 cr)
- PUBH 6655 - Principles and Programs in Maternal and Child Health (2.0 cr)
- PUBH 6673 - Grant Writing for Public Health (1.0 cr)
- PUBH 6675 - Women's Health (2.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 6717 - Decision Analysis for Health Care (2.0 cr)
- PUBH 6724 - The Health Care System and Public Health (3.0 cr)
- PUBH 6727 - Health Leadership and Effecting Change (2.0 cr)
- PUBH 6735 - Principles of Health Policy (3.0 cr)
- PUBH 6744 - State Health Policy and Politics (2.0 cr)
- PUBH 6755 - Planning and Budgeting for Public Health (2.0 cr)
- PUBH 6765 - Continuous Quality Improvement: Methods and Techniques (3.0 cr)
- PUBH 6803 - Conducting a Systematic Literature Review (3.0 cr)
- PUBH 6804 - Mental Health Policy (2.0 cr)
- PUBH 6805 - Introduction to Project Management for Health Professionals (2.0 cr)
- PUBH 6806 - Principles of Public Health Research (2.0 cr)
- PUBH 6809 - Advanced Methods in Health Decision Science (3.0 cr)
- PUBH 6810 - Survey Research Methods (3.0 cr)
- PUBH 6815 - Community-based Participatory Research (2.0 cr)
- PUBH 6832 - Economics of the Health Care System (3.0 cr)
- PUBH 6845 - Using Demographic Data for Policy Analysis (3.0 cr)



- PUBH 6852 - Program Evaluation in Health and Mental Health Settings (2.0 cr)
- PUBH 6855 - Medical Sociology (3.0 cr)
- PUBH 6863 - Understanding Health Care Quality (2.0 cr)
- PUBH 6904 - Nutrition and Aging (2.0 cr)
- PUBH 6905 *(Inactive)*(2.0 cr)
- PUBH 6906 - Global Nutrition (2.0 cr)
- PUBH 6907 - Maternal, Infant, Child and Adolescent Nutrition (3.0 cr)
- PUBH 6914 - Community Nutrition Intervention (3.0 cr)
- PUBH 6920 - Foundations of Interprofessional Professional Communication and Collaboration (1.0 cr)
- PUBH 6933 - Nutrition and Chronic Diseases (2.0 cr)
- PUBH 6954 - Personal, Social and Environmental Influences on the Weight-Related Health of Pediatric Populations (2.0 cr)
- PUBH 6955 - Using Policy to Address the Weight-Related Health of Child and Adolescent Populations (1.0 cr)
- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7227 - Incident Management Systems: The Public Health Role (1.0 cr)
- PUBH 7230 - Topics in Infectious Disease (0.5 - 4.0 cr)
- PUBH 7235 - Surveillance of Zoonotic Pathogens in Animals (1.0 cr)
- PUBH 7242 - War and Public Health (1.0 cr)
- PUBH 7250 - Designing and Conducting Focus Group Interviews (1.0 cr)
- PUBH 7257 - Qualitative Data Analysis (1.0 cr)
- PUBH 7262 - Globalization and Health (1.0 cr)
- PUBH 7415 - Introduction to Clinical Trials (3.0 cr)
- VMED 5881 - Food Production, Processing, and Supply Chain (1.0 cr)
- VMED 5998 - Leadership to Address Global Grand Challenges (1.5 cr)
- WRIT 5051 - Graduate Research Writing for International Students (3.0 cr)

**Joint- or Dual-degree Coursework:** Applicants to one of these joint/dual degree programs must be admitted/enrolled in the relevant advanced degree. MPP/MPH: 14 credits in common allowed. MURP/MPH: 14 credits in common allowed. JD/MPH: 14 credits in common allowed. DNP/MPH: 14 credits in common allowed. DDS/MPH: 14 credits in common allowed. MD/MPH: 14 credits in common allowed. DVM/MPH: 14 credits in common allowed. PharmD/MPH: 14 credits in common allowed. CMU/MPH: 14 credits in common allowed. Student may take a total of 14 credits in common among the academic programs.





### **Twin Cities Campus**

## **Public Health Preparedness, Response, and Recovery Postbaccalaureate Certificate**

School of Public Health - Adm

### **School of Public Health**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware Street, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636, Fax: 612-624-4498)

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program requires summer semesters for timely completion.
- Degree: Public Hlth Prepared/Response/Recovery PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Part of the Public Health Practice major, this certificate program helps to prepare public health workers and others to respond to incidents of bioterrorism, infectious disease outbreaks, and other emerging public health issues.

### **Accreditation**

This program is accredited by Council on Education for Public Health (CEPH)

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Applicants must hold a baccalaureate degree.

#### **Special Application Requirements:**

Applicants must submit to SOPHAS Express, a centralized online application service:

- Completed SOPHAS Express application and application fee, designating the University of Minnesota School of Public Health
- Personal statement describing the applicant's reason for applying, career goals, and how the certificate will help them achieve their goals
- One letter of recommendation
- Unofficial transcripts of record from each college/university where a degree was earned. (If admitted, official transcripts will need to be sent directly to the School of Public Health.)
- Resume or C.V.

For detailed application requirements and instructions visit [www.sph.umn.edu](http://www.sph.umn.edu).

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 100
  - Paper Based - Total Score: 600
- IELTS
  - Total Score: 7



- MELAB  
- Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Coursework

Take at least one course in each group below. Courses at the Public Health Institute are topical and will change from year to year. PUBH 7200 can meet the requirements of each group, depending on the topic. Please consult the program staff for appropriate courses.

#### Policy Development/Program Planning

Take 1 or more course(s) from the following:

- PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)
- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)

#### Analytical/Assessment Skills

Take 1 or more course(s) from the following:

- PUBH 7230 - Topics in Infectious Disease (0.5 - 4.0 cr)
- PUBH 7231 - Surveillance of Foodborne Diseases in Humans (1.0 cr)
- PUBH 7235 - Surveillance of Zoonotic Pathogens in Animals (1.0 cr)

#### Communications Skills

Take 1 or more course(s) from the following:

- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)

#### Cultural Competency Skills

Take 1 or more course(s) from the following:

- PUBH 7223 - Concepts of Disaster Behavioral Health (1.0 cr)
- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)

#### Community Dimensions of Practice Skills

Take 1 or more course(s) from the following:

- PUBH 7227 - Incident Management Systems: The Public Health Role (1.0 cr)
- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)

#### Leadership and Systems Thinking, Financial Planning and Management Skills

Take 1 or more course(s) from the following:

- PUBH 6711 - Public Health Law (2.0 cr)
- PUBH 7221 - Planning for Urgent Threats (1.0 cr)
- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)

#### Electives

Students select remaining credits from an approved list to complete the certificate's 12-credit minimum. Courses at the Public Health Institute are topical and will change from year to year. Please consult the program staff for appropriate courses.

Take 1 or more course(s) from the following:

- PUBH 7200 - Topics: Public Health Practice (0.5 - 4.0 cr)
- PUBH 7210 - Topics: Global Food Systems (0.5 cr)
- PUBH 7237 - Using Risk Analysis Tools: Estimating Food Safety on the Farm to Table Continuum (1.0 cr)
- PUBH 7253 - Introduction to GIS (1.0 cr)



### *Twin Cities Campus*

## Sexual Health Minor

School of Public Health - Adm

### School of Public Health

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Public Health, MMC 819, A395 Mayo Memorial Building, 420 Delaware St SE, Minneapolis, MN 55455 (612-626-3500 OR 1-800-774-8636).

Email: [sph-ask@umn.edu](mailto:sph-ask@umn.edu)

Website: <http://www.sph.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The sexual health minor is designed for students who want to specialize in sex, sexuality, reproductive health, and sexual health. By taking public health courses tailored specifically to address sexual health, students are better able to enter the professional world with the confidence and skills needed to handle complex questions and issues related to sexual and reproductive health.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Sexual Health director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Required coursework must be completed A-F with a minimum grade of B-.  
Minimum GPA is 3.00.

#### **Required Course**

Take the following course:

[PUBH 6081](#) - Sex, Sexuality, and Sexual Health (2.0 cr)

#### **Additional Coursework**

##### **Courses for SPH Majors**

Select at least one course from the following list:

[PUBH 6011](#) - Public Health Approaches to HIV/AIDS (3.0 cr)

[PUBH 6605](#) - Reproductive and Perinatal Health (2.0 cr)

[PUBH 6627](#) - Sexuality Education: Criteria, Curricula, and Controversy (1.0 cr)

[PUBH 6675](#) - Women's Health (2.0 cr)



or **Courses for non-SPH Majors**

Students pursuing a non-SPH graduate program must take at least one of the following courses, in consultation with the Sexual Health director of graduate studies:

[PUBH 6020](#) - Fundamentals of Social and Behavioral Science (2.0 cr)

[PUBH 6250](#) - Foundations of Public Health (2.0 cr)

**Electives**

Select electives in consultation with the Sexual Health director of graduate studies to meet the masters 6-credit or the doctoral 12-credit minimum. The minimum grade required for a course taken for an A-F grade is B-.

[AFRO 8554](#) - Seminar: Gender, Race, Nation, and Policy--Perspectives from Within the African Diaspora (3.0 cr)

[BTHX 8510](#) - Gender and the Politics of Health (3.0 cr)

[FSOS 4101](#) - Sexuality and Gender in Families and Close Relationships (3.0 cr)

[GWSS 4406](#) - Black Feminist Thought in the American and African Diasporas (3.0 cr)

[HSEX 6001](#) - Foundations of Human Sexuality (3.0 cr)

[HSEX 6011](#) - Policy in Human Sexuality: Cutting Edge Analyses (3.0 cr)

[LAW 6036](#) - Reproductive Rights (3.0 cr)

[LAW 6046](#) - Human Trafficking (2.0 cr)

[PA 5601](#) - Global Survey of Gender and Public Policy (3.0 cr)

[LAW 6827](#) - Women's International Human Rights (2.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

**Masters**

**Doctoral**



### **Twin Cities Campus**

## **Aerospace Engineering and Mechanics M.S.**

*Aerospace Engineering & Mechanics*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies, Department of Aerospace Engineering and Mechanics, University of Minnesota, 107 Akerman Hall, 110 Union Street S.E., Minneapolis, MN 55455 (612-625-8000; fax: 612-626-1558)

Email: [aem-dgs@umn.edu](mailto:aem-dgs@umn.edu)

Website: <https://cse.umn.edu/aem>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in Aerospace Engineering and Mechanics emphasizes engineering sciences that are basic to fluid mechanics, aerospace systems, and solid mechanics. Theoretical, analytical, experimental, and computational aspects of these fields are covered by the courses and research opportunities offered by the department.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

A four-year BS degree in an engineering, basic science, or mathematics program is required.

Other requirements to be completed before admission:

Admission depends primarily on the applicant's undergraduate record and letters of recommendation.

#### **Special Application Requirements:**

GRE scores are not required but are strongly recommended for students applying for graduate fellowships. In all cases, these test scores are taken into account if provided. Students are admitted fall semester only. Only under unusual circumstances are students allowed to begin their studies at another time during the academic year.

The application deadline is December 15.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 14 to 24 major credits and 6 to 16 credits outside the major. The final exam is oral.

**Plan C:** Plan C requires 14 to 24 major credits and 6 to 16 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

All plans require a minimum of 14 major credits, of which 12 must be at the 5xxx or 8xxx level.

No more than 8 credits in 4xxx-level courses and no more than 8 credits (6 for Plan A) taken as S/N are allowed.

Two semesters of seminar attendance are required.

### Required Courses (6 credits)

Select one 2-course sequence in fluids, solids, or dynamics.

#### Fluids

[AEM 8201](#) - Fluid Mechanics I (3.0 cr)

[AEM 8202](#) - Fluid Mechanics II (3.0 cr)

#### or Solids

[AEM 5501](#) - Continuum Mechanics (3.0 cr)

[AEM 5503](#) - Theory of Elasticity (3.0 cr)

#### or Dynamics

[AEM 5401](#) - Intermediate Dynamics (3.0 cr)

[AEM 8411](#) - Advanced Dynamics (3.0 cr)

### Additional Major Courses (8-18 credits)

Students select a minimum of 8 credits in consultation with advisor from the following to meet the required 14 credits in AEM courses.

Plan B and Plan C students may take up to 18 credits from the list. One credit of AEM 8000 may be applied to degree requirements.

[AEM 4305](#) - Spacecraft Attitude Dynamics and Control (3.0 cr)

[AEM 4321](#) - Automatic Control Systems (3.0 cr)

[AEM 5247](#) - Hypersonic Aerodynamics (3.0 cr)

[AEM 5253](#) - Computational Fluid Mechanics (3.0 cr)

[AEM 5321](#) - Modern Feedback Control (3.0 cr)

[AEM 5333](#) - Design-to-Flight: Small Uninhabited Aerial Vehicles (3.0 cr)

[AEM 5401](#) - Intermediate Dynamics (3.0 cr)

[AEM 5451](#) - Optimal Estimation (3.0 cr)

[AEM 5501](#) - Continuum Mechanics (3.0 cr)

[AEM 5503](#) - Theory of Elasticity (3.0 cr)

[AEM 5581](#) - Mechanics of Solids (3.0 cr)

[AEM 5651](#) - Aeroelasticity (3.0 cr)

[AEM 8000](#) - Seminar: Aerospace Engineering and Mechanics (1.0 cr)

[AEM 8201](#) - Fluid Mechanics I (3.0 cr)

[AEM 8202](#) - Fluid Mechanics II (3.0 cr)

[AEM 8203](#) - Fluid Mechanics III (3.0 cr)

[AEM 8207](#) - Hydrodynamic Stability (3.0 cr)

[AEM 8211](#) - Theory of Turbulence I (3.0 cr)

[AEM 8212](#) - Theory of Turbulence II (3.0 cr)

[AEM 8213](#) - Turbulent Shear Flows (3.0 cr)

[AEM 8221](#) - Rheological Fluid Mechanics (3.0 cr)

[AEM 8231](#) - Molecular Gas Dynamics (3.0 cr)

[AEM 8232](#) - Physical Gas Dynamics and Molecular Simulation (3.0 cr)

[AEM 8241](#) - Perturbation Methods in Fluid Mechanics (3.0 cr)

[AEM 8251](#) - Finite-Volume Methods in Computational Fluid Dynamics (3.0 cr)

[AEM 8253](#) - Computational Methods in Fluid Mechanics (3.0 cr)

[AEM 8261](#) - Nonlinear Waves in Mechanics (3.0 cr)

[AEM 8271](#) - Experimental Methods in Fluid Mechanics (3.0 cr)



AEM 8400 - Seminar: Aerospace Systems (1.0 cr)  
AEM 8411 - Advanced Dynamics (3.0 cr)  
AEM 8421 - Robust Multivariable Control Design (3.0 cr)  
AEM 8423 - Convex Optimization Methods in Control (3.0 cr)  
AEM 8426 - Optimization and System Sciences (3.0 cr)  
AEM 8442 - Aerospace Positioning, Navigation and Timing (3.0 cr)  
AEM 8451 - System Identification: Theory and Applications (3.0 cr)  
AEM 8500 - Research Seminar in Mechanics of Materials (1.0 cr)  
AEM 8523 - Elastodynamics (3.0 cr)  
AEM 8525 - Elastic Stability of Materials (3.0 cr)  
AEM 8531 - Fracture Mechanics (3.0 cr)  
AEM 8533 - Theory of Plasticity (3.0 cr)  
AEM 8541 - Mechanics of Crystalline Solids (3.0 cr)  
AEM 8551 - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)

#### Outside Courses (6-16 credits)

Students take a minimum of 6 credits from the following list. Plan B and Plan C students may take as many as 16 credits. Consult with advisor for course selection or additional course options.

BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)  
CEGE 8521 - The Atmospheric Boundary Layer (4.0 cr)  
CHEM 8541 - Dynamics (4.0 cr)  
CHEM 8565 - Chemical Reaction Dynamics (2.0 cr)  
CSCI 4041 - Algorithms and Data Structures (4.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5512 - Artificial Intelligence II (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)  
CSCI 8314 - Sparse Matrix Computations (3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 8215 - Nonlinear Systems (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
MATH 4242 - Applied Linear Algebra (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8402 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8431 - Mathematical Fluid Mechanics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8445 - Numerical Analysis of Differential Equations (3.0 cr)  
MATH 8446 - Numerical Analysis of Differential Equations (3.0 cr)  
MATH 8601 - Real Analysis (3.0 cr)  
ME 8285 - Advanced Control System Design, with Applications to Smart Vehicles (3.0 cr)  
ME 8361 - Molecular Gas Dynamics (3.0 cr)  
ME 8446 - Advanced Combustion (3.0 cr)

#### Plan Options

##### Plan A (10 credits)

Take 10 thesis credits

AEM 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### Plan B (3 credits)

Take 3 credits of AEM 8880 and complete a final project. The 3 credits in AEM 8880 may be counted toward the required 14 credits in AEM courses.

AEM 8880 - Plan B Project (1.0 - 3.0 cr)



-OR-

**Plan C**

Plan C students do not have additional requirements.





### **Twin Cities Campus**

## **Aerospace Engineering and Mechanics Minor**

*Aerospace Engineering & Mechanics*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies, Department of Aerospace Engineering and Mechanics, University of Minnesota, 107 Akerman Hall, 110 Union Street S.E., Minneapolis, MN 55455 (612-625-8000; fax: 612-626-1558)

Email: [aem-dgs@umn.edu](mailto:aem-dgs@umn.edu)

Website: <https://cse.umn.edu/aem>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program emphasizes engineering sciences that are basic to fluid mechanics, aerospace systems, and solid mechanics. Theoretical, analytical, experimental, and computational aspects of these fields are covered by the courses and research opportunities offered by the department.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken under the AEM course designator to be counted towards a minor.

Courses must be taken on the A/F grade basis, unless only offered S/N.

The minimum cumulative GPA for the minor is 3.00.

#### **Required Courses (6 credits)**

All students take one course sequence from one of the following research areas for a minimum of 6 credits.

##### **Fluids**

[AEM 8201](#) - Fluid Mechanics I (3.0 cr)

[AEM 8202](#) - Fluid Mechanics II (3.0 cr)

##### **or Solids**

[AEM 5501](#) - Continuum Mechanics (3.0 cr)

[AEM 5503](#) - Theory of Elasticity (3.0 cr)

##### **or Dynamics**

[AEM 5401](#) - Intermediate Dynamics (3.0 cr)

[AEM 8411](#) - Advanced Dynamics (3.0 cr)

##### **or Controls**

[AEM 5321](#) - Modern Feedback Control (3.0 cr)

[AEM 5451](#) - Optimal Estimation (3.0 cr)

[AEM 8421](#) - Robust Multivariable Control Design (3.0 cr)



or **Computational Fluid Dynamics**

[AEM 5253](#) - Computational Fluid Mechanics (3.0 cr)

[AEM 8253](#) - Computational Methods in Fluid Mechanics (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Masters

### Doctoral

#### Electives (6 credits)

Doctoral students select a minimum of 6 additional credits to meet the 12-credit minimum. Choose from the following list or consult with the director of graduate studies for further options.

[AEM 5247](#) - Hypersonic Aerodynamics (3.0 cr)

[AEM 5253](#) - Computational Fluid Mechanics (3.0 cr)

[AEM 5321](#) - Modern Feedback Control (3.0 cr)

[AEM 5333](#) - Design-to-Flight: Small Uninhabited Aerial Vehicles (3.0 cr)

[AEM 5401](#) - Intermediate Dynamics (3.0 cr)

[AEM 5451](#) - Optimal Estimation (3.0 cr)

[AEM 5501](#) - Continuum Mechanics (3.0 cr)

[AEM 5503](#) - Theory of Elasticity (3.0 cr)

[AEM 5581](#) - Mechanics of Solids (3.0 cr)

[AEM 5651](#) - Aeroelasticity (3.0 cr)

[AEM 8201](#) - Fluid Mechanics I (3.0 cr)

[AEM 8202](#) - Fluid Mechanics II (3.0 cr)

[AEM 8203](#) - Fluid Mechanics III (3.0 cr)

[AEM 8207](#) - Hydrodynamic Stability (3.0 cr)

[AEM 8211](#) - Theory of Turbulence I (3.0 cr)

[AEM 8212](#) - Theory of Turbulence II (3.0 cr)

[AEM 8213](#) - Turbulent Shear Flows (3.0 cr)

[AEM 8221](#) - Rheological Fluid Mechanics (3.0 cr)

[AEM 8231](#) - Molecular Gas Dynamics (3.0 cr)

[AEM 8232](#) - Physical Gas Dynamics and Molecular Simulation (3.0 cr)

[AEM 8241](#) - Perturbation Methods in Fluid Mechanics (3.0 cr)

[AEM 8251](#) - Finite-Volume Methods in Computational Fluid Dynamics (3.0 cr)

[AEM 8253](#) - Computational Methods in Fluid Mechanics (3.0 cr)

[AEM 8261](#) - Nonlinear Waves in Mechanics (3.0 cr)

[AEM 8271](#) - Experimental Methods in Fluid Mechanics (3.0 cr)

[AEM 8411](#) - Advanced Dynamics (3.0 cr)

[AEM 8421](#) - Robust Multivariable Control Design (3.0 cr)

[AEM 8423](#) - Convex Optimization Methods in Control (3.0 cr)

[AEM 8426](#) - Optimization and System Sciences (3.0 cr)

[AEM 8442](#) - Aerospace Positioning, Navigation and Timing (3.0 cr)

[AEM 8451](#) - System Identification: Theory and Applications (3.0 cr)

[AEM 8523](#) - Elastodynamics (3.0 cr)

[AEM 8525](#) - Elastic Stability of Materials (3.0 cr)

[AEM 8531](#) - Fracture Mechanics (3.0 cr)

[AEM 8533](#) - Theory of Plasticity (3.0 cr)

[AEM 8541](#) - Mechanics of Crystalline Solids (3.0 cr)

[AEM 8551](#) - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)



### **Twin Cities Campus**

## **Aerospace Engineering and Mechanics Ph.D.**

*Aerospace Engineering & Mechanics*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies, Department of Aerospace Engineering and Mechanics, University of Minnesota, 107 Akerman Hall, 110 Union Street S.E., Minneapolis, MN 55455 (612-625-8000; fax: 612-626-1558)

Email: [aem-dgs@umn.edu](mailto:aem-dgs@umn.edu)

Website: <https://cse.umn.edu/aem>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 66
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Aerospace Engineering and Mechanics offers a PhD degree program which emphasizes engineering sciences that are basic to fluid mechanics, aerospace systems, and solid mechanics. Theoretical, analytical, experimental, and computational aspects of these fields are covered by the courses and research opportunities offered by the department.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

A four-year BS degree in an engineering, basic science, or mathematics program is required.

Other requirements to be completed before admission:

Admission depends primarily on the applicant's undergraduate record, personal statement, and letters of recommendation.

#### **Special Application Requirements:**

GRE scores are not required but are strongly recommended for students applying for graduate fellowships. In all cases, these test scores are taken into account if provided. Students are admitted fall semester only. Only under unusual circumstances are students allowed to begin their studies at another time during the academic year.

The application deadline is December 15.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

12 to 30 credits are required in the major.  
12 to 30 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

No more than 8 credits in 4xxx-level courses and no more than 13 credits taken as S/N are allowed.

The program requires 42 course credits which must include a minimum of 12 credits in AEM courses at the 5xxx or 8xxx level.

Four semesters of seminar attendance are required.

### Required Courses (6 credits)

Select one 2-course sequence in fluids, solids, or dynamics

#### Fluids

[AEM 8201](#) - Fluid Mechanics I (3.0 cr)

[AEM 8202](#) - Fluid Mechanics II (3.0 cr)

#### or Solids

[AEM 5501](#) - Continuum Mechanics (3.0 cr)

[AEM 5503](#) - Theory of Elasticity (3.0 cr)

#### or Dynamics

[AEM 5401](#) - Intermediate Dynamics (3.0 cr)

[AEM 8411](#) - Advanced Dynamics (3.0 cr)

### Additional Major Courses (6-24 credits)

In consultation with advisor, select a minimum of 6 credits from the following to meet the required 12 credits in AEM courses. Students may take up to 24 credits from the list. One credit of AEM 8000 may be applied to degree requirements.

[AEM 4305](#) - Spacecraft Attitude Dynamics and Control (3.0 cr)

[AEM 4321](#) - Automatic Control Systems (3.0 cr)

[AEM 5247](#) - Hypersonic Aerodynamics (3.0 cr)

[AEM 5253](#) - Computational Fluid Mechanics (3.0 cr)

[AEM 5321](#) - Modern Feedback Control (3.0 cr)

[AEM 5333](#) - Design-to-Flight: Small Uninhabited Aerial Vehicles (3.0 cr)

[AEM 5401](#) - Intermediate Dynamics (3.0 cr)

[AEM 5451](#) - Optimal Estimation (3.0 cr)

[AEM 5501](#) - Continuum Mechanics (3.0 cr)

[AEM 5503](#) - Theory of Elasticity (3.0 cr)

[AEM 5581](#) - Mechanics of Solids (3.0 cr)

[AEM 5651](#) - Aeroelasticity (3.0 cr)

[AEM 8000](#) - Seminar: Aerospace Engineering and Mechanics (1.0 cr)

[AEM 8201](#) - Fluid Mechanics I (3.0 cr)

[AEM 8202](#) - Fluid Mechanics II (3.0 cr)

[AEM 8203](#) - Fluid Mechanics III (3.0 cr)

[AEM 8207](#) - Hydrodynamic Stability (3.0 cr)

[AEM 8211](#) - Theory of Turbulence I (3.0 cr)

[AEM 8212](#) - Theory of Turbulence II (3.0 cr)

[AEM 8213](#) - Turbulent Shear Flows (3.0 cr)

[AEM 8221](#) - Rheological Fluid Mechanics (3.0 cr)

[AEM 8231](#) - Molecular Gas Dynamics (3.0 cr)

[AEM 8232](#) - Physical Gas Dynamics and Molecular Simulation (3.0 cr)

[AEM 8241](#) - Perturbation Methods in Fluid Mechanics (3.0 cr)

[AEM 8251](#) - Finite-Volume Methods in Computational Fluid Dynamics (3.0 cr)

[AEM 8253](#) - Computational Methods in Fluid Mechanics (3.0 cr)

[AEM 8261](#) - Nonlinear Waves in Mechanics (3.0 cr)

[AEM 8271](#) - Experimental Methods in Fluid Mechanics (3.0 cr)

[AEM 8400](#) - Seminar: Aerospace Systems (1.0 cr)

[AEM 8411](#) - Advanced Dynamics (3.0 cr)

[AEM 8421](#) - Robust Multivariable Control Design (3.0 cr)

[AEM 8423](#) - Convex Optimization Methods in Control (3.0 cr)



AEM 8426 - Optimization and System Sciences (3.0 cr)  
AEM 8442 - Aerospace Positioning, Navigation and Timing (3.0 cr)  
AEM 8451 - System Identification: Theory and Applications (3.0 cr)  
AEM 8500 - Research Seminar in Mechanics of Materials (1.0 cr)  
AEM 8523 - Elastodynamics (3.0 cr)  
AEM 8525 - Elastic Stability of Materials (3.0 cr)  
AEM 8531 - Fracture Mechanics (3.0 cr)  
AEM 8533 - Theory of Plasticity (3.0 cr)  
AEM 8541 - Mechanics of Crystalline Solids (3.0 cr)  
AEM 8551 - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)

#### Outside Courses (12-30 credits)

Select between 12 and 30 credits from the list. Consult with the advisor for course selection or additional course options.

BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)  
CEGE 8521 - The Atmospheric Boundary Layer (4.0 cr)  
CHEM 8541 - Dynamics (4.0 cr)  
CHEM 8565 - Chemical Reaction Dynamics (2.0 cr)  
CSCI 4041 - Algorithms and Data Structures (4.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5512 - Artificial Intelligence II (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)  
CSCI 8314 - Sparse Matrix Computations (3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 8215 - Nonlinear Systems (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
MATH 4242 - Applied Linear Algebra (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8402 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8431 - Mathematical Fluid Mechanics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8445 - Numerical Analysis of Differential Equations (3.0 cr)  
MATH 8446 - Numerical Analysis of Differential Equations (3.0 cr)  
MATH 8601 - Real Analysis (3.0 cr)  
ME 8285 - Advanced Control System Design, with Applications to Smart Vehicles (3.0 cr)  
ME 8361 - Molecular Gas Dynamics (3.0 cr)  
ME 8446 - Advanced Combustion (3.0 cr)

#### Thesis Credits (24 credits)

Take 24 credits after passing preliminary oral exam.

AEM 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Astrophysics M.S.**

*Astrophysics, Minnesota Institute for*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Minnesota Institute for Astrophysics, 116 Church Street S.E., Minneapolis, MN 55455 (612-624-4811; fax: 612-626-2029)

Email: [MIfA@umn.edu](mailto:MIfA@umn.edu)

Website: <http://www.astro.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Minnesota Institute for Astrophysics does not admit directly into the master's program. The information here is for current graduate students who choose not to seek a Ph.D.

Astrophysics is the study of the universe and its constituent parts. The Minnesota Institute for Astrophysics conducts research in observational, theoretical, and computational astrophysics, as well as instrument development. The main research areas include minor planetary bodies, solar system properties, dynamics of normal and active galaxies, stellar evolution, interaction of stars with their environments, the interstellar medium, astrophysical magnetohydrodynamics, and galactic and cosmological structure. Observational research includes activities that cover X-ray, ultraviolet, optical, infrared, and radio wavelengths. Extensive research programs in space physics, nucleosynthesis, and the elementary particle-cosmology interface are also carried out in interdisciplinary connections with the graduate program in physics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Students are not admitted directly into the master's program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 14 to 24 major credits and 6 to 16 credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

#### **Major Courses (14-24 credits)**

In consultation with adviser, Plan A students select a minimum of 14 credits and Plan B students select 14-24 credits. All students must complete PHYS 5011.



AST 4001 - Astrophysics I (4.0 cr)  
AST 4002 - Astrophysics II (4.0 cr)  
AST 4031 - Interpretation and Analysis of Astrophysical Data (4.0 cr)  
AST 4041 - Computational Methods in the Physical Sciences (4.0 cr)  
AST 5012 - The Interstellar Medium (4.0 cr)  
AST 5022 - Relativity, Cosmology, and the Universe (4.0 cr)  
AST 5201 - Methods of Experimental Astrophysics (4.0 cr)  
AST 8001 - Radiative Processes in Astrophysics (4.0 cr)  
AST 8011 - High Energy Astrophysics (4.0 cr)  
AST 8031 - Astrophysical Fluid Dynamics (4.0 cr)  
AST 8110 - Topics in Astrophysics (4.0 cr)  
AST 8120 - Topics in Astrophysics (2.0 - 4.0 cr)  
AST 8200 - Astrophysics Seminar (1.0 - 3.0 cr)  
AST 8990 - Research in Astronomy and Astrophysics (1.0 - 4.0 cr)  
PHYS 5011 - Classical Physics I (4.0 cr)

#### Electives (6-16 credits)

In consultation with adviser, select a minimum of 6 credits to complete the course credits requirement. Additional courses may be approved by the director of graduate studies.

AEM 5501 - Continuum Mechanics (3.0 cr)  
GRAD 8101 - Teaching in Higher Education (3.0 cr)  
GRAD 8200 - Teaching and Learning Topics in Higher Education (1.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5012 - Classical Physics II (4.0 cr)  
PHYS 8011 - Quantum Field Theory I (3.0 cr)  
PHYS 8012 - Quantum Field Theory II (3.0 cr)  
PHYS 8501 - General Relativity and Cosmology I (3.0 cr)  
PHYS 8502 - General Relativity and Cosmology II (3.0 cr)  
PHYS 8601 - Plasma Physics I (3.0 cr)  
PHYS 8602 - Plasma Physics II (3.0 cr)  
PHYS 8611 - Cosmic Rays and Plasma Astrophysics (3.0 cr)  
PHYS 8801 - Nuclear Physics I (3.0 cr)  
PHYS 8802 - Nuclear Physics II (3.0 cr)

#### Plan Options

##### Plan A (10 credits)

Take 10 thesis credits.

AST 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### Plan B

The Plan B requires the completion of 1-3 papers written in connection with three courses taken in the program.



### **Twin Cities Campus**

## **Astrophysics Minor**

*Astrophysics, Minnesota Institute for*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Minnesota Institute for Astrophysics, 116 Church Street S.E., Minneapolis, MN 55455 (612-624-4811; fax: 612-626-2029)

Email: [MIfA@umn.edu](mailto:MIfA@umn.edu)

Website: <http://www.astro.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Astrophysics is the study of the universe and its constituent parts. The Minnesota Institute for Astrophysics conducts research in observational, theoretical, and computational astrophysics, as well as instrument development. The main research areas include minor planetary bodies, solar system properties, dynamics of normal and active galaxies, stellar evolution, interaction of stars with their environments, the interstellar medium, astrophysical magnetohydrodynamics, and galactic and cosmological structure. Observational research includes activities that cover X-ray, ultraviolet, optical, infrared, and radio wavelengths. Extensive research programs in space physics, nucleosynthesis, and the elementary particle-cosmology interface are also carried out in interdisciplinary connections with the graduate program in physics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Current enrollment in a related University graduate program.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

#### **Major Courses (8-12 credits)**

In consultation with the director of graduate studies, master's students take a minimum of 8 credits and doctoral students take a minimum of 12 credits.

- [AST 4001](#) - Astrophysics I (4.0 cr)
- [AST 4002](#) - Astrophysics II (4.0 cr)
- [AST 4031](#) - Interpretation and Analysis of Astrophysical Data (4.0 cr)
- [AST 4041](#) - Computational Methods in the Physical Sciences (4.0 cr)
- [AST 5012](#) - The Interstellar Medium (4.0 cr)
- [AST 5022](#) - Relativity, Cosmology, and the Universe (4.0 cr)
- [AST 5201](#) - Methods of Experimental Astrophysics (4.0 cr)
- [AST 8001](#) - Radiative Processes in Astrophysics (4.0 cr)





[AST 8011](#) - High Energy Astrophysics (4.0 cr)  
[AST 8031](#) - Astrophysical Fluid Dynamics (4.0 cr)  
[AST 8110](#) - Topics in Astrophysics (4.0 cr)  
[AST 8120](#) - Topics in Astrophysics (2.0 - 4.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Astrophysics Ph.D.**

*Astrophysics, Minnesota Institute for*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Minnesota Institute for Astrophysics, 116 Church Street S.E., Minneapolis, MN 55455 (612-624-4811; fax: 612-626-2029)

Email: [MIfA@umn.edu](mailto:MIfA@umn.edu)

Website: <http://www.astro.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 64
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Astrophysics is the study of the universe and its constituent parts. The Minnesota Institute for Astrophysics conducts research in observational, theoretical, and computational astrophysics, as well as instrument development. The main research areas include minor planetary bodies, solar system properties, dynamics of normal and active galaxies, stellar evolution, interaction of stars with their environments, the interstellar medium, astrophysical magnetohydrodynamics, and galactic and cosmological structure. Observational research includes activities that cover X-ray, ultraviolet, optical, infrared, and radio wavelengths. Extensive research programs in space physics, nucleosynthesis, and the elementary particle-cosmology interface are also carried out in interdisciplinary connections with the graduate program in physics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Undergraduate astronomy, physics or equivalent degree required.

Other requirements to be completed before admission:

Coursework in analytical mechanics, electrodynamics, quantum mechanics, thermodynamics, and statistical physics.

#### **Special Application Requirements:**

A statement of career goals, diversity statement, scores from the GRE General Test (required) and Subject Test in physics (optional), and three letters of recommendation are required. Applications are due by December 15 to be considered for fellowships and by January 15 for teaching and research assistantships. Students are admitted fall semester only.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language



Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

28 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

### Major Courses (28 credits)

In consultation with adviser, select a minimum of 28 credits from the following. All students must complete PHYS 5011-12.

[AST 4001](#) - Astrophysics I (4.0 cr)

[AST 4002](#) - Astrophysics II (4.0 cr)

[AST 4031](#) - Interpretation and Analysis of Astrophysical Data (4.0 cr)

[AST 4041](#) - Computational Methods in the Physical Sciences (4.0 cr)

[AST 5012](#) - The Interstellar Medium (4.0 cr)

[AST 5022](#) - Relativity, Cosmology, and the Universe (4.0 cr)

[AST 5201](#) - Methods of Experimental Astrophysics (4.0 cr)

[AST 8001](#) - Radiative Processes in Astrophysics (4.0 cr)

[AST 8011](#) - High Energy Astrophysics (4.0 cr)

[AST 8031](#) - Astrophysical Fluid Dynamics (4.0 cr)

[AST 8110](#) - Topics in Astrophysics (4.0 cr)

[AST 8120](#) - Topics in Astrophysics (2.0 - 4.0 cr)

[AST 8200](#) - Astrophysics Seminar (1.0 - 3.0 cr)

[AST 8990](#) - Research in Astronomy and Astrophysics (1.0 - 4.0 cr)

[PHYS 5011](#) - Classical Physics I (4.0 cr)

[PHYS 5012](#) - Classical Physics II (4.0 cr)

### Electives (12 credits)

In consultation with adviser, select a minimum of 12 credits. Additional courses may be approved by the director of graduate studies.

[AEM 5501](#) - Continuum Mechanics (3.0 cr)

[GRAD 8101](#) - Teaching in Higher Education (3.0 cr)

[GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)

[MATH 5651](#) - Basic Theory of Probability and Statistics (4.0 cr)

[PHYS 5001](#) - Quantum Mechanics I (4.0 cr)

[PHYS 5002](#) - Quantum Mechanics II (4.0 cr)

[PHYS 5012](#) - Classical Physics II (4.0 cr)

[PHYS 8011](#) - Quantum Field Theory I (3.0 cr)

[PHYS 8012](#) - Quantum Field Theory II (3.0 cr)

[PHYS 8501](#) - General Relativity and Cosmology I (3.0 cr)

[PHYS 8502](#) - General Relativity and Cosmology II (3.0 cr)

[PHYS 8601](#) - Plasma Physics I (3.0 cr)

[PHYS 8602](#) - Plasma Physics II (3.0 cr)

[PHYS 8611](#) - Cosmic Rays and Plasma Astrophysics (3.0 cr)

[PHYS 8801](#) - Nuclear Physics I (3.0 cr)

[PHYS 8802](#) - Nuclear Physics II (3.0 cr)

### Thesis Credits (24 credits)

Take 24 credits after passing preliminary oral exam.

[AST 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### ***Twin Cities Campus***

## **Biomedical Engineering M.S.**

*Department of Biomedical Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Biomedical Engineering Graduate Program, 7-105 Nils Hasselmo Hall, 312 Church Street S.E., Minneapolis, MN 55455 (612-624-8396; fax 612-626-6583)

Email: [bmengp@umn.edu](mailto:bmengp@umn.edu)

Website: <http://cse.umn.edu/bme>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Biomedical engineering is the application of engineering principles and methods to problems in biology and medicine. The discipline includes the study of fundamental processes in biology and physiology, the study of the diagnosis and treatment of disease and injury, and the design and development of medical devices and techniques. Students take courses in mathematics, biology, biomedical engineering, and areas of science and engineering that are relevant to the degree objectives.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

A baccalaureate degree in engineering or in a physical or biological science is required.

Other requirements to be completed before admission:

Applicants with an engineering degree do not need to complete any specific coursework prior to applying. Applicants without an engineering degree must complete (1) math coursework through calculus I, calculus II, linear algebra, and differential equations; and (2) at least 1 year of college-level physics, preferably calculus-based.

Eligibility requirements for the integrated BS/MS program:

-Students must be enrolled in the Biomedical Engineering undergraduate program at the University of Minnesota-Twin Cities.

-Applicants must have a minimum GPA of 3.6 in BME courses. Applicants with a lower GPA will be considered on a space-available basis.

-The following BME courses must be completed at the time of application: 2101, 2401, 2501, 3011, 3015, 3111, 3115, 3211, 3215, 3311, 3315, 3411, and 3415.

#### **Special Application Requirements:**

There are no minimum GPA, GRE, or English language test score requirements. A GPA of at least 3.2 on a 4.0 scale is preferred, but not required. Applicants with a lower GPA may still apply, but they will have a much lower chance of admission.

The fall application deadline for MS applicants is March 31. Local applicants applying for the program as part-time students may, under certain circumstances, be considered for spring admission.

Applicants must submit their test score(s) from the following:

- GRE



International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#) (GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B Project (BMEn 8820, minimum of 2 credits) should entail approximately 50-75 hours of work per credit, performed in collaboration with a faculty advisor.

**Plan C:** Plan C requires 30 major credits and 0 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

All coursework (excluding seminars and internships) must be taken for a letter grade (A-F). A minimum grade of B- is required for coursework to be counted toward degree requirements.

A single course may NOT be counted simultaneously toward more than one of the requirements listed below.

Included in the Core/Elective requirements listed below must be a minimum of 3 credits designated as math-/statistics-intensive. These are not additional credits but will overlap with coursework already satisfying the BMEn Core, Technical Elective, and/or Free Elective requirements. Further information is available in the BME graduate handbook.

8000 Level (Plans A and B only) - Core/Elective coursework must include at least 3 credits at the 8000 level, from any department (does not need to be BMEn). Credits of seminar, directed research, internship, project, thesis, and/or independent study cannot be used to fulfill this requirement. Plan C students are not required to complete 8000-level coursework.

## Required Courses

### BMEn Core (6 credits)

Select at least 6 credits from the following in consultation with the advisor:

- BMEN 5001 - Advanced Biomaterials (3.0 cr)
- BMEN 5101 - Advanced Bioelectricity and Instrumentation (3.0 cr)
- BMEN 5201 - Advanced Biomechanics (3.0 cr)
- BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)
- BMEN 5351 - Cell Engineering (3.0 cr)
- BMEN 5401 - Advanced Biomedical Imaging (3.0 cr)
- BMEN 8001 - Polymeric Biomaterials (3.0 cr)
- BMEN 8041 - Advanced Tissue Engineering Lab (3.0 cr)
- BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)
- BMEN 8151 - Biomedical Electronics and Implantable Microsystems (3.0 cr)
- BMEN 8201 - Advanced Tissue Mechanics (3.0 cr)
- BMEN 8381 - Bioheat and Mass Transfer (3.0 cr)
- BMEN 8421 - Biophotonics (3.0 cr)
- BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)
- BMEN 8501 - Dynamical Systems in Biology (3.0 cr)
- BMEN 8502 - Physiological Control Systems (3.0 cr)
- BMEN 8511 - Systems and Synthetic Biology (3.0 cr)



### BME Seminar (2 credits)

Seminars are 1 credit per semester, repeatable for credit, and may be taken in any order.

[BMEN 8601](#) - Biomedical Engineering Seminar (1.0 cr)

[BMEN 8602](#) - Biomedical Engineering Seminar (1.0 cr)

### Biology Electives (6 credits)

Select 6 credits from the following. Other courses may be applied with director of graduate studies approval.

[BIOC 5216](#) - Current Topics in Signal Transduction (2.0 cr)

[BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)

[BIOC 5444](#) - Muscle (3.0 cr)

[BIOC 6021](#) - Biochemistry (3.0 cr)

[BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)

[BIOC 8216](#) - Signal Transduction and Gene Expression (3.0 cr)

[BMEN 5501](#) - Biology for Biomedical Engineers (3.0 cr)

[BMEN 5701](#) - Cancer Bioengineering (3.0 cr)

[BMEN 8041](#) - Advanced Tissue Engineering Lab (3.0 cr)

[CGSC 8041](#) - Cognitive Neuroscience (4.0 cr)

[CPMS 5101](#) - Introduction to Clinical Physiology and Movement Science (3.0 cr)

[EEB 5371](#) - Principles of Systematics (3.0 cr)

[GCD 5036](#) - Molecular Cell Biology (3.0 cr)

[GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)

[GCD 8103](#) - Human Histology (5.0 cr)

[GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)

[GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)

[GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)

[MEDC 5245](#) - Introduction to Drug Design (3.0 cr)

[MEDC 8461](#) - Design of Cancer Therapeutics (3.0 cr)

[MEDC 8753](#) - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)

[MEDC 8760](#) - Design of Peptidomimetics (2.0 cr)

[MICA 8002](#) - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)

[MICA 8003](#) - Immunity and Immunopathology (4.0 cr)

[MICA 8004](#) - Cellular and Cancer Biology (4.0 cr)

[MICA 8009](#) - Biochemical Aspects of Normal and Abnormal Cell Growth and Cell Death (2.0 cr)

[MLSP 5111](#) - Concepts of Diagnostic Microbiology (3.0 cr)

[MLSP 5511](#) - Principles of Immunobiology (3.0 cr)

[MPHY 5172](#) - Radiation Biology (3.0 cr)

[NEUR 5230](#) - Cerebrovascular Hemodynamics and Diseases I (4.0 cr)

[NSC 5461](#) - Cellular and Molecular Neuroscience (4.0 cr)

[NSC 5462](#) - Neuroscience Principles of Drug Abuse (2.0 cr)

[NSC 5540](#) - Survey of Biomedical Neuroscience (2.0 cr)

[NSC 5561](#) - Systems Neuroscience (4.0 cr)

[NSC 5661W](#) - Behavioral Neuroscience [WI] (4.0 cr)

[NSC 8211](#) - Developmental Neurobiology (4.0 cr)

[NSC 8221](#) - Neurobiology of Pain and Analgesia (3.0 cr)

[NSCI 5101](#) - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)

[OBIO 8012](#) - Basic Concepts in Skeletal Biology (2.0 cr)

[OBIO 8028](#) - Molecular Basis of Cellular and Microbial Adhesion (2.0 cr)

[PHAR 5700](#) - Applied Fundamentals of Pharmacotherapy (3.0 cr)

[PHSL 5061](#) - Principles of Physiology for Biomedical Engineering (4.0 cr)

[PHSL 5115](#) - Clinical Physiology I (3.0 cr)

[PHSL 5116](#) - Clinical Physiology II (3.0 cr)

[PHSL 5444](#) - Muscle (3.0 cr)

[PHSL 5510](#) - Advanced Cardiac Physiology and Anatomy (2.0 - 3.0 cr)

[PHSL 5525](#) - Anatomy and Physiology of the Pelvis and Urinary System (1.0 - 2.0 cr)

[PSY 5015](#) - Cognition, Computation, and Brain (3.0 cr)

[PSY 5062](#) - Cognitive Neuropsychology (3.0 cr)

[PSY 8041](#) - Proseminar in Perception (3.0 cr)

[RSC 5200](#) - Introduction to Neuromodulation (1.0 - 3.0 cr)

[RSC 5231](#) - Clinical Biomechanics (2.0 - 5.0 cr)

[RSC 5281](#) - Physiology for Physical Rehabilitation (2.0 - 4.0 cr)

[RSC 8282](#) - Problems in Human Movement (4.0 cr)

[SCB 8181](#) - Stem Cell Biology (3.0 cr)

### Technical Electives (6-9 credits)

Plan A students select at least 6 credits, and Plan B and Plan C students select at least 9 credits from the following in consultation with



the advisor. Other courses may be applied with director of graduate studies approval.

AEM 5401 - Intermediate Dynamics (3.0 cr)  
AEM 5451 - Optimal Estimation (3.0 cr)  
AEM 5501 - Continuum Mechanics (3.0 cr)  
AEM 5503 - Theory of Elasticity (3.0 cr)  
AEM 8511 - Advanced Topics in Continuum Mechanics (3.0 cr)  
AEM 8531 - Fracture Mechanics (3.0 cr)  
BBE 5301 - Applied Surface and Colloid Science (3.0 cr)  
BIOC 5351 - Protein Engineering (3.0 cr)  
BIOC 5352 - Biotechnology and Bioengineering for Biochemists (3.0 cr)  
BIOC 5528 - Spectroscopy and Kinetics (4.0 cr)  
BIOC 8005 - Biochemistry: Structure and Catalysis (2.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5041 - Tissue Engineering (3.0 cr)  
BMEN 5101 - Advanced Bioelectricity and Instrumentation (3.0 cr)  
BMEN 5111 - Biomedical Ultrasound (3.0 cr)  
BMEN 5151 - Introduction to BioMEMS and Medical Microdevices (2.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5361 - 3D Bioprinting (2.0 cr)  
BMEN 5401 - Advanced Biomedical Imaging (3.0 cr)  
BMEN 5411 - Neural Engineering (3.0 cr)  
BMEN 5412 - Neuromodulation (3.0 cr)  
BMEN 5413 - Neural Decoding and Interfacing (3.0 cr)  
BMEN 5421 - Introduction to Biomedical Optics (3.0 cr)  
BMEN 5601 - Cardiovascular Devices (1.0 cr)  
BMEN 5910 - Special Topics in Biomedical Engineering (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
BMEN 8151 - Biomedical Electronics and Implantable Microsystems (3.0 cr)  
BMEN 8201 - Advanced Tissue Mechanics (3.0 cr)  
BMEN 8381 - Bioheat and Mass Transfer (3.0 cr)  
BMEN 8401 - New Product Design and Business Development (4.0 cr)  
BMEN 8421 - Biophotonics (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8501 - Dynamical Systems in Biology (3.0 cr)  
BMEN 8502 - Physiological Control Systems (3.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEM 8157 - Bioanalytical Chemistry (4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 8101 - Fluid Mechanics (3.0 cr)  
CHEN 8201 - Applied Math (3.0 cr)  
CHEN 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)  
CHEN 8402 - Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)  
CSCI 5103 - Operating Systems (3.0 cr)  
CSCI 5211 - Data Communications and Computer Networks (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
EE 5141 - Introduction to Microsystem Technology (4.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5323 - VLSI Design I (3.0 cr)  
EE 5333 - Analog Integrated Circuit Design (3.0 cr)  
EE 5393 - Circuits, Computation, and Biology (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)



EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5545 - Digital Signal Processing Design (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5601 - Introduction to RF/Microwave Engineering (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 8591 - Predictive Learning from Data (3.0 cr)  
EE 8601 - Advanced Electromagnetic Theory (3.0 cr)  
HINF 5430 - Foundations of Health Informatics I (3.0 cr)  
HINF 5431 - Foundations of Health Informatics II (3.0 cr)  
HUMF 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)  
HUMF 5211 - Human Factors and Work Analysis (4.0 cr)  
IE 5111 - Systems Engineering I (2.0 cr)  
IE 5113 - Systems Engineering II (4.0 cr)  
IE 5511 - Human Factors and Work Analysis (4.0 cr)  
IE 5522 - Quality Engineering and Reliability (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 5553 - Simulation (4.0 cr)  
KIN 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)  
KIN 5643 - Applied Motion Capture and Movement Analysis Technology (3.0 cr)  
MATH 5248 - Cryptology and Number Theory (4.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5447 - Theoretical Neuroscience (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8202 - General Algebra (3.0 cr)  
MATH 8253 - Algebraic Geometry (3.0 cr)  
MATS 8001 - Structure and Symmetry of Materials (3.0 cr)  
MATS 8002 - Thermodynamics and Kinetics (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5241 - Computer-Aided Engineering (4.0 cr)  
ME 5243 - Advanced Mechanism Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5281 - Feedback Control Systems (4.0 cr)  
ME 5286 - Robotics (4.0 cr)  
ME 5341 - Case Studies in Thermal Engineering and Design (4.0 cr)  
ME 5351 - Computational Heat Transfer (4.0 cr)  
ME 8254 - Fundamentals of Microelectromechanical Systems (MEMS) (4.0 cr)  
ME 8341 - Conduction (3.0 cr)  
ME 8342 - Convection (3.0 cr)  
ME 8343 - Radiation (3.0 cr)  
ME 8345 - Computational Heat Transfer and Fluid Flow (3.0 cr)  
MPHY 5170 - Basic Radiological Physics (3.0 cr)  
MPHY 5178 - Physical Principles of Magnetic Resonance Imaging (3.0 cr)  
MPHY 8147 - Advanced Physics of Magnetic Resonance Imaging (MRI) (3.0 cr)  
NSC 5202 - Theoretical Neuroscience: Systems and Information Processing (3.0 cr)  
OBIO 8027 - Biomaterials in Regenerative Dentistry (2.0 cr)  
PHM 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)  
PSY 5065 - Functional Imaging: Hands-on Training (3.0 cr)  
PUBH 6415 - Biostatistical Methods II (3.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
RSC 5135 - Advanced Biomechanics I: Kinematics (3.0 cr)  
RSC 5235 - Advanced Biomechanics II: Kinetics (3.0 cr)  
RSC 5841 - Applied Data Acquisition and Processing (3.0 cr)  
RSC 8135 - Human Kinematics (3.0 cr)  
RSC 8235 - Human Kinetics (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)





STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)

#### Free Electives (0-7 credits)

Plan B students select at least 5 credits, and Plan C students select at least 7 credits from the following to complete minimum credit requirements. Other courses may be applied with director of graduate studies approval. Plan A students are exempt from this requirement.

BMEN 8402 - New Product Design and Business Development (4.0 cr)  
BTHX 5100 - Introduction to Clinical Ethics (3.0 cr)  
BTHX 5120 - Dying in Contemporary Medical Culture (2.0 cr)  
BTHX 5210 - Ethics of Human Subjects Research (3.0 cr)  
BTHX 5300 - Foundations of Bioethics (3.0 cr)  
BTHX 5325 - Biomedical Ethics (3.0 cr)  
BTHX 5650 - Disability Ethics (3.0 cr)  
BTHX 8120 - Dying in Contemporary Medical Culture (2.0 cr)  
CMB 5912 - Creativity (1.0 cr)  
MILI 6235 - Pharmaceutical Industry: Business and Policy (2.0 cr)  
MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)  
MOT 5001 - Technological Business Fundamentals (2.0 cr)  
MOT 5002 - Creating Technological Innovation (2.0 cr)  
MOT 5003 - Technological Business Planning Workshop (1.0 cr)  
PDES 5701 - User-Centered Design Studio (3.0 cr)  
PDES 5702 - Visual Communication (3.0 cr)  
PDES 5704 - Computer-Aided Design Methods (3.0 cr)  
PSY 5036W - Computational Vision [WI] (3.0 cr)  
PUBH 6161 - Regulatory Toxicology (2.0 cr)  
PUBH 6414 - Biostatistical Literacy (3.0 cr)  
PUBH 7415 - Introduction to Clinical Trials (3.0 cr)  
RSC 5106 - Introduction to Rehabilitation Science (1.0 cr)  
SLHS 5804 - Cochlear Implants (3.0 cr)

#### Plan Options

##### Plan A (10 credits)

Complete 10 master's thesis credits.

BMEN 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### Plan B (2 credits)

Complete a minimum of 2 credits for the Plan B project.

BMEN 8820 - Plan B Project (2.0 - 3.0 cr)

-OR-

##### Plan C

Plan C does not have additional requirements.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

#### Combined B.Bm.E./M.S.

The College Science & Engineering offers an early-admission opportunity for eligible University of Minnesota B.Bm.E. students also interested in completing the Biomedical Engineering MS degree (Plan A or Plan B only). The Early Admission sub-plan, also referred to as the Combined B.Bm.E./MS Biomedical Engineering program, enables B.Bm.E. majors to take 3-16 credits toward the MS requirements during their senior (fourth) year, in addition to the courses required for the B.Bm.E. degree. The MS degree may then be completed in the fifth year of study. Students are NOT permitted to count a single course toward both the undergraduate and graduate degrees; each course must be counted either toward the B.Bm.E. requirements or the MS requirements.

Students admitted to the Combined B.Bm.E./M.S. must maintain timely degree progress to ensure that all undergraduate degree requirements are completed by the end of their fourth year. They must also be able to take additional courses during their senior year, beyond those required by the B.Bm.E. curriculum, to be eligible for this program.



### **Twin Cities Campus**

## **Biomedical Engineering Minor**

*Department of Biomedical Engineering*

**College of Science and Engineering**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Biomedical Engineering Graduate Program, 7-105 Nils Hasselmo Hall, 312 Church Street S.E., Minneapolis, MN 55455 (612-624-8396; fax: 612-626-6583)

Email: [bmengp@umn.edu](mailto:bmengp@umn.edu)

Website: <https://cse.umn.edu/bme>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Biomedical engineering is the application of engineering principles and methods to problems in biology and medicine. The discipline includes the study of fundamental processes in biology and physiology, the study of the diagnosis and treatment of disease and injury, and the design and development of medical devices and techniques. Students take courses in mathematics, biology, biomedical engineering, and areas of science and engineering that are relevant for the degree objectives.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Biomedical Engineering director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

All courses applied to the minor must be completed for a letter grade (A-F), with a minimum grade of B- earned for each course. The minimum cumulative GPA for the minor is 3.0.

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### **Masters**

#### **Course Requirements**

##### **Core Coursework (3-6 credits)**

Select at least 3 credits from the following in consultation with the Biomedical Engineering director of graduate studies:

[BMEN 5001](#) - Advanced Biomaterials (3.0 cr)

[BMEN 5101](#) - Advanced Bioelectricity and Instrumentation (3.0 cr)



BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5401 - Advanced Biomedical Imaging (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8041 - Advanced Tissue Engineering Lab (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
BMEN 8151 - Biomedical Electronics and Implantable Microsystems (3.0 cr)  
BMEN 8201 - Advanced Tissue Mechanics (3.0 cr)  
BMEN 8381 - Bioheat and Mass Transfer (3.0 cr)  
BMEN 8421 - Biophotonics (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8501 - Dynamical Systems in Biology (3.0 cr)  
BMEN 8502 - Physiological Control Systems (3.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)

**Additional Coursework (0-3 credits)**

Select 3 credits as needed from the following, in consultation with the Biomedical Engineering director of graduate studies, to complete the 6-credit minimum.

BMEN 5031 - Engineering Extracellular Matrices (3.0 cr)  
BMEN 5041 - Tissue Engineering (3.0 cr)  
BMEN 5111 - Biomedical Ultrasound (3.0 cr)  
BMEN 5151 - Introduction to BioMEMS and Medical Microdevices (2.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 5361 - 3D Bioprinting (2.0 cr)  
BMEN 5411 - Neural Engineering (3.0 cr)  
BMEN 5412 - Neuromodulation (3.0 cr)  
BMEN 5413 - Neural Decoding and Interfacing (3.0 cr)  
BMEN 5421 - Introduction to Biomedical Optics (3.0 cr)  
BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)  
BMEN 5601 - Cardiovascular Devices (1.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 5910 - Special Topics in Biomedical Engineering (3.0 cr)  
BMEN 5920 - Special Topics in Biomedical Engineering (1.0 - 3.0 cr)  
BMEN 8401 - New Product Design and Business Development (4.0 cr)  
BMEN 8402 - New Product Design and Business Development (4.0 cr)  
BMEN 8900 - Special Topics in Biomedical Engineering (1.0 - 4.0 cr)

**Doctoral**

A single course may not be counted toward more than one requirement.

**Core Coursework (6 credits)**

Select 6 credits from the following in consultation with the Biomedical Engineering director of graduate studies:

BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5101 - Advanced Bioelectricity and Instrumentation (3.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5401 - Advanced Biomedical Imaging (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8041 - Advanced Tissue Engineering Lab (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
BMEN 8151 - Biomedical Electronics and Implantable Microsystems (3.0 cr)  
BMEN 8201 - Advanced Tissue Mechanics (3.0 cr)  
BMEN 8381 - Bioheat and Mass Transfer (3.0 cr)  
BMEN 8421 - Biophotonics (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8501 - Dynamical Systems in Biology (3.0 cr)  
BMEN 8502 - Physiological Control Systems (3.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)

**Biology Elective (3 credits)**

Select 3 credits from the following in consultation with the Biomedical Engineering director of graduate studies. Other courses may be applied to this requirement with the approval of the Biomedical Engineering director of graduate studies.

BIOC 5216 - Current Topics in Signal Transduction (2.0 cr)  
BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)



BIOC 5444 - Muscle (3.0 cr)  
BIOC 6021 - Biochemistry (3.0 cr)  
BIOC 8002 - Molecular Biology and Regulation of Biological Processes (3.0 cr)  
BIOC 8216 - Signal Transduction and Gene Expression (3.0 cr)  
BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 8041 - Advanced Tissue Engineering Lab (3.0 cr)  
CGSC 8041 - Cognitive Neuroscience (4.0 cr)  
CPMS 5101 - Introduction to Clinical Physiology and Movement Science (3.0 cr)  
EEB 5371 - Principles of Systematics (3.0 cr)  
GCD 5036 - Molecular Cell Biology (3.0 cr)  
GCD 8008 - Mammalian Gene Transfer and Genome Engineering (2.0 cr)  
GCD 8103 - Human Histology (5.0 cr)  
GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)  
GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)  
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)  
MEDC 5245 - Introduction to Drug Design (3.0 cr)  
MEDC 8461 - Design of Cancer Therapeutics (3.0 cr)  
MEDC 8753 - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)  
MEDC 8760 - Design of Peptidomimetics (2.0 cr)  
MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)  
MICA 8003 - Immunity and Immunopathology (4.0 cr)  
MICA 8004 - Cellular and Cancer Biology (4.0 cr)  
MICA 8009 - Biochemical Aspects of Normal and Abnormal Cell Growth and Cell Death (2.0 cr)  
MLSP 5111 - Concepts of Diagnostic Microbiology (3.0 cr)  
MLSP 5511 - Principles of Immunobiology (3.0 cr)  
MPHY 5172 - Radiation Biology (3.0 cr)  
NEUR 5230 - Cerebrovascular Hemodynamics and Diseases I (4.0 cr)  
NSC 5461 - Cellular and Molecular Neuroscience (4.0 cr)  
NSC 5540 - Survey of Biomedical Neuroscience (2.0 cr)  
NSC 5561 - Systems Neuroscience (4.0 cr)  
NSC 5661W - Behavioral Neuroscience [WI] (4.0 cr)  
NSC 8211 - Developmental Neurobiology (4.0 cr)  
NSC 8221 - Neurobiology of Pain and Analgesia (3.0 cr)  
NSCI 5101 - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)  
OBIO 8012 - Basic Concepts in Skeletal Biology (2.0 cr)  
OBIO 8028 - Molecular Basis of Cellular and Microbial Adhesion (2.0 cr)  
PHAR 5700 - Applied Fundamentals of Pharmacotherapy (3.0 cr)  
PHSL 5061 - Principles of Physiology for Biomedical Engineering (4.0 cr)  
PHSL 5115 - Clinical Physiology I (3.0 cr)  
PHSL 5116 - Clinical Physiology II (3.0 cr)  
PHSL 5444 - Muscle (3.0 cr)  
PHSL 5510 - Advanced Cardiac Physiology and Anatomy (2.0 - 3.0 cr)  
PHSL 5525 - Anatomy and Physiology of the Pelvis and Urinary System (1.0 - 2.0 cr)  
PSY 5015 - Cognition, Computation, and Brain (3.0 cr)  
PSY 5062 - Cognitive Neuropsychology (3.0 cr)  
PSY 8041 - Proseminar in Perception (3.0 cr)  
RSC 5200 - Introduction to Neuromodulation (1.0 - 3.0 cr)  
RSC 5231 - Clinical Biomechanics (2.0 - 5.0 cr)  
RSC 5281 - Physiology for Physical Rehabilitation (2.0 - 4.0 cr)  
RSC 8282 - Problems in Human Movement (4.0 cr)  
SCB 8181 - Stem Cell Biology (3.0 cr)  
SLHS 5808 - Pathophysiology of Hearing Disorders (3.0 cr)

**Technical Elective (3 credits)**

Select 3 credits from the following in consultation with the Biomedical Engineering director of graduate studies. Other courses may be applied to this requirement with the approval of the Biomedical Engineering director of graduate studies.

AEM 5401 - Intermediate Dynamics (3.0 cr)  
AEM 5451 - Optimal Estimation (3.0 cr)  
AEM 5501 - Continuum Mechanics (3.0 cr)  
AEM 5503 - Theory of Elasticity (3.0 cr)  
AEM 8511 - Advanced Topics in Continuum Mechanics (3.0 cr)  
AEM 8531 - Fracture Mechanics (3.0 cr)  
BBE 5301 - Applied Surface and Colloid Science (3.0 cr)  
BIOC 5351 - Protein Engineering (3.0 cr)  
BIOC 5352 - Biotechnology and Bioengineering for Biochemists (3.0 cr)



BIOC 5528 - Spectroscopy and Kinetics (4.0 cr)  
BIOC 8005 - Biochemistry: Structure and Catalysis (2.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5041 - Tissue Engineering (3.0 cr)  
BMEN 5101 - Advanced Bioelectricity and Instrumentation (3.0 cr)  
BMEN 5111 - Biomedical Ultrasound (3.0 cr)  
BMEN 5151 - Introduction to BioMEMS and Medical Microdevices (2.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5361 - 3D Bioprinting (2.0 cr)  
BMEN 5401 - Advanced Biomedical Imaging (3.0 cr)  
BMEN 5411 - Neural Engineering (3.0 cr)  
BMEN 5412 - Neuromodulation (3.0 cr)  
BMEN 5413 - Neural Decoding and Interfacing (3.0 cr)  
BMEN 5421 - Introduction to Biomedical Optics (3.0 cr)  
BMEN 5601 - Cardiovascular Devices (1.0 cr)  
BMEN 5910 - Special Topics in Biomedical Engineering (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
BMEN 8151 - Biomedical Electronics and Implantable Microsystems (3.0 cr)  
BMEN 8201 - Advanced Tissue Mechanics (3.0 cr)  
BMEN 8381 - Bioheat and Mass Transfer (3.0 cr)  
BMEN 8401 - New Product Design and Business Development (4.0 cr)  
BMEN 8421 - Biophotonics (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8501 - Dynamical Systems in Biology (3.0 cr)  
BMEN 8502 - Physiological Control Systems (3.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEM 8157 - Bioanalytical Chemistry (4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 8101 - Fluid Mechanics (3.0 cr)  
CHEN 8201 - Applied Math (3.0 cr)  
CHEN 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)  
CHEN 8402 - Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)  
CSCI 5103 - Operating Systems (3.0 cr)  
CSCI 5211 - Data Communications and Computer Networks (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
EE 5141 - Introduction to Microsystem Technology (4.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5323 - VLSI Design I (3.0 cr)  
EE 5333 - Analog Integrated Circuit Design (3.0 cr)  
EE 5393 - Circuits, Computation, and Biology (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5545 - Digital Signal Processing Design (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5601 - Introduction to RF/Microwave Engineering (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 8591 - Predictive Learning from Data (3.0 cr)  
EE 8601 - Advanced Electromagnetic Theory (3.0 cr)  
HINF 5430 - Foundations of Health Informatics I (3.0 cr)  
HINF 5431 - Foundations of Health Informatics II (3.0 cr)  
HUMF 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)



HUMF 5211 - Human Factors and Work Analysis (4.0 cr)  
IE 5111 - Systems Engineering I (2.0 cr)  
IE 5113 - Systems Engineering II (4.0 cr)  
IE 5511 - Human Factors and Work Analysis (4.0 cr)  
IE 5522 - Quality Engineering and Reliability (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 5553 - Simulation (4.0 cr)  
KIN 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)  
KIN 5643 - Applied Motion Capture and Movement Analysis Technology (3.0 cr)  
MATH 5248 - Cryptology and Number Theory (4.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5447 - Theoretical Neuroscience (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8202 - General Algebra (3.0 cr)  
MATH 8253 - Algebraic Geometry (3.0 cr)  
MATS 8001 - Structure and Symmetry of Materials (3.0 cr)  
MATS 8002 - Thermodynamics and Kinetics (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5241 - Computer-Aided Engineering (4.0 cr)  
ME 5243 - Advanced Mechanism Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5281 - Feedback Control Systems (4.0 cr)  
ME 5286 - Robotics (4.0 cr)  
ME 5341 - Case Studies in Thermal Engineering and Design (4.0 cr)  
ME 5351 - Computational Heat Transfer (4.0 cr)  
ME 8254 - Fundamentals of Microelectromechanical Systems (MEMS) (4.0 cr)  
ME 8341 - Conduction (3.0 cr)  
ME 8342 - Convection (3.0 cr)  
ME 8343 - Radiation (3.0 cr)  
ME 8345 - Computational Heat Transfer and Fluid Flow (3.0 cr)  
MPHY 5170 - Basic Radiological Physics (3.0 cr)  
MPHY 5178 - Physical Principles of Magnetic Resonance Imaging (3.0 cr)  
MPHY 8147 - Advanced Physics of Magnetic Resonance Imaging (MRI) (3.0 cr)  
NSC 5202 - Theoretical Neuroscience: Systems and Information Processing (3.0 cr)  
OBIO 8027 - Biomaterials in Regenerative Dentistry (2.0 cr)  
PHM 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)  
PSY 5065 - Functional Imaging: Hands-on Training (3.0 cr)  
PUBH 6415 - Biostatistical Methods II (3.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
RSC 5135 - Advanced Biomechanics I: Kinematics (3.0 cr)  
RSC 5235 - Advanced Biomechanics II: Kinetics (3.0 cr)  
RSC 5841 - Applied Data Acquisition and Processing (3.0 cr)  
RSC 8135 - Human Kinematics (3.0 cr)  
RSC 8235 - Human Kinetics (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)



### **Twin Cities Campus**

## **Biomedical Engineering Ph.D.**

*Department of Biomedical Engineering*

**College of Science and Engineering**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Biomedical Engineering Graduate Program, 7-105 Nils Hasselmo Hall, 312 Church Street S.E., Minneapolis, MN 55455 (612-624-8396; fax: 612-626-6583)

Email: [bmengp@umn.edu](mailto:bmengp@umn.edu)

Website: <https://cse.umn.edu/bme>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 54
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Biomedical engineering is the application of engineering principles and methods to problems in biology and medicine. The discipline includes the study of fundamental processes in biology and physiology, the study of the diagnosis and treatment of disease and injury, and the design and development of medical devices and techniques. Students take courses in mathematics, biology, biomedical engineering, and areas of science and engineering that are relevant for the degree objectives.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

A baccalaureate degree in engineering or in a physical or biological science is required.

Other requirements to be completed before admission:

Applicants with an engineering degree do not need to complete any specific coursework prior to applying. Applicants without an engineering degree must complete (1) math coursework through calculus I, calculus II, linear algebra, and differential equations; and (2) at least one year of college-level physics, preferably calculus-based.

There are no minimum required GPA, GRE, or English language test scores. A GPA of at least 3.5 on a 4.0 scale is preferred, but not required. Applicants with a lower GPA may still apply, but they will have a much lower chance of admission.

### **Special Application Requirements:**

Fall application deadline is December 15. PhD applications are not accepted for the spring or summer terms.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
- IELTS

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

30 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

All coursework (excluding seminars and internships) must be taken for a letter grade (A-F). A minimum grade of B- is required for coursework to be counted toward degree requirements.

A single course may NOT be counted simultaneously toward more than one of the requirements listed below.

Included in the Core/Elective requirements listed below must be a minimum of 6 credits designated as math-/statistics-intensive. These are not additional credits but will overlap with coursework already satisfying the BME Core, Technical Elective, and/or Free Elective requirements. Further information is available in the BME graduate handbook.

### Required Courses

#### **BMEEn 8000-Level Core (6 credits)**

Select at least 6 credits from the following in consultation with the advisor:

[BMEN 8001](#) - Polymeric Biomaterials (3.0 cr)

[BMEN 8041](#) - Advanced Tissue Engineering Lab (3.0 cr)

[BMEN 8101](#) - Biomedical Digital Signal Processing (3.0 cr)

[BMEN 8151](#) - Biomedical Electronics and Implantable Microsystems (3.0 cr)

[BMEN 8201](#) - Advanced Tissue Mechanics (3.0 cr)

[BMEN 8381](#) - Bioheat and Mass Transfer (3.0 cr)

[BMEN 8421](#) - Biophotonics (3.0 cr)

[BMEN 8431](#) - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)

[BMEN 8501](#) - Dynamical Systems in Biology (3.0 cr)

[BMEN 8502](#) - Physiological Control Systems (3.0 cr)

[BMEN 8511](#) - Systems and Synthetic Biology (3.0 cr)

#### **BMEEn Seminars (3 credits)**

Seminars are 1 credit per semester, repeatable for credit, and may be taken in any order. Up to 1 seminar credit from another department/program may be applied to this requirement with prior approval of the director of graduate studies.

[BMEN 8601](#) - Biomedical Engineering Seminar (1.0 cr)

[BMEN 8602](#) - Biomedical Engineering Seminar (1.0 cr)

#### **Ethics Course (2 credits)**

Take the following course:

[BMEN 8611](#) - Professional Skills and Ethics for Biomedical Engineers (2.0 cr)

### **Biology Electives (6 credits)**

Select 6 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with director of graduate studies approval.

[BIOC 5216](#) - Current Topics in Signal Transduction (2.0 cr)

[BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)

[BIOC 5444](#) - Muscle (3.0 cr)

[BIOC 6021](#) - Biochemistry (3.0 cr)

[BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)

[BIOC 8216](#) - Signal Transduction and Gene Expression (3.0 cr)

[BMEN 5501](#) - Biology for Biomedical Engineers (3.0 cr)

[BMEN 5701](#) - Cancer Bioengineering (3.0 cr)

[BMEN 8041](#) - Advanced Tissue Engineering Lab (3.0 cr)

[CGSC 8041](#) - Cognitive Neuroscience (4.0 cr)

[CPMS 5101](#) - Introduction to Clinical Physiology and Movement Science (3.0 cr)

[EEB 5371](#) - Principles of Systematics (3.0 cr)

[GCD 5036](#) - Molecular Cell Biology (3.0 cr)

[GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)

[GCD 8103](#) - Human Histology (5.0 cr)

[GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)





GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)  
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)  
MEDC 5245 - Introduction to Drug Design (3.0 cr)  
MEDC 8461 - Design of Cancer Therapeutics (3.0 cr)  
MEDC 8753 - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)  
MEDC 8760 - Design of Peptidomimetics (2.0 cr)  
MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)  
MICA 8003 - Immunity and Immunopathology (4.0 cr)  
MICA 8004 - Cellular and Cancer Biology (4.0 cr)  
MICA 8009 - Biochemical Aspects of Normal and Abnormal Cell Growth and Cell Death (2.0 cr)  
MLSP 5111 - Concepts of Diagnostic Microbiology (3.0 cr)  
MLSP 5511 - Principles of Immunobiology (3.0 cr)  
MPHY 5172 - Radiation Biology (3.0 cr)  
NEUR 5230 - Cerebrovascular Hemodynamics and Diseases I (4.0 cr)  
NSC 5461 - Cellular and Molecular Neuroscience (4.0 cr)  
NSC 5462 - Neuroscience Principles of Drug Abuse (2.0 cr)  
NSC 5540 - Survey of Biomedical Neuroscience (2.0 cr)  
NSC 5561 - Systems Neuroscience (4.0 cr)  
NSC 5661W - Behavioral Neuroscience [WI] (4.0 cr)  
NSC 8211 - Developmental Neurobiology (4.0 cr)  
NSC 8221 - Neurobiology of Pain and Analgesia (3.0 cr)  
NSCI 5101 - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)  
OBIO 8012 - Basic Concepts in Skeletal Biology (2.0 cr)  
OBIO 8028 - Molecular Basis of Cellular and Microbial Adhesion (2.0 cr)  
PHAR 5700 - Applied Fundamentals of Pharmacotherapy (3.0 cr)  
PHSL 5061 - Principles of Physiology for Biomedical Engineering (4.0 cr)  
PHSL 5115 - Clinical Physiology I (3.0 cr)  
PHSL 5116 - Clinical Physiology II (3.0 cr)  
PHSL 5444 - Muscle (3.0 cr)  
PHSL 5510 - Advanced Cardiac Physiology and Anatomy (2.0 - 3.0 cr)  
PHSL 5525 - Anatomy and Physiology of the Pelvis and Urinary System (1.0 - 2.0 cr)  
PSY 5015 - Cognition, Computation, and Brain (3.0 cr)  
PSY 5062 - Cognitive Neuropsychology (3.0 cr)  
PSY 8041 - Proseminar in Perception (3.0 cr)  
RSC 5200 - Introduction to Neuromodulation (1.0 - 3.0 cr)  
RSC 5231 - Clinical Biomechanics (2.0 - 5.0 cr)  
RSC 5281 - Physiology for Physical Rehabilitation (2.0 - 4.0 cr)  
RSC 8282 - Problems in Human Movement (4.0 cr)  
SCB 8181 - Stem Cell Biology (3.0 cr)  
SLHS 5808 - Pathophysiology of Hearing Disorders (3.0 cr)

#### Technical Electives (9 credits)

Select 9 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with director of graduate studies approval.

AEM 5401 - Intermediate Dynamics (3.0 cr)  
AEM 5451 - Optimal Estimation (3.0 cr)  
AEM 5501 - Continuum Mechanics (3.0 cr)  
AEM 5503 - Theory of Elasticity (3.0 cr)  
AEM 8511 - Advanced Topics in Continuum Mechanics (3.0 cr)  
AEM 8531 - Fracture Mechanics (3.0 cr)  
BBE 5301 - Applied Surface and Colloid Science (3.0 cr)  
BIOC 5351 - Protein Engineering (3.0 cr)  
BIOC 5352 - Biotechnology and Bioengineering for Biochemists (3.0 cr)  
BIOC 5528 - Spectroscopy and Kinetics (4.0 cr)  
BIOC 8005 - Biochemistry: Structure and Catalysis (2.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5041 - Tissue Engineering (3.0 cr)  
BMEN 5101 - Advanced Bioelectricity and Instrumentation (3.0 cr)  
BMEN 5111 - Biomedical Ultrasound (3.0 cr)  
BMEN 5151 - Introduction to BioMEMS and Medical Microdevices (2.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5361 - 3D Bioprinting (2.0 cr)



BMEN 5401 - Advanced Biomedical Imaging (3.0 cr)  
BMEN 5411 - Neural Engineering (3.0 cr)  
BMEN 5412 - Neuromodulation (3.0 cr)  
BMEN 5413 - Neural Decoding and Interfacing (3.0 cr)  
BMEN 5421 - Introduction to Biomedical Optics (3.0 cr)  
BMEN 5601 - Cardiovascular Devices (1.0 cr)  
BMEN 5910 - Special Topics in Biomedical Engineering (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
BMEN 8151 - Biomedical Electronics and Implantable Microsystems (3.0 cr)  
BMEN 8201 - Advanced Tissue Mechanics (3.0 cr)  
BMEN 8381 - Bioheat and Mass Transfer (3.0 cr)  
BMEN 8401 - New Product Design and Business Development (4.0 cr)  
BMEN 8421 - Biophotonics (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8501 - Dynamical Systems in Biology (3.0 cr)  
BMEN 8502 - Physiological Control Systems (3.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEM 8157 - Bioanalytical Chemistry (4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 8101 - Fluid Mechanics (3.0 cr)  
CHEN 8201 - Applied Math (3.0 cr)  
CHEN 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)  
CHEN 8402 - Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)  
CSCI 5103 - Operating Systems (3.0 cr)  
CSCI 5211 - Data Communications and Computer Networks (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
EE 5141 - Introduction to Microsystem Technology (4.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5323 - VLSI Design I (3.0 cr)  
EE 5333 - Analog Integrated Circuit Design (3.0 cr)  
EE 5393 - Circuits, Computation, and Biology (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5545 - Digital Signal Processing Design (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5601 - Introduction to RF/Microwave Engineering (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 8591 - Predictive Learning from Data (3.0 cr)  
EE 8601 - Advanced Electromagnetic Theory (3.0 cr)  
HINF 5430 - Foundations of Health Informatics I (3.0 cr)  
HINF 5431 - Foundations of Health Informatics II (3.0 cr)  
HUMF 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)  
HUMF 5211 - Human Factors and Work Analysis (4.0 cr)  
IE 5111 - Systems Engineering I (2.0 cr)  
IE 5113 - Systems Engineering II (4.0 cr)  
IE 5511 - Human Factors and Work Analysis (4.0 cr)  
IE 5522 - Quality Engineering and Reliability (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 5553 - Simulation (4.0 cr)  
KIN 5001 - Foundations of Human Factors/Ergonomics (3.0 cr)  
KIN 5643 - Applied Motion Capture and Movement Analysis Technology (3.0 cr)  
MATH 5248 - Cryptology and Number Theory (4.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)



MATH 5447 - Theoretical Neuroscience (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8202 - General Algebra (3.0 cr)  
MATH 8253 - Algebraic Geometry (3.0 cr)  
MATS 8001 - Structure and Symmetry of Materials (3.0 cr)  
MATS 8002 - Thermodynamics and Kinetics (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5241 - Computer-Aided Engineering (4.0 cr)  
ME 5243 - Advanced Mechanism Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5281 - Feedback Control Systems (4.0 cr)  
ME 5286 - Robotics (4.0 cr)  
ME 5341 - Case Studies in Thermal Engineering and Design (4.0 cr)  
ME 5351 - Computational Heat Transfer (4.0 cr)  
ME 8254 - Fundamentals of Microelectromechanical Systems (MEMS) (4.0 cr)  
ME 8341 - Conduction (3.0 cr)  
ME 8342 - Convection (3.0 cr)  
ME 8343 - Radiation (3.0 cr)  
ME 8345 - Computational Heat Transfer and Fluid Flow (3.0 cr)  
MPHY 5170 - Basic Radiological Physics (3.0 cr)  
MPHY 5178 - Physical Principles of Magnetic Resonance Imaging (3.0 cr)  
MPHY 8147 - Advanced Physics of Magnetic Resonance Imaging (MRI) (3.0 cr)  
NSC 5202 - Theoretical Neuroscience: Systems and Information Processing (3.0 cr)  
OBIO 8027 - Biomaterials in Regenerative Dentistry (2.0 cr)  
PHM 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)  
PSY 5065 - Functional Imaging: Hands-on Training (3.0 cr)  
PUBH 6415 - Biostatistical Methods II (3.0 cr)  
PUBH 6450 - Biostatistics I (4.0 cr)  
PUBH 6451 - Biostatistics II (4.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
RSC 5135 - Advanced Biomechanics I: Kinematics (3.0 cr)  
RSC 5200 - Introduction to Neuromodulation (1.0 - 3.0 cr)  
RSC 5235 - Advanced Biomechanics II: Kinetics (3.0 cr)  
RSC 5841 - Applied Data Acquisition and Processing (3.0 cr)  
RSC 8135 - Human Kinematics (3.0 cr)  
RSC 8235 - Human Kinetics (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)

#### Free Electives (4 credits)

Select 4 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with director of graduate studies approval.

BMEN 8402 - New Product Design and Business Development (4.0 cr)  
BTHX 5100 - Introduction to Clinical Ethics (3.0 cr)  
BTHX 5120 - Dying in Contemporary Medical Culture (2.0 cr)  
BTHX 5210 - Ethics of Human Subjects Research (3.0 cr)  
BTHX 5300 - Foundations of Bioethics (3.0 cr)  
BTHX 5325 - Biomedical Ethics (3.0 cr)  
BTHX 5650 - Disability Ethics (3.0 cr)  
BTHX 8120 - Dying in Contemporary Medical Culture (2.0 cr)  
CMB 5912 - Creativity (1.0 cr)  
MILI 3589 - Medical Technology and Society [TS] (3.0 cr)  
MILI 6235 - Pharmaceutical Industry: Business and Policy (2.0 cr)  
MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)  
MOT 5001 - Technological Business Fundamentals (2.0 cr)  
MOT 5002 - Creating Technological Innovation (2.0 cr)



[MOT 5003](#) - Technological Business Planning Workshop (1.0 cr)  
[PDES 5701](#) - User-Centered Design Studio (3.0 cr)  
[PDES 5702](#) - Visual Communication (3.0 cr)  
[PDES 5704](#) - Computer-Aided Design Methods (3.0 cr)  
[PHAR 5204](#) - Drugs and the US Healthcare System (3.0 cr)  
[PSY 5036W](#) - Computational Vision [WI] (3.0 cr)  
[PUBH 6161](#) - Regulatory Toxicology (2.0 cr)  
[PUBH 6414](#) - Biostatistical Literacy (3.0 cr)  
[PUBH 7415](#) - Introduction to Clinical Trials (3.0 cr)  
[RSC 5106](#) - Introduction to Rehabilitation Science (1.0 cr)  
[SLHS 5804](#) - Cochlear Implants (3.0 cr)

**Thesis Credits (24 credits)**

Complete 24 credits after passing preliminary oral exam.

[BMEN 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Chemical Engineering M.Ch.E.**

*Chemical Engineering & Materials Science*

**College of Science and Engineering**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Chemical Engineering and Materials Science, University of Minnesota, 151 Amundson Hall, 421 Washington Avenue SE, Minneapolis, MN 55455 (612-625-0382; fax 612-626-7246)

Email: [cemsgrad@umn.edu](mailto:cemsgrad@umn.edu)

Website: <http://www.cems.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Chemical Engineering

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Research activities in the Chemical Engineering and Materials Science (CEMS) Department focus on the development of renewable energy technologies, the solution of important medical and biological engineering challenges, the development of advanced materials and characterization methods, and the application of sophisticated mathematical and theoretical models. Graduate courses offered cover core areas of chemical engineering (fluid mechanics, applied mathematics: linear and nonlinear analysis, transport, chemical thermodynamics, statistical thermodynamics and kinetics, and analysis of chemical reactors) and core areas of materials science (structure and symmetry of materials, thermodynamics and kinetics, transport, advanced mathematics, electronic properties of materials, and mechanical properties of materials). In addition, several specialized topics are offered, including biochemical engineering, biological transport processes, colloids, principles of mass transfer in engineering and biological engineering, rheology, process control, ceramics, polymers, scattering, and electrochemical engineering.

The master of chemical engineering (M.Ch.E.), also known as the professional master's, is designed for working professionals who are interested in obtaining a master's degree part-time. This degree requires a design project. Part-time students may also choose the M.S.Ch.E. Plan C, which is coursework only.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

A bachelor's degree in chemical engineering or other related field.

Other requirements to be completed before admission:

This professional master of engineering degree is designed for employees of local industries who wish to pursue their studies part time. No financial support is available. Applicants should contact the program before applying for admission.

### **Special Application Requirements:**

Applicants must submit scores from the General Test of the GRE; three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of official transcripts; and a clearly written statement summarizing research/work experience and motivation for graduate work. International students are required to provide TOEFL results.

Applications are accepted for fall semester only. December 15 is the application deadline; late applications are considered if space is available.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21



- Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 12 to 14 major credits, 6 to 8 credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

In addition to the coursework, MChE students are required to complete a design project. The work-related MChE design project consists of an in-depth study of an engineering design. It need not represent a publishable research project. While the amount of work should be the same as for a master's thesis, the project can contain elements that the thesis would not, such as economic considerations, design consultation, and social relevance.

### Core Courses (12-14 Credits)

In consultation with the advisor, select a minimum of 12 credits from the following.

- [CHEN 8101](#) - Fluid Mechanics (3.0 cr)
- [CHEN 8201](#) - Applied Math (3.0 cr)
- [CHEN 8301](#) - Physical Rate Processes I: Transport (3.0 cr)
- [CHEN 8401](#) - Physical and Chemical Thermodynamics (3.0 cr)
- [CHEN 8402](#) - Statistical Thermodynamics and Kinetics (3.0 cr)
- [CHEN 8501](#) - Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)

### Electives (6-8 credits)

In consultation with the advisor, select courses from the following to complete the course credit requirements. A minimum of 6 credits must be in non-CHEN courses. Additional courses may be approved by the director of graduate studies.

- [AEM 4511](#) - Mechanics of Composite Materials (3.0 cr)
- [AEM 5321](#) - Modern Feedback Control (3.0 cr)
- [AEM 5451](#) - Optimal Estimation (3.0 cr)
- [AEM 5501](#) - Continuum Mechanics (3.0 cr)
- [AEM 5503](#) - Theory of Elasticity (3.0 cr)
- [AEM 5581](#) - Mechanics of Solids (3.0 cr)
- [AEM 8201](#) - Fluid Mechanics I (3.0 cr)
- [AEM 8202](#) - Fluid Mechanics II (3.0 cr)
- [AEM 8203](#) - Fluid Mechanics III (3.0 cr)
- [AEM 8251](#) - Finite-Volume Methods in Computational Fluid Dynamics (3.0 cr)
- [AEM 8421](#) - Robust Multivariable Control Design (3.0 cr)
- [AEM 8423](#) - Convex Optimization Methods in Control (3.0 cr)
- [AEM 8525](#) - Elastic Stability of Materials (3.0 cr)
- [AEM 8531](#) - Fracture Mechanics (3.0 cr)
- [AEM 8541](#) - Mechanics of Crystalline Solids (3.0 cr)
- [AEM 8551](#) - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)
- [BBE 5001](#) - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)
- [BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)
- [BIOC 5351](#) - Protein Engineering (3.0 cr)
- [BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)
- [BIOC 5528](#) - Spectroscopy and Kinetics (4.0 cr)
- [BIOC 6021](#) - Biochemistry (3.0 cr)
- [BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)
- [BIOL 5950](#) - Special Topics (1.0 - 4.0 cr)



BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5041 - Tissue Engineering (3.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)  
CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)  
CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)  
CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)  
CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)  
CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)  
CEGE 8504 - Theory of Unit Operations (4.0 cr)  
CEGE 8505 - Biological Processes (3.0 cr)  
CHEM 5210 - Materials Characterization (4.0 cr)  
CHEM 5755 - X-Ray Crystallography (4.0 cr)  
CHEM 8011 - Mechanisms of Chemical Reactions (4.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEM 8151 - Analytical Separations and Chemical Equilibria (4.0 cr)  
CHEM 8152 - Analytical Spectroscopy (4.0 cr)  
CHEM 8201 - Materials Chemistry (4.0 cr)  
CHEM 8211 - Physical Polymer Chemistry (4.0 cr)  
CHEM 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEM 8321 - Organic Synthesis (4.0 cr)  
CHEM 8322 - Advanced Organic Chemistry (4.0 cr)  
CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)  
CHEM 8551 - Quantum Mechanics I (4.0 cr)  
CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)  
CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)  
CHEN 4214 - Polymers (3.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 5753 - Advanced Biomedical Transport Processes (3.0 cr)  
CHEN 5771 - Colloids and Dispersions (3.0 cr)  
CHEN 8101 - Fluid Mechanics (3.0 cr)  
CHEN 8102 - Principles and Applications of Rheology (2.0 cr)  
CHEN 8104 - Coating Process Fundamentals (2.0 cr)  
CHEN 8201 - Applied Math (3.0 cr)  
CHEN 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)  
CHEN 8401 - Physical and Chemical Thermodynamics (3.0 cr)  
CHEN 8402 - Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 8501 - Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)  
CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
EE 5163 - Semiconductor Properties and Devices I (3.0 cr)  
EE 5164 - Semiconductor Properties and Devices II (3.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5173 - Basic Microelectronics Laboratory (1.0 cr)  
EE 5181 - Micro and Nanotechnology by Self Assembly (3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)



EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 5622 - Physical Optics Laboratory (1.0 cr)  
EE 5624 - Optical Electronics (4.0 cr)  
EE 5640 - Introduction to Nano-Optics (3.0 cr)  
EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)  
EE 5655 - Magnetic Recording (3.0 cr)  
EE 5657 - Physical Principles of Thin Film Technology (4.0 cr)  
EE 8161 - Physics of Semiconductors (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
GCD 4034 - Molecular Genetics and Genomics (3.0 cr)  
GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)  
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
IE 8532 - Stochastic Processes and Queuing Systems (4.0 cr)  
MATH 4428 - Mathematical Modeling (4.0 cr)  
MATH 4512 - Differential Equations with Applications (3.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)  
MATH 5535 - Dynamical Systems and Chaos (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8450 - Topics in Numerical Analysis (1.0 - 3.0 cr)  
MATS 4214 - Polymers (3.0 cr)  
MATS 5517 - Microscopy of Materials (3.0 cr)  
MATS 5531 - Electrochemical Engineering (3.0 cr)  
MATS 8001 - Structure and Symmetry of Materials (3.0 cr)  
MATS 8002 - Thermodynamics and Kinetics (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)  
MATS 8004 - Mechanical Properties (3.0 cr)  
MATS 8201 - Applied Math (3.0 cr)  
MATS 8211 - Physical Chemistry of Polymers (4.0 cr)  
MATS 8217 - Transmission Electron Microscopy (3.0 cr)  
MATS 8221 - Synthetic Polymer Chemistry (4.0 cr)  
MATS 8301 - Physical Rate Processes I: Transport (3.0 cr)  
ME 5113 - Aerosol/Particle Engineering (4.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5446 - Introduction to Combustion (4.0 cr)  
ME 8341 - Conduction (3.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
MEDC 8753 - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)  
MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)  
PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)  
PHYS 8711 - Solid-State Physics I (3.0 cr)  
PHYS 8712 - Solid-State Physics II (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)





[STAT 5601](#) - Nonparametric Methods (3.0 cr)

**Thesis Credits**

10 thesis credits are required for the design project.

[CHEN 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Chemical Engineering M.S.Ch.E.**

*Chemical Engineering & Materials Science*

**College of Science and Engineering**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Chemical Engineering and Materials Science, University of Minnesota, 151 Amundson Hall, 421 Washington Ave SE, Minneapolis, MN 55455 (612-625-0382; fax: 612-626-7246)

Email: [cemsgrad@umn.edu](mailto:cemsgrad@umn.edu)

Website: <http://www.cems.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science in Chemical Engineering

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Research activities in the Chemical Engineering and Materials Science (CEMS) Department focus on the development of renewable energy technologies, the solution of important medical and biological engineering challenges, the development of advanced materials and characterization methods, and the application of sophisticated mathematical and theoretical models. Graduate courses offered cover core areas of chemical engineering (fluid mechanics, applied mathematics: linear and nonlinear analysis, transport, chemical thermodynamics, statistical thermodynamics and kinetics, and analysis of chemical reactors) and core areas of materials science (structure and symmetry of materials, thermodynamics and kinetics, transport, advanced mathematics, electronic properties of materials, and mechanical properties of materials). In addition, several specialized topics are offered, including biochemical engineering, biological transport processes, colloids, principles of mass transfer in engineering and biological engineering, rheology, process control, ceramics, polymers, scattering, and electrochemical engineering.

The Chemical Engineering program offers two types of master's degrees: the M.S.Ch.E. (Plan A or C) and the M.Ch.E. degree, also known as the professional master's. The M.S.Ch.E. Plan A degree is a thesis-based master's that requires the student to work in a faculty member's research laboratory. The M.S.Ch.E. Plan C degree is a coursework-based master's that is generally reserved only for current graduate students who choose not to seek a PhD. Working professionals who are interested in obtaining a master's degree part time should follow the requirements for the M.Ch.E. degree, which requires a design project.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

A bachelor's degree in chemical engineering or other related field.

Other requirements to be completed before admission:

With the exception of the professional master's degree (the MChE) and the MSChE Plan C, the CEMS Department focuses on the PhD and does not generally admit students directly to the MSChE Plan A degree.

### **Special Application Requirements:**

Applicants must submit scores from the General Test of the GRE; three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of official transcripts; and a clearly written statement summarizing research/work experience and motivation for graduate work. International students are required to provide TOEFL results.

Applications are accepted for fall semester only. December 15 is the application deadline; late applications are considered if space is available.

Applicants must submit their test score(s) from the following:

- GRE



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 12 to 14 major credits, 6 to 8 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan C:** Plan C requires 12 to 18 major credits and 12 to 18 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

### Core Courses (12-18 credits)

In consultation with the advisor, select a minimum of 12 credits from the following.

- [CHEN 8101](#) - Fluid Mechanics (3.0 cr)
- [CHEN 8201](#) - Applied Math (3.0 cr)
- [CHEN 8301](#) - Physical Rate Processes I: Transport (3.0 cr)
- [CHEN 8401](#) - Physical and Chemical Thermodynamics (3.0 cr)
- [CHEN 8402](#) - Statistical Thermodynamics and Kinetics (3.0 cr)
- [CHEN 8501](#) - Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)

### Electives (6-18 credits)

In consultation with the advisor, select courses to complete the course credit requirements. Plan A students must include a minimum of 6 credits in non-CHEN courses and Plan C students must include a minimum of 12 credits in non-CHEN courses. Additional courses may be approved by the director of graduate studies.

- [AEM 4511](#) - Mechanics of Composite Materials (3.0 cr)
- [AEM 5321](#) - Modern Feedback Control (3.0 cr)
- [AEM 5451](#) - Optimal Estimation (3.0 cr)
- [AEM 5501](#) - Continuum Mechanics (3.0 cr)
- [AEM 5503](#) - Theory of Elasticity (3.0 cr)
- [AEM 5581](#) - Mechanics of Solids (3.0 cr)
- [AEM 8201](#) - Fluid Mechanics I (3.0 cr)
- [AEM 8202](#) - Fluid Mechanics II (3.0 cr)
- [AEM 8203](#) - Fluid Mechanics III (3.0 cr)
- [AEM 8251](#) - Finite-Volume Methods in Computational Fluid Dynamics (3.0 cr)
- [AEM 8421](#) - Robust Multivariable Control Design (3.0 cr)
- [AEM 8423](#) - Convex Optimization Methods in Control (3.0 cr)
- [AEM 8525](#) - Elastic Stability of Materials (3.0 cr)
- [AEM 8531](#) - Fracture Mechanics (3.0 cr)
- [AEM 8541](#) - Mechanics of Crystalline Solids (3.0 cr)
- [AEM 8551](#) - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)
- [BBE 5001](#) - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)
- [BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)
- [BIOC 5351](#) - Protein Engineering (3.0 cr)
- [BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)
- [BIOC 5528](#) - Spectroscopy and Kinetics (4.0 cr)



BIOC 6021 - Biochemistry (3.0 cr)  
BIOC 8002 - Molecular Biology and Regulation of Biological Processes (3.0 cr)  
BIOL 5950 - Special Topics (1.0 - 4.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5041 - Tissue Engineering (3.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)  
CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)  
CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)  
CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)  
CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)  
CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)  
CEGE 8504 - Theory of Unit Operations (4.0 cr)  
CEGE 8505 - Biological Processes (3.0 cr)  
CHEM 5210 - Materials Characterization (4.0 cr)  
CHEM 5755 - X-Ray Crystallography (4.0 cr)  
CHEM 8011 - Mechanisms of Chemical Reactions (4.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEM 8151 - Analytical Separations and Chemical Equilibria (4.0 cr)  
CHEM 8152 - Analytical Spectroscopy (4.0 cr)  
CHEM 8201 - Materials Chemistry (4.0 cr)  
CHEM 8211 - Physical Polymer Chemistry (4.0 cr)  
CHEM 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEM 8321 - Organic Synthesis (4.0 cr)  
CHEM 8322 - Advanced Organic Chemistry (4.0 cr)  
CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)  
CHEM 8551 - Quantum Mechanics I (4.0 cr)  
CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)  
CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)  
CHEN 4214 - Polymers (3.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 5753 - Advanced Biomedical Transport Processes (3.0 cr)  
CHEN 5771 - Colloids and Dispersions (3.0 cr)  
CHEN 8101 - Fluid Mechanics (3.0 cr)  
CHEN 8102 - Principles and Applications of Rheology (2.0 cr)  
CHEN 8104 - Coating Process Fundamentals (2.0 cr)  
CHEN 8201 - Applied Math (3.0 cr)  
CHEN 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)  
CHEN 8401 - Physical and Chemical Thermodynamics (3.0 cr)  
CHEN 8402 - Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 8501 - Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)  
CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
EE 5163 - Semiconductor Properties and Devices I (3.0 cr)  
EE 5164 - Semiconductor Properties and Devices II (3.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5173 - Basic Microelectronics Laboratory (1.0 cr)  
EE 5181 - Micro and Nanotechnology by Self Assembly (3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)



EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 5622 - Physical Optics Laboratory (1.0 cr)  
EE 5624 - Optical Electronics (4.0 cr)  
EE 5640 - Introduction to Nano-Optics (3.0 cr)  
EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)  
EE 5655 - Magnetic Recording (3.0 cr)  
EE 5657 - Physical Principles of Thin Film Technology (4.0 cr)  
EE 8161 - Physics of Semiconductors (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
GCD 4034 - Molecular Genetics and Genomics (3.0 cr)  
GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)  
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
IE 8532 - Stochastic Processes and Queuing Systems (4.0 cr)  
MATH 4428 - Mathematical Modeling (4.0 cr)  
MATH 4512 - Differential Equations with Applications (3.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)  
MATH 5535 - Dynamical Systems and Chaos (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8450 - Topics in Numerical Analysis (1.0 - 3.0 cr)  
MATS 4214 - Polymers (3.0 cr)  
MATS 5517 - Microscopy of Materials (3.0 cr)  
MATS 5531 - Electrochemical Engineering (3.0 cr)  
MATS 8001 - Structure and Symmetry of Materials (3.0 cr)  
MATS 8002 - Thermodynamics and Kinetics (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)  
MATS 8004 - Mechanical Properties (3.0 cr)  
MATS 8201 - Applied Math (3.0 cr)  
MATS 8211 - Physical Chemistry of Polymers (4.0 cr)  
MATS 8217 - Transmission Electron Microscopy (3.0 cr)  
MATS 8221 - Synthetic Polymer Chemistry (4.0 cr)  
MATS 8301 - Physical Rate Processes I: Transport (3.0 cr)  
ME 5113 - Aerosol/Particle Engineering (4.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5446 - Introduction to Combustion (4.0 cr)  
ME 8341 - Conduction (3.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
MEDC 8753 - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)  
MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)  
PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)  
PHYS 8711 - Solid-State Physics I (3.0 cr)



[PHYS 8712](#) - Solid-State Physics II (3.0 cr)  
[STAT 5021](#) - Statistical Analysis (4.0 cr)  
[STAT 5303](#) - Designing Experiments (4.0 cr)  
[STAT 5601](#) - Nonparametric Methods (3.0 cr)

**Plan Options**

**Plan A (10 credits)**

Complete 10 thesis credits.

[CHEN 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan C**

Plan C students do not have additional requirements.



### **Twin Cities Campus**

## **Chemical Engineering Minor**

*Chemical Engineering & Materials Science*

**College of Science and Engineering**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Chemical Engineering and Materials Science, University of Minnesota, 151 Amundson Hall, 421 Washington Ave SE, Minneapolis, MN 55455 (612-625-0382; fax: 612-626-7246)

Email: [cemsgrad@umn.edu](mailto:cemsgrad@umn.edu)

Website: <http://www.cems.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Research in the Chemical Engineering and Materials Science (CEMS) Department spans all aspects of chemical and materials engineering ranging from fluid mechanics, transport, catalysis, and reactor design to bioengineering, renewable energy, polymer synthesis and processing, and advanced semiconductor growth and characterization. A strong tradition in mathematical modeling and computation complements experimental efforts. The research of CEMS core faculty and affiliated graduate faculty is organized into 14 themes: applied and computational mathematics; biological engineering; catalysis, separations and reaction engineering; electrochemical materials and devices; electronic, magnetic and photonic materials; electron microscopy; energy; materials processing; materials theory; nanomaterials and nanotechnology; nanomechanics and plasticity; polymer science and engineering; systems engineering; and transport and fluid mechanics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Chemical Engineering director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Minor programs must be approved by the Chemical Engineering director of graduate studies.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

#### **Minor Courses (6-12 credits)**

Master's students select a minimum of 6 credits, and doctoral students select a minimum of 12 credits in consultation with the Chemical Engineering director of graduate studies.

[CHEN 8101](#) - Fluid Mechanics (3.0 cr)

[CHEN 8201](#) - Applied Math (3.0 cr)

[CHEN 8301](#) - Physical Rate Processes I: Transport (3.0 cr)

[CHEN 8401](#) - Physical and Chemical Thermodynamics (3.0 cr)



[CHEN 8402](#) - Statistical Thermodynamics and Kinetics (3.0 cr)

[CHEN 8501](#) - Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters

Doctoral





### **Twin Cities Campus**

## **Chemical Engineering Ph.D.**

*Chemical Engineering & Materials Science*

**College of Science and Engineering**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Chemical Engineering and Materials Science, University of Minnesota, 151 Amundson Hall, 421 Washington Avenue SE, Minneapolis, MN 55455 (612-625-0382; fax: 612-626-7246)

Email: [cemsgrad@umn.edu](mailto:cemsgrad@umn.edu)

Website: <http://www.cems.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 57
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Research activities in the Chemical Engineering and Materials Science (CEMS) Department focus on the development of renewable energy technologies, the solution of important medical and biological engineering challenges, the development of advanced materials and characterization methods, and the application of sophisticated mathematical and theoretical models. Graduate courses offered cover core areas of chemical engineering (fluid mechanics, applied mathematics: linear and nonlinear analysis, transport, chemical thermodynamics, statistical thermodynamics and kinetics, and analysis of chemical reactors) and core areas of materials science (structure and symmetry of materials, thermodynamics and kinetics, transport, advanced mathematics, electronic properties of materials, and mechanical properties of materials). In addition, several specialized topics are offered, including biochemical engineering, biological transport processes, colloids, principles of mass transfer in engineering and biological engineering, rheology, process control, ceramics, polymers, scattering, and electrochemical engineering.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

A bachelor's degree in chemical engineering or related field.

Other requirements to be completed before admission:

Applicants must submit scores from the General Test of the GRE; three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of official transcripts; and a clearly written statement summarizing research/work experience and motivation for graduate work. International students are required to provide TOEFL results.

### **Special Application Requirements:**

Applications are accepted for fall semester only. Submission of all application materials by December 15 is strongly encouraged to ensure priority consideration for fellowships and assistantships; late applications are considered if space is available.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80



Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

21 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

Students must attend, but not enroll in, the departmental seminar for six semesters. Informal attendance will be done within the department.

### Core Courses (12 credits)

Take the following courses:

[CHEN 8101](#) - Fluid Mechanics (3.0 cr)

[CHEN 8201](#) - Applied Math (3.0 cr)

[CHEN 8301](#) - Physical Rate Processes I: Transport (3.0 cr)

[CHEN 8401](#) - Physical and Chemical Thermodynamics (3.0 cr)

[CHEN 8402](#) - Statistical Thermodynamics and Kinetics (3.0 cr)

[CHEN 8501](#) - Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)

### Outside Coursework (12 credits)

Select courses from the following in consultation with the advisor. Other courses may be selected with director of graduate studies approval.

[AEM 4511](#) - Mechanics of Composite Materials (3.0 cr)

[AEM 5321](#) - Modern Feedback Control (3.0 cr)

[AEM 5451](#) - Optimal Estimation (3.0 cr)

[AEM 5501](#) - Continuum Mechanics (3.0 cr)

[AEM 5503](#) - Theory of Elasticity (3.0 cr)

[AEM 5581](#) - Mechanics of Solids (3.0 cr)

[AEM 8201](#) - Fluid Mechanics I (3.0 cr)

[AEM 8202](#) - Fluid Mechanics II (3.0 cr)

[AEM 8203](#) - Fluid Mechanics III (3.0 cr)

[AEM 8251](#) - Finite-Volume Methods in Computational Fluid Dynamics (3.0 cr)

[AEM 8421](#) - Robust Multivariable Control Design (3.0 cr)

[AEM 8423](#) - Convex Optimization Methods in Control (3.0 cr)

[AEM 8525](#) - Elastic Stability of Materials (3.0 cr)

[AEM 8531](#) - Fracture Mechanics (3.0 cr)

[AEM 8541](#) - Mechanics of Crystalline Solids (3.0 cr)

[AEM 8551](#) - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)

[BBE 5001](#) - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)

[BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)

[BIOC 5351](#) - Protein Engineering (3.0 cr)

[BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)

[BIOC 5528](#) - Spectroscopy and Kinetics (4.0 cr)

[BIOC 6021](#) - Biochemistry (3.0 cr)

[BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)

[BIOL 5950](#) - Special Topics (1.0 - 4.0 cr)

[BMEN 5001](#) - Advanced Biomaterials (3.0 cr)

[BMEN 5041](#) - Tissue Engineering (3.0 cr)

[BMEN 5201](#) - Advanced Biomechanics (3.0 cr)

[BMEN 5311](#) - Advanced Biomedical Transport Processes (3.0 cr)

[BMEN 5321](#) - Microfluidics in Biology and Medicine (3.0 cr)



BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)  
CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)  
CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)  
CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)  
CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)  
CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)  
CEGE 8504 - Theory of Unit Operations (4.0 cr)  
CEGE 8505 - Biological Processes (3.0 cr)  
CHEM 5210 - Materials Characterization (4.0 cr)  
CHEM 5755 - X-Ray Crystallography (4.0 cr)  
CHEM 8011 - Mechanisms of Chemical Reactions (4.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEM 8151 - Analytical Separations and Chemical Equilibria (4.0 cr)  
CHEM 8152 - Analytical Spectroscopy (4.0 cr)  
CHEM 8201 - Materials Chemistry (4.0 cr)  
CHEM 8211 - Physical Polymer Chemistry (4.0 cr)  
CHEM 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEM 8321 - Organic Synthesis (4.0 cr)  
CHEM 8322 - Advanced Organic Chemistry (4.0 cr)  
CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)  
CHEM 8551 - Quantum Mechanics I (4.0 cr)  
CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)  
CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
EE 5163 - Semiconductor Properties and Devices I (3.0 cr)  
EE 5164 - Semiconductor Properties and Devices II (3.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5173 - Basic Microelectronics Laboratory (1.0 cr)  
EE 5181 - Micro and Nanotechnology by Self Assembly (3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 5622 - Physical Optics Laboratory (1.0 cr)  
EE 5624 - Optical Electronics (4.0 cr)  
EE 5640 - Introduction to Nano-Optics (3.0 cr)  
EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)  
EE 5655 - Magnetic Recording (3.0 cr)  
EE 5657 - Physical Principles of Thin Film Technology (4.0 cr)  
EE 8161 - Physics of Semiconductors (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
GCD 4034 - Molecular Genetics and Genomics (3.0 cr)  
GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)  
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
IE 8532 - Stochastic Processes and Queuing Systems (4.0 cr)



MATH 4428 - Mathematical Modeling (4.0 cr)  
MATH 4512 - Differential Equations with Applications (3.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)  
MATH 5535 - Dynamical Systems and Chaos (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8450 - Topics in Numerical Analysis (1.0 - 3.0 cr)  
MATS 4214 - Polymers (3.0 cr)  
MATS 5517 - Microscopy of Materials (3.0 cr)  
MATS 5531 - Electrochemical Engineering (3.0 cr)  
MATS 8001 - Structure and Symmetry of Materials (3.0 cr)  
MATS 8002 - Thermodynamics and Kinetics (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)  
MATS 8004 - Mechanical Properties (3.0 cr)  
MATS 8201 - Applied Math (3.0 cr)  
MATS 8211 - Physical Chemistry of Polymers (4.0 cr)  
MATS 8217 - Transmission Electron Microscopy (3.0 cr)  
MATS 8221 - Synthetic Polymer Chemistry (4.0 cr)  
MATS 8301 - Physical Rate Processes I: Transport (3.0 cr)  
ME 5113 - Aerosol/Particle Engineering (4.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5446 - Introduction to Combustion (4.0 cr)  
ME 8341 - Conduction (3.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
MEDC 8753 - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)  
MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)  
PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)  
PHYS 8711 - Solid-State Physics I (3.0 cr)  
PHYS 8712 - Solid-State Physics II (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5601 - Nonparametric Methods (3.0 cr)

### Electives

Select courses from the following, in consultation with the advisor, to complete the minimum number of course credits required. Other coursework may be selected with director of graduate studies approval.

CHEN 4214 - Polymers (3.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 5753 - Advanced Biomedical Transport Processes (3.0 cr)  
CHEN 5771 - Colloids and Dispersions (3.0 cr)  
CHEN 8101 - Fluid Mechanics (3.0 cr)  
CHEN 8102 - Principles and Applications of Rheology (2.0 cr)  
CHEN 8104 - Coating Process Fundamentals (2.0 cr)  
CHEN 8201 - Applied Math (3.0 cr)  
CHEN 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)  
CHEN 8401 - Physical and Chemical Thermodynamics (3.0 cr)  
CHEN 8402 - Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 8501 - Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)  
CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)



**Thesis Credits (24 credits)**

Complete 24 doctoral thesis credits after passing preliminary oral exam.

[CHEN 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### *Twin Cities Campus*

## Chemical Physics M.S.

Chemistry

### College of Science and Engineering

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Chemical Physics Program, University of Minnesota, 137 Smith Hall, 207 Pleasant St SE, Minneapolis, MN 55455 (612-626-7444; fax: 612-626-7541)

Email: [chmapply@umn.edu](mailto:chmapply@umn.edu)

Website: <http://chem.umn.edu/academics/graduate/chemical-physics>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Chemical physics focuses on research areas where the techniques of chemistry and physics are combined for the study of atoms and molecules; their interactions in gases, liquids, and solids; and the detailed structure and dynamics of material changes. Areas of research and specialization include spectroscopy, molecular collisions, chemical dynamics, quantum mechanics, statistical mechanics, thermodynamics, low-temperature behavior, polymers and macromolecules, surface science, and biochemical and heterogeneous catalysis.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.20.

An undergraduate degree in chemistry, physics, or a related field is required for admission.

Other requirements to be completed before admission:

Prospective graduate students should have adequate undergraduate preparation in chemistry, physics and mathematics.

Scores from the GRE general test are required for international applicants. A Subject GRE score is not required but is strongly recommended. The Subject GRE can be taken in chemistry, physics, or a related discipline.

#### **Special Application Requirements:**

Applications for fall semester must be completed by December 1 in order to be considered for financial support. Applications received after December 1 will be reviewed on a space available basis. The department prefers to admit for fall semester and will only consider spring admission under extenuating circumstances.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Internet Based - Speaking Score: 23
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 83

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is written. A capstone project is required.

**Capstone Project:** Each Plan B project should involve a combined total of approximately 160 hours (the equivalent of four full-time weeks) of library research, reading, and/or writing resulting in the preparation of a significant written document. Students who plan to work on Plan B projects independent of the Preliminary Examination should present a plan, after consultation with the chosen instructor for the Plan B project, outlining the number and content of their projects to the director of graduate studies. Projects should be completed to the satisfaction of the instructor; the final grade is determined by the instructor.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

All CHPH, CHEM, and PHYS courses must be taken at the 5xxx or 8xxx level. A maximum of 8 credits in 4xxx-level courses from other departments may be used with approval from the director of graduate studies.

Course credits must include at least 6 CHEM credits and 6 PHYS credits, or at least 3 credits each in quantum mechanics, thermodynamics, and statistical mechanics.

All first-year students must register for CHPH 8601 during both fall and spring semesters and for CHEM 8066 during the spring semester of their first year in residence.

### Major Courses (20-22 credits)

Plan A students select 20 credits, and Plan B students select 22 credits from the following list. Other coursework may be applied to this requirement with advisor approval. One credit each of CHEM 8066 and CHPH 8601 can be applied to degree requirements.

CHEM 5210 - Materials Characterization (4.0 cr)  
CHEM 5755 - X-Ray Crystallography (4.0 cr)  
CHEM 8011 - Mechanisms of Chemical Reactions (4.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEM 8066 - Professional Conduct of Chemical Research (1.0 cr)  
CHEM 8151 - Analytical Separations and Chemical Equilibria (4.0 cr)  
CHEM 8152 - Analytical Spectroscopy (4.0 cr)  
CHEM 8153 - Extracting Signal From Noise (5.0 cr)  
CHEM 8155 - Advanced Electroanalytical Chemistry (4.0 cr)  
CHEM 8157 - Bioanalytical Chemistry (4.0 cr)  
CHEM 8159 - Nuclear Magnetic Resonance Spectroscopy (4.0 cr)  
CHEM 8180 - Special Topics in Analytical Chemistry (2.0 - 4.0 cr)  
CHEM 8201 - Materials Chemistry (4.0 cr)  
CHEM 8211 - Physical Polymer Chemistry (4.0 cr)  
CHEM 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEM 8280 - Special Topics in Materials Chemistry (2.0 - 4.0 cr)  
CHEM 8321 - Organic Synthesis (4.0 cr)  
CHEM 8322 - Advanced Organic Chemistry (4.0 cr)  
CHEM 8352 - Physical Organic Chemistry (4.0 cr)  
CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)  
CHEM 8380 - Special Topics in Organic Chemistry (1.0 - 4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)  
CHEM 8413 - Nucleic Acids (4.0 cr)  
CHEM 8480 - Special Topics in Biological Chemistry (2.0 - 4.0 cr)  
CHEM 8541 - Dynamics (4.0 cr)



CHEM 8551 - Quantum Mechanics I (4.0 cr)  
CHEM 8552 - Quantum Mechanics II (2.0 cr)  
CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)  
CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)  
CHEM 8563 - Molecular Simulations (2.0 cr)  
CHEM 8564 - Laser Spectroscopy (2.0 cr)  
CHEM 8565 - Chemical Reaction Dynamics (2.0 cr)  
CHEM 8566 - Spin Dynamics (2.0 cr)  
CHEM 8567 - Biophysical Chemistry (2.0 cr)  
CHEM 8568 - Chemical Bonding at Surfaces (2.0 cr)  
CHEM 8569 - Electronic Structure (2.0 cr)  
CHEM 8580 - Special Topics in Physical Chemistry (2.0 - 4.0 cr)  
CHEM 8601 - Seminar: Modern Problems in Chemistry (1.0 cr)  
CHEM 8700 - Advanced Concepts in Medicinal Chemistry: Combinatorial Methods in Chemical Biology (2.0 cr)  
CHEM 8715 - Physical Inorganic Chemistry (4.0 cr)  
CHEM 8725 - Organometallic Chemistry (4.0 cr)  
CHEM 8735 - Bioinorganic Chemistry (4.0 cr)  
CHEM 8745 - Advanced Inorganic Chemistry (4.0 cr)  
CHEM 8780 - Special Topics in Inorganic Chemistry (2.0 - 4.0 cr)  
CHEM 8880 - Special Topics in Chemistry (2.0 - 4.0 cr)  
CHPH 8601 - Seminar: Modern Problems in Chemical Physics (1.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5011 - Classical Physics I (4.0 cr)  
PHYS 5012 - Classical Physics II (4.0 cr)  
PHYS 5022 - Relativity, Cosmology, and the Universe (4.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5621 - Introduction to Plasma Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)  
PHYS 8011 - Quantum Field Theory I (3.0 cr)  
PHYS 8012 - Quantum Field Theory II (3.0 cr)  
PHYS 8013 - Special Topics in Quantum Field Theory (3.0 cr)  
PHYS 8014 - Quantum many Body Systems (3.0 cr)  
PHYS 8161 - Atomic and Molecular Structure (3.0 cr)  
PHYS 8301 - Symmetry and Its Application to Physical Problems (3.0 cr)  
PHYS 8311 - Biological Physics of Single Molecules (3.0 cr)  
PHYS 8312 - Biological Physics of Macroscopic Systems (3.0 cr)  
PHYS 8501 - General Relativity and Cosmology I (3.0 cr)  
PHYS 8502 - General Relativity and Cosmology II (3.0 cr)  
PHYS 8601 - Plasma Physics I (3.0 cr)  
PHYS 8602 - Plasma Physics II (3.0 cr)  
PHYS 8611 - Cosmic Rays and Plasma Astrophysics (3.0 cr)  
PHYS 8650 - Advanced Topics in Space and Plasma Physics (3.0 cr)  
PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)  
PHYS 8711 - Solid-State Physics I (3.0 cr)  
PHYS 8712 - Solid-State Physics II (3.0 cr)  
PHYS 8750 - Advanced Topics in Condensed Matter Physics (3.0 cr)  
PHYS 8801 - Nuclear Physics I (3.0 cr)  
PHYS 8802 - Nuclear Physics II (3.0 cr)  
PHYS 8850 - Advanced Topics in Nuclear Physics (3.0 cr)  
PHYS 8901 - Elementary Particle Physics I (3.0 cr)  
PHYS 8902 - Elementary Particle Physics II (3.0 cr)  
PHYS 8911 - Introduction to Supersymmetry (3.0 cr)  
PHYS 8950 - Advanced Topics in Elementary Particle Physics (3.0 cr)

#### Plan Options

##### Plan A

Complete 10 master's thesis credits.

CHPH 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### Plan B (8 credits)

Take the Plan B project courses for 8 credits.





[CHPH 8081](#) - M.S. Plan B Project I (4.0 cr)

[CHPH 8082](#) - M.S. Plan B Project II (4.0 cr)



### *Twin Cities Campus*

## Chemical Physics Minor

*Chemistry*

### College of Science and Engineering

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Chemical Physics Program, University of Minnesota, 137 Smith Hall, 207 Pleasant Street SE, Minneapolis, MN 55455 (612-626-7444; fax: 612-626-7541)

Email: [chmapply@umn.edu](mailto:chmapply@umn.edu)

Website: <http://chem.umn.edu/academics/graduate/chemical-physics>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Chemical physics focuses on research areas where the techniques of chemistry and physics are combined for the study of atoms and molecules; their interactions in gases, liquids, and solids, and the detailed structure and dynamics of material changes. Areas of research and specialization include spectroscopy, molecular collisions, chemical dynamics, quantum mechanics, statistical mechanics, thermodynamics, low-temperature behavior, polymers and macromolecules, surface science, and biochemical and heterogeneous catalysis.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Chemical Physics director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

#### **Chemistry Coursework (3 to 6 credits)**

Master's students select 3 credits, and doctoral students select 6 credits from the following in consultation with their advisor and the Chemical Physics director of graduate studies:

[CHEM 5210](#) - Materials Characterization (4.0 cr)

[CHEM 5755](#) - X-Ray Crystallography (4.0 cr)

[CHEM 8011](#) - Mechanisms of Chemical Reactions (4.0 cr)

[CHEM 8021](#) - Computational Chemistry (4.0 cr)

[CHEM 8151](#) - Analytical Separations and Chemical Equilibria (4.0 cr)

[CHEM 8152](#) - Analytical Spectroscopy (4.0 cr)

[CHEM 8153](#) - Extracting Signal From Noise (5.0 cr)



CHEM 8155 - Advanced Electroanalytical Chemistry (4.0 cr)  
CHEM 8157 - Bioanalytical Chemistry (4.0 cr)  
CHEM 8159 - Nuclear Magnetic Resonance Spectroscopy (4.0 cr)  
CHEM 8180 - Special Topics in Analytical Chemistry (2.0 - 4.0 cr)  
CHEM 8201 - Materials Chemistry (4.0 cr)  
CHEM 8211 - Physical Polymer Chemistry (4.0 cr)  
CHEM 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEM 8280 - Special Topics in Materials Chemistry (2.0 - 4.0 cr)  
CHEM 8321 - Organic Synthesis (4.0 cr)  
CHEM 8322 - Advanced Organic Chemistry (4.0 cr)  
CHEM 8352 - Physical Organic Chemistry (4.0 cr)  
CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)  
CHEM 8380 - Special Topics in Organic Chemistry (1.0 - 4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)  
CHEM 8413 - Nucleic Acids (4.0 cr)  
CHEM 8480 - Special Topics in Biological Chemistry (2.0 - 4.0 cr)  
CHEM 8541 - Dynamics (4.0 cr)  
CHEM 8551 - Quantum Mechanics I (4.0 cr)  
CHEM 8552 - Quantum Mechanics II (2.0 cr)  
CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)  
CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)  
CHEM 8563 - Molecular Simulations (2.0 cr)  
CHEM 8564 - Laser Spectroscopy (2.0 cr)  
CHEM 8565 - Chemical Reaction Dynamics (2.0 cr)  
CHEM 8566 - Spin Dynamics (2.0 cr)  
CHEM 8567 - Biophysical Chemistry (2.0 cr)  
CHEM 8568 - Chemical Bonding at Surfaces (2.0 cr)  
CHEM 8569 - Electronic Structure (2.0 cr)  
CHEM 8580 - Special Topics in Physical Chemistry (2.0 - 4.0 cr)  
CHEM 8700 - Advanced Concepts in Medicinal Chemistry: Combinatorial Methods in Chemical Biology (2.0 cr)  
CHEM 8715 - Physical Inorganic Chemistry (4.0 cr)  
CHEM 8725 - Organometallic Chemistry (4.0 cr)  
CHEM 8735 - Bioinorganic Chemistry (4.0 cr)  
CHEM 8745 - Advanced Inorganic Chemistry (4.0 cr)  
CHEM 8780 - Special Topics in Inorganic Chemistry (2.0 - 4.0 cr)  
CHEM 8880 - Special Topics in Chemistry (2.0 - 4.0 cr)

### Physics Coursework (3 to 6 credits)

Master's students select 3 credits and doctoral students select 6 credits from the following in consultation with their advisor and the Chemical Physics director of graduate studies:

PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5011 - Classical Physics I (4.0 cr)  
PHYS 5012 - Classical Physics II (4.0 cr)  
PHYS 5022 - Relativity, Cosmology, and the Universe (4.0 cr)  
PHYS 5041 - Mathematical Methods for Physics (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5621 - Introduction to Plasma Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)  
PHYS 8011 - Quantum Field Theory I (3.0 cr)  
PHYS 8012 - Quantum Field Theory II (3.0 cr)  
PHYS 8013 - Special Topics in Quantum Field Theory (3.0 cr)  
PHYS 8014 - Quantum many Body Systems (3.0 cr)  
PHYS 8161 - Atomic and Molecular Structure (3.0 cr)  
PHYS 8200 - Seminar: Cosmology and High Energy Astrophysics (1.0 cr)  
PHYS 8301 - Symmetry and Its Application to Physical Problems (3.0 cr)  
PHYS 8311 - Biological Physics of Single Molecules (3.0 cr)  
PHYS 8312 - Biological Physics of Macroscopic Systems (3.0 cr)  
PHYS 8501 - General Relativity and Cosmology I (3.0 cr)  
PHYS 8502 - General Relativity and Cosmology II (3.0 cr)  
PHYS 8601 - Plasma Physics I (3.0 cr)  
PHYS 8602 - Plasma Physics II (3.0 cr)



PHYS 8611 - Cosmic Rays and Plasma Astrophysics (3.0 cr)  
PHYS 8650 - Advanced Topics in Space and Plasma Physics (3.0 cr)  
PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)  
PHYS 8711 - Solid-State Physics I (3.0 cr)  
PHYS 8712 - Solid-State Physics II (3.0 cr)  
PHYS 8750 - Advanced Topics in Condensed Matter Physics (3.0 cr)  
PHYS 8801 - Nuclear Physics I (3.0 cr)  
PHYS 8802 - Nuclear Physics II (3.0 cr)  
PHYS 8850 - Advanced Topics in Nuclear Physics (3.0 cr)  
PHYS 8901 - Elementary Particle Physics I (3.0 cr)  
PHYS 8902 - Elementary Particle Physics II (3.0 cr)  
PHYS 8911 - Introduction to Supersymmetry (3.0 cr)  
PHYS 8950 - Advanced Topics in Elementary Particle Physics (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### *Twin Cities Campus*

## Chemical Physics Ph.D.

Chemistry

### College of Science and Engineering

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Chemical Physics Program, University of Minnesota, 137 Smith Hall, 207 Pleasant St SE, Minneapolis, MN 55455 (612-626-7444; fax: 612-626-7541)

Email: [chmapply@umn.edu](mailto:chmapply@umn.edu)

Website: <http://chem.umn.edu/academics/graduate/chemical-physics>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Chemical physics focuses on research areas where the techniques of chemistry and physics are combined for the study of atoms and molecules; their interactions in gases, liquids, and solids; and the detailed structure and dynamics of material changes. Areas of research and specialization include spectroscopy, molecular collisions, chemical dynamics, quantum mechanics, statistical mechanics, thermodynamics, low-temperature behavior, polymers and macromolecules, surface science, and biochemical and heterogeneous catalysis.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.20.

An undergraduate degree in chemistry, physics, or a related field is required for admission.

Other requirements to be completed before admission:

Prospective graduate students should have adequate undergraduate preparation in chemistry, physics and mathematics.

Scores from the GRE general test are required for international applicants. A Subject GRE score is not required but is strongly recommended. The Subject GRE can be taken in chemistry, physics, or a related discipline.

#### **Special Application Requirements:**

Applications for fall semester must be completed by December 1 in order to be considered for financial support. Applications received after December 1 will be reviewed on a space available basis. The program prefers to admit for fall semester and will only consider spring admission under extenuating circumstances.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Internet Based - Speaking Score: 23
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 83



Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

All CHPH, CHEM, and PHYS courses must be taken at the 5xxx or 8xxx level. A maximum of 8 credits in 4xxx-level courses from other departments may be used with approval from the director of graduate studies.

The 24 course credits required must include either:

At least 5 CHEM credits and at least 5 PHYS credits, or

At least 16 credits in chemistry and/or physics combined, including at least 5 credits of quantum mechanics and at least 5 credits chosen from among the areas of thermodynamics, statistical mechanics, statistical physics, and chemical dynamics.

All first-year students must register for CHPH 8601 during both fall and spring semesters and for CHEM 8066 during the spring semester of their first year in residence.

### Major Courses (24 credits)

Select courses from the following list, or consult with the advisor for additional options. One credit each of CHEM 8066 and CHPH 8601 can be applied to degree requirements.

- [CHEM 5210](#) - Materials Characterization (4.0 cr)
- [CHEM 5755](#) - X-Ray Crystallography (4.0 cr)
- [CHEM 8011](#) - Mechanisms of Chemical Reactions (4.0 cr)
- [CHEM 8021](#) - Computational Chemistry (4.0 cr)
- [CHEM 8066](#) - Professional Conduct of Chemical Research (1.0 cr)
- [CHEM 8151](#) - Analytical Separations and Chemical Equilibria (4.0 cr)
- [CHEM 8152](#) - Analytical Spectroscopy (4.0 cr)
- [CHEM 8153](#) - Extracting Signal From Noise (5.0 cr)
- [CHEM 8155](#) - Advanced Electroanalytical Chemistry (4.0 cr)
- [CHEM 8157](#) - Bioanalytical Chemistry (4.0 cr)
- [CHEM 8159](#) - Nuclear Magnetic Resonance Spectroscopy (4.0 cr)
- [CHEM 8180](#) - Special Topics in Analytical Chemistry (2.0 - 4.0 cr)
- [CHEM 8201](#) - Materials Chemistry (4.0 cr)
- [CHEM 8211](#) - Physical Polymer Chemistry (4.0 cr)
- [CHEM 8221](#) - Synthetic Polymer Chemistry (4.0 cr)
- [CHEM 8280](#) - Special Topics in Materials Chemistry (2.0 - 4.0 cr)
- [CHEM 8321](#) - Organic Synthesis (4.0 cr)
- [CHEM 8322](#) - Advanced Organic Chemistry (4.0 cr)
- [CHEM 8352](#) - Physical Organic Chemistry (4.0 cr)
- [CHEM 8361](#) - Interpretation of Organic Spectra (4.0 cr)
- [CHEM 8380](#) - Special Topics in Organic Chemistry (1.0 - 4.0 cr)
- [CHEM 8411](#) - Introduction to Chemical Biology (4.0 cr)
- [CHEM 8412](#) - Chemical Biology of Enzymes (4.0 cr)
- [CHEM 8413](#) - Nucleic Acids (4.0 cr)
- [CHEM 8480](#) - Special Topics in Biological Chemistry (2.0 - 4.0 cr)
- [CHEM 8541](#) - Dynamics (4.0 cr)
- [CHEM 8551](#) - Quantum Mechanics I (4.0 cr)
- [CHEM 8552](#) - Quantum Mechanics II (2.0 cr)
- [CHEM 8561](#) - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)
- [CHEM 8562](#) - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)
- [CHEM 8563](#) - Molecular Simulations (2.0 cr)



CHEM 8564 - Laser Spectroscopy (2.0 cr)  
CHEM 8565 - Chemical Reaction Dynamics (2.0 cr)  
CHEM 8566 - Spin Dynamics (2.0 cr)  
CHEM 8567 - Biophysical Chemistry (2.0 cr)  
CHEM 8568 - Chemical Bonding at Surfaces (2.0 cr)  
CHEM 8569 - Electronic Structure (2.0 cr)  
CHEM 8580 - Special Topics in Physical Chemistry (2.0 - 4.0 cr)  
CHEM 8601 - Seminar: Modern Problems in Chemistry (1.0 cr)  
CHEM 8700 - Advanced Concepts in Medicinal Chemistry: Combinatorial Methods in Chemical Biology (2.0 cr)  
CHEM 8715 - Physical Inorganic Chemistry (4.0 cr)  
CHEM 8725 - Organometallic Chemistry (4.0 cr)  
CHEM 8735 - Bioinorganic Chemistry (4.0 cr)  
CHEM 8745 - Advanced Inorganic Chemistry (4.0 cr)  
CHEM 8780 - Special Topics in Inorganic Chemistry (2.0 - 4.0 cr)  
CHEM 8880 - Special Topics in Chemistry (2.0 - 4.0 cr)  
CHPH 8601 - Seminar: Modern Problems in Chemical Physics (1.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5011 - Classical Physics I (4.0 cr)  
PHYS 5012 - Classical Physics II (4.0 cr)  
PHYS 5022 - Relativity, Cosmology, and the Universe (4.0 cr)  
PHYS 5041 - Mathematical Methods for Physics (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5621 - Introduction to Plasma Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)  
PHYS 8011 - Quantum Field Theory I (3.0 cr)  
PHYS 8012 - Quantum Field Theory II (3.0 cr)  
PHYS 8013 - Special Topics in Quantum Field Theory (3.0 cr)  
PHYS 8014 - Quantum many Body Systems (3.0 cr)  
PHYS 8161 - Atomic and Molecular Structure (3.0 cr)  
PHYS 8301 - Symmetry and Its Application to Physical Problems (3.0 cr)  
PHYS 8311 - Biological Physics of Single Molecules (3.0 cr)  
PHYS 8312 - Biological Physics of Macroscopic Systems (3.0 cr)  
PHYS 8501 - General Relativity and Cosmology I (3.0 cr)  
PHYS 8502 - General Relativity and Cosmology II (3.0 cr)  
PHYS 8601 - Plasma Physics I (3.0 cr)  
PHYS 8602 - Plasma Physics II (3.0 cr)  
PHYS 8611 - Cosmic Rays and Plasma Astrophysics (3.0 cr)  
PHYS 8650 - Advanced Topics in Space and Plasma Physics (3.0 cr)  
PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)  
PHYS 8711 - Solid-State Physics I (3.0 cr)  
PHYS 8712 - Solid-State Physics II (3.0 cr)  
PHYS 8750 - Advanced Topics in Condensed Matter Physics (3.0 cr)  
PHYS 8801 - Nuclear Physics I (3.0 cr)  
PHYS 8802 - Nuclear Physics II (3.0 cr)  
PHYS 8850 - Advanced Topics in Nuclear Physics (3.0 cr)  
PHYS 8901 - Elementary Particle Physics I (3.0 cr)  
PHYS 8902 - Elementary Particle Physics II (3.0 cr)  
PHYS 8911 - Introduction to Supersymmetry (3.0 cr)  
PHYS 8950 - Advanced Topics in Elementary Particle Physics (3.0 cr)

**Thesis Credits (24 credits)**

Complete 24 doctoral thesis credits after passing preliminary oral exam.

CHPH 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Chemistry M.S.**

Chemistry

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Assistant to the Director of Graduate Studies, Department of Chemistry, University of Minnesota, 137 Smith Hall, 207 Pleasant St SE, Minneapolis, MN 55455 (612-626-7444 or 1-800-777-2431; fax: 612-626-7541)

Email: [chmapply@umn.edu](mailto:chmapply@umn.edu)

Website: <http://www.chem.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

While modern research in chemistry is very interdisciplinary, graduate work in the Department of Chemistry falls broadly into the focus areas of analytical chemistry, chemical biology, environmental chemistry, inorganic chemistry, materials chemistry, organic chemistry, polymer chemistry, experimental physical chemistry, and computational chemistry.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

An undergraduate degree in chemistry or a related field is required for admission.

Other requirements to be completed before admission:

Applicants must offer the substantial equivalent of the courses in analytical, inorganic, organic, and physical chemistry that are required of undergraduate majors in the University of Minnesota chemistry curriculum. They must also have at least one year of college physics, plus college mathematics through calculus.

Scores from the GRE general test are required for international applicants. A Subject GRE score is not required but is strongly recommended. The Subject GRE can be taken in chemistry or a related discipline.

#### **Special Application Requirements:**

Applications for fall semester must be completed by December 1 in order to be considered for fellowship support and teaching and research assistantships. Applications received after December 1 will be reviewed on a space available basis. The department prefers to admit for fall semester and will only consider spring admission under extenuating circumstances.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Internet Based - Speaking Score: 23
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 83





Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is written. A capstone project is required.

**Capstone Project:** Each Plan B project should involve a combined total of approximately 160 hours (the equivalent of four full-time weeks) of library research, reading, and/or writing resulting in the preparation of a significant written document. Students who plan to work on Plan B projects independent of the Preliminary Examination should present a plan, after consultation with the chosen instructor for the Plan B project, outlining the number and content of their projects to the director of graduate studies. Projects should be completed to the satisfaction of the instructor; the final grade is determined by the instructor.

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

All CHEM courses must be taken at the 5xxx or 8xxx level. A maximum of 8 credits in 4xxx-level courses from another department may be used with approval from the director of graduate studies.

All first-year students must register for CHEM 8601 during both fall and spring semesters and for CHEM 8066 during the spring semester of their first year in residence.

### Major Courses (20-30 credits)

Plan A students select 20 credits, Plan B students select 22 credits, and Plan C students select 30 credits from the following list. Other courses may be applied to this requirement with advisor approval. Students may count one credit each of CHEM 8066 and CHPH 8601 towards degree requirements.

- CHEM 5210 - Materials Characterization (4.0 cr)
- CHEM 5755 - X-Ray Crystallography (4.0 cr)
- CHEM 8011 - Mechanisms of Chemical Reactions (4.0 cr)
- CHEM 8021 - Computational Chemistry (4.0 cr)
- CHEM 8066 - Professional Conduct of Chemical Research (1.0 cr)
- CHEM 8151 - Analytical Separations and Chemical Equilibria (4.0 cr)
- CHEM 8152 - Analytical Spectroscopy (4.0 cr)
- CHEM 8153 - Extracting Signal From Noise (5.0 cr)
- CHEM 8155 - Advanced Electroanalytical Chemistry (4.0 cr)
- CHEM 8157 - Bioanalytical Chemistry (4.0 cr)
- CHEM 8159 - Nuclear Magnetic Resonance Spectroscopy (4.0 cr)
- CHEM 8180 - Special Topics in Analytical Chemistry (2.0 - 4.0 cr)
- CHEM 8201 - Materials Chemistry (4.0 cr)
- CHEM 8211 - Physical Polymer Chemistry (4.0 cr)
- CHEM 8221 - Synthetic Polymer Chemistry (4.0 cr)
- CHEM 8280 - Special Topics in Materials Chemistry (2.0 - 4.0 cr)
- CHEM 8321 - Organic Synthesis (4.0 cr)
- CHEM 8322 - Advanced Organic Chemistry (4.0 cr)
- CHEM 8352 - Physical Organic Chemistry (4.0 cr)
- CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)
- CHEM 8380 - Special Topics in Organic Chemistry (1.0 - 4.0 cr)
- CHEM 8411 - Introduction to Chemical Biology (4.0 cr)
- CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)
- CHEM 8413 - Nucleic Acids (4.0 cr)



- CHEM 8480 - Special Topics in Biological Chemistry (2.0 - 4.0 cr)
- CHEM 8541 - Dynamics (4.0 cr)
- CHEM 8551 - Quantum Mechanics I (4.0 cr)
- CHEM 8552 - Quantum Mechanics II (2.0 cr)
- CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)
- CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)
- CHEM 8563 - Molecular Simulations (2.0 cr)
- CHEM 8564 - Laser Spectroscopy (2.0 cr)
- CHEM 8565 - Chemical Reaction Dynamics (2.0 cr)
- CHEM 8566 - Spin Dynamics (2.0 cr)
- CHEM 8567 - Biophysical Chemistry (2.0 cr)
- CHEM 8568 - Chemical Bonding at Surfaces (2.0 cr)
- CHEM 8569 - Electronic Structure (2.0 cr)
- CHEM 8580 - Special Topics in Physical Chemistry (2.0 - 4.0 cr)
- CHEM 8601 - Seminar: Modern Problems in Chemistry (1.0 cr)
- CHEM 8700 - Advanced Concepts in Medicinal Chemistry: Combinatorial Methods in Chemical Biology (2.0 cr)
- CHEM 8715 - Physical Inorganic Chemistry (4.0 cr)
- CHEM 8725 - Organometallic Chemistry (4.0 cr)
- CHEM 8735 - Bioinorganic Chemistry (4.0 cr)
- CHEM 8745 - Advanced Inorganic Chemistry (4.0 cr)
- CHEM 8780 - Special Topics in Inorganic Chemistry (2.0 - 4.0 cr)
- CHEM 8880 - Special Topics in Chemistry (2.0 - 4.0 cr)

#### Plan Options

##### Plan A

Take 10 master's thesis credits.

CHEM 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### Plan B (8 credits)

Take the following project courses:

CHEM 8081 - M.S. Plan B Project I (1.0 - 4.0 cr)

CHEM 8082 - M.S. Plan B Project II (1.0 - 4.0 cr)

-OR-

##### Plan C



### **Twin Cities Campus**

## **Chemistry Minor**

Chemistry

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Assistant to the Director of Graduate Studies, Department of Chemistry, University of Minnesota, 137 Smith Hall, 207 Pleasant St SE, Minneapolis, MN 55455 (612-626-7444 or 1-800-777-2431; fax: 612-626-7541)

Email: [chmapply@umn.edu](mailto:chmapply@umn.edu)

Website: <http://www.chem.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

While modern research in chemistry is very interdisciplinary, graduate work in the Department of Chemistry falls broadly into the focus areas of analytical chemistry, chemical biology, environmental chemistry, inorganic chemistry, materials chemistry, organic chemistry, polymer chemistry, experimental physical chemistry, and computational chemistry.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

#### **Minor Coursework (6-12 credits)**

The following courses may be used for the minor or consult with the chemistry director of graduate studies for additional options.

Master's students select 6 credits and doctoral students select 12 credits.

- [CHEM 5210](#) - Materials Characterization (4.0 cr)
- [CHEM 5755](#) - X-Ray Crystallography (4.0 cr)
- [CHEM 8011](#) - Mechanisms of Chemical Reactions (4.0 cr)
- [CHEM 8021](#) - Computational Chemistry (4.0 cr)
- [CHEM 8151](#) - Analytical Separations and Chemical Equilibria (4.0 cr)
- [CHEM 8152](#) - Analytical Spectroscopy (4.0 cr)
- [CHEM 8153](#) - Extracting Signal From Noise (5.0 cr)
- [CHEM 8155](#) - Advanced Electroanalytical Chemistry (4.0 cr)
- [CHEM 8157](#) - Bioanalytical Chemistry (4.0 cr)
- [CHEM 8159](#) - Nuclear Magnetic Resonance Spectroscopy (4.0 cr)
- [CHEM 8180](#) - Special Topics in Analytical Chemistry (2.0 - 4.0 cr)
- [CHEM 8201](#) - Materials Chemistry (4.0 cr)
- [CHEM 8211](#) - Physical Polymer Chemistry (4.0 cr)
- [CHEM 8221](#) - Synthetic Polymer Chemistry (4.0 cr)



- CHEM 8280 - Special Topics in Materials Chemistry (2.0 - 4.0 cr)
- CHEM 8321 - Organic Synthesis (4.0 cr)
- CHEM 8322 - Advanced Organic Chemistry (4.0 cr)
- CHEM 8352 - Physical Organic Chemistry (4.0 cr)
- CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)
- CHEM 8380 - Special Topics in Organic Chemistry (1.0 - 4.0 cr)
- CHEM 8411 - Introduction to Chemical Biology (4.0 cr)
- CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)
- CHEM 8413 - Nucleic Acids (4.0 cr)
- CHEM 8480 - Special Topics in Biological Chemistry (2.0 - 4.0 cr)
- CHEM 8541 - Dynamics (4.0 cr)
- CHEM 8551 - Quantum Mechanics I (4.0 cr)
- CHEM 8552 - Quantum Mechanics II (2.0 cr)
- CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)
- CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)
- CHEM 8563 - Molecular Simulations (2.0 cr)
- CHEM 8564 - Laser Spectroscopy (2.0 cr)
- CHEM 8565 - Chemical Reaction Dynamics (2.0 cr)
- CHEM 8566 - Spin Dynamics (2.0 cr)
- CHEM 8567 - Biophysical Chemistry (2.0 cr)
- CHEM 8568 - Chemical Bonding at Surfaces (2.0 cr)
- CHEM 8569 - Electronic Structure (2.0 cr)
- CHEM 8580 - Special Topics in Physical Chemistry (2.0 - 4.0 cr)
- CHEM 8700 - Advanced Concepts in Medicinal Chemistry: Combinatorial Methods in Chemical Biology (2.0 cr)
- CHEM 8715 - Physical Inorganic Chemistry (4.0 cr)
- CHEM 8725 - Organometallic Chemistry (4.0 cr)
- CHEM 8735 - Bioinorganic Chemistry (4.0 cr)
- CHEM 8745 - Advanced Inorganic Chemistry (4.0 cr)
- CHEM 8780 - Special Topics in Inorganic Chemistry (2.0 - 4.0 cr)
- CHEM 8880 - Special Topics in Chemistry (2.0 - 4.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Chemistry Ph.D.**

Chemistry

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Assistant to the Director of Graduate Studies, Department of Chemistry, University of Minnesota, 137 Smith Hall, 207 Pleasant St SE, Minneapolis, MN 55455 (612-626-7444 or 1-800-777-2431; fax: 612-626-7541)

Email: [chmapply@umn.edu](mailto:chmapply@umn.edu)

Website: <http://www.chem.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

While modern research in chemistry is very interdisciplinary, graduate work in the Department of Chemistry falls broadly into the focus areas of analytical chemistry, chemical biology, environmental chemistry, inorganic chemistry, materials chemistry, organic chemistry, polymer chemistry, experimental physical chemistry, and computational chemistry.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.20.

An undergraduate degree in chemistry or a related field is required for admission.

Other requirements to be completed before admission:

Applicants must offer the substantial equivalent of the courses in analytical, inorganic, organic, and physical chemistry that are required of undergraduate majors in the University of Minnesota chemistry curriculum. They must also have at least one year of college physics, plus college mathematics through calculus.

Scores from the GRE general test are required for international applicants. A Subject GRE score is not required but is strongly recommended. The Subject GRE can be taken in chemistry or a related discipline.

#### **Special Application Requirements:**

Applications for fall semester must be completed by December 1 in order to be considered for fellowship support and teaching and research assistantships. Applications received after December 1 will be reviewed on a space available basis. The department prefers to admit for fall semester and will only consider spring admission under extenuating circumstances.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 95
  - Internet Based - Speaking Score: 23
- IELTS
  - Total Score: 7
- MELAB
  - Final score: 83



Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

All CHEM courses must be taken at the 5xxx or 8xxx level. A maximum of 8 credits in 4xxx-level courses from other departments may be used with approval from the director of graduate studies.

All first-year students must register for CHEM 8601 during both fall and spring semesters and for CHEM 8066 during the spring semester of their first year in residence.

### Major Courses (24 credits)

Select courses from the following list or consult with the advisor for further options. One credit each of CHEM 8066 and 8601 can be applied to degree requirements.

- CHEM 5210 - Materials Characterization (4.0 cr)
- CHEM 5755 - X-Ray Crystallography (4.0 cr)
- CHEM 8011 - Mechanisms of Chemical Reactions (4.0 cr)
- CHEM 8021 - Computational Chemistry (4.0 cr)
- CHEM 8066 - Professional Conduct of Chemical Research (1.0 cr)
- CHEM 8151 - Analytical Separations and Chemical Equilibria (4.0 cr)
- CHEM 8152 - Analytical Spectroscopy (4.0 cr)
- CHEM 8153 - Extracting Signal From Noise (5.0 cr)
- CHEM 8155 - Advanced Electroanalytical Chemistry (4.0 cr)
- CHEM 8157 - Bioanalytical Chemistry (4.0 cr)
- CHEM 8159 - Nuclear Magnetic Resonance Spectroscopy (4.0 cr)
- CHEM 8180 - Special Topics in Analytical Chemistry (2.0 - 4.0 cr)
- CHEM 8201 - Materials Chemistry (4.0 cr)
- CHEM 8211 - Physical Polymer Chemistry (4.0 cr)
- CHEM 8221 - Synthetic Polymer Chemistry (4.0 cr)
- CHEM 8280 - Special Topics in Materials Chemistry (2.0 - 4.0 cr)
- CHEM 8321 - Organic Synthesis (4.0 cr)
- CHEM 8322 - Advanced Organic Chemistry (4.0 cr)
- CHEM 8352 - Physical Organic Chemistry (4.0 cr)
- CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)
- CHEM 8380 - Special Topics in Organic Chemistry (1.0 - 4.0 cr)
- CHEM 8411 - Introduction to Chemical Biology (4.0 cr)
- CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)
- CHEM 8413 - Nucleic Acids (4.0 cr)
- CHEM 8480 - Special Topics in Biological Chemistry (2.0 - 4.0 cr)
- CHEM 8541 - Dynamics (4.0 cr)
- CHEM 8551 - Quantum Mechanics I (4.0 cr)
- CHEM 8552 - Quantum Mechanics II (2.0 cr)
- CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)
- CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)
- CHEM 8563 - Molecular Simulations (2.0 cr)
- CHEM 8564 - Laser Spectroscopy (2.0 cr)
- CHEM 8565 - Chemical Reaction Dynamics (2.0 cr)
- CHEM 8566 - Spin Dynamics (2.0 cr)



- CHEM 8567 - Biophysical Chemistry (2.0 cr)
- CHEM 8568 - Chemical Bonding at Surfaces (2.0 cr)
- CHEM 8569 - Electronic Structure (2.0 cr)
- CHEM 8580 - Special Topics in Physical Chemistry (2.0 - 4.0 cr)
- CHEM 8601 - Seminar: Modern Problems in Chemistry (1.0 cr)
- CHEM 8700 - Advanced Concepts in Medicinal Chemistry: Combinatorial Methods in Chemical Biology (2.0 cr)
- CHEM 8715 - Physical Inorganic Chemistry (4.0 cr)
- CHEM 8725 - Organometallic Chemistry (4.0 cr)
- CHEM 8735 - Bioinorganic Chemistry (4.0 cr)
- CHEM 8745 - Advanced Inorganic Chemistry (4.0 cr)
- CHEM 8780 - Special Topics in Inorganic Chemistry (2.0 - 4.0 cr)
- CHEM 8880 - Special Topics in Chemistry (2.0 - 4.0 cr)

**Thesis Credits (24 credits)**

Complete 24 credits after passing preliminary oral exam.

- CHEM 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Civil Engineering M.C.E.**

*CSENG Civil, Envrn & Geo-Eng (CEGE)*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Civil, Environmental, and Geo-Engineering, University of Minnesota, 122 Civil Engineering Building, 500 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-625-5522; fax: 612-626-7750)

Email: [cegesps@umn.edu](mailto:cegesps@umn.edu)

Website: <http://www.cege.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Civil Engineering

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Civil engineering emphases are available in environmental engineering (e.g., pollutant fate and transport, process modeling, soil and groundwater remediation, water and wastewater treatment), geomechanics (e.g., fracture and localization, groundwater flow, stability and liquefaction, wave and shock propagation), structural engineering (e.g., computational and structural mechanics, earthquake engineering, infrastructure performance and durability, new systems and materials), transportation engineering (e.g., intelligent transportation systems, pavement design and materials, transportation economics, traffic safety), and water resources engineering (e.g., earthscape processes, environmental and biological systems, hydrologic and climate dynamics, hydrodynamics, and turbulence).

The master of civil engineering (MCE) degree is designed for the practicing engineer who would like to obtain an advanced degree on a part-time or full-time basis. Students who intend to proceed to the PhD program or who think they may later wish to be admitted to the PhD program should apply for the master of science program. Students are expected to follow a coherent program of coursework in one of the following subareas of civil engineering: environmental, geomechanics, structural, transportation, or water resources engineering. The program is selected with the help of a faculty adviser and approved by the director of graduate studies. In addition to completing graduate-level courses, students must demonstrate professional competence either by carrying out and defending a design project or by taking a coursework-related final oral exam (without a project).

The degree typically takes 2-3 semesters (12-18 months) to complete on a full-time basis or 6-8 semesters on a part-time basis.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

An ABET-accredited, four-year bachelor's degree in engineering is required for admission.

Other requirements to be completed before admission:

The application deadlines are December 3 for fall admission and August 31 for spring admission. All materials must be submitted to the online application.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19





- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The Plan C requires 100 hours of project work and an oral presentation of no less than 10 minutes. Plan C coursework must include a minimum of two 8xxx-level courses.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N.

The MCE degree is offered under two plans. The Plan A requires preparation of a thesis/design project. The thesis/design project must be carried out by the student in consultation with a faculty adviser. The Plan C is a coursework-only degree program.

Plan C coursework must include a minimum of two 8xxx-level courses.

### Core Courses (12-30 credits)

Select at least 12 credits from the following in consultation with the advisor. One seminar credit (CEGE 8200, 8300, 8400, 8500) may be applied to this requirement.

- CEGE 4201 - Principles of Highway Design (3.0 cr)
- CEGE 4411 - Matrix Structural Analysis (3.0 cr)
- CEGE 4412 - Reinforced Concrete II (3.0 cr)
- CEGE 4413 - Steel Design II (3.0 cr)
- CEGE 4511 - Hydraulic Structures (3.0 cr)
- CEGE 4561 - Solids and Hazardous Wastes (3.0 cr)
- CEGE 4563 - Pollutant Fate and Transport: Processes and Modeling (3.0 cr)
- CEGE 5094 - Directed Research (1.0 - 4.0 cr)
- CEGE 5180 - Special Topics (1.0 - 4.0 cr)
- CEGE 5211 - Traffic Engineering (3.0 cr)
- CEGE 5212 - Transportation Policy, Planning, and Deployment (3.0 cr)
- CEGE 5213 - Transit Planning and Management (3.0 cr)
- CEGE 5214 - Transportation Systems Analysis (3.0 cr)
- CEGE 5341 - Wave Methods for Nondestructive Testing (3.0 cr)
- CEGE 5342 - Introduction to Inverse Problems (3.0 cr)
- CEGE 5351 - Advanced Engineering Mathematics I (3.0 cr)
- CEGE 5411 - Applied Structural Mechanics (3.0 cr)
- CEGE 5414 - Prestressed Concrete Design (3.0 cr)
- CEGE 5415 - Masonry Structures (3.0 cr)
- CEGE 5416 - Sensors in Infrastructure (3.0 cr)
- CEGE 5417 - Structural Engineering Design of Wood Buildings (3.0 cr)
- CEGE 5511 - Urban Hydrology and Water Quality (4.0 cr)
- CEGE 5512 - Stochastic Ecohydrology (3.0 cr)
- CEGE 5513 - Energy Conversion from Wind, Hydro and Solar Resources (3.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)
- CEGE 5543 - Introductory Environmental Fluid Mechanics (4.0 cr)
- CEGE 5551 - Environmental Microbiology (3.0 cr)
- CEGE 5552 - Environmental Microbiology Laboratory (1.0 cr)



- CEGE 5570 - Design for Sustainable Development - India (3.0 - 9.0 cr)
- CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)
- CEGE 8094 - Directed Research (1.0 - 4.0 cr)
- CEGE 8200 - Seminar: Transportation (1.0 cr)
- CEGE 8211 - Theory of Traffic Flow (4.0 cr)
- CEGE 8212 - Advanced Travel Demand Modeling and Supply Analysis (3.0 cr)
- CEGE 8213 - Advanced Transportation Technologies Seminar (1.0 cr)
- CEGE 8214 - Transportation Economics (4.0 cr)
- CEGE 8215 - Transportation Data Analysis (3.0 cr)
- CEGE 8216 - Urban Traffic Operations (3.0 cr)
- CEGE 8217 - Transportation Network Analysis (4.0 cr)
- CEGE 8218 - Dynamic Transportation Network Analysis (4.0 cr)
- CEGE 8231 - Advanced Pavement Engineering (3.0 cr)
- CEGE 8233 - Advanced Bituminous Materials Characterization (3.0 cr)
- CEGE 8300 - Seminar: Geomechanics (1.0 - 3.0 cr)
- CEGE 8301 - Fracture of Geomaterials (3.0 cr)
- CEGE 8302 - Soil/Rock Plasticity and Limit Analysis (4.0 cr)
- CEGE 8311 - Advanced Rock Mechanics (3.0 cr)
- CEGE 8321 - Thermoporoelasticity (4.0 cr)
- CEGE 8322 - Storage and Flow of Granular Materials (3.0 cr)
- CEGE 8331 - Modeling Geomechanical Processes (3.0 cr)
- CEGE 8336 - Boundary Element Methods I (3.0 cr)
- CEGE 8337 - Boundary Element Methods II (3.0 cr)
- CEGE 8341 - Wave Propagation in Solids and Structures (4.0 cr)
- CEGE 8351 - Advanced Engineering Mathematics II (3.0 cr)
- CEGE 8352 - Advanced Groundwater Mechanics II (3.0 cr)
- CEGE 8361 - Engineering Model Fitting (3.0 cr)
- CEGE 8400 - Seminar: Structures (1.0 cr)
- CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)
- CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)
- CEGE 8411 - Plate Structures (3.0 cr)
- CEGE 8412 - Shell Structures (3.0 cr)
- CEGE 8413 - Fracture and Scaling (3.0 cr)
- CEGE 8421 - Structural Dynamics (3.0 cr)
- CEGE 8422 - Earthquake Engineering (3.0 cr)
- CEGE 8431 - Structural Stability (3.0 cr)
- CEGE 8432 - Analysis of Thin-Walled Members (3.0 cr)
- CEGE 8441 - Ductile Behavior of Steel Structures (3.0 cr)
- CEGE 8442 - Nonlinear Analysis of Structural Systems (3.0 cr)
- CEGE 8443 - Fracture of Materials and Structures (3.0 cr)
- CEGE 8451 - Behavior of Reinforced Concrete Structures (3.0 cr)
- CEGE 8461 - Structural Reliability (3.0 cr)
- CEGE 8490 - Special Topics (1.0 - 4.0 cr)
- CEGE 8500 - Environmental Seminar (1.0 cr)
- CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)
- CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)
- CEGE 8503 - Environmental Mass Transport (4.0 cr)
- CEGE 8504 - Theory of Unit Operations (4.0 cr)
- CEGE 8505 - Biological Processes (3.0 cr)
- CEGE 8506 - Stochastic Hydrology (4.0 cr)
- CEGE 8507 - Advanced Methods in Hydrology (4.0 cr)
- CEGE 8508 - Ecological Fluid Mechanics (4.0 cr)
- CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)
- CEGE 8521 - The Atmospheric Boundary Layer (4.0 cr)
- CEGE 8541 - Aquatic Chemistry (3.0 cr)
- CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)
- CEGE 8551 - Environmental Microbiology: Molecular Theory and Methods (4.0 cr)
- CEGE 8552 - Groundwater Microbiology: Laboratory (4.0 cr)
- CEGE 8553 - Biofilms (3.0 cr)
- CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)
- CEGE 8562 - Analysis and Modeling of Aquatic Environments II (3.0 cr)
- CEGE 8563 - Industrial Waste Treatment (3.0 cr)
- CEGE 8571 - Hydraulic Measurements (3.0 cr)
- CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)
- CEGE 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)



CEGE 8601 - Introduction to Stream Restoration (3.0 cr)  
CEGE 8602 - Stream Restoration Practice (2.0 cr)

### Electives (0-18 credits)

Select courses from the following as needed, in consultation with the advisor, to complete the minimum number of course credits required. Coursework from the Core Courses list, as well as other courses, can be selected with director of graduate studies approval.

AEM 4511 - Mechanics of Composite Materials (3.0 cr)  
AEM 5501 - Continuum Mechanics (3.0 cr)  
AEM 5503 - Theory of Elasticity (3.0 cr)  
AEM 8211 - Theory of Turbulence I (3.0 cr)  
AEM 8525 - Elastic Stability of Materials (3.0 cr)  
AEM 8531 - Fracture Mechanics (3.0 cr)  
AEM 8551 - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)  
APEC 5031 - Methods of Economic Data Analysis (3.0 cr)  
ARCH 5391 - Design and Representation with BIM (3.0 cr)  
ARCH 5671 - Historic Preservation (3.0 cr)  
BBE 5513 - Watershed Engineering (3.0 cr)  
BBE 5523 - Ecological Engineering Design (3.0 cr)  
BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)  
BBE 5753 - Air Quality and Pollution Control Engineering (3.0 cr)  
BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
CHEM 5210 - Materials Characterization (4.0 cr)  
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
EEB 5601 - Limnology (3.0 cr)  
ESCI 8801 - Geomicrobiology (3.0 cr)  
ESPM 5071 - Ecological Restoration (4.0 cr)  
ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)  
FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
GCC 5005 - Innovation for the Public Good: Post-Pandemic Venture Design [GP] (3.0 cr)  
GEOG 5561 - Principles of Geographic Information Science (4.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)  
LAAS 5621 - Soil and Environmental Genomics (3.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8402 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)  
PA 5231 - Transit Planning and Management (3.0 cr)  
PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)  
PA 5880 - Exploring Global Cities (1.0 - 3.0 cr)  
PA 5926 - Presentation Skills: How to Inspire Your Audience and Change the World (1.0 cr)  
PUBH 6132 - Air, Water, and Health (2.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
WRS 5101 - Water Policy (3.0 cr)  
WRS 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

### Plan Options

#### Plan A

Complete 10 master's thesis credits for the design project.



[CEGE 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan C**



### **Twin Cities Campus**

## **Civil Engineering M.S.**

*CSENG Civil, Envrn & Geo-Eng (CEGE)*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Civil, Environmental, and Geo-Engineering, University of Minnesota, 122 Civil Engineering Building, 500 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-625-5522; fax: 612-626-7750)

Email: [cegesps@umn.edu](mailto:cegesps@umn.edu)

Website: <http://www.cege.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Civil engineering emphases are available in environmental engineering (e.g., pollutant fate and transport, process modeling, soil and groundwater remediation, water and wastewater treatment), geomechanics (e.g., fracture and localization, groundwater flow, stability and liquefaction, wave and shock propagation), structural engineering (e.g., computational and structural mechanics, earthquake engineering, infrastructure performance and durability, new systems and materials), transportation engineering (e.g., intelligent transportation systems, pavement design and materials, transportation economics, traffic safety), and water resources engineering (e.g., earthscape processes, environmental and biological systems, hydrologic and climate dynamics, hydrodynamics, and turbulence).

The master of science (M.S.) degree balances education in engineering fundamentals and design, and provides preparation for students wishing to pursue a career in industry, as well as those wanting to continue studies toward a Ph.D. degree. Programs range from the Plan C, which is a coursework-only program, to the Plan A, which balances coursework with research and development. The Plan C program is intended for practicing engineers who want to pursue a degree on a part-time basis, self-funded full-time students, as well as students who plan to continue on for a Ph.D. degree.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree in an engineering, basic science, or mathematics program is preferred.

Other requirements to be completed before admission:

Admission depends primarily on the applicant's academic record and letters of recommendation. Applicants who lack civil engineering training are often required to complete one or more appropriate courses from the undergraduate civil engineering program. Graduate credit is not awarded for such preparatory work.

Eligibility requirements for the integrated BS/MS program:

Application is open to civil engineering undergraduates who:

- are within 32 credits of completing the requirements for the bachelors degree;
- have a faculty advisor selected prior to admission; and
- hold a cumulative GPA of 3.3 or higher.

#### **Special Application Requirements:**

The application deadlines are December 3 for fall admission and August 31 for spring admission. All materials must be submitted to the online application.



Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B requires completion of 1 to 3 Plan B papers as determined by the faculty advisor. Plan B papers can include computer programs, annotated bibliographies, field investigations, and analysis/design of special engineering problems.

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The Plan C requires 100 hours of project work and an oral presentation of no less than 10 minutes.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N.

Plan C coursework must include a minimum of 2 8xxx-level courses.

### Core Courses (12-30 credits)

Select at least 12 credits from the following in consultation with the advisor. One seminar credit (CEGE 8200, 8300, 8400, 8500) may be applied to this requirement.

- CEGE 4201 - Principles of Highway Design (3.0 cr)
- CEGE 4411 - Matrix Structural Analysis (3.0 cr)
- CEGE 4412 - Reinforced Concrete II (3.0 cr)
- CEGE 4413 - Steel Design II (3.0 cr)
- CEGE 4511 - Hydraulic Structures (3.0 cr)
- CEGE 4561 - Solids and Hazardous Wastes (3.0 cr)
- CEGE 4563 - Pollutant Fate and Transport: Processes and Modeling (3.0 cr)
- CEGE 5094 - Directed Research (1.0 - 4.0 cr)
- CEGE 5180 - Special Topics (1.0 - 4.0 cr)
- CEGE 5211 - Traffic Engineering (3.0 cr)
- CEGE 5212 - Transportation Policy, Planning, and Deployment (3.0 cr)
- CEGE 5213 - Transit Planning and Management (3.0 cr)
- CEGE 5214 - Transportation Systems Analysis (3.0 cr)
- CEGE 5341 - Wave Methods for Nondestructive Testing (3.0 cr)
- CEGE 5342 - Introduction to Inverse Problems (3.0 cr)
- CEGE 5351 - Advanced Engineering Mathematics I (3.0 cr)



- CEGE 5411 - Applied Structural Mechanics (3.0 cr)
- CEGE 5414 - Prestressed Concrete Design (3.0 cr)
- CEGE 5415 - Masonry Structures (3.0 cr)
- CEGE 5416 - Sensors in Infrastructure (3.0 cr)
- CEGE 5417 - Structural Engineering Design of Wood Buildings (3.0 cr)
- CEGE 5511 - Urban Hydrology and Water Quality (4.0 cr)
- CEGE 5512 - Stochastic Ecohydrology (3.0 cr)
- CEGE 5513 - Energy Conversion from Wind, Hydro and Solar Resources (3.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)
- CEGE 5543 - Introductory Environmental Fluid Mechanics (4.0 cr)
- CEGE 5551 - Environmental Microbiology (3.0 cr)
- CEGE 5552 - Environmental Microbiology Laboratory (1.0 cr)
- CEGE 5570 - Design for Sustainable Development - India (3.0 - 9.0 cr)
- CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)
- CEGE 8094 - Directed Research (1.0 - 4.0 cr)
- CEGE 8200 - Seminar: Transportation (1.0 cr)
- CEGE 8211 - Theory of Traffic Flow (4.0 cr)
- CEGE 8212 - Advanced Travel Demand Modeling and Supply Analysis (3.0 cr)
- CEGE 8213 - Advanced Transportation Technologies Seminar (1.0 cr)
- CEGE 8214 - Transportation Economics (4.0 cr)
- CEGE 8215 - Transportation Data Analysis (3.0 cr)
- CEGE 8216 - Urban Traffic Operations (3.0 cr)
- CEGE 8217 - Transportation Network Analysis (4.0 cr)
- CEGE 8218 - Dynamic Transportation Network Analysis (4.0 cr)
- CEGE 8231 - Advanced Pavement Engineering (3.0 cr)
- CEGE 8233 - Advanced Bituminous Materials Characterization (3.0 cr)
- CEGE 8300 - Seminar: Geomechanics (1.0 - 3.0 cr)
- CEGE 8301 - Fracture of Geomaterials (3.0 cr)
- CEGE 8302 - Soil/Rock Plasticity and Limit Analysis (4.0 cr)
- CEGE 8311 - Advanced Rock Mechanics (3.0 cr)
- CEGE 8321 - Thermoporoelasticity (4.0 cr)
- CEGE 8322 - Storage and Flow of Granular Materials (3.0 cr)
- CEGE 8331 - Modeling Geomechanical Processes (3.0 cr)
- CEGE 8336 - Boundary Element Methods I (3.0 cr)
- CEGE 8337 - Boundary Element Methods II (3.0 cr)
- CEGE 8341 - Wave Propagation in Solids and Structures (4.0 cr)
- CEGE 8351 - Advanced Engineering Mathematics II (3.0 cr)
- CEGE 8352 - Advanced Groundwater Mechanics II (3.0 cr)
- CEGE 8361 - Engineering Model Fitting (3.0 cr)
- CEGE 8400 - Seminar: Structures (1.0 cr)
- CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)
- CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)
- CEGE 8411 - Plate Structures (3.0 cr)
- CEGE 8412 - Shell Structures (3.0 cr)
- CEGE 8413 - Fracture and Scaling (3.0 cr)
- CEGE 8421 - Structural Dynamics (3.0 cr)
- CEGE 8422 - Earthquake Engineering (3.0 cr)
- CEGE 8431 - Structural Stability (3.0 cr)
- CEGE 8432 - Analysis of Thin-Walled Members (3.0 cr)
- CEGE 8441 - Ductile Behavior of Steel Structures (3.0 cr)
- CEGE 8442 - Nonlinear Analysis of Structural Systems (3.0 cr)
- CEGE 8443 - Fracture of Materials and Structures (3.0 cr)
- CEGE 8451 - Behavior of Reinforced Concrete Structures (3.0 cr)
- CEGE 8461 - Structural Reliability (3.0 cr)
- CEGE 8490 - Special Topics (1.0 - 4.0 cr)
- CEGE 8500 - Environmental Seminar (1.0 cr)
- CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)
- CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)
- CEGE 8503 - Environmental Mass Transport (4.0 cr)
- CEGE 8504 - Theory of Unit Operations (4.0 cr)
- CEGE 8505 - Biological Processes (3.0 cr)
- CEGE 8506 - Stochastic Hydrology (4.0 cr)
- CEGE 8507 - Advanced Methods in Hydrology (4.0 cr)
- CEGE 8508 - Ecological Fluid Mechanics (4.0 cr)



CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)  
CEGE 8521 - The Atmospheric Boundary Layer (4.0 cr)  
CEGE 8541 - Aquatic Chemistry (3.0 cr)  
CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)  
CEGE 8551 - Environmental Microbiology: Molecular Theory and Methods (4.0 cr)  
CEGE 8552 - Groundwater Microbiology: Laboratory (4.0 cr)  
CEGE 8553 - Biofilms (3.0 cr)  
CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)  
CEGE 8562 - Analysis and Modeling of Aquatic Environments II (3.0 cr)  
CEGE 8563 - Industrial Waste Treatment (3.0 cr)  
CEGE 8571 - Hydraulic Measurements (3.0 cr)  
CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)  
CEGE 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)  
CEGE 8601 - Introduction to Stream Restoration (3.0 cr)  
CEGE 8602 - Stream Restoration Practice (2.0 cr)

#### Electives (0-18 credits)

Select courses from the following as needed, in consultation with the advisor, to complete the minimum course credits required. Coursework from the Core Courses list, as well as other courses, can be selected with director of graduate studies approval.

AEM 4511 - Mechanics of Composite Materials (3.0 cr)  
AEM 5501 - Continuum Mechanics (3.0 cr)  
AEM 5503 - Theory of Elasticity (3.0 cr)  
AEM 8211 - Theory of Turbulence I (3.0 cr)  
AEM 8525 - Elastic Stability of Materials (3.0 cr)  
AEM 8531 - Fracture Mechanics (3.0 cr)  
AEM 8551 - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)  
APEC 5031 - Methods of Economic Data Analysis (3.0 cr)  
ARCH 5391 - Design and Representation with BIM (3.0 cr)  
ARCH 5671 - Historic Preservation (3.0 cr)  
BBE 5513 - Watershed Engineering (3.0 cr)  
BBE 5523 - Ecological Engineering Design (3.0 cr)  
BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)  
BBE 5753 - Air Quality and Pollution Control Engineering (3.0 cr)  
BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
CHEM 5210 - Materials Characterization (4.0 cr)  
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
EEB 5601 - Limnology (3.0 cr)  
ESCI 8801 - Geomicrobiology (3.0 cr)  
ESPM 5071 - Ecological Restoration (4.0 cr)  
ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)  
FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
GCC 5005 - Innovation for the Public Good: Post-Pandemic Venture Design [GP] (3.0 cr)  
GEOG 5561 - Principles of Geographic Information Science (4.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)  
LAAS 5621 - Soil and Environmental Genomics (3.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8402 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)  
PA 5231 - Transit Planning and Management (3.0 cr)





PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)  
PA 5880 - Exploring Global Cities (1.0 - 3.0 cr)  
PA 5926 - Presentation Skills: How to Inspire Your Audience and Change the World (1.0 cr)  
PUBH 6132 - Air, Water, and Health (2.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
WRS 5101 - Water Policy (3.0 cr)  
WRS 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

### Plan Options

#### Plan A

Take 10 master's thesis credits.

CEGE 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B (0-3 credits)

Up to 3 credits of CEGE 8094 may be applied to the 30-credit minimum.

CEGE 8094 - Directed Research (1.0 - 4.0 cr)

-OR-

#### Plan C

**Joint- or Dual-degree Coursework:**MS-Civil Engineering/ MSISyE (Transportation Engineering Focus): 15 common creditsMS-Civil Engineering/MURP (Transportation or Environmental Engineering Focus): 18 common credits

### Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

#### Integrated B.C.E./M.S. - Civil Engineering

The department offers an integrated Bachelor of Civil Engineering (BCE) and Master of Science (MS) in Civil Engineering. The integrated BCE/MS program offers students the opportunity to earn a bachelor's degree and a master's degree in five years. These programs offer several benefits: streamlined admissions from the undergraduate to the graduate program (GRE not required); flexibility in fulfilling required courses for both degrees during the senior year (up to 16 credits can be transferred to the graduate program); and eligibility for teaching and research assistantships.

Both the BCE and MS degrees must be completed in their entirety, with no courses shared between them. The graduate degree cannot be earned before the undergraduate requirements are satisfied. Admitted students who decide not to complete the MS degree are permitted to count credits originally planned for the graduate program toward their BCE technical electives.

#### Integrated B.GeoE./M.S. - Civil Engineering

The department offers an integrated Bachelor of Geoengineering (B.GeoE.) and Master of Science (MS) in Civil Engineering. Benefits, eligibility requirements, and degree-completion requirements outlined for the BCE/MS integrated program also apply to the B.GeoE./MS

#### Integrated B.Env.E./M.S. - Civil Engineering

The department offers an integrated Bachelor of Environmental Engineering (B.Env.E.) and Master of Science (MS) in Civil Engineering. Benefits, eligibility requirements, and degree-completion requirements outlined for the BCE/MS integrated program also apply to the B.Env.E./MS



### **Twin Cities Campus**

## **Civil Engineering Minor**

*CSENG Civil, Envrn & Geo-Eng (CEGE)*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Civil, Environmental, and Geo-Engineering, University of Minnesota, 122 Civil Engineering Building, 500 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-625-5522; fax: 612-626-7750)

Email: [cegesps@umn.edu](mailto:cegesps@umn.edu)

Website: <http://www.cege.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Civil engineering emphases are available in environmental engineering (e.g., pollutant fate and transport, process modeling, soil and groundwater remediation, water and wastewater treatment), geomechanics (e.g., fracture and localization, groundwater flow, stability and liquefaction, wave and shock propagation), structural engineering (e.g., computational and structural mechanics, earthquake engineering, infrastructure performance and durability, new systems and materials), transportation engineering (e.g., intelligent transportation systems, pavement design and materials, transportation economics, traffic safety), and water resources engineering (e.g., earthscape processes, environmental and biological systems, hydrologic and climate dynamics, hydrodynamics, and turbulence).

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Civil Engineering director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N.

The minimum cumulative GPA for the minor is 3.00.

#### **Minor Coursework (6-12 credits)**

Master's students select 6 credits, and doctoral students select 12 credits from the following in consultation with the Civil Engineering director of graduate studies:

- [CEGE 5211](#) - Traffic Engineering (3.0 cr)
- [CEGE 5212](#) - Transportation Policy, Planning, and Deployment (3.0 cr)
- [CEGE 5213](#) - Transit Planning and Management (3.0 cr)
- [CEGE 5214](#) - Transportation Systems Analysis (3.0 cr)
- [CEGE 5341](#) - Wave Methods for Nondestructive Testing (3.0 cr)
- [CEGE 5342](#) - Introduction to Inverse Problems (3.0 cr)
- [CEGE 5351](#) - Advanced Engineering Mathematics I (3.0 cr)



- CEGE 5411 - Applied Structural Mechanics (3.0 cr)
- CEGE 5414 - Prestressed Concrete Design (3.0 cr)
- CEGE 5415 - Masonry Structures (3.0 cr)
- CEGE 5416 - Sensors in Infrastructure (3.0 cr)
- CEGE 5417 - Structural Engineering Design of Wood Buildings (3.0 cr)
- CEGE 5511 - Urban Hydrology and Water Quality (4.0 cr)
- CEGE 5512 - Stochastic Ecohydrology (3.0 cr)
- CEGE 5513 - Energy Conversion from Wind, Hydro and Solar Resources (3.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)
- CEGE 5543 - Introductory Environmental Fluid Mechanics (4.0 cr)
- CEGE 5551 - Environmental Microbiology (3.0 cr)
- CEGE 5552 - Environmental Microbiology Laboratory (1.0 cr)
- CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)
- CEGE 8211 - Theory of Traffic Flow (4.0 cr)
- CEGE 8212 - Advanced Travel Demand Modeling and Supply Analysis (3.0 cr)
- CEGE 8213 - Advanced Transportation Technologies Seminar (1.0 cr)
- CEGE 8214 - Transportation Economics (4.0 cr)
- CEGE 8215 - Transportation Data Analysis (3.0 cr)
- CEGE 8216 - Urban Traffic Operations (3.0 cr)
- CEGE 8217 - Transportation Network Analysis (4.0 cr)
- CEGE 8218 - Dynamic Transportation Network Analysis (4.0 cr)
- CEGE 8231 - Advanced Pavement Engineering (3.0 cr)
- CEGE 8233 - Advanced Bituminous Materials Characterization (3.0 cr)
- CEGE 8301 - Fracture of Geomaterials (3.0 cr)
- CEGE 8302 - Soil/Rock Plasticity and Limit Analysis (4.0 cr)
- CEGE 8311 - Advanced Rock Mechanics (3.0 cr)
- CEGE 8321 - Thermoporoelasticity (4.0 cr)
- CEGE 8322 - Storage and Flow of Granular Materials (3.0 cr)
- CEGE 8331 - Modeling Geomechanical Processes (3.0 cr)
- CEGE 8336 - Boundary Element Methods I (3.0 cr)
- CEGE 8337 - Boundary Element Methods II (3.0 cr)
- CEGE 8341 - Wave Propagation in Solids and Structures (4.0 cr)
- CEGE 8351 - Advanced Engineering Mathematics II (3.0 cr)
- CEGE 8352 - Advanced Groundwater Mechanics II (3.0 cr)
- CEGE 8361 - Engineering Model Fitting (3.0 cr)
- CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)
- CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)
- CEGE 8411 - Plate Structures (3.0 cr)
- CEGE 8412 - Shell Structures (3.0 cr)
- CEGE 8413 - Fracture and Scaling (3.0 cr)
- CEGE 8421 - Structural Dynamics (3.0 cr)
- CEGE 8422 - Earthquake Engineering (3.0 cr)
- CEGE 8431 - Structural Stability (3.0 cr)
- CEGE 8432 - Analysis of Thin-Walled Members (3.0 cr)
- CEGE 8441 - Ductile Behavior of Steel Structures (3.0 cr)
- CEGE 8442 - Nonlinear Analysis of Structural Systems (3.0 cr)
- CEGE 8443 - Fracture of Materials and Structures (3.0 cr)
- CEGE 8451 - Behavior of Reinforced Concrete Structures (3.0 cr)
- CEGE 8461 - Structural Reliability (3.0 cr)
- CEGE 8490 - Special Topics (1.0 - 4.0 cr)
- CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)
- CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)
- CEGE 8503 - Environmental Mass Transport (4.0 cr)
- CEGE 8504 - Theory of Unit Operations (4.0 cr)
- CEGE 8505 - Biological Processes (3.0 cr)
- CEGE 8506 - Stochastic Hydrology (4.0 cr)
- CEGE 8507 - Advanced Methods in Hydrology (4.0 cr)
- CEGE 8508 - Ecological Fluid Mechanics (4.0 cr)
- CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)
- CEGE 8521 - The Atmospheric Boundary Layer (4.0 cr)
- CEGE 8541 - Aquatic Chemistry (3.0 cr)
- CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)
- CEGE 8551 - Environmental Microbiology: Molecular Theory and Methods (4.0 cr)
- CEGE 8552 - Groundwater Microbiology: Laboratory (4.0 cr)



- [CEGE 8553](#) - Biofilms (3.0 cr)
- [CEGE 8561](#) - Analysis and Modeling of Aquatic Environments I (3.0 cr)
- [CEGE 8562](#) - Analysis and Modeling of Aquatic Environments II (3.0 cr)
- [CEGE 8563](#) - Industrial Waste Treatment (3.0 cr)
- [CEGE 8571](#) - Hydraulic Measurements (3.0 cr)
- [CEGE 8572](#) - Computational Environmental Fluid Dynamics (4.0 cr)
- [CEGE 8581](#) - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)
- [CEGE 8601](#) - Introduction to Stream Restoration (3.0 cr)
- [CEGE 8602](#) - Stream Restoration Practice (2.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Civil Engineering Ph.D.**

*CSENG Civil, Envrn & Geo-Eng (CEGE)*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Civil, Environmental, and Geo-Engineering, University of Minnesota, 122 Civil Engineering Building, 500 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-625-5522; fax: 612-626-7750)

Email: [cegesps@umn.edu](mailto:cegesps@umn.edu)

Website: <http://www.cege.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Civil engineering emphases are available in environmental engineering (e.g., pollutant fate and transport, process modeling, soil and groundwater remediation, water and wastewater treatment), geomechanics (e.g., fracture and localization, groundwater flow, stability and liquefaction, wave and shock propagation), structural engineering (e.g., computational and structural mechanics, earthquake engineering, infrastructure performance and durability, new systems and materials), transportation engineering (e.g., intelligent transportation systems, pavement design and materials, transportation economics, traffic safety), and water resources engineering (e.g., earthscape processes, environmental and biological systems, hydrologic and climate dynamics, hydrodynamics, and turbulence).

The PhD degree couples independent research with coursework in a comprehensive program for those wishing to attain mastery of their field. The PhD degree demands the ability and desire to pursue independent and original studies and can be earned with emphasis in environmental, geomechanics, structural, transportation, or water resources engineering. Research performance, as judged by preparation of a dissertation on an independently pursued research topic, is the primary requirement for the PhD degree.

Students enter the PhD program two to four years following the bachelor's degree, normally after completing the MS degree. The PhD program is typically completed in four to six years following the bachelor's degree. Each program of study is designed in consultation with a faculty adviser to meet the special needs of the student, although programs must be approved by the director of graduate studies.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree in an engineering, basic science, or mathematics program is preferred.

Other requirements to be completed before admission:

Admission depends primarily on the applicant's academic record and letters of recommendation. Applicants who lack civil engineering training are often required to complete one or more appropriate courses from the undergraduate civil engineering program. Graduate credit is not awarded for such preparatory work.

#### **Special Application Requirements:**

The application deadlines are December 3 for fall admission and August 31 for spring admission. All materials must be submitted to the online application.

Applicants must submit their test score(s) from the following:

- GRE



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#) (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

36 credits are required in the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken on the A/F grading basis, unless only offered S/N.

### Core Courses (12-36 credits)

Select at least 12 credits from the following in consultation with the advisor. A maximum of 2 seminar credits (CEGE 8200, 8300, 8400, 8500) may be applied to this requirement.

- [CEGE 4201](#) - Principles of Highway Design (3.0 cr)
- [CEGE 4411](#) - Matrix Structural Analysis (3.0 cr)
- [CEGE 4412](#) - Reinforced Concrete II (3.0 cr)
- [CEGE 4413](#) - Steel Design II (3.0 cr)
- [CEGE 4511](#) - Hydraulic Structures (3.0 cr)
- [CEGE 4561](#) - Solids and Hazardous Wastes (3.0 cr)
- [CEGE 4563](#) - Pollutant Fate and Transport: Processes and Modeling (3.0 cr)
- [CEGE 5094](#) - Directed Research (1.0 - 4.0 cr)
- [CEGE 5180](#) - Special Topics (1.0 - 4.0 cr)
- [CEGE 5211](#) - Traffic Engineering (3.0 cr)
- [CEGE 5212](#) - Transportation Policy, Planning, and Deployment (3.0 cr)
- [CEGE 5213](#) - Transit Planning and Management (3.0 cr)
- [CEGE 5214](#) - Transportation Systems Analysis (3.0 cr)
- [CEGE 5341](#) - Wave Methods for Nondestructive Testing (3.0 cr)
- [CEGE 5342](#) - Introduction to Inverse Problems (3.0 cr)
- [CEGE 5351](#) - Advanced Engineering Mathematics I (3.0 cr)
- [CEGE 5411](#) - Applied Structural Mechanics (3.0 cr)
- [CEGE 5414](#) - Prestressed Concrete Design (3.0 cr)
- [CEGE 5415](#) - Masonry Structures (3.0 cr)
- [CEGE 5416](#) - Sensors in Infrastructure (3.0 cr)
- [CEGE 5417](#) - Structural Engineering Design of Wood Buildings (3.0 cr)
- [CEGE 5511](#) - Urban Hydrology and Water Quality (4.0 cr)
- [CEGE 5512](#) - Stochastic Ecohydrology (3.0 cr)
- [CEGE 5513](#) - Energy Conversion from Wind, Hydro and Solar Resources (3.0 cr)
- [CEGE 5541](#) - Environmental Water Chemistry (3.0 cr)
- [CEGE 5542](#) - Experimental Methods in Environmental Engineering (3.0 cr)
- [CEGE 5543](#) - Introductory Environmental Fluid Mechanics (4.0 cr)
- [CEGE 5551](#) - Environmental Microbiology (3.0 cr)
- [CEGE 5552](#) - Environmental Microbiology Laboratory (1.0 cr)
- [CEGE 5570](#) - Design for Sustainable Development - India (3.0 - 9.0 cr)
- [CEGE 8022](#) - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)



- CEGE 8094 - Directed Research (1.0 - 4.0 cr)
- CEGE 8200 - Seminar: Transportation (1.0 cr)
- CEGE 8211 - Theory of Traffic Flow (4.0 cr)
- CEGE 8212 - Advanced Travel Demand Modeling and Supply Analysis (3.0 cr)
- CEGE 8213 - Advanced Transportation Technologies Seminar (1.0 cr)
- CEGE 8214 - Transportation Economics (4.0 cr)
- CEGE 8215 - Transportation Data Analysis (3.0 cr)
- CEGE 8216 - Urban Traffic Operations (3.0 cr)
- CEGE 8217 - Transportation Network Analysis (4.0 cr)
- CEGE 8218 - Dynamic Transportation Network Analysis (4.0 cr)
- CEGE 8231 - Advanced Pavement Engineering (3.0 cr)
- CEGE 8233 - Advanced Bituminous Materials Characterization (3.0 cr)
- CEGE 8300 - Seminar: Geomechanics (1.0 - 3.0 cr)
- CEGE 8301 - Fracture of Geomaterials (3.0 cr)
- CEGE 8302 - Soil/Rock Plasticity and Limit Analysis (4.0 cr)
- CEGE 8311 - Advanced Rock Mechanics (3.0 cr)
- CEGE 8321 - Thermoporoelasticity (4.0 cr)
- CEGE 8322 - Storage and Flow of Granular Materials (3.0 cr)
- CEGE 8331 - Modeling Geomechanical Processes (3.0 cr)
- CEGE 8336 - Boundary Element Methods I (3.0 cr)
- CEGE 8337 - Boundary Element Methods II (3.0 cr)
- CEGE 8341 - Wave Propagation in Solids and Structures (4.0 cr)
- CEGE 8351 - Advanced Engineering Mathematics II (3.0 cr)
- CEGE 8352 - Advanced Groundwater Mechanics II (3.0 cr)
- CEGE 8361 - Engineering Model Fitting (3.0 cr)
- CEGE 8400 - Seminar: Structures (1.0 cr)
- CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)
- CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)
- CEGE 8411 - Plate Structures (3.0 cr)
- CEGE 8412 - Shell Structures (3.0 cr)
- CEGE 8413 - Fracture and Scaling (3.0 cr)
- CEGE 8421 - Structural Dynamics (3.0 cr)
- CEGE 8422 - Earthquake Engineering (3.0 cr)
- CEGE 8431 - Structural Stability (3.0 cr)
- CEGE 8432 - Analysis of Thin-Walled Members (3.0 cr)
- CEGE 8441 - Ductile Behavior of Steel Structures (3.0 cr)
- CEGE 8442 - Nonlinear Analysis of Structural Systems (3.0 cr)
- CEGE 8443 - Fracture of Materials and Structures (3.0 cr)
- CEGE 8451 - Behavior of Reinforced Concrete Structures (3.0 cr)
- CEGE 8461 - Structural Reliability (3.0 cr)
- CEGE 8490 - Special Topics (1.0 - 4.0 cr)
- CEGE 8500 - Environmental Seminar (1.0 cr)
- CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)
- CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)
- CEGE 8503 - Environmental Mass Transport (4.0 cr)
- CEGE 8504 - Theory of Unit Operations (4.0 cr)
- CEGE 8505 - Biological Processes (3.0 cr)
- CEGE 8506 - Stochastic Hydrology (4.0 cr)
- CEGE 8507 - Advanced Methods in Hydrology (4.0 cr)
- CEGE 8508 - Ecological Fluid Mechanics (4.0 cr)
- CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)
- CEGE 8521 - The Atmospheric Boundary Layer (4.0 cr)
- CEGE 8541 - Aquatic Chemistry (3.0 cr)
- CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)
- CEGE 8551 - Environmental Microbiology: Molecular Theory and Methods (4.0 cr)
- CEGE 8552 - Groundwater Microbiology: Laboratory (4.0 cr)
- CEGE 8553 - Biofilms (3.0 cr)
- CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)
- CEGE 8562 - Analysis and Modeling of Aquatic Environments II (3.0 cr)
- CEGE 8563 - Industrial Waste Treatment (3.0 cr)
- CEGE 8571 - Hydraulic Measurements (3.0 cr)
- CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)
- CEGE 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)
- CEGE 8601 - Introduction to Stream Restoration (3.0 cr)
- CEGE 8602 - Stream Restoration Practice (2.0 cr)



### Electives (0-24 credits)

Select courses from the following as needed, in consultation with the advisor, to complete the 36 course credits required. Coursework from the Core Courses list, as well as other courses, can be selected with director of graduate studies approval.

- AEM 4511 - Mechanics of Composite Materials (3.0 cr)
- AEM 5501 - Continuum Mechanics (3.0 cr)
- AEM 5503 - Theory of Elasticity (3.0 cr)
- AEM 8211 - Theory of Turbulence I (3.0 cr)
- AEM 8525 - Elastic Stability of Materials (3.0 cr)
- AEM 8531 - Fracture Mechanics (3.0 cr)
- AEM 8551 - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)
- APEC 5031 - Methods of Economic Data Analysis (3.0 cr)
- ARCH 5391 - Design and Representation with BIM (3.0 cr)
- ARCH 5671 - Historic Preservation (3.0 cr)
- BBE 5513 - Watershed Engineering (3.0 cr)
- BBE 5523 - Ecological Engineering Design (3.0 cr)
- BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)
- BBE 5753 - Air Quality and Pollution Control Engineering (3.0 cr)
- BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)
- BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)
- CHEM 5210 - Materials Characterization (4.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
- CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
- EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)
- EE 5251 - Optimal Filtering and Estimation (3.0 cr)
- EE 8231 - Optimization Theory (3.0 cr)
- EE 8581 - Detection and Estimation Theory (3.0 cr)
- EEB 5601 - Limnology (3.0 cr)
- ESCI 8801 - Geomicrobiology (3.0 cr)
- ESPM 5071 - Ecological Restoration (4.0 cr)
- ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- GCC 5005 - Innovation for the Public Good: Post-Pandemic Venture Design [GP] (3.0 cr)
- GEOG 5561 - Principles of Geographic Information Science (4.0 cr)
- HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)
- IE 5531 - Engineering Optimization I (4.0 cr)
- IE 5532 - Stochastic Models (4.0 cr)
- IE 5541 - Project Management (4.0 cr)
- IE 5545 - Decision Analysis (4.0 cr)
- IE 8531 - Discrete Optimization (4.0 cr)
- LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)
- LAAS 5621 - Soil and Environmental Genomics (3.0 cr)
- MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)
- MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)
- MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)
- MATH 8402 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)
- MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)
- MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)
- PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)
- PA 5231 - Transit Planning and Management (3.0 cr)
- PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)
- PA 5880 - Exploring Global Cities (1.0 - 3.0 cr)
- PA 5926 - Presentation Skills: How to Inspire Your Audience and Change the World (1.0 cr)
- PUBH 6132 - Air, Water, and Health (2.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- WRS 5101 - Water Policy (3.0 cr)
- WRS 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

### Thesis Credits (24 credits)

Complete 24 thesis credits after passing preliminary oral exam.

- CEGE 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)





### **Twin Cities Campus**

## **Computer Science M.C.S.**

*Computer Science and Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Computer Science and Engineering, University of Minnesota, 4-192 Keller Hall, 200 Union Street SE, Minneapolis, MN 55455 (612- 625-4002; fax: 612-625-0572)

Email: [csgradmn@umn.edu](mailto:csgradmn@umn.edu)

Website: <http://www.cs.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Computer Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Masters of Computer Science degree (MCS) is a terminal, professionally focused coursework-only degree designed for working professionals seeking to boost their current career, or change course. The MCS graduate program core offers coursework from a broad spectrum of theoretical and applied computer science topics and incorporates elective coursework opportunities in nearly all areas of the field. Faculty members have expertise in areas such as algorithms and theoretical computer science; numerical, parallel, and high-performance computing; distributed computing and systems; artificial intelligence, robotics, and computer vision; databases and data mining; human-computer interaction and information systems; graphics and visualization; software engineering and programming languages; computer architecture and compilers; networking; bio-informatics and computational biology; and computer security. Faculty from the Department of Computer Science and Engineering also participate in a variety of other graduate programs, including Bioinformatics and Computational Biology, Health Informatics, Cognitive Science, Scientific Computation, and Human Factors and Ergonomics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must have an undergraduate or graduate degree in a major with a substantial background in computer science and engineering.

Other requirements to be completed before admission:

The names and email addresses of three recommenders are required; they will be asked to upload their letters of recommendation to the University system. The department only accepts students for fall admission; the application deadline is March 1.

#### **Special Application Requirements:**

Applicants with an inadequate background must resolve any deficiencies before applying to the program.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB



- Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 31 major credits and 0 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

All major courses must be taken on the A-F grading option and students must maintain a GPA above 3.00 after completing 8 credits.

### Required Coursework (16 credits)

#### Breadth Courses (9 credits)

Select 3 credits from each of the 3 subject areas, for a total of 9 credits. Courses are selected in consultation with the advisor.

#### Applications

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
- CSCI 5123 - Recommender Systems (3.0 cr)
- CSCI 5125 - Collaborative and Social Computing (3.0 cr)
- CSCI 5127W - Embodied Computing: Design & Prototyping [WI] (3.0 cr)
- CSCI 5271 - Introduction to Computer Security (3.0 cr)
- CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- CSCI 5471 - Modern Cryptography (3.0 cr)
- CSCI 5511 - Artificial Intelligence I (3.0 cr)
- CSCI 5512 - Artificial Intelligence II (3.0 cr)
- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)
- CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)
- CSCI 5561 - Computer Vision (3.0 cr)
- CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)
- CSCI 5609 - Visualization (3.0 cr)
- CSCI 5611 - Animation & Planning in Games (3.0 cr)
- CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)
- CSCI 5707 - Principles of Database Systems (3.0 cr)

#### Architecture, Systems and Software

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- CSCI 5103 - Operating Systems (3.0 cr)
- CSCI 5105 - Introduction to Distributed Systems (3.0 cr)
- CSCI 5106 - Programming Languages (3.0 cr)
- CSCI 5161 - Introduction to Compilers (3.0 cr)
- CSCI 5204 - Advanced Computer Architecture (3.0 cr)
- CSCI 5211 - Data Communications and Computer Networks (3.0 cr)
- CSCI 5221 - Foundations of Advanced Networking (3.0 cr)
- CSCI 5231 - Wireless and Sensor Networks (3.0 cr)
- CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
- CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)
- CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)
- CSCI 5751 - Big Data Engineering and Architecture (3.0 cr)
- CSCI 5801 - Software Engineering I (3.0 cr)
- CSCI 5802 - Software Engineering II (3.0 cr)

#### Theory and Algorithms

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)
- CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)



- CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)

**Colloquium (1 credit)**

Take the following:

CSCI 8970 - Computer Science Colloquium (1.0 cr)

**Computer Science 8000-level Courses (6 credits)**

Select 6 credits from the following in consultation with the advisor. CSCI 8980 can be taken twice if the topics are different.

- CSCI 8101 - Advanced Operating Systems (3.0 cr)
- CSCI 8102 - Foundations of Distributed Computing (3.0 cr)
- CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)
- CSCI 8117 - Understanding the Social Web (3.0 cr)
- CSCI 8161 - Advanced Compiler Techniques (3.0 cr)
- CSCI 8205 - Parallel Computer Organization (3.0 cr)
- CSCI 8211 - Advanced Computer Networks and Their Applications (3.0 cr)
- CSCI 8271 - Security and Privacy in Computing (3.0 cr)
- CSCI 8314 - Sparse Matrix Computations (3.0 cr)
- CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)
- CSCI 8442 - Computational Geometry and Applications (3.0 cr)
- CSCI 8551 - Intelligent Agents (3.0 cr)
- CSCI 8581 - Big Data in Astrophysics (4.0 cr)
- CSCI 8701 - Overview of Database Research (3.0 cr)
- CSCI 8715 - Spatial Data Science Research (3.0 cr)
- CSCI 8725 - Databases for Bioinformatics (3.0 cr)
- CSCI 8735 - Advanced Database Systems (3.0 cr)
- CSCI 8801 - Advanced Software Engineering (3.0 cr)
- CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)
- CSCI 8991 - Independent Study (1.0 - 3.0 cr)
- or CSCI 8994 - Directed Research in Computer Science (1.0 - 3.0 cr)

**Electives (15 credits)**

Select 15 credits from the following to complete the 31 credits required. Other courses can be applied to this requirement with director of graduate studies approval

**Computer Science Courses**

- CSCI 5103 - Operating Systems (3.0 cr)
- CSCI 5105 - Introduction to Distributed Systems (3.0 cr)
- CSCI 5106 - Programming Languages (3.0 cr)
- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
- CSCI 5125 - Collaborative and Social Computing (3.0 cr)
- CSCI 5143 - Real-Time and Embedded Systems (3.0 cr)
- CSCI 5161 - Introduction to Compilers (3.0 cr)
- CSCI 5204 - Advanced Computer Architecture (3.0 cr)
- CSCI 5211 - Data Communications and Computer Networks (3.0 cr)
- CSCI 5231 - Wireless and Sensor Networks (3.0 cr)
- CSCI 5271 - Introduction to Computer Security (3.0 cr)
- CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)
- CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
- CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
- CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
- CSCI 5511 - Artificial Intelligence I (3.0 cr)
- CSCI 5512 - Artificial Intelligence II (3.0 cr)
- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)
- CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)
- CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)
- CSCI 5561 - Computer Vision (3.0 cr)
- CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)
- CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)
- CSCI 5611 - Animation & Planning in Games (3.0 cr)
- CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)
- CSCI 5707 - Principles of Database Systems (3.0 cr)
- CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)
- CSCI 5715 - From GPS, Google Maps, and Uber to Spatial Data Science (3.0 cr)



CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 5802 - Software Engineering II (3.0 cr)  
CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)  
CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)  
CSCI 8205 - Parallel Computer Organization (3.0 cr)  
CSCI 8211 - Advanced Computer Networks and Their Applications (3.0 cr)  
CSCI 8271 - Security and Privacy in Computing (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
CSCI 8551 - Intelligent Agents (3.0 cr)  
CSCI 8715 - Spatial Data Science Research (3.0 cr)  
CSCI 8735 - Advanced Database Systems (3.0 cr)  
CSCI 8970 - Computer Science Colloquium (1.0 cr)

**Related Fields**

AEM 5401 - Intermediate Dynamics (3.0 cr)  
AEM 5451 - Optimal Estimation (3.0 cr)  
AEM 8411 - Advanced Dynamics (3.0 cr)  
AEM 8423 - Convex Optimization Methods in Control (3.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 8151 - Biomedical Electronics and Implantable Microsystems (3.0 cr)  
CEGE 8211 - Theory of Traffic Flow (4.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5301 - VLSI Design Automation I (3.0 cr)  
EE 5333 - Analog Integrated Circuit Design (3.0 cr)  
EE 5351 - Applied Parallel Programming (3.0 cr)  
EE 5355 - Algorithmic Techniques for Scalable Many-core Computing (3.0 cr)  
EE 5364 - Advanced Computer Architecture (3.0 cr)  
EE 5371 - Computer Systems Performance Measurement and Evaluation (3.0 cr)  
EE 5373 - Data Modeling Using R (1.0 cr)  
EE 5393 - Circuits, Computation, and Biology (3.0 cr)  
EE 5505 - Wireless Communication (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5581 - Information Theory and Coding (3.0 cr)  
EE 5585 - Data Compression (3.0 cr)  
EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)  
EE 5741 - Advanced Power Electronics (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
EE 8367 - Parallel Computer Organization (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
EE 8591 - Predictive Learning from Data (3.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
MATH 5075 - Mathematics of Options, Futures, and Derivative Securities I (4.0 cr)  
MATH 5165 - Mathematical Logic I (4.0 cr)  
MATH 5248 - Cryptology and Number Theory (4.0 cr)  
MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)  
MATH 5335 - Geometry I (4.0 cr)  
MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)  
MATH 5447 - Theoretical Neuroscience (4.0 cr)  
MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 5654 - Prediction and Filtering (4.0 cr)  
MATH 5705 - Enumerative Combinatorics (4.0 cr)  
MATH 5707 - Graph Theory and Non-enumerative Combinatorics (4.0 cr)  
MATH 5711 - Linear Programming and Combinatorial Optimization (4.0 cr)  
MATH 8211 - Commutative and Homological Algebra (3.0 cr)  
MATH 8212 - Commutative and Homological Algebra (3.0 cr)



MATH 8253 - Algebraic Geometry (3.0 cr)  
MATH 8254 - Algebraic Geometry (3.0 cr)  
MATH 8270 - Topics in Algebraic Geometry (1.0 - 3.0 cr)  
MATH 8301 - Manifolds and Topology (3.0 cr)  
MATH 8302 - Manifolds and Topology (3.0 cr)  
MATH 8306 - Algebraic Topology (3.0 cr)  
MATH 8307 - Algebraic Topology (3.0 cr)  
MATH 8365 - Riemannian Geometry (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8501 - Differential Equations and Dynamical Systems I (3.0 cr)  
MATH 8601 - Real Analysis (3.0 cr)  
MATH 8602 - Real Analysis (3.0 cr)  
MATH 8651 - Theory of Probability Including Measure Theory (3.0 cr)  
MATH 8991 - Independent Study (1.0 - 6.0 cr)  
ME 5241 - Computer-Aided Engineering (4.0 cr)  
ME 5243 - Advanced Mechanism Design (4.0 cr)  
ME 8253 - Computational Nanomechanics (3.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
ME 8794 - Mechanical Engineering Research (1.0 - 4.0 cr)  
MSBA 6320 - Data Management, Databases, and Data Warehousing (3.0 cr)  
MSBA 6330 - Big Data Analytics (3.0 cr)  
MSBA 6420 - Predictive Analytics (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5421 - Analysis of Categorical Data (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 5701 - Statistical Computing (3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)  
STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)  
STAT 8102 - Theory of Statistics 2 (3.0 cr)  
STAT 8931 - Advanced Topics in Statistics (3.0 cr)  
STAT 8932 - Advanced Topics in Statistics (3.0 cr)  
STAT 8933 - Advanced Topics in Statistics (3.0 cr)



### **Twin Cities Campus**

## **Computer Science M.S.**

*Computer Science and Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Computer Science and Engineering, University of Minnesota, 4-192 Keller Hall, 200 Union Street SE, Minneapolis, MN 55455 (612- 625-4002; fax: 612-625-0572)

Email: [csgradmn@umn.edu](mailto:csgradmn@umn.edu)

Website: <http://www.cs.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Computer Science MS degree offers coursework from across a broad spectrum of theoretical and applied computer science and combines research opportunities in nearly all areas of the field. The graduate program's faculty members advise students in such areas as algorithms and theoretical computer science; numerical, parallel, and high-performance computing; distributed computing and systems; artificial intelligence, robotics, and computer vision; databases and data mining; human-computer interaction and information systems; graphics and visualization; software engineering and programming languages; computer architecture and compilers; networking; bio-informatics and computational biology; and computer security. In addition, students may choose a course of study that integrates research in computer science with applications in other fields. The Computer Science MS degree offers three distinct variations: Plan A with thesis, Plan B with project, or coursework-only Plan C with coursework-based projects. Faculty from the Department of Computer Science and Engineering also participate in a variety of other graduate programs, including bioinformatics and computational biology, health informatics, cognitive science, scientific computation, and human factors and ergonomics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.25.

A degree in any major with a substantial background in computer science is required; a computer science major is preferred.

Other requirements to be completed before admission:

Applicants with an inadequate background must resolve any deficiencies before applying to the program.

Eligibility requirements for the integrated BS/MS program:

Application to the integrated program is open to University students in the computer science or computer engineering program who have completed a majority of the required upper division courses for their undergraduate degree and have a technical GPA of 3.5 or higher, or a strong recommendation from a Computer Science and Engineering faculty member.

#### **Special Application Requirements:**

The program requires all applicants to complete the University's online application. The names and email addresses of three recommenders; and scores from the General (Aptitude) Test of the GRE are required. Students are accepted for fall admission only. The application deadline is March 1.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:



- TOEFL
  - Internet Based - Total Score: 85
  - Internet Based - Writing Score: 23
  - Internet Based - Reading Score: 23
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 21 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan B:** Plan B requires 31 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project, completed in conjunction with CSCI 8760, demonstrates the student's familiarity with the tools of research, the capability to work independently, and the ability to effectively relate their results to their committee. A written report describing the Plan B project must be approved by the advisor.

**Plan C:** Plan C requires 31 major credits and 0 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** Plan C students must complete a minimum of 100 hours of course-based project work, a written research report, and an oral presentation within CSCI courses taken for graduate credit.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.25 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B- earned for each course.

### Required Coursework (13 to 16 credits)

#### Breadth Courses (9 credits)

Select 3 credits from each of the 3 subject areas, for a total of 9 credits. Courses are selected in consultation with the advisor.

#### Applications

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
- CSCI 5123 - Recommender Systems (3.0 cr)
- CSCI 5125 - Collaborative and Social Computing (3.0 cr)
- CSCI 5127W - Embodied Computing: Design & Prototyping [WI] (3.0 cr)
- CSCI 5271 - Introduction to Computer Security (3.0 cr)
- CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- CSCI 5471 - Modern Cryptography (3.0 cr)
- CSCI 5511 - Artificial Intelligence I (3.0 cr)
- CSCI 5512 - Artificial Intelligence II (3.0 cr)
- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)
- CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)
- CSCI 5561 - Computer Vision (3.0 cr)
- CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)
- CSCI 5609 - Visualization (3.0 cr)
- CSCI 5611 - Animation & Planning in Games (3.0 cr)
- CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)



- CSCI 5707 - Principles of Database Systems (3.0 cr)

#### Architecture, Systems and Software

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- CSCI 5103 - Operating Systems (3.0 cr)
- CSCI 5105 - Introduction to Distributed Systems (3.0 cr)
- CSCI 5106 - Programming Languages (3.0 cr)
- CSCI 5161 - Introduction to Compilers (3.0 cr)
- CSCI 5204 - Advanced Computer Architecture (3.0 cr)
- CSCI 5211 - Data Communications and Computer Networks (3.0 cr)
- CSCI 5221 - Foundations of Advanced Networking (3.0 cr)
- CSCI 5231 - Wireless and Sensor Networks (3.0 cr)
- CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
- CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)
- CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)
- CSCI 5751 - Big Data Engineering and Architecture (3.0 cr)
- CSCI 5801 - Software Engineering I (3.0 cr)
- CSCI 5802 - Software Engineering II (3.0 cr)

#### Theory and Algorithms

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)
- CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
- CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)

#### Colloquium (1 credit)

Take the following:

CSCI 8970 - Computer Science Colloquium (1.0 cr)

#### Computer Science 8000-level Courses (3 to 6 credits)

Plan A students and Plan C students select 6 credits, and Plan B students select 3 credits from the following in consultation with the advisor. CSCI 8980 can be taken twice if the topics are different.

- CSCI 8101 - Advanced Operating Systems (3.0 cr)
- CSCI 8102 - Foundations of Distributed Computing (3.0 cr)
- CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)
- CSCI 8117 - Understanding the Social Web (3.0 cr)
- CSCI 8161 - Advanced Compiler Techniques (3.0 cr)
- CSCI 8205 - Parallel Computer Organization (3.0 cr)
- CSCI 8211 - Advanced Computer Networks and Their Applications (3.0 cr)
- CSCI 8271 - Security and Privacy in Computing (3.0 cr)
- CSCI 8314 - Sparse Matrix Computations (3.0 cr)
- CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)
- CSCI 8442 - Computational Geometry and Applications (3.0 cr)
- CSCI 8551 - Intelligent Agents (3.0 cr)
- CSCI 8581 - Big Data in Astrophysics (4.0 cr)
- CSCI 8701 - Overview of Database Research (3.0 cr)
- CSCI 8715 - Spatial Data Science Research (3.0 cr)
- CSCI 8725 - Databases for Bioinformatics (3.0 cr)
- CSCI 8735 - Advanced Database Systems (3.0 cr)
- CSCI 8801 - Advanced Software Engineering (3.0 cr)
- CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)
- CSCI 8991 - Independent Study (1.0 - 3.0 cr)
- or CSCI 8994 - Directed Research in Computer Science (1.0 - 3.0 cr)

#### Electives (5-15 credits)

Plan A students select 5 credits, and Plan B and Plan C students select 15 credits from the following in consultation with the advisor to meet the minimum number of course credits required. Other courses may be applied to this requirement with director of graduate studies approval.

#### Computer Science Courses

- CSCI 5103 - Operating Systems (3.0 cr)
- CSCI 5105 - Introduction to Distributed Systems (3.0 cr)
- CSCI 5106 - Programming Languages (3.0 cr)
- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
- CSCI 5125 - Collaborative and Social Computing (3.0 cr)
- CSCI 5143 - Real-Time and Embedded Systems (3.0 cr)
- CSCI 5161 - Introduction to Compilers (3.0 cr)





CSCI 5204 - Advanced Computer Architecture (3.0 cr)  
CSCI 5211 - Data Communications and Computer Networks (3.0 cr)  
CSCI 5231 - Wireless and Sensor Networks (3.0 cr)  
CSCI 5271 - Introduction to Computer Security (3.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)  
CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5512 - Artificial Intelligence II (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)  
CSCI 5561 - Computer Vision (3.0 cr)  
CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)  
CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)  
CSCI 5611 - Animation & Planning in Games (3.0 cr)  
CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)  
CSCI 5707 - Principles of Database Systems (3.0 cr)  
CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)  
CSCI 5715 - From GPS, Google Maps, and Uber to Spatial Data Science (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 5802 - Software Engineering II (3.0 cr)  
CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)  
CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)  
CSCI 8205 - Parallel Computer Organization (3.0 cr)  
CSCI 8211 - Advanced Computer Networks and Their Applications (3.0 cr)  
CSCI 8271 - Security and Privacy in Computing (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
CSCI 8551 - Intelligent Agents (3.0 cr)  
CSCI 8715 - Spatial Data Science Research (3.0 cr)  
CSCI 8735 - Advanced Database Systems (3.0 cr)  
CSCI 8970 - Computer Science Colloquium (1.0 cr)

#### Related Fields

AEM 5401 - Intermediate Dynamics (3.0 cr)  
AEM 5451 - Optimal Estimation (3.0 cr)  
AEM 8411 - Advanced Dynamics (3.0 cr)  
AEM 8423 - Convex Optimization Methods in Control (3.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 8151 - Biomedical Electronics and Implantable Microsystems (3.0 cr)  
CEGE 8211 - Theory of Traffic Flow (4.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5301 - VLSI Design Automation I (3.0 cr)  
EE 5333 - Analog Integrated Circuit Design (3.0 cr)  
EE 5351 - Applied Parallel Programming (3.0 cr)  
EE 5355 - Algorithmic Techniques for Scalable Many-core Computing (3.0 cr)  
EE 5364 - Advanced Computer Architecture (3.0 cr)  
EE 5371 - Computer Systems Performance Measurement and Evaluation (3.0 cr)  
EE 5373 - Data Modeling Using R (1.0 cr)  
EE 5393 - Circuits, Computation, and Biology (3.0 cr)  
EE 5505 - Wireless Communication (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5581 - Information Theory and Coding (3.0 cr)  
EE 5585 - Data Compression (3.0 cr)  
EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)



EE 5741 - Advanced Power Electronics (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
EE 8367 - Parallel Computer Organization (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
EE 8591 - Predictive Learning from Data (3.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
MATH 5075 - Mathematics of Options, Futures, and Derivative Securities I (4.0 cr)  
MATH 5165 - Mathematical Logic I (4.0 cr)  
MATH 5248 - Cryptology and Number Theory (4.0 cr)  
MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)  
MATH 5335 - Geometry I (4.0 cr)  
MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)  
MATH 5447 - Theoretical Neuroscience (4.0 cr)  
MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 5654 - Prediction and Filtering (4.0 cr)  
MATH 5705 - Enumerative Combinatorics (4.0 cr)  
MATH 5707 - Graph Theory and Non-enumerative Combinatorics (4.0 cr)  
MATH 5711 - Linear Programming and Combinatorial Optimization (4.0 cr)  
MATH 8211 - Commutative and Homological Algebra (3.0 cr)  
MATH 8212 - Commutative and Homological Algebra (3.0 cr)  
MATH 8253 - Algebraic Geometry (3.0 cr)  
MATH 8254 - Algebraic Geometry (3.0 cr)  
MATH 8270 - Topics in Algebraic Geometry (1.0 - 3.0 cr)  
MATH 8301 - Manifolds and Topology (3.0 cr)  
MATH 8302 - Manifolds and Topology (3.0 cr)  
MATH 8306 - Algebraic Topology (3.0 cr)  
MATH 8307 - Algebraic Topology (3.0 cr)  
MATH 8365 - Riemannian Geometry (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8501 - Differential Equations and Dynamical Systems I (3.0 cr)  
MATH 8601 - Real Analysis (3.0 cr)  
MATH 8602 - Real Analysis (3.0 cr)  
MATH 8651 - Theory of Probability Including Measure Theory (3.0 cr)  
MATH 8991 - Independent Study (1.0 - 6.0 cr)  
ME 5241 - Computer-Aided Engineering (4.0 cr)  
ME 5243 - Advanced Mechanism Design (4.0 cr)  
ME 8253 - Computational Nanomechanics (3.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
ME 8794 - Mechanical Engineering Research (1.0 - 4.0 cr)  
MSBA 6320 - Data Management, Databases, and Data Warehousing (3.0 cr)  
MSBA 6330 - Big Data Analytics (3.0 cr)  
MSBA 6420 - Predictive Analytics (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5421 - Analysis of Categorical Data (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 5701 - Statistical Computing (3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)  
STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)  
STAT 8102 - Theory of Statistics 2 (3.0 cr)  
STAT 8931 - Advanced Topics in Statistics (3.0 cr)  
STAT 8932 - Advanced Topics in Statistics (3.0 cr)  
STAT 8933 - Advanced Topics in Statistics (3.0 cr)

#### Plan Options



**Plan A (10 credits)**

Complete 10 thesis credits.

[CSCI 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan B (3 credits)**

Take the following:

[CSCI 8760](#) - Plan B Project (3.0 cr)

-OR-

**Plan C (0-3 credits)**

Plan C students can apply up to 3 credits of the following directed research/independent study courses toward the minimum 31-credit requirement.

[CSCI 5991](#) - Independent Study (1.0 - 3.0 cr)

[CSCI 5994](#) - Directed Research (1.0 - 3.0 cr)

[CSCI 8991](#) - Independent Study (1.0 - 3.0 cr)

[CSCI 8994](#) - Directed Research in Computer Science (1.0 - 3.0 cr)

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Integrated B.S.Comp.Sc./M.S. - Computer Science

The Department of Computer Science and Engineering offers an integrated bachelor of science in computer science (BCompSc) and master of science (MS). The integrated BCompSc/MS program offers students the opportunity to earn both degrees in five years. The combined program offers several advantages: streamlined admissions from the undergraduate to the graduate program (GRE not required); flexibility in fulfilling required courses for both degrees during the senior year; eligibility for graduate assistantships and fellowships; and financial savings by allowing up to 16 graduate credits to be completed at the undergraduate tuition rate.

Both the BCompSc and MS degrees must be completed in their entirety, with no courses shared between them. The graduate degree cannot be earned before the undergraduate requirements are satisfied. Students must spend a minimum of two semesters as a graduate student after the completion of their undergraduate degree.

### Integrated B.Comp.E./M.S. - Computer Science

The Department of Computer Science and Engineering offers an integrated bachelor of computer engineering (BCompE) and master of science (MS). Benefits, eligibility requirements, and degree-completion requirements outlined for the BCompSc/MS integrated program also apply to the BCompE/MS.

### Integrated B.A./M.S. - Computer Science

The Department of Computer Science and Engineering offers an integrated bachelor of arts (BA) and master of science (MS) in computer science. Benefits, eligibility requirements, and degree-completion requirements outlined for the BCompSc/MS integrated program also apply to the BA/MS.



### **Twin Cities Campus**

## **Computer Science Minor**

*Computer Science and Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Computer Science and Engineering, University of Minnesota, 4-192 Keller Hall, 200 Union Street S.E., Minneapolis, MN 55455 (612- 625-4002; fax: 612-625-0572)

Email: [admissions@cs.umn.edu](mailto:admissions@cs.umn.edu)

Website: <http://www.cs.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 13
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in computer science offers coursework from across a broad spectrum of theoretical and applied computer science and combines research opportunities in nearly all areas of the field. The graduate program's faculty members advise students in such areas as algorithms and theoretical computer science; numerical, parallel, and high-performance computing; distributed computing and systems; artificial intelligence, robotics, and computer vision; databases and data mining; human-computer interaction and information systems; graphics and visualization; software engineering and programming languages; computer architecture and compilers; networking; bio-informatics and computational biology; and computer security. Faculty from the Department of Computer Science and Engineering also participate in a variety of other graduate programs, including bioinformatics and computational biology, health informatics, cognitive science, scientific computation, and human factors and ergonomics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Computer Science director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Only one 4xxx-level course may be applied to minor field course requirements.

Coursework applied to the minor must be taken A/F.

The minimum cumulative GPA for minor field coursework is 3.00 for masters students and 3.25 for doctoral students.

#### **Minor Coursework (9-12 credits)**

Masters students select 9 credits, and doctoral students select 12 credits from the following in consultation with the Computer Science director of graduate studies. Advanced Computer Science Courses requires student to complete at least 1 8xxx-level course or 1 5xxx-level course with a 5xxx-level prerequisite. Other courses may be applied to the minor with approval of the Computer Science director of graduate studies.



### Advanced Computer Science Courses

Complete at least one of the following courses:

- CSCI 5105 - Introduction to Distributed Systems (3.0 cr)
- CSCI 5125 - Collaborative and Social Computing (3.0 cr)
- CSCI 5161 - Introduction to Compilers (3.0 cr)
- CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)
- CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)
- CSCI 5751 - Big Data Engineering and Architecture (3.0 cr)
- CSCI 5802 - Software Engineering II (3.0 cr)
- CSCI 8101 - Advanced Operating Systems (3.0 cr)
- CSCI 8102 - Foundations of Distributed Computing (3.0 cr)
- CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)
- CSCI 8117 - Understanding the Social Web (3.0 cr)
- CSCI 8161 - Advanced Compiler Techniques (3.0 cr)
- CSCI 8205 - Parallel Computer Organization (3.0 cr)
- CSCI 8211 - Advanced Computer Networks and Their Applications (3.0 cr)
- CSCI 8271 - Security and Privacy in Computing (3.0 cr)
- CSCI 8314 - Sparse Matrix Computations (3.0 cr)
- CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)
- CSCI 8442 - Computational Geometry and Applications (3.0 cr)
- CSCI 8551 - Intelligent Agents (3.0 cr)
- CSCI 8581 - Big Data in Astrophysics (4.0 cr)
- CSCI 8701 - Overview of Database Research (3.0 cr)
- CSCI 8715 - Spatial Data Science Research (3.0 cr)
- CSCI 8725 - Databases for Bioinformatics (3.0 cr)
- CSCI 8735 - Advanced Database Systems (3.0 cr)
- CSCI 8801 - Advanced Software Engineering (3.0 cr)
- CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)

Complete coursework to meet the minimum credit requirement. Other courses may be applied to the minor with approval of the Computer Science director of graduate studies.

- CSCI 5103 - Operating Systems (3.0 cr)
- CSCI 5106 - Programming Languages (3.0 cr)
- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
- CSCI 5123 - Recommender Systems (3.0 cr)
- CSCI 5127W - Embodied Computing: Design & Prototyping [WI] (3.0 cr)
- CSCI 5143 - Real-Time and Embedded Systems (3.0 cr)
- CSCI 5204 - Advanced Computer Architecture (3.0 cr)
- CSCI 5211 - Data Communications and Computer Networks (3.0 cr)
- CSCI 5231 - Wireless and Sensor Networks (3.0 cr)
- CSCI 5271 - Introduction to Computer Security (3.0 cr)
- CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)
- CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
- CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
- CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- CSCI 5471 - Modern Cryptography (3.0 cr)
- CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
- CSCI 5511 - Artificial Intelligence I (3.0 cr)
- CSCI 5512 - Artificial Intelligence II (3.0 cr)
- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)
- CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)
- CSCI 5561 - Computer Vision (3.0 cr)
- CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)
- CSCI 5609 - Visualization (3.0 cr)
- CSCI 5611 - Animation & Planning in Games (3.0 cr)
- CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)
- CSCI 5707 - Principles of Database Systems (3.0 cr)
- CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)
- CSCI 5715 - From GPS, Google Maps, and Uber to Spatial Data Science (3.0 cr)
- CSCI 5801 - Software Engineering I (3.0 cr)
- CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Masters

#### Doctoral

#### Colloquium Credit (1 credit)

Doctoral students take the following to complete the 13-credit requirement:

[CSCI 8970](#) - Computer Science Colloquium (1.0 cr)



### **Twin Cities Campus**

## **Computer Science Ph.D.**

*Computer Science and Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Computer Science and Engineering, University of Minnesota, 4-192 Keller Hall, 200 Union Street S.E., Minneapolis, MN 55455 (612- 625-4002; fax: 612-625-0572)

Email: [csadmit@umn.edu](mailto:csadmit@umn.edu)

Website: <http://www.cs.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 55
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Computer Science PhD offers coursework from across a broad spectrum of theoretical and applied computer science, combined with research opportunities in nearly all areas of the field. Faculty members advise students in such areas as algorithms and theoretical computer science; numerical, parallel, and high-performance computing; distributed computing and systems; artificial intelligence, robotics, and computer vision; databases and data mining; human-computer interaction and information systems; graphics and visualization; software engineering and programming languages; computer architecture and compilers; networking; bio-informatics and computational biology; machine learning; and computer security. In addition, students may choose a course of study that integrates research in computer science with applications in other fields. Faculty from the Department of Computer Science and Engineering also participate in a variety of other graduate programs, including Bioinformatics and Computational Biology, Health Informatics, Cognitive Science, Scientific Computation, and Human Factors and Ergonomics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.45.

A degree in any major with a substantial background in computer science is required; a computer science major is preferred.

Other requirements to be completed before admission:

The program requires all applicants to complete the department's online application, as well as the University's online application. The names and email addresses of three recommenders are required; they will be asked to upload their letters of recommendation to the CS&E online application only. Scores from the General (Aptitude) Test of the GRE are also required. Students are accepted for fall admission only. The application deadline is April 1. Students seeking financial aid must apply by December 5.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 85
  - Internet Based - Writing Score: 23
  - Internet Based - Reading Score: 23
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).



For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

16 to 25 credits are required in the major.  
6 to 15 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.45 is required for students to remain in good standing.

Students are expected to complete all courses in their degree program with a GPA of at least 3.45. All courses must be taken for graduate credit and on the A-F grading basis.

### Required Coursework (16 credits)

#### Breadth Courses (15 credits)

Select at least 3 credits from each of the 3 subject areas for a total of 9 credits, plus 6 credits from any of the subject areas, for a total of 15 credits. Courses are selected in consultation with the advisor.

#### Applications

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
- CSCI 5123 - Recommender Systems (3.0 cr)
- CSCI 5125 - Collaborative and Social Computing (3.0 cr)
- CSCI 5127W - Embodied Computing: Design & Prototyping [WI] (3.0 cr)
- CSCI 5271 - Introduction to Computer Security (3.0 cr)
- CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- CSCI 5471 - Modern Cryptography (3.0 cr)
- CSCI 5511 - Artificial Intelligence I (3.0 cr)
- CSCI 5512 - Artificial Intelligence II (3.0 cr)
- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)
- CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)
- CSCI 5561 - Computer Vision (3.0 cr)
- CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)
- CSCI 5609 - Visualization (3.0 cr)
- CSCI 5611 - Animation & Planning in Games (3.0 cr)
- CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)
- CSCI 5707 - Principles of Database Systems (3.0 cr)

#### Architecture, Systems and Software

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- CSCI 5103 - Operating Systems (3.0 cr)
- CSCI 5105 - Introduction to Distributed Systems (3.0 cr)
- CSCI 5106 - Programming Languages (3.0 cr)
- CSCI 5161 - Introduction to Compilers (3.0 cr)
- CSCI 5204 - Advanced Computer Architecture (3.0 cr)
- CSCI 5211 - Data Communications and Computer Networks (3.0 cr)
- CSCI 5221 - Foundations of Advanced Networking (3.0 cr)
- CSCI 5231 - Wireless and Sensor Networks (3.0 cr)
- CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
- CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)
- CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)
- CSCI 5751 - Big Data Engineering and Architecture (3.0 cr)
- CSCI 5801 - Software Engineering I (3.0 cr)
- CSCI 5802 - Software Engineering II (3.0 cr)

#### Theory and Algorithms

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)





- CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
- CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)

**Colloquium (1 credit)**

Take the following:

- CSCI 8970 - Computer Science Colloquium (1.0 cr)

**Additional Coursework (15 credits)**

**Outside Coursework (6 to 15 credits)**

Select at least 6 credits from the following in consultation with the advisor:

- AEM 5401 - Intermediate Dynamics (3.0 cr)
- AEM 5451 - Optimal Estimation (3.0 cr)
- AEM 8411 - Advanced Dynamics (3.0 cr)
- AEM 8423 - Convex Optimization Methods in Control (3.0 cr)
- BMEN 5001 - Advanced Biomaterials (3.0 cr)
- BMEN 5201 - Advanced Biomechanics (3.0 cr)
- BMEN 5701 - Cancer Bioengineering (3.0 cr)
- BMEN 8151 - Biomedical Electronics and Implantable Microsystems (3.0 cr)
- CEGE 8211 - Theory of Traffic Flow (4.0 cr)
- EE 5231 - Linear Systems and Optimal Control (3.0 cr)
- EE 5235 - Robust Control System Design (3.0 cr)
- EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)
- EE 5251 - Optimal Filtering and Estimation (3.0 cr)
- EE 5301 - VLSI Design Automation I (3.0 cr)
- EE 5333 - Analog Integrated Circuit Design (3.0 cr)
- EE 5351 - Applied Parallel Programming (3.0 cr)
- EE 5355 - Algorithmic Techniques for Scalable Many-core Computing (3.0 cr)
- EE 5364 - Advanced Computer Architecture (3.0 cr)
- EE 5371 - Computer Systems Performance Measurement and Evaluation (3.0 cr)
- EE 5373 - Data Modeling Using R (1.0 cr)
- EE 5393 - Circuits, Computation, and Biology (3.0 cr)
- EE 5505 - Wireless Communication (3.0 cr)
- EE 5531 - Probability and Stochastic Processes (3.0 cr)
- EE 5542 - Adaptive Digital Signal Processing (3.0 cr)
- EE 5581 - Information Theory and Coding (3.0 cr)
- EE 5585 - Data Compression (3.0 cr)
- EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)
- EE 5741 - Advanced Power Electronics (3.0 cr)
- EE 8231 - Optimization Theory (3.0 cr)
- EE 8367 - Parallel Computer Organization (3.0 cr)
- EE 8581 - Detection and Estimation Theory (3.0 cr)
- EE 8591 - Predictive Learning from Data (3.0 cr)
- IE 5531 - Engineering Optimization I (4.0 cr)
- IE 5532 - Stochastic Models (4.0 cr)
- MATH 5075 - Mathematics of Options, Futures, and Derivative Securities I (4.0 cr)
- MATH 5165 - Mathematical Logic I (4.0 cr)
- MATH 5248 - Cryptology and Number Theory (4.0 cr)
- MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)
- MATH 5335 - Geometry I (4.0 cr)
- MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)
- MATH 5447 - Theoretical Neuroscience (4.0 cr)
- MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)
- MATH 5485 - Introduction to Numerical Methods I (4.0 cr)
- MATH 5486 - Introduction To Numerical Methods II (4.0 cr)
- MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)
- MATH 5652 - Introduction to Stochastic Processes (4.0 cr)
- MATH 5654 - Prediction and Filtering (4.0 cr)
- MATH 5705 - Enumerative Combinatorics (4.0 cr)
- MATH 5707 - Graph Theory and Non-enumerative Combinatorics (4.0 cr)
- MATH 5711 - Linear Programming and Combinatorial Optimization (4.0 cr)
- MATH 8211 - Commutative and Homological Algebra (3.0 cr)
- MATH 8212 - Commutative and Homological Algebra (3.0 cr)
- MATH 8253 - Algebraic Geometry (3.0 cr)
- MATH 8254 - Algebraic Geometry (3.0 cr)



MATH 8270 - Topics in Algebraic Geometry (1.0 - 3.0 cr)  
MATH 8301 - Manifolds and Topology (3.0 cr)  
MATH 8302 - Manifolds and Topology (3.0 cr)  
MATH 8306 - Algebraic Topology (3.0 cr)  
MATH 8307 - Algebraic Topology (3.0 cr)  
MATH 8365 - Riemannian Geometry (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8501 - Differential Equations and Dynamical Systems I (3.0 cr)  
MATH 8601 - Real Analysis (3.0 cr)  
MATH 8602 - Real Analysis (3.0 cr)  
MATH 8651 - Theory of Probability Including Measure Theory (3.0 cr)  
MATH 8991 - Independent Study (1.0 - 6.0 cr)  
ME 5241 - Computer-Aided Engineering (4.0 cr)  
ME 5243 - Advanced Mechanism Design (4.0 cr)  
ME 8253 - Computational Nanomechanics (3.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
ME 8794 - Mechanical Engineering Research (1.0 - 4.0 cr)  
MSBA 6320 - Data Management, Databases, and Data Warehousing (3.0 cr)  
MSBA 6330 - Big Data Analytics (3.0 cr)  
MSBA 6420 - Predictive Analytics (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5421 - Analysis of Categorical Data (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 5701 - Statistical Computing (3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)  
STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)  
STAT 8102 - Theory of Statistics 2 (3.0 cr)  
STAT 8931 - Advanced Topics in Statistics (3.0 cr)  
STAT 8932 - Advanced Topics in Statistics (3.0 cr)  
STAT 8933 - Advanced Topics in Statistics (3.0 cr)

**Electives (0 to 9 credits)**

Select credits, as needed to complete the 31 course credits required, in consultation with the advisor. Students are encouraged, but not required, to take CSCI 8001 and 8002.

CSCI 5103 - Operating Systems (3.0 cr)  
CSCI 5105 - Introduction to Distributed Systems (3.0 cr)  
CSCI 5106 - Programming Languages (3.0 cr)  
CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)  
CSCI 5117 - Developing the Interactive Web (3.0 cr)  
CSCI 5125 - Collaborative and Social Computing (3.0 cr)  
CSCI 5161 - Introduction to Compilers (3.0 cr)  
CSCI 5204 - Advanced Computer Architecture (3.0 cr)  
CSCI 5211 - Data Communications and Computer Networks (3.0 cr)  
CSCI 5221 - Foundations of Advanced Networking (3.0 cr)  
CSCI 5231 - Wireless and Sensor Networks (3.0 cr)  
CSCI 5271 - Introduction to Computer Security (3.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5471 - Modern Cryptography (3.0 cr)  
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)  
CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5512 - Artificial Intelligence II (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
CSCI 5561 - Computer Vision (3.0 cr)  
CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)



CSCI 5611 - Animation & Planning in Games (3.0 cr)  
CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)  
CSCI 5707 - Principles of Database Systems (3.0 cr)  
CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)  
CSCI 5715 - From GPS, Google Maps, and Uber to Spatial Data Science (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 5802 - Software Engineering II (3.0 cr)  
CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)  
CSCI 5991 - Independent Study (1.0 - 3.0 cr)  
CSCI 5994 - Directed Research (1.0 - 3.0 cr)  
CSCI 8001 - Introduction to Research in Computer Science I (1.0 cr)  
CSCI 8002 - Introduction to Research in Computer Science, II (2.0 cr)  
CSCI 8101 - Advanced Operating Systems (3.0 cr)  
CSCI 8102 - Foundations of Distributed Computing (3.0 cr)  
CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)  
CSCI 8117 - Understanding the Social Web (3.0 cr)  
CSCI 8205 - Parallel Computer Organization (3.0 cr)  
CSCI 8211 - Advanced Computer Networks and Their Applications (3.0 cr)  
CSCI 8271 - Security and Privacy in Computing (3.0 cr)  
CSCI 8314 - Sparse Matrix Computations (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
CSCI 8442 - Computational Geometry and Applications (3.0 cr)  
CSCI 8551 - Intelligent Agents (3.0 cr)  
CSCI 8581 - Big Data in Astrophysics (4.0 cr)  
CSCI 8701 - Overview of Database Research (3.0 cr)  
CSCI 8715 - Spatial Data Science Research (3.0 cr)  
CSCI 8725 - Databases for Bioinformatics (3.0 cr)  
CSCI 8735 - Advanced Database Systems (3.0 cr)  
CSCI 8801 - Advanced Software Engineering (3.0 cr)  
CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)  
CSCI 8991 - Independent Study (1.0 - 3.0 cr)

**Thesis Credits (24 credits)**

Take 24 credits after passing preliminary oral exam.

CSCI 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### ***Twin Cities Campus***

## **Cyber Security Minor**

*Technological Leadership Institute*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Technological Leadership Institute, University of Minnesota, 290 McNamara Alumni Center, 200 Oak Street SE, Minneapolis MN 55455  
(612-624-5474; fax: 612-624-7510)

Email: [msst@umn.edu](mailto:msst@umn.edu)

Website: <http://tli.umn.edu>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Cyber Security minor integrates the fields of technology, security, and management, to provide students with the skills and insights to assume a leadership role in cyber security, or continue their field of study with a focus on cyber security and its role in organizations.

The curriculum applies fundamental concepts of business management, organizational leadership, and risk management techniques and strategies, each as applied in the context of cyber security, to empower engineering, technology, and business professionals to adapt and lead in the emerging field of cyber security. Each class will include exercises that inform students on those cyber security topics, and give them an opportunity to practice the fundamental skills of communications, teamwork, and project management.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Students not currently enrolled in the Master of Science in Security Technologies (MSST) program must be approved for the minor by the Director of Graduate Studies. Non-MSST students may be asked to complete a background check prior to receiving registration permission for courses with ST designators.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

#### **Required Courses (6 credits)**

These core courses are designed to be taken in sequence.

[ST 8661](#) - Securing Cyberspace (Fundamentals) (3.0 cr)

[ST 8662](#) - Securing Cyberspace - Advanced (3.0 cr)



### Elective Courses (2-6 credits)

Master's students select at least of 2 credits, and doctoral students select at least 6 credits in consultation with the Cyber Security director of graduate studies to complete the minimum credit requirement. Other courses may be applied to the minor with approval of the Cyber Security director of graduate studies.

[ST 8113](#) - Information and Cyber Security (2.0 cr)

[ST 8513](#) - Cyber Threat Intelligence (2.0 cr)

[CSCI 5271](#) - Introduction to Computer Security (3.0 cr)

[CSCI 5471](#) - Modern Cryptography (3.0 cr)

[CSCI 8271](#) - Security and Privacy in Computing (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Data Science Certificate**

*Computer Science and Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Data Science Graduate Program, Department of Computer Science and Engineering, University of Minnesota, 4-192 Keller Hall, 200 Union Street S.E., Minneapolis, MN 55455 (612- 625-4002; fax: 612-625-0572).

Email: [datascience@umn.edu](mailto:datascience@umn.edu)

Website: <http://datascience.umn.edu>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Data Science Certificate program provides a strong foundation in the science of Big Data and its analysis by gathering in a single program the knowledge, expertise, and educational assets in data collection and management, data analytics, scalable data-driven pattern discovery, and the fundamental concepts behind these methods.

Students who graduate from this 2-semester certificate program will learn the state-of-the-art methods for treating Big Data and be exposed to the cutting edge methods and theory forming the basis for the next generation of Big Data technology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree from an accredited college or university in computer science, math, statistics, engineering, natural sciences, or a related field.

Other requirements to be completed before admission:

The undergraduate degree must include statistics, calculus, multivariable calculus, linear algebra, and mathematical software environments such as Matlab or R or the equivalent, programming languages such as C+, C++, Java, programming experience including algorithms and data structures normally taught in beginning computer science courses either as part of the undergraduate degree or subsequent work experience.

#### **Special Application Requirements:**

Admission application deadlines: rolling. Applicants are considered for Fall or Spring admission and decisions are made after all applications are received following the close of the application cycle.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Writing Score: 23
  - Internet Based - Reading Score: 23
- IELTS
  - Total Score: 6.5
- MELAB
  - Part 1 (Composition) score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

The Data Science certificate requires a minimum of 12 credits consisting of one course from each of the three emphasis areas, plus one course chosen from any of the three emphasis areas.

Courses must be taken on the A/F grading scale with a minimum grade of B-.

### Algorithmics (3-6 credits)

Select at least 3 credits from the following:

[CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)

[CSCI 5523](#) - Introduction to Data Mining (3.0 cr)

[CSCI 5525](#) - Machine Learning (3.0 cr)

[EE 8591](#) - Predictive Learning from Data (3.0 cr)

[PUBH 7475](#) - Statistical Learning and Data Mining (3.0 cr)

### Statistics (3-6 credits)

Select at least 3 credits from the following:

[PUBH 7402](#) - Biostatistics Modeling and Methods (4.0 cr)

[PUBH 7440](#) - Introduction to Bayesian Analysis (3.0 cr)

[STAT 5102](#) - Theory of Statistics II (4.0 cr)

[STAT 5302](#) - Applied Regression Analysis (4.0 cr)

[STAT 5401](#) - Applied Multivariate Methods (3.0 cr)

[STAT 5511](#) - Time Series Analysis (3.0 cr)

[STAT 8051](#) - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)

[MATH 5651](#) - Basic Theory of Probability and Statistics (4.0 cr)

or [STAT 5101](#) - Theory of Statistics I (4.0 cr)

### Infrastructure and Large Scale Computing (3-6 credits)

Select at least 3 credits from the following:

[CSCI 5105](#) - Introduction to Distributed Systems (3.0 cr)

[CSCI 5451](#) - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)

[CSCI 5707](#) - Principles of Database Systems (3.0 cr)

[CSCI 8980](#) - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)

[EE 5351](#) - Applied Parallel Programming (3.0 cr)

[CSCI 8205](#) - Parallel Computer Organization (3.0 cr)

or [EE 8367](#) - Parallel Computer Organization (3.0 cr)



### **Twin Cities Campus**

## **Data Science in Astrophysics Minor**

*Astrophysics, Minnesota Institute for*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Minnesota Institute for Astrophysics, John T. Tate Hall, 116 Church Street S.E., Minneapolis, MN 55455 (612-624-4811; fax: 612-626-2029)

Email: [MIfA@umn.edu](mailto:MIfA@umn.edu)

Website: <http://www.astro.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 8
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The minor in Data Science in Astrophysics is designed to be interdisciplinary and integrates data science (statistics, data processing, artificial intelligence) with the field of astrophysics. Students pursuing the minor will receive the training needed to advance the field of astrophysics, while simultaneously preparing to be successful professionals and leaders in the modern data-driven workforce.

The curriculum covers the fundamental concepts in statistics, data processing and data management, as well as the modern machine learning and deep learning techniques needed for analyzing the ever-increasing astrophysics data-sets. Students will have opportunities to conduct frontier research projects using modern astrophysics data-sets, and will work in interdisciplinary teams mentored by interdisciplinary faculty. They will also have opportunities to develop their professional skills, such as communications and leadership.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Other requirements to be completed before admission:

Current students with a science, engineering, or statistics background and in good standing from any University graduate program are eligible for the minor.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses applied to the minor that are offered on both the A/F and S/N grade basis must be taken A/F.

The minimum cumulative GPA for the minor is 3.00.

#### **Required courses (8 credits)**

All students take one Astrostatistics course and one Big Data course for a total of 8 credits. Course selection must be approved by the Astrophysics director of graduate studies.

##### **Astrostatistics**





[AST 5731](#) - Bayesian Astrostatistics (4.0 cr)  
or [STAT 5731](#) - Bayesian Astrostatistics (4.0 cr)

**Big Data**

[AST 8581](#) - Big Data in Astrophysics (4.0 cr)  
or [CSCI 8581](#) - Big Data in Astrophysics (4.0 cr)  
or [PHYS 8581](#) - Big Data in Astrophysics (4.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Masters

### Doctoral

#### Electives (4 credits)

Doctoral students select a minimum of 4 additional credits in consultation with the Data Science in Astrophysics director of graduate studies to meet the 12-credit minimum.

[AST 5022](#) - Relativity, Cosmology, and the Universe (4.0 cr)  
[AST 8001](#) - Radiative Processes in Astrophysics (4.0 cr)  
[AST 8011](#) - High Energy Astrophysics (4.0 cr)  
[AST 8990](#) - Research in Astronomy and Astrophysics (1.0 - 4.0 cr)  
[CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)  
[CSCI 5523](#) - Introduction to Data Mining (3.0 cr)  
[CSCI 5525](#) - Machine Learning (3.0 cr)  
[CSCI 5609](#) - Visualization (3.0 cr)  
[CSCI 5707](#) - Principles of Database Systems (3.0 cr)  
[EE 5239](#) - Introduction to Nonlinear Optimization (3.0 cr)  
[EE 5251](#) - Optimal Filtering and Estimation (3.0 cr)  
[EE 5531](#) - Probability and Stochastic Processes (3.0 cr)  
[EE 5542](#) - Adaptive Digital Signal Processing (3.0 cr)  
[EE 5561](#) - Image Processing and Applications (3.0 cr)  
[EE 8581](#) - Detection and Estimation Theory (3.0 cr)  
[EE 8591](#) - Predictive Learning from Data (3.0 cr)  
[PHYS 8611](#) - Cosmic Rays and Plasma Astrophysics (3.0 cr)  
[PUBH 7460](#) - Advanced Statistical Computing (3.0 cr)  
[PUBH 8442](#) - Bayesian Decision Theory and Data Analysis (3.0 cr)  
[STAT 5302](#) - Applied Regression Analysis (4.0 cr)  
[STAT 5401](#) - Applied Multivariate Methods (3.0 cr)  
[STAT 5421](#) - Analysis of Categorical Data (3.0 cr)  
[STAT 5511](#) - Time Series Analysis (3.0 cr)  
[STAT 5601](#) - Nonparametric Methods (3.0 cr)  
[STAT 8051](#) - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)



### **Twin Cities Campus**

## **Data Science M.S.**

*Computer Science and Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Data Science Graduate Program, Department of Computer Science and Engineering, University of Minnesota, 4-192 Keller Hall, 200 Union Street S.E., Minneapolis, MN 55455 (612- 625-4002; fax: 612-625-0572).

Email: [datascience@umn.edu](mailto:datascience@umn.edu)

Website: <http://datascience.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Data Science MS program provides a strong foundation in the science of Big Data and its analysis by gathering in a single program the knowledge, expertise, and educational assets in data collection and management, data analytics, scalable data-driven pattern discovery, and the fundamental concepts behind these methods.

Students who graduate from this regular 2-year master's program will learn the state-of-the-art methods for treating Big Data, be exposed to the cutting-edge methods and theory forming the basis for the next generation of Big Data technology, and will complete a project demonstrating that they can use the fundamental concepts to design innovative methods for new application areas arising from business, government, security, medicine, biology, physical sciences, and the environment.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree from an accredited college or university in computer science, math, statistics, engineering, natural sciences, or a related field.

Other requirements to be completed before admission:

The undergraduate degree must include statistics, calculus, multivariable calculus, linear algebra, and mathematical software environments such as Matlab or R or the equivalent, programming languages such as C+, C++, Java, programming experience including algorithms and data structures normally taught in beginning computer science courses either as part of the undergraduate degree or subsequent work experience.

#### **Special Application Requirements:**

Admission application deadlines: February 1st international applicants, March 1st domestic applicants. Applicants are only considered for fall admission and decisions are made after all applications are received following the close of the application cycle.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Writing Score: 23
  - Internet Based - Reading Score: 23
- IELTS
  - Total Score: 6.5



- MELAB
  - Part 1 (Composition) score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 31 major credits and up to null credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** Students must complete 3 credit hours of capstone project coursework supervised by a faculty member.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

At least 3 8xxx-level credits, either from an emphasis or an elective, are required.

### Statistics (6 credits)

In consultation with advisor, select 6 credits from the Statistics emphasis, at least 3 of which must be from the following short list:

#### Short List

- PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)
- PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)
- PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
- STAT 5102 - Theory of Statistics II (4.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)
- STAT 5511 - Time Series Analysis (3.0 cr)
- STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)
- MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)
  - or STAT 5101 - Theory of Statistics I (4.0 cr)

#### Additional Courses

- EE 5531 - Probability and Stochastic Processes (3.0 cr)
- EE 8581 - Detection and Estimation Theory (3.0 cr)
- PUBH 7405 - Biostatistics: Regression (4.0 cr)
- PUBH 7406 - Advanced Regression and Design (4.0 cr)
- PUBH 7407 - Analysis of Categorical Data (3.0 cr)
- PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
- PUBH 7485 - Methods for Causal Inference (3.0 cr)
- PUBH 8401 - Linear Models (4.0 cr)
- PUBH 8432 - Probability Models for Biostatistics (3.0 cr)
- PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)
- STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)
- STAT 5601 - Nonparametric Methods (3.0 cr)

### Algorithmics (6 credits)

In consultation with advisor, select 6 credits from the Algorithmics emphasis, at least 3 of which must be from the following short list:

#### Short List

- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)
- EE 8591 - Predictive Learning from Data (3.0 cr)
- PUBH 8475 - Statistical Learning and Data Mining (3.0 cr)

#### Additional Courses



CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5512 - Artificial Intelligence II (3.0 cr)  
CSCI 5609 - Visualization (3.0 cr)  
CSCI 8314 - Sparse Matrix Computations (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5355 - Algorithmic Techniques for Scalable Many-core Computing (3.0 cr)  
EE 5391 - Computing With Neural Networks (3.0 cr)  
EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5551 - Multiscale and Multirate Signal Processing (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5581 - Information Theory and Coding (3.0 cr)  
EE 5585 - Data Compression (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
IE 8534 - Advanced Topics in Operations Research (4.0 cr)

#### Infrastructure and Large Scale Computing (6 credits)

In consultation with advisor, select 6 credits from the Infrastructure and Large Scale Computing emphasis, at least 3 of which must be from the following short list:

##### Short List

CSCI 5105 - Introduction to Distributed Systems (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5707 - Principles of Database Systems (3.0 cr)  
CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)  
EE 5351 - Applied Parallel Programming (3.0 cr)  
EE 8367 - Parallel Computer Organization (3.0 cr)  
CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)

##### Additional Courses

CSCI 5211 - Data Communications and Computer Networks (3.0 cr)  
CSCI 5231 - Wireless and Sensor Networks (3.0 cr)  
CSCI 5271 - Introduction to Computer Security (3.0 cr)  
CSCI 5715 - From GPS, Google Maps, and Uber to Spatial Data Science (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 5802 - Software Engineering II (3.0 cr)  
CSCI 8102 - Foundations of Distributed Computing (3.0 cr)  
CSCI 8701 - Overview of Database Research (3.0 cr)  
CSCI 8715 - Spatial Data Science Research (3.0 cr)  
CSCI 8735 - Advanced Database Systems (3.0 cr)  
CSCI 8801 - Advanced Software Engineering (3.0 cr)  
EE 5371 - Computer Systems Performance Measurement and Evaluation (3.0 cr)  
EE 5381 - Telecommunications Networks (3.0 cr)  
EE 5501 - Digital Communication (3.0 cr)

#### Electives (9 credits)

Select credits from the following to meet the 31-credit minimum, or choose additional courses from the lists above. Other courses may be applied to this requirement with director of graduate studies approval.

CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)  
CSCI 5561 - Computer Vision (3.0 cr)  
CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)  
CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)  
CSCI 8271 - Security and Privacy in Computing (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
CSCI 8715 - Spatial Data Science Research (3.0 cr)  
CSCI 8725 - Databases for Bioinformatics (3.0 cr)  
MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)  
MSBA 6330 - Big Data Analytics (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 8445 - Statistics for Human Genetics and Molecular Biology (3.0 cr)



[PUBH 8446](#) - Advanced Statistical Genetics and Genomics (3.0 cr)

[PUBH 8472](#) - Spatial Biostatistics (3.0 cr)

**Research Colloquium (1 credit)**

Take 1 credit from the one of the following:

[CSCI 8970](#) - Computer Science Colloquium (1.0 cr)

or [DSCI 8970](#) - Data Science M.S. Colloquium (1.0 cr)

**Capstone Course (3 credits)**

Complete 3 credits for the capstone project.

[DSCI 8760](#) - Data Science M.S. Plan B Project (3.0 cr)



### **Twin Cities Campus**

## **Data Science Minor**

*Computer Science and Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Data Science Graduate Program, Department of Computer Science and Engineering, University of Minnesota, 4-192 Keller Hall, 200 Union Street S.E., Minneapolis, MN 55455 (612- 625-4002; fax: 612-625-0572).

Email: [datascience@umn.edu](mailto:datascience@umn.edu)

Website: <http://datascience.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Data Science minor provides a strong foundation in the science of Big Data and its analysis by gathering together the knowledge, expertise, and educational assets in data collection and management, data analytics, scalable data-driven pattern discovery, and the fundamental concepts behind these methods. Students completing this minor will learn the state-of-the-art methods for treating Big Data and be exposed to the cutting-edge methods and theory forming the basis for the next generation of Big Data technology.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

## **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Data Science director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken at the University of Minnesota Twin Cities Campus; transfer coursework will not be accepted.

Courses must be taken on the A/F grading scale.

A 3.0 GPA must be maintained in the courses applied to the Data Science minor.

#### **Algorithmics (3 credits)**

All students select 3 credits from the following:

- [CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)
- [CSCI 5523](#) - Introduction to Data Mining (3.0 cr)
- [CSCI 5525](#) - Machine Learning (3.0 cr)



EE 8591 - Predictive Learning from Data (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)

### Statistics (3 credits)

All students select 3 credits from the following:

PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)  
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
or STAT 5101 - Theory of Statistics I (4.0 cr)

### Infrastructure and Large Scale Computing (3 credits)

All students select 3 credits from the following:

CSCI 5105 - Introduction to Distributed Systems (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5707 - Principles of Database Systems (3.0 cr)  
CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)  
EE 5351 - Applied Parallel Programming (3.0 cr)  
CSCI 8205 - Parallel Computer Organization (3.0 cr)  
or EE 8367 - Parallel Computer Organization (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

### Masters

### Doctoral

Coursework from the student's home department cannot be applied as a doctoral minor elective.

### Electives (3 Credits)

Select 3 credits from the following to complete the 12-credit minimum for the doctoral minor.

CSCI 5105 - Introduction to Distributed Systems (3.0 cr)  
CSCI 5211 - Data Communications and Computer Networks (3.0 cr)  
CSCI 5231 - Wireless and Sensor Networks (3.0 cr)  
CSCI 5271 - Introduction to Computer Security (3.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5512 - Artificial Intelligence II (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5609 - Visualization (3.0 cr)  
CSCI 5707 - Principles of Database Systems (3.0 cr)  
CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)  
CSCI 5715 - From GPS, Google Maps, and Uber to Spatial Data Science (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 5802 - Software Engineering II (3.0 cr)  
CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)  
CSCI 8102 - Foundations of Distributed Computing (3.0 cr)  
CSCI 8205 - Parallel Computer Organization (3.0 cr)  
CSCI 8314 - Sparse Matrix Computations (3.0 cr)  
CSCI 8701 - Overview of Database Research (3.0 cr)  
CSCI 8715 - Spatial Data Science Research (3.0 cr)  
CSCI 8725 - Databases for Bioinformatics (3.0 cr)  
CSCI 8735 - Advanced Database Systems (3.0 cr)



CSCI 8801 - Advanced Software Engineering (3.0 cr)  
CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5351 - Applied Parallel Programming (3.0 cr)  
EE 5355 - Algorithmic Techniques for Scalable Many-core Computing (3.0 cr)  
EE 5371 - Computer Systems Performance Measurement and Evaluation (3.0 cr)  
EE 5381 - Telecommunications Networks (3.0 cr)  
EE 5391 - Computing With Neural Networks (3.0 cr)  
EE 5501 - Digital Communication (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5551 - Multiscale and Multirate Signal Processing (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5581 - Information Theory and Coding (3.0 cr)  
EE 5585 - Data Compression (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
EE 8367 - Parallel Computer Organization (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
EE 8591 - Predictive Learning from Data (3.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
IE 8534 - Advanced Topics in Operations Research (4.0 cr)  
PUBH 7401 - Fundamentals of Biostatistical Inference (4.0 cr)  
PUBH 7402 - Biostatistics Modeling and Methods (4.0 cr)  
PUBH 7405 - Biostatistics: Regression (4.0 cr)  
PUBH 7406 - Advanced Regression and Design (4.0 cr)  
PUBH 7407 - Analysis of Categorical Data (3.0 cr)  
PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)  
PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)  
PUBH 7460 - Advanced Statistical Computing (3.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
PUBH 7485 - Methods for Causal Inference (3.0 cr)  
PUBH 8401 - Linear Models (4.0 cr)  
PUBH 8432 - Probability Models for Biostatistics (3.0 cr)  
PUBH 8442 - Bayesian Decision Theory and Data Analysis (3.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5421 - Analysis of Categorical Data (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 5601 - Nonparametric Methods (3.0 cr)  
STAT 8051 - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)





### **Twin Cities Campus**

## **Earth Sciences M.S.**

*Department of Earth Sciences*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Earth Sciences, University of Minnesota, John T. Tate Hall-Suite 150, 116 Church St. SE, Minneapolis, MN 55455 (612-624-1333; fax: 612-625-3819)

Email: [esci@umn.edu](mailto:esci@umn.edu)

Website: <http://www.esci.umn.edu/programs/graduate>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The modern earth sciences are a remarkable synthesis of the physical and biological sciences. They are at the forefront of inquiry into and solutions of most of the major issues involving the global environment: climate, oceans, freshwater in all its forms, natural resources, and natural disasters. Like no other field, they integrate all the systems, from surface to great depth, from physics to chemistry to biology, and over all of geologic time and all geographic scales. The program includes the fields of structural geology, tectonics, petrology, hydrogeology, geomorphology, sedimentology, surface processes, geochemistry, geobiochemistry, geobiology, chemical oceanography, mineralogy, mineral and rock magnetism, rock and mineral physics, geodynamics, seismology, geostatistics, planetary geology, and geophysics and applied geophysics. Students may accommodate other areas of interest such as engineering geology, environmental geology, materials science, soil science, and paleoecology by choosing a minor or supporting field from outside the program.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree in geology, geophysics, earth and material sciences, chemistry, physics, biology, or environmental science.

Other requirements to be completed before admission:

At least one year each of study in calculus, chemistry, and physics is required. In general, an outstanding academic record is expected.

#### **Special Application Requirements:**

Materials required for a complete application file include the student's statement of purpose, three letters of recommendation, transcripts, official GRE scores, and the Application for Admission. Applications are considered at any time; however, to be considered for financial aid, all materials must be submitted by December 15. Studies may begin in any semester or summer session, although fall semester is preferable.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5



- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 14 to 22 major credits and 8 to 16 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** Students must demonstrate familiarity with the tools of research or scholarship in their track, the ability to work independently, and the ability to present the results of their investigation effectively, by completing one or more projects, which may take the form of a research paper, presentation of research results, or completion of a faculty-supervised research experience. The Plan B project(s) should involve a minimum combined total of approximately 120 hours (the equivalent of three full-time weeks) of work.

**Plan C:** Plan C requires 14 to 21 major credits and 9 to 16 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At the onset of studies, a coursework "compact" will be developed with the student, their advisor, and the graduate studies committee. The compact will be reviewed annually to assure timely progress and revise as needed.

The masters degree is offered under Plan A (thesis), Plan B (project), or Plan C (coursework). Plan A and Plan B students must choose one of five tracks in the earth sciences program: geology, geophysics, biogeology, hydrogeology, or earth sciences. Plan C students may only choose the hydrogeology track. Tracks carry coursework requirements that are part of the student's course compact.

Coursework taken A/F must be completed with an average grade of B or better.

### Required Courses (3 credits)

Take ESci 8001 and 1 credit of ESCI 8980, preferably in the first year.

[ESCI 8001](#) - Introductory Graduate Seminar (2.0 cr)

[ESCI 8980](#) - Seminar: Current Topics in Earth Sciences (1.0 - 4.0 cr)

### Outside Coursework (6 to 9 credits)

Plan A students select 6 credits, Plan B students select 8 credits, and Plan C students select 9 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with director of graduate studies approval.

[ANTH 5403](#) - Quantitative Methods in Biological Anthropology (4.0 cr)

[CEGE 4501](#) - Hydrologic Design (4.0 cr)

[CEGE 4512](#) - Open Channel Hydraulics (4.0 cr)

[CEGE 5541](#) - Environmental Water Chemistry (3.0 cr)

[CEGE 5551](#) - Environmental Microbiology (3.0 cr)

[CEGE 5552](#) - Environmental Microbiology Laboratory (1.0 cr)

[CHEM 4501](#) - Introduction to Thermodynamics, Kinetics, and Statistical Mechanics (3.0 cr)

[CSCI 5304](#) - Computational Aspects of Matrix Theory (3.0 cr)

[CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)

[CSCI 5609](#) - Visualization (3.0 cr)

[EE 5531](#) - Probability and Stochastic Processes (3.0 cr)

[EE 8581](#) - Detection and Estimation Theory (3.0 cr)

[EEB 5053](#) - Ecology: Theory and Concepts (4.0 cr)

[EEB 5407](#) - Ecology (3.0 cr)

[EEB 5601](#) - Limnology (3.0 cr)

[ESPM 5402](#) - Biometeorology (3.0 cr)

[FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)

[FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)



FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)  
FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)  
LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)  
LAAS 5425 - Atmospheric Processes I: Thermodynamics and Dynamics of the Atmosphere (3.0 cr)  
LAAS 5426 - Atmospheric Processes II: Radiation, Composition, and Climate (3.0 cr)  
LAAS 5515 - Soil Formation: Earth Surface Processes and Biogeochemistry (3.0 cr)  
LAAS 5621 - Soil and Environmental Genomics (3.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATS 5517 - Microscopy of Materials (3.0 cr)  
MATS 8001 - Structure and Symmetry of Materials (3.0 cr)  
MATS 8002 - Thermodynamics and Kinetics (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)  
STAT 8102 - Theory of Statistics 2 (3.0 cr)

### Electives

Select courses from the following, as needed to complete the minimum number of course credits required.

ESCI 4203 - Environmental Geophysics (3.0 cr)  
ESCI 4204 - Geomagnetism and Paleomagnetism (3.0 cr)  
ESCI 4211 - Solid Earth Geophysics I (3.0 cr)  
ESCI 4212 - Solid Earth Geophysics II (3.0 cr)  
ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)  
ESCI 4402 - Biogeochemical Cycles in the Ocean (3.0 cr)  
ESCI 4501 - Structural Geology (3.0 cr)  
ESCI 4502 - Tectonic Styles (3.0 cr)  
ESCI 4602 - Sedimentology and Stratigraphy (3.0 cr)  
ESCI 4701 - Geomorphology (4.0 cr)  
ESCI 4702 - General Hydrogeology (4.0 cr)  
ESCI 4703 - Glacial Geology (4.0 cr)  
ESCI 4801 - Geomicrobiology (3.0 cr)  
ESCI 4911 - Advanced Field Geology (4.0 cr)  
ESCI 5093 - Directed Studies in Earth Sciences (1.0 - 4.0 cr)  
ESCI 5102 - Climate Change and Human History (3.0 cr)  
ESCI 5201 - Time-Series Analysis of Geological Phenomena (3.0 cr)  
ESCI 5203 - Mineral and Rock Physics (3.0 cr)  
ESCI 5204 - Geostatistics and Inverse Theory (3.0 cr)  
ESCI 5302 - Isotope Geology (3.0 cr)  
ESCI 5351 - Geochemical Modeling of Aqueous Systems (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
ESCI 5402 - Science and Politics of Global Warming (3.0 cr)  
ESCI 5403 - Computer Applications in Earth & Environmental Sciences (3.0 cr)  
ESCI 5503 - Advanced Petrology (3.0 cr)  
ESCI 5705 - Limnogeology and Paleoenvironment (3.0 cr)  
ESCI 5805 - Standards and Practices for Professional Geoscientists (3.0 cr)  
ESCI 5971 - Field Hydrogeology (2.0 cr)  
ESCI 5980 - Seminar: Current Topics in Earth Sciences (1.0 - 4.0 cr)  
ESCI 8203 - Environmental Geophysics (3.0 cr)  
ESCI 8204 - Geomagnetism and Paleomagnetism (3.0 cr)  
ESCI 8243 - Principles of Rock Magnetism (1.0 - 3.0 cr)  
ESCI 8353 - Phase Equilibrium in Mineral Systems (3.0 cr)  
ESCI 8354 - Igneous Petrology (3.0 cr)  
ESCI 8355 - Metamorphic Petrology (3.0 cr)  
ESCI 8401 - Aqueous Environmental Geochemistry (3.0 cr)  
ESCI 8402 - Biogeochemical Cycles in the Ocean (3.0 cr)  
ESCI 8501 - Structural Geology (4.0 cr)  
ESCI 8502 - Tectonic Styles (3.0 cr)  
ESCI 8511 - Mechanics of Sediment Transport (3.0 cr)  
ESCI 8601 - Introduction to Stream Restoration (3.0 cr)  
ESCI 8602 - Stream Restoration Practice (2.0 cr)  
ESCI 8701 - Geomorphology (4.0 cr)  
ESCI 8712 - Transport Phenomena and Analytical Geohydrology (3.0 - 4.0 cr)  
ESCI 8718 - Numerical Methods in Hydrogeology (4.0 cr)  
ESCI 8801 - Geomicrobiology (3.0 cr)  
ESCI 8970 - Seminar: Current Topics in Earth Sciences (1.0 - 4.0 cr)



[ESCI 8994](#) - Research in Earth Sciences (1.0 - 4.0 cr)

### Plan Options

#### Plan A

Complete 10 master's thesis credits.

[ESCI 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B (0-3 credits)

Up to 3 credits of [ESCI 8994](#) may be used for the Plan B project requirement.

[ESCI 8994](#) - Research in Earth Sciences (1.0 - 4.0 cr)

-OR-

#### Plan C

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Biogeology

This sub-plan is limited to students completing the program under Plan A or Plan B.

Biogeology represents a rapidly growing area at the intersection between Earth and the life sciences. It includes research in microbial evolution and biochemistry, microbe/mineral chemical interactions, the role of organisms in basic geological processes, the principles through which organisms or organic compounds can be used to reconstruct surface conditions, biogeochemical cycling, pollution control and remediation, the origin of life on Earth, and astrobiology.

#### Required Courses (6 credits)

Take the following courses:

[ESCI 8402](#) - Biogeochemical Cycles in the Ocean (3.0 cr)

[ESCI 8801](#) - Geomicrobiology (3.0 cr)

### Earth Sciences

This sub-plan is limited to students completing the program under Plan A or Plan B.

This generalist track exists for students whose curriculum and/or thesis, paper, or project do not fit any of the other four tracks. A curriculum specific to the student will be set through the compact process.

#### Required Courses (6 credits)

Select 6 credits from the following:

[ESCI 4xxx](#)

[ESCI 5xxx](#)

[ESCI 8xxx](#)

### Geology

This sub-plan is limited to students completing the program under Plan A or Plan B.

Geology uses field observation, laboratory work, analog and computer modeling, chemical and biological probes and assays to understand Earth's coupled rock, water and biological systems, the underlying processes, and their history of interaction as evidenced in the rock record.

#### Required Courses (6 credits)

Select 6 credits from the following:

[ESCI 5302](#) - Isotope Geology (3.0 cr)

[ESCI 5351](#) - Geochemical Modeling of Aqueous Systems (3.0 cr)

[ESCI 5353](#) - Electron Microprobe Theory and Practice (3.0 cr)

[ESCI 5503](#) - Advanced Petrology (3.0 cr)

[ESCI 5705](#) - Limnogeology and Paleoenvironment (3.0 cr)



### Geophysics

This sub-plan is limited to students completing the program under Plan A or Plan B.

Geophysics uses remote sensing probes (seismic waves, potential fields, etc.), laboratory simulation of deep earth conditions and computer modeling of fluid and continuum mechanical dynamics to investigate the structure, composition, history and dynamics of solid Earth and other planets.

#### Required Courses (6 credits)

Take the following course:

[ESCI 4211](#) - Solid Earth Geophysics I (3.0 cr)

Select 3 credits from the following:

[ESCI 4212](#) - Solid Earth Geophysics II (3.0 cr)

[ESCI 5201](#) - Time-Series Analysis of Geological Phenomena (3.0 cr)

[ESCI 5203](#) - Mineral and Rock Physics (3.0 cr)

[ESCI 5204](#) - Geostatistics and Inverse Theory (3.0 cr)

[ESCI 8203](#) - Environmental Geophysics (3.0 cr)

[ESCI 8204](#) - Geomagnetism and Paleomagnetism (3.0 cr)

### Hydrogeology

Hydrogeology uses direct observation and remote sensing, computer modeling and laboratory simulation to constrain the interaction of water and rock in Earth's shallow subsurface. Freshwater is Earth's most precious and increasingly overexploited resource.

Hydrogeology is a key discipline in the effective shepherding of this important reserve. This track establishes a baseline curriculum for hydrogeology at the graduate level. The compact process will identify additional coursework appropriate to the student's prior training and research directions.

#### Required Courses (6 credits)

Take the following courses:

[ESCI 4702](#) - General Hydrogeology (4.0 cr)

[ESCI 5971](#) - Field Hydrogeology (2.0 cr)



### **Twin Cities Campus**

## **Earth Sciences Minor**

Department of Earth Sciences

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Earth Sciences, University of Minnesota, John T. Tate Hall-Suite 150, 116 Church St. SE, Minneapolis, MN 55455 (612-624-1333; fax: 612-625-3819)

Email: [esci@umn.edu](mailto:esci@umn.edu)

Website: <http://www.esci.umn.edu/programs/graduate>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The modern earth sciences are a remarkable synthesis of the physical and biological sciences. They are at the forefront of inquiry into and solutions of most of the major issues involving the global environment: climate, oceans, freshwater in all its forms, natural resources, and natural disasters. Like no other field, they integrate all the systems, from surface to great depth, from physics to chemistry to biology, and over all of geologic time and all geographic scales. The program includes the fields of structural geology, tectonics, petrology, hydrogeology, geomorphology, sedimentology, surface processes, geochemistry, geobiochemistry, geobiology, chemical oceanography, mineralogy, mineral and rock magnetism, rock and mineral physics, geodynamics, seismology, geostatistics, planetary geology, and geophysics and applied geophysics.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Earth Sciences director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Courses must be taken on the A/F grade basis, unless only offered S/N.

The minimum cumulative GPA for the minor is 3.00.

#### **Minor Courses (6 to 12 credits)**

Masters students select at least 6 credits, and doctoral students select at least 12 credits from the following, in consultation with the Earth Sciences director of graduate studies. With approval of the Earth Sciences director of graduate studies, other courses may be applied to the minor.

[ESCI 4203](#) - Environmental Geophysics (3.0 cr)

[ESCI 4204](#) - Geomagnetism and Paleomagnetism (3.0 cr)

[ESCI 4211](#) - Solid Earth Geophysics I (3.0 cr)

[ESCI 4212](#) - Solid Earth Geophysics II (3.0 cr)



ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)  
ESCI 4402 - Biogeochemical Cycles in the Ocean (3.0 cr)  
ESCI 4501 - Structural Geology (3.0 cr)  
ESCI 4502 - Tectonic Styles (3.0 cr)  
ESCI 4602 - Sedimentology and Stratigraphy (3.0 cr)  
ESCI 4701 - Geomorphology (4.0 cr)  
ESCI 4702 - General Hydrogeology (4.0 cr)  
ESCI 4703 - Glacial Geology (4.0 cr)  
ESCI 4801 - Geomicrobiology (3.0 cr)  
ESCI 4911 - Advanced Field Geology (4.0 cr)  
ESCI 5093 - Directed Studies in Earth Sciences (1.0 - 4.0 cr)  
ESCI 5102 - Climate Change and Human History (3.0 cr)  
ESCI 5201 - Time-Series Analysis of Geological Phenomena (3.0 cr)  
ESCI 5203 - Mineral and Rock Physics (3.0 cr)  
ESCI 5204 - Geostatistics and Inverse Theory (3.0 cr)  
ESCI 5302 - Isotope Geology (3.0 cr)  
ESCI 5351 - Geochemical Modeling of Aqueous Systems (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
ESCI 5402 - Science and Politics of Global Warming (3.0 cr)  
ESCI 5403 - Computer Applications in Earth & Environmental Sciences (3.0 cr)  
ESCI 5503 - Advanced Petrology (3.0 cr)  
ESCI 5705 - Limnogeology and Paleoenvironment (3.0 cr)  
ESCI 5805 - Standards and Practices for Professional Geoscientists (3.0 cr)  
ESCI 5971 - Field Hydrogeology (2.0 cr)  
ESCI 5980 - Seminar: Current Topics in Earth Sciences (1.0 - 4.0 cr)  
ESCI 8203 - Environmental Geophysics (3.0 cr)  
ESCI 8204 - Geomagnetism and Paleomagnetism (3.0 cr)  
ESCI 8243 - Principles of Rock Magnetism (1.0 - 3.0 cr)  
ESCI 8353 - Phase Equilibrium in Mineral Systems (3.0 cr)  
ESCI 8354 - Igneous Petrology (3.0 cr)  
ESCI 8355 - Metamorphic Petrology (3.0 cr)  
ESCI 8401 - Aqueous Environmental Geochemistry (3.0 cr)  
ESCI 8402 - Biogeochemical Cycles in the Ocean (3.0 cr)  
ESCI 8501 - Structural Geology (4.0 cr)  
ESCI 8502 - Tectonic Styles (3.0 cr)  
ESCI 8511 - Mechanics of Sediment Transport (3.0 cr)  
ESCI 8601 - Introduction to Stream Restoration (3.0 cr)  
ESCI 8602 - Stream Restoration Practice (2.0 cr)  
ESCI 8701 - Geomorphology (4.0 cr)  
ESCI 8712 - Transport Phenomena and Analytical Geohydrology (3.0 - 4.0 cr)  
ESCI 8718 - Numerical Methods in Hydrogeology (4.0 cr)  
ESCI 8801 - Geomicrobiology (3.0 cr)  
ESCI 8970 - Seminar: Current Topics in Earth Sciences (1.0 - 4.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Earth Sciences Ph.D.**

*Department of Earth Sciences*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Earth Sciences, University of Minnesota, John T. Tate Hall-Suite 150, 116 Church St. SE, Minneapolis, MN 55455 (612-624-1333; fax: 612-625-3819)

Email: [esci@umn.edu](mailto:esci@umn.edu)

Website: <http://www.esci.umn.edu/programs/graduate>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The modern earth sciences are a remarkable synthesis of the physical and biological sciences. They are at the forefront of inquiry into and solutions of most of the major issues involving the global environment: climate, oceans, freshwater in all its forms, natural resources, and natural disasters. Like no other field, they integrate all the systems, from surface to great depth, from physics to chemistry to biology, and over all of geologic time and all geographic scales. The program includes the fields of structural geology, tectonics, petrology, hydrogeology, geomorphology, sedimentology, surface processes, geochemistry, geobiochemistry, geobiology, chemical oceanography, mineralogy, mineral and rock magnetism, rock and mineral physics, geodynamics, seismology, geostatistics, planetary geology, and geophysics and applied geophysics. Students may accommodate other areas of interest such as engineering geology, environmental geology, materials science, soil science, and paleoecology by choosing a minor or supporting field from outside the program.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Bachelor's degree in geology, geophysics, earth and material sciences, chemistry, physics, biology, or environmental science.

Other requirements to be completed before admission:

At least one year of study each in calculus, chemistry, and physics is required. In general, an outstanding academic record is expected.

#### **Special Application Requirements:**

Materials required for a complete application file include the student's statement of purpose, three letters of recommendation, transcripts, official GRE scores, and the Application for Admission. Applications are considered at any time; however, to be considered for financial aid, all materials must be submitted by December 15. Studies may begin in any semester or summer session, although fall semester is preferable.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB





- Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

12 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At the onset of studies, a coursework "compact" is developed with the student, the advisor, and the graduate studies committee. The compact will be reviewed annually to assure timely progress and revise as needed.

Students must choose one of five tracks: geology, geophysics, biogeology, hydrogeology, or earth sciences. Tracks carry coursework requirements that are part of the student's course compact.

Coursework taken A/F must be completed with an average grade of B or better.

### Required Courses (3 credits)

Take ESci 8001 and 1 credit of ESCI 8980, preferably in the first year.

[ESCI 8001](#) - Introductory Graduate Seminar (2.0 cr)

[ESCI 8980](#) - Seminar: Current Topics in Earth Sciences (1.0 - 4.0 cr)

### Outside Coursework (12 credits)

Select 12 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with director of graduate studies approval.

[ANTH 5403](#) - Quantitative Methods in Biological Anthropology (4.0 cr)

[CEGE 4501](#) - Hydrologic Design (4.0 cr)

[CEGE 4512](#) - Open Channel Hydraulics (4.0 cr)

[CEGE 5541](#) - Environmental Water Chemistry (3.0 cr)

[CEGE 5551](#) - Environmental Microbiology (3.0 cr)

[CEGE 5552](#) - Environmental Microbiology Laboratory (1.0 cr)

[CHEM 4501](#) - Introduction to Thermodynamics, Kinetics, and Statistical Mechanics (3.0 cr)

[CSCI 5304](#) - Computational Aspects of Matrix Theory (3.0 cr)

[CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)

[CSCI 5609](#) - Visualization (3.0 cr)

[EE 5531](#) - Probability and Stochastic Processes (3.0 cr)

[EE 8581](#) - Detection and Estimation Theory (3.0 cr)

[EEB 5053](#) - Ecology: Theory and Concepts (4.0 cr)

[EEB 5407](#) - Ecology (3.0 cr)

[EEB 5601](#) - Limnology (3.0 cr)

[ESPM 5402](#) - Biometeorology (3.0 cr)

[FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)

[FNRM 5131](#) - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)

[FNRM 5203](#) - Forest Fire and Disturbance Ecology (3.0 cr)

[FNRM 5262](#) - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)

[LAAS 5311](#) - Soil Chemistry and Mineralogy (3.0 cr)

[LAAS 5425](#) - Atmospheric Processes I: Thermodynamics and Dynamics of the Atmosphere (3.0 cr)

[LAAS 5426](#) - Atmospheric Processes II: Radiation, Composition, and Climate (3.0 cr)

[LAAS 5515](#) - Soil Formation: Earth Surface Processes and Biogeochemistry (3.0 cr)

[LAAS 5621](#) - Soil and Environmental Genomics (3.0 cr)

[MATH 5485](#) - Introduction to Numerical Methods I (4.0 cr)

[MATH 5486](#) - Introduction To Numerical Methods II (4.0 cr)

[MATS 5517](#) - Microscopy of Materials (3.0 cr)

[MATS 8001](#) - Structure and Symmetry of Materials (3.0 cr)



MATS 8002 - Thermodynamics and Kinetics (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)  
STAT 8102 - Theory of Statistics 2 (3.0 cr)

#### Elective Courses

Select courses from the following, as needed to complete the minimum number of course credits required.

ESCI 4203 - Environmental Geophysics (3.0 cr)  
ESCI 4204 - Geomagnetism and Paleomagnetism (3.0 cr)  
ESCI 4211 - Solid Earth Geophysics I (3.0 cr)  
ESCI 4212 - Solid Earth Geophysics II (3.0 cr)  
ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)  
ESCI 4402 - Biogeochemical Cycles in the Ocean (3.0 cr)  
ESCI 4501 - Structural Geology (3.0 cr)  
ESCI 4502 - Tectonic Styles (3.0 cr)  
ESCI 4602 - Sedimentology and Stratigraphy (3.0 cr)  
ESCI 4701 - Geomorphology (4.0 cr)  
ESCI 4702 - General Hydrogeology (4.0 cr)  
ESCI 4703 - Glacial Geology (4.0 cr)  
ESCI 4801 - Geomicrobiology (3.0 cr)  
ESCI 4911 - Advanced Field Geology (4.0 cr)  
ESCI 5093 - Directed Studies in Earth Sciences (1.0 - 4.0 cr)  
ESCI 5102 - Climate Change and Human History (3.0 cr)  
ESCI 5201 - Time-Series Analysis of Geological Phenomena (3.0 cr)  
ESCI 5203 - Mineral and Rock Physics (3.0 cr)  
ESCI 5204 - Geostatistics and Inverse Theory (3.0 cr)  
ESCI 5302 - Isotope Geology (3.0 cr)  
ESCI 5351 - Geochemical Modeling of Aqueous Systems (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
ESCI 5402 - Science and Politics of Global Warming (3.0 cr)  
ESCI 5403 - Computer Applications in Earth & Environmental Sciences (3.0 cr)  
ESCI 5503 - Advanced Petrology (3.0 cr)  
ESCI 5705 - Limnogeology and Paleoenvironment (3.0 cr)  
ESCI 5805 - Standards and Practices for Professional Geoscientists (3.0 cr)  
ESCI 5971 - Field Hydrogeology (2.0 cr)  
ESCI 5980 - Seminar: Current Topics in Earth Sciences (1.0 - 4.0 cr)  
ESCI 8203 - Environmental Geophysics (3.0 cr)  
ESCI 8204 - Geomagnetism and Paleomagnetism (3.0 cr)  
ESCI 8243 - Principles of Rock Magnetism (1.0 - 3.0 cr)  
ESCI 8353 - Phase Equilibrium in Mineral Systems (3.0 cr)  
ESCI 8354 - Igneous Petrology (3.0 cr)  
ESCI 8355 - Metamorphic Petrology (3.0 cr)  
ESCI 8401 - Aqueous Environmental Geochemistry (3.0 cr)  
ESCI 8402 - Biogeochemical Cycles in the Ocean (3.0 cr)  
ESCI 8501 - Structural Geology (4.0 cr)  
ESCI 8502 - Tectonic Styles (3.0 cr)  
ESCI 8511 - Mechanics of Sediment Transport (3.0 cr)  
ESCI 8601 - Introduction to Stream Restoration (3.0 cr)  
ESCI 8602 - Stream Restoration Practice (2.0 cr)  
ESCI 8701 - Geomorphology (4.0 cr)  
ESCI 8712 - Transport Phenomena and Analytical Geohydrology (3.0 - 4.0 cr)  
ESCI 8718 - Numerical Methods in Hydrogeology (4.0 cr)  
ESCI 8801 - Geomicrobiology (3.0 cr)  
ESCI 8970 - Seminar: Current Topics in Earth Sciences (1.0 - 4.0 cr)  
ESCI 8994 - Research in Earth Sciences (1.0 - 4.0 cr)

#### Thesis Credits (24 credits)

Complete 24 doctoral credits after passing preliminary oral exam.

ESCI 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

#### Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.



### Biogeology

Biogeology represents a rapidly growing area at the intersection between Earth and the life sciences. It includes research in microbial evolution and biochemistry, microbe/mineral chemical interactions, the role of organisms in basic geological processes, the principles through which organisms or organic compounds can be used to reconstruct surface conditions, biogeochemical cycling, pollution control and remediation, the origin of life on Earth, and astrobiology.

#### Required Courses (6 credits)

Take the following courses:

[ESCI 8402](#) - Biogeochemical Cycles in the Ocean (3.0 cr)

[ESCI 8801](#) - Geomicrobiology (3.0 cr)

### Earth Sciences

This generalist track exists for students whose curriculum and/or dissertation do not fit any of the other four tracks. A curriculum specific to the student will be set through the compact process.

#### Required Courses (6 credits)

Select 6 credits from the following:

ESCI 4xxx

ESCI 5xxx

ESCI 8xxx

### Geology

Geology uses field observation, laboratory work, analog and computer modeling, chemical and biological probes and assays to understand Earth's coupled rock, water and biological systems, the underlying processes, and their history of interaction as evidenced in the rock record.

#### Required Courses (6 credits)

Select 6 credits from the following:

[ESCI 5302](#) - Isotope Geology (3.0 cr)

[ESCI 5351](#) - Geochemical Modeling of Aqueous Systems (3.0 cr)

[ESCI 5353](#) - Electron Microprobe Theory and Practice (3.0 cr)

[ESCI 5503](#) - Advanced Petrology (3.0 cr)

[ESCI 5705](#) - Limnogeology and Paleoenvironment (3.0 cr)

### Geophysics

Geophysics uses remote sensing probes (seismic waves, potential fields, etc.), laboratory simulation of deep Earth conditions and computer modeling of fluid and continuum mechanical dynamics to investigate the structure, composition, history and dynamics of solid Earth and other planets.

#### Required Courses (6 credits)

Take the following course:

[ESCI 4211](#) - Solid Earth Geophysics I (3.0 cr)

Select 3 credits from the following:

[ESCI 4212](#) - Solid Earth Geophysics II (3.0 cr)

[ESCI 5201](#) - Time-Series Analysis of Geological Phenomena (3.0 cr)

[ESCI 5203](#) - Mineral and Rock Physics (3.0 cr)

[ESCI 5204](#) - Geostatistics and Inverse Theory (3.0 cr)

[ESCI 8203](#) - Environmental Geophysics (3.0 cr)

[ESCI 8204](#) - Geomagnetism and Paleomagnetism (3.0 cr)

### Hydrogeology

Hydrogeology uses direct observation and remote sensing, computer modeling and laboratory simulation to constrain the interaction of water and rock in Earth's shallow subsurface. Freshwater is Earth's most precious and increasingly overexploited resource.

Hydrogeology is a key discipline in the effective shepherding of this important reserve. This track establishes a baseline curriculum for hydrogeology at the graduate level. The compact process will identify additional coursework appropriate to the student's prior training and research directions.

#### Required Courses (6 credits)

Take the following courses:

[ESCI 4702](#) - General Hydrogeology (4.0 cr)

[ESCI 5971](#) - Field Hydrogeology (2.0 cr)



### **Twin Cities Campus**

## **Electrical and Computer Engineering MS.E.C.E.**

*Electrical and Computer Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies, Department of Electrical and Computer Engineering, University of Minnesota, 3-166 Keller Hall, 200 Union Street SE, Minneapolis, MN 55455 (612-625-3564; fax: 612-625-4583)

Email: [newgrad@umn.edu](mailto:newgrad@umn.edu)

Website: <http://www.ece.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Electrical and Computer Engineering offers diverse educational programs that encompass nearly all aspects of modern electrical and computer engineering, ranging from the very theoretical system and information theory to highly experimental work in novel device research and microelectronics. Emphases in the major are solid state and physical electronics, surface physics, thin films, sputtering, noise and fluctuation phenomena, quantum electronics, plasma physics, automation, power systems and power electronics theory, wave propagation, communication systems and theory, optics, lasers, fiber optics, magnetism, semiconductor properties and devices, VLSI and WSI engineering in theory and practice, network theory, signal and image processing, and computer and systems engineering. Interdisciplinary work is also available in bioelectrical sciences, control sciences, computer sciences, solar energy, applications of systems theory to urban transportation and economic planning, and biological modeling.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.40.

Other requirements to be completed before admission:

Consideration is given to students who have completed another curriculum in engineering, science, physics, or mathematics that includes sufficient preparation to pursue a graduate program in electrical and computer engineering. In some instances, additional preparatory studies may be required after admission.

Eligibility requirements for the integrated BS/MS program:

University of Minnesota undergraduates can apply to the 5-year integrated BEE/MSECE and BCompE/MSECE degree program after they have completed a majority of their upper division required (non elective) courses for their BEE or BCompE degree.

#### **Special Application Requirements:**

All documents must be submitted electronically. No documents should be mailed to the department or the Graduate Admissions Office.

Every applicant must submit the General Test of the GRE (except University of Minnesota bachelor of electrical engineering or bachelor of computer engineering graduates who have a GPA of 3.40 or better). The GRE Subject Test is not required for admission.

Applications for admission are considered for fall admission only and the deadline for applying is December 1. Applications can be submitted after the deadline and will be considered if there is space in the program.

Minnesota residents who are employed full-time who want to obtain a degree as a part-time student may apply for spring admission.



Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan C:** Plan C requires 18 to 24 major credits and 6 to 12 credits outside the major. There is no final exam. A capstone project is required.

**Capstone Project:** The Plan C project requirement can be satisfied by taking EE 8965 (3 credits) or through completion of specific major field courses. Adviser approval is required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

Non-EE coursework that is cross-listed with Electrical Engineering counts only toward major field requirements.

Only the 4xxx-level courses listed below may be used towards degree requirements. Up to 6 of the 9 credits at the 4xxx-level allowed by University policy can be from EE courses. Refer to the ECE graduate handbook for further information.

Courses offered on both the A/F and S/N grade basis must be taken A/F, with the exception of EE 5041 and EE 8925. The minimum grade earned is C.

Part-time students must choose the Plan C option; full-time students may choose either Plan A or Plan C.

### Major Field Coursework (14 to 24 credits)

In consultation with adviser, Plan A students select 14 credits from the following and Plan C students select 18 to 24 credits. All major field coursework for Plan C students must be 5xxx or 8xxx level.

- EE 4111 - Advanced Analog Electronics Design (4.0 cr)
- EE 4161W - Energy Conversion and Storage [WI] (3.0 cr)
- EE 4163 - Energy Conversion and Storage Laboratory (1.0 cr)
- EE 4231 - Linear Control Systems: Designed by Input/Output Methods (3.0 cr)
- EE 4233 - State Space Control System Design (3.0 cr)
- EE 4235 - Linear Control Systems Laboratory (1.0 cr)
- EE 4237 - State Space Control Laboratory (1.0 cr)
- EE 4301 - Digital Design With Programmable Logic (4.0 cr)
- EE 4303 - Introduction to Programmable Devices Laboratory (1.0 cr)
- EE 4341 - Embedded System Design (4.0 cr)
- EE 4363 - Computer Architecture and Machine Organization (4.0 cr)
- EE 4389W - Introduction to Predictive Learning [WI] (3.0 cr)
- EE 4501 - Communications Systems (3.0 cr)
- EE 4505 - Communications Systems Laboratory (1.0 cr)
- EE 4541 - Digital Signal Processing (3.0 cr)
- EE 4607 - Wireless Hardware System Design (3.0 cr)
- EE 4701 - Electric Drives (3.0 cr)



EE 4703 - Electric Drives Laboratory (1.0 cr)  
EE 4721 - Introduction to Power System Analysis (3.0 cr)  
EE 4722 - Power System Analysis Laboratory (1.0 cr)  
EE 4741 - Power Electronics (3.0 cr)  
EE 4743 - Switch-Mode Power Electronics Laboratory (1.0 cr)  
EE 5121 - Transistor Device Modeling for Circuit Simulation (3.0 cr)  
EE 5141 - Introduction to Microsystem Technology (4.0 cr)  
EE 5163 - Semiconductor Properties and Devices I (3.0 cr)  
EE 5164 - Semiconductor Properties and Devices II (3.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5173 - Basic Microelectronics Laboratory (1.0 cr)  
EE 5181 - Micro and Nanotechnology by Self Assembly (3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5301 - VLSI Design Automation I (3.0 cr)  
EE 5302 - VLSI Design Automation II (3.0 cr)  
EE 5323 - VLSI Design I (3.0 cr)  
EE 5324 - VLSI Design II (3.0 cr)  
EE 5327 - VLSI Design Laboratory (3.0 cr)  
EE 5329 - VLSI Digital Signal Processing Systems (3.0 cr)  
EE 5333 - Analog Integrated Circuit Design (3.0 cr)  
EE 5351 - Applied Parallel Programming (3.0 cr)  
EE 5364 - Advanced Computer Architecture (3.0 cr)  
EE 5371 - Computer Systems Performance Measurement and Evaluation (3.0 cr)  
EE 5381 - Telecommunications Networks (3.0 cr)  
EE 5391 - Computing With Neural Networks (3.0 cr)  
EE 5393 - Circuits, Computation, and Biology (3.0 cr)  
EE 5501 - Digital Communication (3.0 cr)  
EE 5505 - Wireless Communication (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5545 - Digital Signal Processing Design (3.0 cr)  
EE 5549 - Digital Signal Processing Structures for VLSI (3.0 cr)  
EE 5551 - Multiscale and Multirate Signal Processing (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5581 - Information Theory and Coding (3.0 cr)  
EE 5583 - Error Control Coding (3.0 cr)  
EE 5585 - Data Compression (3.0 cr)  
EE 5601 - Introduction to RF/Microwave Engineering (3.0 cr)  
EE 5602 - RF/Microwave Circuit Design (3.0 cr)  
EE 5611 - Plasma-Aided Manufacturing (4.0 cr)  
EE 5613 - RF/Microwave Circuit Design Laboratory (2.0 cr)  
EE 5616 - Antenna Theory and Design (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 5622 - Physical Optics Laboratory (1.0 cr)  
EE 5624 - Optical Electronics (4.0 cr)  
EE 5627 - Optical Fiber Communication (3.0 cr)  
EE 5628 - Fiber Optics Laboratory (1.0 cr)  
EE 5629 - Optical System Design (2.0 cr)  
EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)  
EE 5655 - Magnetic Recording (3.0 cr)  
EE 5657 - Physical Principles of Thin Film Technology (4.0 cr)  
EE 5705 - Electric Drives in Sustainable Energy Systems (3.0 cr)  
EE 5707 - Electric Drives in Sustainable Energy Systems Laboratory (1.0 cr)  
EE 5721 - Power Generation Operation and Control (3.0 cr)  
EE 5725 - Power Systems Engineering (3.0 cr)  
EE 5741 - Advanced Power Electronics (3.0 cr)  
EE 5745 - Wind Energy Essentials (2.0 cr)  
EE 5940 - Special Topics in Electrical Engineering I (1.0 - 4.0 cr)  
EE 5950 - Special Topics in Electrical Engineering II (1.0 - 4.0 cr)  
EE 5960 - Special Topics in Electrical Engineering III (1.0 - 4.0 cr)  
EE 5970 - Special Topics in Electrical Engineering IV (1.0 - 4.0 cr)  
EE 8100 - Advanced Topics in Electronics (1.0 - 3.0 cr)



- EE 8141 - Advanced Heterojunction Transistors (3.0 cr)
- EE 8161 - Physics of Semiconductors (3.0 cr)
- EE 8163 - Quantum Electronics (3.0 cr)
- EE 8213 - Advanced System Theory (3.0 cr)
- EE 8215 - Nonlinear Systems (3.0 cr)
- EE 8231 - Optimization Theory (3.0 cr)
- EE 8235 - Advanced Control Topics (3.0 cr)
- EE 8300 - Advanced Topics in Computers (1.0 - 3.0 cr)
- EE 8310 - Advanced Topics in VLSI (1.0 - 3.0 cr)
- EE 8320 - Advanced Topics in Design Automation (1.0 - 3.0 cr)
- EE 8331 - CMOS Data Converters: A/D and D/A (3.0 cr)
- EE 8337 - Analog Circuits for Wire/Wireless Communications (3.0 cr)
- EE 8367 - Parallel Computer Organization (3.0 cr)
- EE 8510 - Advanced Topics in Communications (1.0 - 3.0 cr)
- EE 8520 - Advanced Topics in Signal Processing (1.0 - 3.0 cr)
- EE 8581 - Detection and Estimation Theory (3.0 cr)
- EE 8591 - Predictive Learning from Data (3.0 cr)
- EE 8601 - Advanced Electromagnetic Theory (3.0 cr)
- EE 8611 - Plasma Physics (3.0 cr)
- EE 8620 - Advanced Topics in Magnetism (1.0 - 3.0 cr)
- EE 8630 - Advanced Topics in Electromagnetics (1.0 - 3.0 cr)
- EE 8725 - Advanced Power System Analysis and Economics (3.0 cr)
- EE 8741 - Power Electronics in Power Systems (3.0 cr)
- EE 8950 - Advanced Topics in Electrical and Computer Engineering (1.0 - 3.0 cr)

**Additional Course Options (0 to 2 credits)**

Plan A students can select coursework from the following to meet the major field credit requirement. Plan C students must first satisfy minimum major and outside credit requirements before including any coursework from this list. MOT 4001 is restricted to Plan C students.

- EE 5041 - Industrial Assignment for Graduate Students (1.0 cr)
- EE 8190 - Electronics Seminar (1.0 cr)
- EE 8210 - System Theory Seminar (1.0 cr)
- EE 8230 - Control Theory Seminar (1.0 cr)
- EE 8360 - Computer Systems Seminar (1.0 cr)
- EE 8370 - Computer Aided Design Seminar (1.0 cr)
- EE 8500 - Seminar: Communications (1.0 cr)
- EE 8610 - Seminar: Electronics, Fields, and Photonics (1.0 cr)
- EE 8660 - Seminar: Magnetism (1.0 cr)
- EE 8920 - Teaching Experience in Electrical and Computer Engineering (1.0 cr)
- EE 8925 - Ethics in Electrical and Computer Engineering (1.0 cr)
- MOT 4001 - Leadership, Professionalism and Business Basics for Engineers (2.0 cr)
- EE 8940 - Special Investigations (1.0 - 3.0 cr)

**Outside Field Coursework (6 to 12 credits)**

Plan A students select 6 credits from the following to complete the 20 course credits required, and Plan C students select 6 to 12 credits to meet the 30-credit minimum. Only the 4xxx and 5xxx courses listed below will count toward the non-EE credit requirement. Additional 8xxx level courses may be approved by the director of graduate studies.

- AEM 4203 - Aerospace Propulsion (4.0 cr)
- AEM 4290 - Special Topics in Fluid Mechanics (1.0 - 3.0 cr)
- AEM 4301 - Orbital Mechanics (3.0 cr)
- AEM 4303W - Flight Dynamics and Control [WI] (3.0 cr)
- AEM 4305 - Spacecraft Attitude Dynamics and Control (3.0 cr)
- AEM 4331 - Aerospace Vehicle Design (4.0 cr)
- AEM 4333 - Aerospace Design: Special Projects (3.0 cr)
- AEM 4490 - Special Topics in Aerospace Systems (1.0 - 3.0 cr)
- AEM 4501 - Aerospace Structures (3.0 cr)
- AEM 4502 - Computational Structural Analysis (3.0 cr)
- AEM 4511 - Mechanics of Composite Materials (3.0 cr)
- AEM 4581 - Mechanics of Solids (3.0 cr)
- AEM 4590 - Special Topics in Solid Mechanics and Materials (1.0 - 3.0 cr)
- AEM 4601 - Instrumentation Laboratory (3.0 cr)
- AEM 4602W - Aeromechanics Laboratory [WI] (4.0 cr)
- AEM 5247 - Hypersonic Aerodynamics (3.0 cr)
- AEM 5253 - Computational Fluid Mechanics (3.0 cr)
- AEM 5333 - Design-to-Flight: Small Uninhabited Aerial Vehicles (3.0 cr)
- AEM 5401 - Intermediate Dynamics (3.0 cr)
- AEM 5501 - Continuum Mechanics (3.0 cr)



AEM 5503 - Theory of Elasticity (3.0 cr)  
AEM 5581 - Mechanics of Solids (3.0 cr)  
AEM 5651 - Aeroelasticity (3.0 cr)  
BBE 5023 - Process Control and Instrumentation (3.0 cr)  
BBE 5333 - Off-road Vehicle Design (4.0 cr)  
SSM 5413 - A Systems Approach to Residential Construction (4.0 cr)  
SSM 5416 - Building Testing & Diagnostics (2.0 cr)  
BBE 5733 - Renewable Energy Technologies (3.0 cr)  
BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)  
BIOC 5527 - Introduction to Modern Structural Biology (4.0 cr)  
BIOC 5528 - Spectroscopy and Kinetics (4.0 cr)  
BIOL 4003 - Genetics (3.0 cr)  
BIOL 4004 - Cell Biology (3.0 cr)  
PMB 4121 - Microbial Ecology and Applied Microbiology (3.0 cr)  
BIOL 4850 - Special Topics in Biology (1.0 - 5.0 cr)  
BIOL 5272 - Applied Biostatistics (4.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5041 - Tissue Engineering (3.0 cr)  
BMEN 5101 - Advanced Bioelectricity and Instrumentation (3.0 cr)  
BMEN 5111 - Biomedical Ultrasound (3.0 cr)  
BMEN 5151 - Introduction to BioMEMS and Medical Microdevices (2.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5401 - Advanced Biomedical Imaging (3.0 cr)  
BMEN 5411 - Neural Engineering (3.0 cr)  
BMEN 5412 - Neuromodulation (3.0 cr)  
BMEN 5413 - Neural Decoding and Interfacing (3.0 cr)  
BMEN 5421 - Introduction to Biomedical Optics (3.0 cr)  
BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
CEGE 5211 - Traffic Engineering (3.0 cr)  
CEGE 5411 - Applied Structural Mechanics (3.0 cr)  
CHEM 4001 - Chemistry of Biomass and Biomass Conversion to Fuels and Products [ENV] (4.0 cr)  
CHEM 4011 - Mechanisms of Chemical Reactions (3.0 cr)  
CHEM 4021 - Computational Chemistry (3.0 cr)  
CHEM 4066 - Chemistry of Industry (3.0 cr)  
CHEM 4101 - Modern Instrumental Methods of Chemical Analysis (3.0 cr)  
CHEM 4111W - Modern Instrumental Methods of Chemical Analysis Lab [WI] (2.0 cr)  
CHEM 4201 - Materials Chemistry (3.0 cr)  
CHEM 4214 - Polymers (3.0 cr)  
CHEM 4221 - Introduction to Polymer Chemistry (3.0 cr)  
CHEM 4223W - Polymer Laboratory [WI] (2.0 cr)  
CHEM 4301 - Applied Surface and Colloid Science (3.0 cr)  
CHEM 4311W - Advanced Organic Chemistry Lab [WI] (4.0 cr)  
CHEM 4321 - Organic Synthesis (3.0 cr)  
CHEM 4322 - Advanced Organic Chemistry (3.0 cr)  
CHEM 4352 - Physical Organic Chemistry (3.0 cr)  
CHEM 4361 - Interpretation of Organic Spectra (3.0 cr)  
CHEM 4411 - Introduction to Chemical Biology (3.0 cr)  
CHEM 4412 - Chemical Biology of Enzymes (3.0 cr)  
CHEM 4501 - Introduction to Thermodynamics, Kinetics, and Statistical Mechanics (3.0 cr)  
CHEM 4502 - Introduction to Quantum Mechanics and Spectroscopy (3.0 cr)  
CHEM 4511W - Advanced Physical Chemistry Lab [WI] (3.0 cr)  
CHEM 4601 - Green Chemistry [ENV] (3.0 cr)  
CHEM 4701 - Inorganic Chemistry (3.0 cr)  
CHEM 4711W - Advanced Inorganic Chemistry Lab [WI] (3.0 cr)  
CHEM 4715 - Physical Inorganic Chemistry (3.0 cr)  
CHEM 4725 - Organometallic Chemistry (3.0 cr)  
CHEM 4735 - Bioinorganic Chemistry (3.0 cr)  
CHEM 4745 - Advanced Inorganic Chemistry (3.0 cr)  
CHEM 5755 - X-Ray Crystallography (4.0 cr)  
CHEN 4214 - Polymers (3.0 cr)  
CHEN 4401W - Senior Chemical Engineering Lab [WI] (4.0 cr)





CHEN 4501W - Chemical Engineering Design [WI] (4.0 cr)  
CHEN 4601 - Process Control (3.0 cr)  
CHEN 4701 - Applied Math (3.0 cr)  
CHEN 4702 - Advanced Undergraduate Rheology (2.0 cr)  
CHEN 4704 - Advanced Undergraduate Physical Rate Processes I: Transport (3.0 cr)  
CHEN 4707 - Advanced Undergraduate Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 4708 - Advanced Undergraduate Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 5753 - Advanced Biomedical Transport Processes (3.0 cr)  
CHEN 5771 - Colloids and Dispersions (3.0 cr)  
CMB 5200 - Statistical Genetics and Genomics (4.0 cr)  
CSCI 4011 - Formal Languages and Automata Theory (4.0 cr)  
CSCI 4041 - Algorithms and Data Structures (4.0 cr)  
CSCI 4061 - Introduction to Operating Systems (4.0 cr)  
CSCI 4131 - Internet Programming (3.0 cr)  
CSCI 4211 - Introduction to Computer Networks (3.0 cr)  
CSCI 4511W - Introduction to Artificial Intelligence [WI] (4.0 cr)  
CSCI 4611 - Programming Interactive Computer Graphics and Games (3.0 cr)  
CSCI 4707 - Practice of Database Systems (3.0 cr)  
CSCI 4921 - History of Computing [TS, HIS] (3.0 cr)  
CSCI 4970W - Advanced Project Laboratory [WI] (3.0 cr)  
CSCI 5103 - Operating Systems (3.0 cr)  
CSCI 5105 - Introduction to Distributed Systems (3.0 cr)  
CSCI 5106 - Programming Languages (3.0 cr)  
CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)  
CSCI 5125 - Collaborative and Social Computing (3.0 cr)  
CSCI 5143 - Real-Time and Embedded Systems (3.0 cr)  
CSCI 5161 - Introduction to Compilers (3.0 cr)  
CSCI 5211 - Data Communications and Computer Networks (3.0 cr)  
CSCI 5221 - Foundations of Advanced Networking (3.0 cr)  
CSCI 5231 - Wireless and Sensor Networks (3.0 cr)  
CSCI 5271 - Introduction to Computer Security (3.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5471 - Modern Cryptography (3.0 cr)  
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)  
CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5512 - Artificial Intelligence II (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)  
CSCI 5561 - Computer Vision (3.0 cr)  
CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)  
CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)  
CSCI 5609 - Visualization (3.0 cr)  
CSCI 5611 - Animation & Planning in Games (3.0 cr)  
CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)  
CSCI 5707 - Principles of Database Systems (3.0 cr)  
CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 5802 - Software Engineering II (3.0 cr)  
ESCI 5201 - Time-Series Analysis of Geological Phenomena (3.0 cr)  
ESCI 5204 - Geostatistics and Inverse Theory (3.0 cr)  
ESCI 5302 - Isotope Geology (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
GCD 5036 - Molecular Cell Biology (3.0 cr)  
IE 5111 - Systems Engineering I (2.0 cr)  
IE 5113 - Systems Engineering II (4.0 cr)  
IE 5441 - Financial Decision Making (4.0 cr)  
MATH 4065 - Theory of Interest (4.0 cr)



MATH 4152 - Elementary Mathematical Logic (3.0 cr)  
MATH 4242 - Applied Linear Algebra (4.0 cr)  
MATH 4281 - Introduction to Modern Algebra (4.0 cr)  
MATH 4428 - Mathematical Modeling (4.0 cr)  
MATH 4512 - Differential Equations with Applications (3.0 cr)  
MATH 4567 - Applied Fourier Analysis (4.0 cr)  
MATH 4603 - Advanced Calculus I (4.0 cr)  
MATH 4604 - Advanced Calculus II (4.0 cr)  
MATH 4653 - Elementary Probability (4.0 cr)  
MATH 4707 - Introduction to Combinatorics and Graph Theory (4.0 cr)  
MATH 4990 - Topics in Mathematics (1.0 - 4.0 cr)  
MATH 5067 - Actuarial Mathematics I (4.0 cr)  
MATH 5068 - Actuarial Mathematics II (4.0 cr)  
MATH 5075 - Mathematics of Options, Futures, and Derivative Securities I (4.0 cr)  
MATH 5076 - Mathematics of Options, Futures, and Derivative Securities II (4.0 cr)  
MATH 5165 - Mathematical Logic I (4.0 cr)  
MATH 5248 - Cryptology and Number Theory (4.0 cr)  
MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)  
MATH 5335 - Geometry I (4.0 cr)  
MATH 5378 - Differential Geometry (4.0 cr)  
MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5447 - Theoretical Neuroscience (4.0 cr)  
MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)  
MATH 5535 - Dynamical Systems and Chaos (4.0 cr)  
MATH 5583 - Complex Analysis (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 5654 - Prediction and Filtering (4.0 cr)  
MATH 5705 - Enumerative Combinatorics (4.0 cr)  
MATH 5707 - Graph Theory and Non-enumerative Combinatorics (4.0 cr)  
MATH 5711 - Linear Programming and Combinatorial Optimization (4.0 cr)  
MATS 5517 - Microscopy of Materials (3.0 cr)  
MATS 5531 - Electrochemical Engineering (3.0 cr)  
MATS 5771 - Colloids and Dispersions (3.0 cr)  
ME 5113 - Aerosol/Particle Engineering (4.0 cr)  
ME 5223 - Materials in Design (4.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5241 - Computer-Aided Engineering (4.0 cr)  
ME 5243 - Advanced Mechanism Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5281 - Feedback Control Systems (4.0 cr)  
ME 5286 - Robotics (4.0 cr)  
ME 5312 - Solar Thermal Technologies (4.0 cr)  
ME 5344 - Thermodynamics of Fluid Flow With Applications (4.0 cr)  
ME 5351 - Computational Heat Transfer (4.0 cr)  
ME 5461 - Internal Combustion Engines (4.0 cr)  
MPHY 5170 - Basic Radiological Physics (3.0 cr)  
MPHY 5171 - Medical and Health Physics of Imaging I (3.0 cr)  
MPHY 5174 - Medical and Health Physics of Imaging II (3.0 cr)  
NSC 5040 - Brain Networks: From Connectivity to Dynamics (4.0 cr)  
NSC 5202 - Theoretical Neuroscience: Systems and Information Processing (3.0 cr)  
NSC 5203 - Basic and Clinical Vision Science (3.0 cr)  
NSC 5561 - Systems Neuroscience (4.0 cr)  
PHSL 5061 - Principles of Physiology for Biomedical Engineering (4.0 cr)  
PHSL 5101 - Human Physiology (5.0 cr)  
PHSL 5201 - Computational Neuroscience I: Membranes and Channels (3.0 cr)  
PHYS 4001 - Analytical Mechanics (4.0 cr)  
PHYS 4002 - Electricity and Magnetism (4.0 cr)  
PHYS 4041 - Computational Methods in the Physical Sciences (4.0 cr)



PHYS 4051 - Methods of Experimental Physics I (5.0 cr)  
PHYS 4052W - Methods of Experimental Physics II [WI] (5.0 cr)  
PHYS 4101 - Quantum Mechanics (4.0 cr)  
PHYS 4121W - History of 20th-Century Physics [WI] (3.0 cr)  
PHYS 4201 - Statistical and Thermal Physics (3.0 cr)  
PHYS 4211 - Introduction to Solid-State Physics (3.0 cr)  
PHYS 4303 - Electrodynamics and Waves (3.0 cr)  
PHYS 4511 - Introduction to Nuclear and Particle Physics (3.0 cr)  
PHYS 4611 - Introduction to Space Physics (3.0 cr)  
PHYS 4621 - Introduction to Plasma Physics (3.0 cr)  
PHYS 4911 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5011 - Classical Physics I (4.0 cr)  
PHYS 5012 - Classical Physics II (4.0 cr)  
PHYS 5041 - Mathematical Methods for Physics (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PSY 5036W - Computational Vision [WI] (3.0 cr)  
PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)  
STAT 4101 - Theory of Statistics I (4.0 cr)  
STAT 4102 - Theory of Statistics II (4.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5421 - Analysis of Categorical Data (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)

### Plan Options

#### Plan A (10 credits)

Complete 10 thesis credits.

[EE 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan C (0-3 credits)

Plan C students can complete the Plan C project through completion of specific major field courses, or by taking [EE 8965](#). Advisor approval is required.

[EE 8965](#) - Plan C Project I (3.0 cr)

### Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

#### Rochester

The University of Minnesota Rochester (UMR) offers the Master of Science in Electrical and Computer Engineering degree. Students may complete all degree requirements in Rochester by combining courses taught by College of Science and Engineering faculty in person (face-to-face), or via streaming video using the UNITE (University-Industry Television for Education) instructional television system. UNITE enables students to watch class live via the internet or pick up class on a special server at a later time.

#### Integrated B.E.E./MS.E.C.E.

The Department of Electrical and Computer Engineering offers an integrated bachelor of electrical engineering (BEE) and master of science in electrical and computer engineering (MSECE). The integrated BEE/MSECE program offers students the opportunity to earn both degrees in five years. The programs were established to allow high-achieving University undergraduates the opportunity to work toward a masters degree while simultaneously working toward their undergraduate degree. The combined program offers several advantages: flexibility in fulfilling required courses for both degrees during the senior year; eligibility for graduate assistantships and fellowships; and the ability to save money by completing up to 16 graduate credits at the undergraduate tuition rate.



Both the BEE and MSECE degrees must be completed in their entirety, with no courses shared between them. The graduate degree cannot be earned before the undergraduate requirements are satisfied.

**Integrated B.Comp.E./MS.E.C.E.**

The Department of Electrical and Computer Engineering offers an integrated bachelor of computer engineering (B.Comp.E.) and master of science in electrical and computer engineering (MSECE). Benefits, eligibility requirements, and degree-completion requirements outlined for the BEE/MSECE integrated program also apply to the B.Comp.E./MSECE.



### **Twin Cities Campus**

## **Electrical Engineering Minor**

*Electrical and Computer Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies, Department of Electrical and Computer Engineering, University of Minnesota, 3-166 Keller Hall, 200 Union Street SE, Minneapolis, MN 55455 (612-625-3564; fax: 612-625-4583)

Email: [jager001@umn.edu](mailto:jager001@umn.edu)

Website: <http://www.ece.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Electrical and Computer Engineering offers diverse educational programs that encompass nearly all aspects of modern electrical and computer engineering, ranging from the very theoretical system and information theory, to highly experimental work in novel device research and microelectronics. Emphases in the major are solid state and physical electronics, surface physics, thin films, sputtering, noise and fluctuation phenomena, quantum electronics, plasma physics, automation, power systems and power electronics theory, wave propagation, communication systems and theory, optics, lasers, fiber optics, magnetism, semiconductor properties and devices, VLSI and WSI engineering in theory and practice, network theory, signal and image processing, and computer and systems engineering. Interdisciplinary work is also available in bioelectrical sciences, control sciences, computer sciences, solar energy, applications of systems theory to urban transportation and economic planning, and biological modeling.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Electrical Engineering director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

#### **Minor Coursework (6-12 credits)**

Master's students select a minimum of 6 credits, and doctoral students select a minimum of 12 credits from the following in consultation with the Electrical Engineering director of graduate studies:

[EE 5121](#) - Transistor Device Modeling for Circuit Simulation (3.0 cr)

[EE 5141](#) - Introduction to Microsystem Technology (4.0 cr)

[EE 5163](#) - Semiconductor Properties and Devices I (3.0 cr)

[EE 5164](#) - Semiconductor Properties and Devices II (3.0 cr)



EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5173 - Basic Microelectronics Laboratory (1.0 cr)  
EE 5181 - Micro and Nanotechnology by Self Assembly (3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5301 - VLSI Design Automation I (3.0 cr)  
EE 5302 - VLSI Design Automation II (3.0 cr)  
EE 5323 - VLSI Design I (3.0 cr)  
EE 5324 - VLSI Design II (3.0 cr)  
EE 5327 - VLSI Design Laboratory (3.0 cr)  
EE 5329 - VLSI Digital Signal Processing Systems (3.0 cr)  
EE 5333 - Analog Integrated Circuit Design (3.0 cr)  
EE 5351 - Applied Parallel Programming (3.0 cr)  
EE 5364 - Advanced Computer Architecture (3.0 cr)  
EE 5371 - Computer Systems Performance Measurement and Evaluation (3.0 cr)  
EE 5381 - Telecommunications Networks (3.0 cr)  
EE 5391 - Computing With Neural Networks (3.0 cr)  
EE 5393 - Circuits, Computation, and Biology (3.0 cr)  
EE 5501 - Digital Communication (3.0 cr)  
EE 5505 - Wireless Communication (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5545 - Digital Signal Processing Design (3.0 cr)  
EE 5549 - Digital Signal Processing Structures for VLSI (3.0 cr)  
EE 5551 - Multiscale and Multirate Signal Processing (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5581 - Information Theory and Coding (3.0 cr)  
EE 5583 - Error Control Coding (3.0 cr)  
EE 5585 - Data Compression (3.0 cr)  
EE 5601 - Introduction to RF/Microwave Engineering (3.0 cr)  
EE 5602 - RF/Microwave Circuit Design (3.0 cr)  
EE 5611 - Plasma-Aided Manufacturing (4.0 cr)  
EE 5613 - RF/Microwave Circuit Design Laboratory (2.0 cr)  
EE 5616 - Antenna Theory and Design (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 5622 - Physical Optics Laboratory (1.0 cr)  
EE 5624 - Optical Electronics (4.0 cr)  
EE 5627 - Optical Fiber Communication (3.0 cr)  
EE 5628 - Fiber Optics Laboratory (1.0 cr)  
EE 5629 - Optical System Design (2.0 cr)  
EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)  
EE 5655 - Magnetic Recording (3.0 cr)  
EE 5657 - Physical Principles of Thin Film Technology (4.0 cr)  
EE 5705 - Electric Drives in Sustainable Energy Systems (3.0 cr)  
EE 5707 - Electric Drives in Sustainable Energy Systems Laboratory (1.0 cr)  
EE 5721 - Power Generation Operation and Control (3.0 cr)  
EE 5725 - Power Systems Engineering (3.0 cr)  
EE 5741 - Advanced Power Electronics (3.0 cr)  
EE 5745 - Wind Energy Essentials (2.0 cr)  
EE 8141 - Advanced Heterojunction Transistors (3.0 cr)  
EE 8161 - Physics of Semiconductors (3.0 cr)  
EE 8163 - Quantum Electronics (3.0 cr)  
EE 8213 - Advanced System Theory (3.0 cr)  
EE 8215 - Nonlinear Systems (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
EE 8331 - CMOS Data Converters: A/D and D/A (3.0 cr)  
EE 8337 - Analog Circuits for Wire/Wireless Communications (3.0 cr)  
EE 8367 - Parallel Computer Organization (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
EE 8591 - Predictive Learning from Data (3.0 cr)  
EE 8601 - Advanced Electromagnetic Theory (3.0 cr)  
EE 8611 - Plasma Physics (3.0 cr)  
EE 8725 - Advanced Power System Analysis and Economics (3.0 cr)



EE 8741 - Power Electronics in Power Systems (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Electrical Engineering Ph.D.**

*Electrical and Computer Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies, Department of Electrical and Computer Engineering, University of Minnesota, 3-166 Keller Hall, 200 Union Street SE, Minneapolis, MN 55455 (612-625-3564; fax: 612-625-4583)

Email: [newgrad@umn.edu](mailto:newgrad@umn.edu)

Website: <http://www.ece.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 64
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Department of Electrical and Computer Engineering offers diverse educational programs that encompass nearly all aspects of modern electrical and computer engineering, ranging from the very theoretical system and information theory to highly experimental work in novel device research and microelectronics. Emphases in the major are solid state and physical electronics, surface physics, thin films, sputtering, noise and fluctuation phenomena, quantum electronics, plasma physics, automation, power systems and power electronics theory, wave propagation, communication systems and theory, optics, lasers, fiber optics, magnetism, semiconductor properties and devices, VLSI and WSI engineering in theory and practice, network theory, signal and image processing, and computer and systems engineering. Interdisciplinary work is also available in bioelectrical sciences, control sciences, computer sciences, solar energy, applications of systems theory to urban transportation and economic planning, and biological modeling.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)
- partially online (between 50% to 80% of instruction is online)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.40.

Other requirements to be completed before admission:

All documents must be submitted electronically. No documents should be mailed to the department or the Graduate Admissions Office.

Applicants to the doctoral program must submit a writing sample with their online application. The writing sample should consist of a minimum of one, to a maximum of three, class papers or publications.

Every applicant, except University of Minnesota bachelor of electrical engineering graduates who have a GPA of 3.40 or better, must submit the General Test of the GRE. The GRE Subject Test is not required for admission.

#### **Special Application Requirements:**

Students are considered for admission beginning fall semester only (except for part-time students living in Minnesota who work in industry who may apply for other terms). The deadline for applying for fall semester is December 1.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19





- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

14 to 28 credits are required in the major.  
12 to 26 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.30 is required for students to remain in good standing.

Non-EE coursework that is cross-listed with Electrical Engineering counts only toward major field requirements.

A minimum of 6 course credits at the 8xxx-level is required.

Courses can be from the major or outside field; but seminars, directed study, and special investigations may not be used to satisfy this requirement.

Only the 4xxx-level courses listed below may be used towards degree requirements. Up to 6 of the 9 credits at the 4xxx-level allowed by University policy can be from EE courses. Refer to the ECE graduate handbook for further information.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of C earned for each course.

## Coursework

### Major Coursework (14 credits)

Select 14 credits from the following in consultation with the advisor:

- EE 5121 - Transistor Device Modeling for Circuit Simulation (3.0 cr)
- EE 5141 - Introduction to Microsystem Technology (4.0 cr)
- EE 5163 - Semiconductor Properties and Devices I (3.0 cr)
- EE 5164 - Semiconductor Properties and Devices II (3.0 cr)
- EE 5171 - Microelectronic Fabrication (4.0 cr)
- EE 5173 - Basic Microelectronics Laboratory (1.0 cr)
- EE 5181 - Micro and Nanotechnology by Self Assembly (3.0 cr)
- EE 5231 - Linear Systems and Optimal Control (3.0 cr)
- EE 5235 - Robust Control System Design (3.0 cr)
- EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)
- EE 5251 - Optimal Filtering and Estimation (3.0 cr)
- EE 5301 - VLSI Design Automation I (3.0 cr)
- EE 5302 - VLSI Design Automation II (3.0 cr)
- EE 5323 - VLSI Design I (3.0 cr)
- EE 5324 - VLSI Design II (3.0 cr)
- EE 5327 - VLSI Design Laboratory (3.0 cr)
- EE 5329 - VLSI Digital Signal Processing Systems (3.0 cr)
- EE 5333 - Analog Integrated Circuit Design (3.0 cr)
- EE 5351 - Applied Parallel Programming (3.0 cr)
- EE 5364 - Advanced Computer Architecture (3.0 cr)
- EE 5371 - Computer Systems Performance Measurement and Evaluation (3.0 cr)
- EE 5381 - Telecommunications Networks (3.0 cr)
- EE 5391 - Computing With Neural Networks (3.0 cr)
- EE 5393 - Circuits, Computation, and Biology (3.0 cr)
- EE 5501 - Digital Communication (3.0 cr)
- EE 5505 - Wireless Communication (3.0 cr)



- EE 5531 - Probability and Stochastic Processes (3.0 cr)
- EE 5542 - Adaptive Digital Signal Processing (3.0 cr)
- EE 5545 - Digital Signal Processing Design (3.0 cr)
- EE 5549 - Digital Signal Processing Structures for VLSI (3.0 cr)
- EE 5551 - Multiscale and Multirate Signal Processing (3.0 cr)
- EE 5561 - Image Processing and Applications (3.0 cr)
- EE 5581 - Information Theory and Coding (3.0 cr)
- EE 5583 - Error Control Coding (3.0 cr)
- EE 5585 - Data Compression (3.0 cr)
- EE 5601 - Introduction to RF/Microwave Engineering (3.0 cr)
- EE 5602 - RF/Microwave Circuit Design (3.0 cr)
- EE 5611 - Plasma-Aided Manufacturing (4.0 cr)
- EE 5613 - RF/Microwave Circuit Design Laboratory (2.0 cr)
- EE 5616 - Antenna Theory and Design (3.0 cr)
- EE 5621 - Physical Optics (3.0 cr)
- EE 5622 - Physical Optics Laboratory (1.0 cr)
- EE 5624 - Optical Electronics (4.0 cr)
- EE 5627 - Optical Fiber Communication (3.0 cr)
- EE 5628 - Fiber Optics Laboratory (1.0 cr)
- EE 5629 - Optical System Design (2.0 cr)
- EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)
- EE 5655 - Magnetic Recording (3.0 cr)
- EE 5657 - Physical Principles of Thin Film Technology (4.0 cr)
- EE 5705 - Electric Drives in Sustainable Energy Systems (3.0 cr)
- EE 5707 - Electric Drives in Sustainable Energy Systems Laboratory (1.0 cr)
- EE 5721 - Power Generation Operation and Control (3.0 cr)
- EE 5725 - Power Systems Engineering (3.0 cr)
- EE 5741 - Advanced Power Electronics (3.0 cr)
- EE 5745 - Wind Energy Essentials (2.0 cr)
- EE 5940 - Special Topics in Electrical Engineering I (1.0 - 4.0 cr)
- EE 5950 - Special Topics in Electrical Engineering II (1.0 - 4.0 cr)
- EE 5960 - Special Topics in Electrical Engineering III (1.0 - 4.0 cr)
- EE 5970 - Special Topics in Electrical Engineering IV (1.0 - 4.0 cr)
- EE 8100 - Advanced Topics in Electronics (1.0 - 3.0 cr)
- EE 8141 - Advanced Heterojunction Transistors (3.0 cr)
- EE 8161 - Physics of Semiconductors (3.0 cr)
- EE 8163 - Quantum Electronics (3.0 cr)
- EE 8213 - Advanced System Theory (3.0 cr)
- EE 8215 - Nonlinear Systems (3.0 cr)
- EE 8231 - Optimization Theory (3.0 cr)
- EE 8235 - Advanced Control Topics (3.0 cr)
- EE 8300 - Advanced Topics in Computers (1.0 - 3.0 cr)
- EE 8310 - Advanced Topics in VLSI (1.0 - 3.0 cr)
- EE 8320 - Advanced Topics in Design Automation (1.0 - 3.0 cr)
- EE 8331 - CMOS Data Converters: A/D and D/A (3.0 cr)
- EE 8337 - Analog Circuits for Wire/Wireless Communications (3.0 cr)
- EE 8367 - Parallel Computer Organization (3.0 cr)
- EE 8510 - Advanced Topics in Communications (1.0 - 3.0 cr)
- EE 8520 - Advanced Topics in Signal Processing (1.0 - 3.0 cr)
- EE 8581 - Detection and Estimation Theory (3.0 cr)
- EE 8591 - Predictive Learning from Data (3.0 cr)
- EE 8601 - Advanced Electromagnetic Theory (3.0 cr)
- EE 8611 - Plasma Physics (3.0 cr)
- EE 8620 - Advanced Topics in Magnetics (1.0 - 3.0 cr)
- EE 8630 - Advanced Topics in Electromagnetics (1.0 - 3.0 cr)
- EE 8725 - Advanced Power System Analysis and Economics (3.0 cr)
- EE 8741 - Power Electronics in Power Systems (3.0 cr)
- EE 8950 - Advanced Topics in Electrical and Computer Engineering (1.0 - 3.0 cr)

**Outside Coursework (12 credits)**

Select at least 12 credits from the following in consultation with the advisor:

- AEM 4203 - Aerospace Propulsion (4.0 cr)
- AEM 4290 - Special Topics in Fluid Mechanics (1.0 - 3.0 cr)
- AEM 4301 - Orbital Mechanics (3.0 cr)
- AEM 4303W - Flight Dynamics and Control [WI] (3.0 cr)
- AEM 4305 - Spacecraft Attitude Dynamics and Control (3.0 cr)



AEM 4331 - Aerospace Vehicle Design (4.0 cr)  
AEM 4333 - Aerospace Design: Special Projects (3.0 cr)  
AEM 4490 - Special Topics in Aerospace Systems (1.0 - 3.0 cr)  
AEM 4501 - Aerospace Structures (3.0 cr)  
AEM 4502 - Computational Structural Analysis (3.0 cr)  
AEM 4511 - Mechanics of Composite Materials (3.0 cr)  
AEM 4581 - Mechanics of Solids (3.0 cr)  
AEM 4590 - Special Topics in Solid Mechanics and Materials (1.0 - 3.0 cr)  
AEM 4601 - Instrumentation Laboratory (3.0 cr)  
AEM 4602W - Aeromechanics Laboratory [WI] (4.0 cr)  
AEM 5247 - Hypersonic Aerodynamics (3.0 cr)  
AEM 5253 - Computational Fluid Mechanics (3.0 cr)  
AEM 5333 - Design-to-Flight: Small Uninhabited Aerial Vehicles (3.0 cr)  
AEM 5401 - Intermediate Dynamics (3.0 cr)  
AEM 5501 - Continuum Mechanics (3.0 cr)  
AEM 5503 - Theory of Elasticity (3.0 cr)  
AEM 5581 - Mechanics of Solids (3.0 cr)  
AEM 5651 - Aeroelasticity (3.0 cr)  
AEM 8202 - Fluid Mechanics II (3.0 cr)  
AEM 8211 - Theory of Turbulence I (3.0 cr)  
AEM 8253 - Computational Methods in Fluid Mechanics (3.0 cr)  
AEM 8421 - Robust Multivariable Control Design (3.0 cr)  
AEM 8423 - Convex Optimization Methods in Control (3.0 cr)  
AEM 8495 - Advanced Topics in Aerospace Systems (1.0 - 4.0 cr)  
BBE 5023 - Process Control and Instrumentation (3.0 cr)  
BBE 5333 - Off-road Vehicle Design (4.0 cr)  
SSM 5413 - A Systems Approach to Residential Construction (4.0 cr)  
SSM 5416 - Building Testing & Diagnostics (2.0 cr)  
BBE 5733 - Renewable Energy Technologies (3.0 cr)  
BIOC 5361 - Microbial Genomics and Bioinformatics (3.0 cr)  
BIOC 5527 - Introduction to Modern Structural Biology (4.0 cr)  
BIOC 5528 - Spectroscopy and Kinetics (4.0 cr)  
BIOL 4003 - Genetics (3.0 cr)  
BIOL 4004 - Cell Biology (3.0 cr)  
PMB 4121 - Microbial Ecology and Applied Microbiology (3.0 cr)  
BIOL 4850 - Special Topics in Biology (1.0 - 5.0 cr)  
BIOL 5272 - Applied Biostatistics (4.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5041 - Tissue Engineering (3.0 cr)  
BMEN 5101 - Advanced Bioelectricity and Instrumentation (3.0 cr)  
BMEN 5111 - Biomedical Ultrasound (3.0 cr)  
BMEN 5151 - Introduction to BioMEMS and Medical Microdevices (2.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5401 - Advanced Biomedical Imaging (3.0 cr)  
BMEN 5411 - Neural Engineering (3.0 cr)  
BMEN 5412 - Neuromodulation (3.0 cr)  
BMEN 5413 - Neural Decoding and Interfacing (3.0 cr)  
BMEN 5421 - Introduction to Biomedical Optics (3.0 cr)  
BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8041 - Advanced Tissue Engineering Lab (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
BMEN 8201 - Advanced Tissue Mechanics (3.0 cr)  
BMEN 8381 - Bioheat and Mass Transfer (3.0 cr)  
BMEN 8401 - New Product Design and Business Development (4.0 cr)  
BMEN 8402 - New Product Design and Business Development (4.0 cr)  
BMEN 8421 - Biophotonics (3.0 cr)  
BMEN 8501 - Dynamical Systems in Biology (3.0 cr)  
BMEN 8502 - Physiological Control Systems (3.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)  
BMEN 8900 - Special Topics in Biomedical Engineering (1.0 - 4.0 cr)



CEGE 5211 - Traffic Engineering (3.0 cr)  
CEGE 5411 - Applied Structural Mechanics (3.0 cr)  
CHEM 4001 - Chemistry of Biomass and Biomass Conversion to Fuels and Products [ENV] (4.0 cr)  
CHEM 4011 - Mechanisms of Chemical Reactions (3.0 cr)  
CHEM 4021 - Computational Chemistry (3.0 cr)  
CHEM 4066 - Chemistry of Industry (3.0 cr)  
CHEM 4101 - Modern Instrumental Methods of Chemical Analysis (3.0 cr)  
CHEM 4111W - Modern Instrumental Methods of Chemical Analysis Lab [WI] (2.0 cr)  
CHEM 4201 - Materials Chemistry (3.0 cr)  
CHEM 4214 - Polymers (3.0 cr)  
CHEM 4221 - Introduction to Polymer Chemistry (3.0 cr)  
CHEM 4223W - Polymer Laboratory [WI] (2.0 cr)  
CHEM 4301 - Applied Surface and Colloid Science (3.0 cr)  
CHEM 4311W - Advanced Organic Chemistry Lab [WI] (4.0 cr)  
CHEM 4321 - Organic Synthesis (3.0 cr)  
CHEM 4322 - Advanced Organic Chemistry (3.0 cr)  
CHEM 4352 - Physical Organic Chemistry (3.0 cr)  
CHEM 4361 - Interpretation of Organic Spectra (3.0 cr)  
CHEM 4411 - Introduction to Chemical Biology (3.0 cr)  
CHEM 4412 - Chemical Biology of Enzymes (3.0 cr)  
CHEM 4501 - Introduction to Thermodynamics, Kinetics, and Statistical Mechanics (3.0 cr)  
CHEM 4502 - Introduction to Quantum Mechanics and Spectroscopy (3.0 cr)  
CHEM 4511W - Advanced Physical Chemistry Lab [WI] (3.0 cr)  
CHEM 4601 - Green Chemistry [ENV] (3.0 cr)  
CHEM 4701 - Inorganic Chemistry (3.0 cr)  
CHEM 4711W - Advanced Inorganic Chemistry Lab [WI] (3.0 cr)  
CHEM 4715 - Physical Inorganic Chemistry (3.0 cr)  
CHEM 4725 - Organometallic Chemistry (3.0 cr)  
CHEM 4735 - Bioinorganic Chemistry (3.0 cr)  
CHEM 4745 - Advanced Inorganic Chemistry (3.0 cr)  
CHEM 5755 - X-Ray Crystallography (4.0 cr)  
CHEM 8152 - Analytical Spectroscopy (4.0 cr)  
CHEM 8201 - Materials Chemistry (4.0 cr)  
CHEM 8551 - Quantum Mechanics I (4.0 cr)  
CHEM 8552 - Quantum Mechanics II (2.0 cr)  
CHEN 4214 - Polymers (3.0 cr)  
CHEN 4401W - Senior Chemical Engineering Lab [WI] (4.0 cr)  
CHEN 4501W - Chemical Engineering Design [WI] (4.0 cr)  
CHEN 4601 - Process Control (3.0 cr)  
CHEN 4701 - Applied Math (3.0 cr)  
CHEN 4702 - Advanced Undergraduate Rheology (2.0 cr)  
CHEN 4704 - Advanced Undergraduate Physical Rate Processes I: Transport (3.0 cr)  
CHEN 4707 - Advanced Undergraduate Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 4708 - Advanced Undergraduate Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 5753 - Advanced Biomedical Transport Processes (3.0 cr)  
CHEN 5771 - Colloids and Dispersions (3.0 cr)  
CHEN 8101 - Fluid Mechanics (3.0 cr)  
CHEN 8401 - Physical and Chemical Thermodynamics (3.0 cr)  
CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)  
CMB 5200 - Statistical Genetics and Genomics (4.0 cr)  
CSCI 4011 - Formal Languages and Automata Theory (4.0 cr)  
CSCI 4041 - Algorithms and Data Structures (4.0 cr)  
CSCI 4061 - Introduction to Operating Systems (4.0 cr)  
CSCI 4131 - Internet Programming (3.0 cr)  
CSCI 4211 - Introduction to Computer Networks (3.0 cr)  
CSCI 4511W - Introduction to Artificial Intelligence [WI] (4.0 cr)  
CSCI 4611 - Programming Interactive Computer Graphics and Games (3.0 cr)  
CSCI 4707 - Practice of Database Systems (3.0 cr)  
CSCI 4921 - History of Computing [TS, HIS] (3.0 cr)  
CSCI 4970W - Advanced Project Laboratory [WI] (3.0 cr)  
CSCI 5103 - Operating Systems (3.0 cr)  
CSCI 5105 - Introduction to Distributed Systems (3.0 cr)  
CSCI 5106 - Programming Languages (3.0 cr)  
CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)



CSCI 5125 - Collaborative and Social Computing (3.0 cr)  
CSCI 5143 - Real-Time and Embedded Systems (3.0 cr)  
CSCI 5161 - Introduction to Compilers (3.0 cr)  
CSCI 5211 - Data Communications and Computer Networks (3.0 cr)  
CSCI 5221 - Foundations of Advanced Networking (3.0 cr)  
CSCI 5231 - Wireless and Sensor Networks (3.0 cr)  
CSCI 5271 - Introduction to Computer Security (3.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5471 - Modern Cryptography (3.0 cr)  
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)  
CSCI 5511 - Artificial Intelligence I (3.0 cr)  
CSCI 5512 - Artificial Intelligence II (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)  
CSCI 5561 - Computer Vision (3.0 cr)  
CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)  
CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)  
CSCI 5609 - Visualization (3.0 cr)  
CSCI 5611 - Animation & Planning in Games (3.0 cr)  
CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)  
CSCI 5707 - Principles of Database Systems (3.0 cr)  
CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 5802 - Software Engineering II (3.0 cr)  
CSCI 8161 - Advanced Compiler Techniques (3.0 cr)  
CSCI 8205 - Parallel Computer Organization (3.0 cr)  
CSCI 8211 - Advanced Computer Networks and Their Applications (3.0 cr)  
CSCI 8314 - Sparse Matrix Computations (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)  
ESCI 5201 - Time-Series Analysis of Geological Phenomena (3.0 cr)  
ESCI 5204 - Geostatistics and Inverse Theory (3.0 cr)  
ESCI 5302 - Isotope Geology (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
GCD 5036 - Molecular Cell Biology (3.0 cr)  
IE 5111 - Systems Engineering I (2.0 cr)  
IE 5113 - Systems Engineering II (4.0 cr)  
IE 5441 - Financial Decision Making (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
IE 8532 - Stochastic Processes and Queuing Systems (4.0 cr)  
IE 8534 - Advanced Topics in Operations Research (4.0 cr)  
MATH 4065 - Theory of Interest (4.0 cr)  
MATH 4152 - Elementary Mathematical Logic (3.0 cr)  
MATH 4242 - Applied Linear Algebra (4.0 cr)  
MATH 4281 - Introduction to Modern Algebra (4.0 cr)  
MATH 4428 - Mathematical Modeling (4.0 cr)  
MATH 4512 - Differential Equations with Applications (3.0 cr)  
MATH 4567 - Applied Fourier Analysis (4.0 cr)  
MATH 4603 - Advanced Calculus I (4.0 cr)  
MATH 4604 - Advanced Calculus II (4.0 cr)  
MATH 4653 - Elementary Probability (4.0 cr)  
MATH 4707 - Introduction to Combinatorics and Graph Theory (4.0 cr)  
MATH 4990 - Topics in Mathematics (1.0 - 4.0 cr)  
MATH 5067 - Actuarial Mathematics I (4.0 cr)  
MATH 5068 - Actuarial Mathematics II (4.0 cr)  
MATH 5075 - Mathematics of Options, Futures, and Derivative Securities I (4.0 cr)  
MATH 5076 - Mathematics of Options, Futures, and Derivative Securities II (4.0 cr)  
MATH 5165 - Mathematical Logic I (4.0 cr)



MATH 5248 - Cryptology and Number Theory (4.0 cr)  
MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)  
MATH 5335 - Geometry I (4.0 cr)  
MATH 5378 - Differential Geometry (4.0 cr)  
MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5447 - Theoretical Neuroscience (4.0 cr)  
MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)  
MATH 5535 - Dynamical Systems and Chaos (4.0 cr)  
MATH 5583 - Complex Analysis (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 5654 - Prediction and Filtering (4.0 cr)  
MATH 5705 - Enumerative Combinatorics (4.0 cr)  
MATH 5707 - Graph Theory and Non-enumerative Combinatorics (4.0 cr)  
MATH 5711 - Linear Programming and Combinatorial Optimization (4.0 cr)  
MATH 8301 - Manifolds and Topology (3.0 cr)  
MATH 8302 - Manifolds and Topology (3.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8402 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8445 - Numerical Analysis of Differential Equations (3.0 cr)  
MATH 8450 - Topics in Numerical Analysis (1.0 - 3.0 cr)  
MATH 8600 - Topics in Advanced Applied Mathematics (1.0 - 3.0 cr)  
MATH 8601 - Real Analysis (3.0 cr)  
MATH 8602 - Real Analysis (3.0 cr)  
MATH 8651 - Theory of Probability Including Measure Theory (3.0 cr)  
MATH 8668 - Combinatorial Theory (3.0 cr)  
MATS 5517 - Microscopy of Materials (3.0 cr)  
MATS 5531 - Electrochemical Engineering (3.0 cr)  
MATS 5771 - Colloids and Dispersions (3.0 cr)  
MATS 8001 - Structure and Symmetry of Materials (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)  
MATS 8995 - Special Topics (1.0 - 4.0 cr)  
ME 5113 - Aerosol/Particle Engineering (4.0 cr)  
ME 5223 - Materials in Design (4.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5241 - Computer-Aided Engineering (4.0 cr)  
ME 5243 - Advanced Mechanism Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5281 - Feedback Control Systems (4.0 cr)  
ME 5286 - Robotics (4.0 cr)  
ME 5312 - Solar Thermal Technologies (4.0 cr)  
ME 5344 - Thermodynamics of Fluid Flow With Applications (4.0 cr)  
ME 5351 - Computational Heat Transfer (4.0 cr)  
ME 5461 - Internal Combustion Engines (4.0 cr)  
ME 8228 - Finite Elements in Multidisciplinary Flow/Thermal/Stress and Manufacturing Applications (4.0 cr)  
ME 8229 - Finite Element Methods for Computational Mechanics: Transient/Dynamic Problems (4.0 cr)  
ME 8243 - Topics in Design (4.0 cr)  
ME 8253 - Computational Nanomechanics (3.0 cr)  
ME 8254 - Fundamentals of Microelectromechanical Systems (MEMS) (4.0 cr)  
ME 8281 - Advanced Control System Design (4.0 cr)  
ME 8343 - Radiation (3.0 cr)  
MOT 4001 - Leadership, Professionalism and Business Basics for Engineers (2.0 cr)  
MPHY 5170 - Basic Radiological Physics (3.0 cr)  
MPHY 5171 - Medical and Health Physics of Imaging I (3.0 cr)  
MPHY 5174 - Medical and Health Physics of Imaging II (3.0 cr)  
MPHY 8147 - Advanced Physics of Magnetic Resonance Imaging (MRI) (3.0 cr)  
NPSE 8101 - Nanoparticle Science and Engineering Seminar (1.0 cr)  
NSC 5040 - Brain Networks: From Connectivity to Dynamics (4.0 cr)



NSC 5202 - Theoretical Neuroscience: Systems and Information Processing (3.0 cr)  
NSC 5203 - Basic and Clinical Vision Science (3.0 cr)  
NSC 5561 - Systems Neuroscience (4.0 cr)  
PHSL 5061 - Principles of Physiology for Biomedical Engineering (4.0 cr)  
PHSL 5101 - Human Physiology (5.0 cr)  
PHSL 5201 - Computational Neuroscience I: Membranes and Channels (3.0 cr)  
PHYS 4001 - Analytical Mechanics (4.0 cr)  
PHYS 4002 - Electricity and Magnetism (4.0 cr)  
PHYS 4041 - Computational Methods in the Physical Sciences (4.0 cr)  
PHYS 4051 - Methods of Experimental Physics I (5.0 cr)  
PHYS 4052W - Methods of Experimental Physics II [WI] (5.0 cr)  
PHYS 4101 - Quantum Mechanics (4.0 cr)  
PHYS 4121W - History of 20th-Century Physics [WI] (3.0 cr)  
PHYS 4201 - Statistical and Thermal Physics (3.0 cr)  
PHYS 4211 - Introduction to Solid-State Physics (3.0 cr)  
PHYS 4303 - Electrodynamics and Waves (3.0 cr)  
PHYS 4511 - Introduction to Nuclear and Particle Physics (3.0 cr)  
PHYS 4611 - Introduction to Space Physics (3.0 cr)  
PHYS 4621 - Introduction to Plasma Physics (3.0 cr)  
PHYS 4911 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5011 - Classical Physics I (4.0 cr)  
PHYS 5012 - Classical Physics II (4.0 cr)  
PHYS 5041 - Mathematical Methods for Physics (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)  
PHYS 8711 - Solid-State Physics I (3.0 cr)  
PHYS 8712 - Solid-State Physics II (3.0 cr)  
PSY 5036W - Computational Vision [WI] (3.0 cr)  
PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)  
STAT 4101 - Theory of Statistics I (4.0 cr)  
STAT 4102 - Theory of Statistics II (4.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5101 - Theory of Statistics I (4.0 cr)  
STAT 5102 - Theory of Statistics II (4.0 cr)  
STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5421 - Analysis of Categorical Data (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 8053 - Applied Statistical Methods 3: Multivariate Analysis and Advanced Regression (3.0 cr)  
STAT 8054 - Statistical Methods 4: Advanced Statistical Computing (3.0 cr)  
STAT 8101 - Theory of Statistics 1 (3.0 cr)  
STAT 8111 - Mathematical Statistics I (3.0 cr)  
STAT 8501 - Introduction to Stochastic Processes with Applications (3.0 cr)  
STAT 8711 - Statistical Computing (3.0 cr)  
STAT 8931 - Advanced Topics in Statistics (3.0 cr)  
STAT 8932 - Advanced Topics in Statistics (3.0 cr)

#### Electives

Select courses from the following, as needed to complete the minimum number of course credits required, in consultation with the advisor. A maximum of 2 credits of the following EE courses may be selected: 5041, 8190, 8210, 8230, 8360, 8370, 8500, 8610, 8660, 8920, 8925, and 8940.

EE 4111 - Advanced Analog Electronics Design (4.0 cr)  
EE 4161W - Energy Conversion and Storage [WI] (3.0 cr)  
EE 4163 - Energy Conversion and Storage Laboratory (1.0 cr)  
EE 4231 - Linear Control Systems: Designed by Input/Output Methods (3.0 cr)  
EE 4233 - State Space Control System Design (3.0 cr)  
EE 4235 - Linear Control Systems Laboratory (1.0 cr)  
EE 4237 - State Space Control Laboratory (1.0 cr)  
EE 4301 - Digital Design With Programmable Logic (4.0 cr)  
EE 4303 - Introduction to Programmable Devices Laboratory (1.0 cr)



- EE 4341 - Embedded System Design (4.0 cr)
- EE 4363 - Computer Architecture and Machine Organization (4.0 cr)
- EE 4389W - Introduction to Predictive Learning [WI] (3.0 cr)
- EE 4501 - Communications Systems (3.0 cr)
- EE 4505 - Communications Systems Laboratory (1.0 cr)
- EE 4541 - Digital Signal Processing (3.0 cr)
- EE 4607 - Wireless Hardware System Design (3.0 cr)
- EE 4701 - Electric Drives (3.0 cr)
- EE 4703 - Electric Drives Laboratory (1.0 cr)
- EE 4721 - Introduction to Power System Analysis (3.0 cr)
- EE 4722 - Power System Analysis Laboratory (1.0 cr)
- EE 4741 - Power Electronics (3.0 cr)
- EE 4743 - Switch-Mode Power Electronics Laboratory (1.0 cr)
- EE 5041 - Industrial Assignment for Graduate Students (1.0 cr)
- EE 8190 - Electronics Seminar (1.0 cr)
- EE 8210 - System Theory Seminar (1.0 cr)
- EE 8230 - Control Theory Seminar (1.0 cr)
- EE 8360 - Computer Systems Seminar (1.0 cr)
- EE 8370 - Computer Aided Design Seminar (1.0 cr)
- EE 8500 - Seminar: Communications (1.0 cr)
- EE 8610 - Seminar: Electronics, Fields, and Photonics (1.0 cr)
- EE 8660 - Seminar: Magnetism (1.0 cr)
- EE 8920 - Teaching Experience in Electrical and Computer Engineering (1.0 cr)
- EE 8925 - Ethics in Electrical and Computer Engineering (1.0 cr)
- EE 8940 - Special Investigations (1.0 - 3.0 cr)

#### Thesis Credits

Complete 24 thesis credits after passing preliminary oral exam.

- EE 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)





### **Twin Cities Campus**

## **Financial Mathematics M.F.M.**

*School of Mathematics*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Program in Financial Mathematics, 127 Vincent Hall, 206 Church Street SE, Minneapolis, MN 55455 (612-624-6391; fax: 612-624-6702)

Email: [mfmath@umn.edu](mailto:mfmath@umn.edu)

Website: <http://www.math.umn.edu/finmath/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 32
- This program does not require summer semesters for timely completion.
- Degree: Master of Financial Mathematics

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of financial mathematics degree program helps students understand the underlying mathematics of quantitative finance. The program offers a range of courses, from theoretical to practical, including a mathematical course on stochastic processes, a practitioner's course offering hands-on application of financial software tools, and a programming course focusing on C# and MATLAB.

Courses are offered in the evenings to accommodate working professionals. The program is designed with the possibility for full-time students to complete all requirements in one year.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree from an accredited US university or foreign equivalent.

Other requirements to be completed before admission:

Applicants should have completed college level courses in single variable and multivariable calculus and linear algebra. Background in probability and familiarity with programming language are highly recommended.

Students who do not have a strong mathematics background or who need a refresher may be asked to take FM 5001/5002 - Preparation for Financial Mathematics.

#### **Special Application Requirements:**

Applications are accepted for fall semester only. The application deadline is February 1.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19

Key to [test abbreviations](#)(GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan C:** Plan C requires 32 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B earned for each course.

### Required Courses (32 credits)

Students complete all 4 course sequences for total of 32 credits. These sequences may be taken either in parallel or sequentially, following their numerical order, with the exception of FM 5091/5092, which is recommended to be taken as early as possible.

[FM 5011](#) - Mathematical Background for Finance I (4.0 cr)

[FM 5012](#) - Mathematical Background for Finance II (4.0 cr)

[FM 5021](#) - Mathematical Theory Applied to Finance I (4.0 cr)

[FM 5022](#) - Mathematical Theory Applied to Finance II (4.0 cr)

[FM 5031](#) - A Practitioner's Course in Finance I (4.0 cr)

[FM 5032](#) - A Practitioner's Course in Finance II (4.0 cr)

[FM 5091](#) - Computation, Algorithms, and Coding in Finance I (4.0 cr)

[FM 5092](#) - Computation, Algorithms, and Coding in Finance II (4.0 cr)

### Optional Course (0-2 credits)

Students may take the optional FM 5990 topics course.

[FM 5990](#) - Topics in Financial Mathematics (1.0 - 2.0 cr)



### **Twin Cities Campus**

## **Fundamentals of Quantitative Finance Postbaccalaureate Certificate**

School of Mathematics

College of Science and Engineering

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Director of Graduate Studies, School of Mathematics, University of Minnesota, 127 Vincent Hall, 206 Church Street S.E., Minneapolis, MN 55455 (612-624-6391; fax: 612-624-6702)

Email: [mfmath@umn.edu](mailto:mfmath@umn.edu)

Website: <http://www.math.umn.edu/finmath/>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 14
- This program does not require summer semesters for timely completion.
- Degree: Fundamentals of Quantitative Finance PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The 14-credit Fundamentals of Quantitative Finance (FQF) certificate is good preparation for the Financial Mathematics master's (MFM) program.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree from an accredited US university or foreign equivalent.

Other requirements to be completed before admission:

Applicants should have a good background in mathematics, but not necessarily at the level of a mathematics major. In particular, all applicants must have taken at least three semesters of college calculus, covering two semesters of single variable calculus and an additional semester of either multivariable calculus or linear algebra.

### **Special Application Requirements:**

Applications are accepted for fall semester only. The application deadline is May 15.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B earned for each course.



**Required Courses (14 credits)**

Students must complete all four courses for a total of 14 credits.

[FM 5001](#) - Preparation for Financial Mathematics I (3.0 cr)

[FM 5002](#) - Preparation for Financial Mathematics II (3.0 cr)

[FM 5091](#) - Computation, Algorithms, and Coding in Finance I (4.0 cr)

[FM 5092](#) - Computation, Algorithms, and Coding in Finance II (4.0 cr)



### **Twin Cities Campus**

## **Geoengineering M.GeoE.**

*CSENG Civil, Envrn & Geo-Eng (CEGE)*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Civil, Environmental, and Geo-Engineering, University of Minnesota, 122 Civil Engineering Building, 500 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-625-5522; fax: 612-626-7750)

Email: [cegesps@umn.edu](mailto:cegesps@umn.edu)

Website: <http://www.cege.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Geoengineering

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Emphases are in fundamental aspects of geomechanics and its applications. Research focuses on the use and development of discrete and continuum theories such as elasticity, plasticity, fracture mechanics, and poroelasticity for solving engineering problems. Numerical methods are being developed for obtaining solutions; experimental methods and novel apparatus are being developed for gathering physical evidence. Applications include processes of comminution, flow of granular materials, hydraulic fracturing, and nondestructive testing.

The master of geoenvironmental engineering (M.GeoE.) degree is for the practicing engineer who would like to obtain an advanced degree enrolling part-time or full-time. Students who intend to proceed to the PhD program, or who think they may later wish to be admitted to the PhD program, should apply for the master of science program. Students are expected to follow a coherent program of coursework selected with the help of a faculty advisor and approved by the director of graduate studies. Students also must demonstrate professional competence by carrying out and defending a design project or by taking a coursework-related final oral exam (without a project).

The degree typically takes 2-3 semesters (12-18 months) to complete on a full-time basis or 6-8 semesters on a part-time basis. Students interested in pursuing doctoral studies should see the PhD program in civil engineering.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

An ABET-accredited, four-year bachelor's degree in engineering is required for admission.

Other requirements to be completed before admission:

The application deadlines are December 3 for fall admission and August 31 for spring admission. All materials must be submitted to the online application.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB



- Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N.

The M. GeoE. is offered under two plans. Plan A requires preparation of a thesis/design project. The thesis/design project must be carried out by the student in consultation with a faculty advisor. Plan C is a coursework-only degree program.

### Core Courses (12-30 credits)

Select a minimum of 12 credits from the following in consultation with the advisor. One credit of CEGE 8300 seminar may be applied to this requirement.

- CEGE 4201 - Principles of Highway Design (3.0 cr)
- CEGE 4411 - Matrix Structural Analysis (3.0 cr)
- CEGE 4412 - Reinforced Concrete II (3.0 cr)
- CEGE 4413 - Steel Design II (3.0 cr)
- CEGE 4511 - Hydraulic Structures (3.0 cr)
- CEGE 4561 - Solids and Hazardous Wastes (3.0 cr)
- CEGE 4563 - Pollutant Fate and Transport: Processes and Modeling (3.0 cr)
- CEGE 5094 - Directed Research (1.0 - 4.0 cr)
- CEGE 5180 - Special Topics (1.0 - 4.0 cr)
- CEGE 5211 - Traffic Engineering (3.0 cr)
- CEGE 5212 - Transportation Policy, Planning, and Deployment (3.0 cr)
- CEGE 5213 - Transit Planning and Management (3.0 cr)
- CEGE 5214 - Transportation Systems Analysis (3.0 cr)
- CEGE 5341 - Wave Methods for Nondestructive Testing (3.0 cr)
- CEGE 5342 - Introduction to Inverse Problems (3.0 cr)
- CEGE 5351 - Advanced Engineering Mathematics I (3.0 cr)
- CEGE 5411 - Applied Structural Mechanics (3.0 cr)
- CEGE 5414 - Prestressed Concrete Design (3.0 cr)
- CEGE 5415 - Masonry Structures (3.0 cr)
- CEGE 5416 - Sensors in Infrastructure (3.0 cr)
- CEGE 5417 - Structural Engineering Design of Wood Buildings (3.0 cr)
- CEGE 5511 - Urban Hydrology and Water Quality (4.0 cr)
- CEGE 5512 - Stochastic Ecohydrology (3.0 cr)
- CEGE 5513 - Energy Conversion from Wind, Hydro and Solar Resources (3.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)
- CEGE 5543 - Introductory Environmental Fluid Mechanics (4.0 cr)
- CEGE 5551 - Environmental Microbiology (3.0 cr)
- CEGE 5552 - Environmental Microbiology Laboratory (1.0 cr)
- CEGE 5570 - Design for Sustainable Development - India (3.0 - 9.0 cr)
- CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)
- CEGE 8094 - Directed Research (1.0 - 4.0 cr)
- CEGE 8211 - Theory of Traffic Flow (4.0 cr)
- CEGE 8212 - Advanced Travel Demand Modeling and Supply Analysis (3.0 cr)
- CEGE 8213 - Advanced Transportation Technologies Seminar (1.0 cr)
- CEGE 8214 - Transportation Economics (4.0 cr)
- CEGE 8215 - Transportation Data Analysis (3.0 cr)



- CEGE 8216 - Urban Traffic Operations (3.0 cr)
- CEGE 8217 - Transportation Network Analysis (4.0 cr)
- CEGE 8218 - Dynamic Transportation Network Analysis (4.0 cr)
- CEGE 8231 - Advanced Pavement Engineering (3.0 cr)
- CEGE 8233 - Advanced Bituminous Materials Characterization (3.0 cr)
- CEGE 8300 - Seminar: Geomechanics (1.0 - 3.0 cr)
- CEGE 8301 - Fracture of Geomaterials (3.0 cr)
- CEGE 8302 - Soil/Rock Plasticity and Limit Analysis (4.0 cr)
- CEGE 8311 - Advanced Rock Mechanics (3.0 cr)
- CEGE 8321 - Thermoporoelasticity (4.0 cr)
- CEGE 8322 - Storage and Flow of Granular Materials (3.0 cr)
- CEGE 8331 - Modeling Geomechanical Processes (3.0 cr)
- CEGE 8336 - Boundary Element Methods I (3.0 cr)
- CEGE 8337 - Boundary Element Methods II (3.0 cr)
- CEGE 8341 - Wave Propagation in Solids and Structures (4.0 cr)
- CEGE 8351 - Advanced Engineering Mathematics II (3.0 cr)
- CEGE 8352 - Advanced Groundwater Mechanics II (3.0 cr)
- CEGE 8361 - Engineering Model Fitting (3.0 cr)
- CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)
- CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)
- CEGE 8411 - Plate Structures (3.0 cr)
- CEGE 8412 - Shell Structures (3.0 cr)
- CEGE 8413 - Fracture and Scaling (3.0 cr)
- CEGE 8421 - Structural Dynamics (3.0 cr)
- CEGE 8422 - Earthquake Engineering (3.0 cr)
- CEGE 8431 - Structural Stability (3.0 cr)
- CEGE 8432 - Analysis of Thin-Walled Members (3.0 cr)
- CEGE 8441 - Ductile Behavior of Steel Structures (3.0 cr)
- CEGE 8442 - Nonlinear Analysis of Structural Systems (3.0 cr)
- CEGE 8443 - Fracture of Materials and Structures (3.0 cr)
- CEGE 8451 - Behavior of Reinforced Concrete Structures (3.0 cr)
- CEGE 8461 - Structural Reliability (3.0 cr)
- CEGE 8490 - Special Topics (1.0 - 4.0 cr)
- CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)
- CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)
- CEGE 8503 - Environmental Mass Transport (4.0 cr)
- CEGE 8504 - Theory of Unit Operations (4.0 cr)
- CEGE 8505 - Biological Processes (3.0 cr)
- CEGE 8506 - Stochastic Hydrology (4.0 cr)
- CEGE 8507 - Advanced Methods in Hydrology (4.0 cr)
- CEGE 8508 - Ecological Fluid Mechanics (4.0 cr)
- CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)
- CEGE 8521 - The Atmospheric Boundary Layer (4.0 cr)
- CEGE 8541 - Aquatic Chemistry (3.0 cr)
- CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)
- CEGE 8551 - Environmental Microbiology: Molecular Theory and Methods (4.0 cr)
- CEGE 8552 - Groundwater Microbiology: Laboratory (4.0 cr)
- CEGE 8553 - Biofilms (3.0 cr)
- CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)
- CEGE 8562 - Analysis and Modeling of Aquatic Environments II (3.0 cr)
- CEGE 8563 - Industrial Waste Treatment (3.0 cr)
- CEGE 8571 - Hydraulic Measurements (3.0 cr)
- CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)
- CEGE 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)
- CEGE 8601 - Introduction to Stream Restoration (3.0 cr)
- CEGE 8602 - Stream Restoration Practice (2.0 cr)

**Electives (0-18 credits)**

Select courses from the following, in consultation with the advisor, to complete minimum course credit requirements. Other courses may be selected with director of graduate studies approval.

- AEM 4511 - Mechanics of Composite Materials (3.0 cr)
- AEM 5501 - Continuum Mechanics (3.0 cr)
- AEM 5503 - Theory of Elasticity (3.0 cr)
- AEM 8211 - Theory of Turbulence I (3.0 cr)
- AEM 8525 - Elastic Stability of Materials (3.0 cr)



AEM 8531 - Fracture Mechanics (3.0 cr)  
AEM 8551 - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)  
APEC 5031 - Methods of Economic Data Analysis (3.0 cr)  
ARCH 5391 - Design and Representation with BIM (3.0 cr)  
ARCH 5671 - Historic Preservation (3.0 cr)  
BBE 5513 - Watershed Engineering (3.0 cr)  
BBE 5523 - Ecological Engineering Design (3.0 cr)  
BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)  
BBE 5753 - Air Quality and Pollution Control Engineering (3.0 cr)  
BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
CHEM 5210 - Materials Characterization (4.0 cr)  
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
EEB 5601 - Limnology (3.0 cr)  
ESCI 8801 - Geomicrobiology (3.0 cr)  
ESPM 5071 - Ecological Restoration (4.0 cr)  
ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)  
FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
GCC 5005 - Innovation for the Public Good: Post-Pandemic Venture Design [GP] (3.0 cr)  
GEOG 5561 - Principles of Geographic Information Science (4.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)  
LAAS 5621 - Soil and Environmental Genomics (3.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8402 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)  
PA 5231 - Transit Planning and Management (3.0 cr)  
PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)  
PA 5880 - Exploring Global Cities (1.0 - 3.0 cr)  
PA 5926 - Presentation Skills: How to Inspire Your Audience and Change the World (1.0 cr)  
PUBH 6132 - Air, Water, and Health (2.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
WRS 5101 - Water Policy (3.0 cr)  
WRS 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

#### Plan Options

##### Plan A (10 credits)

Complete 10 thesis credits for the design project.  
CEGE 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### Plan C

Plan C requires completion of 100 hours of project work and an oral presentation of no less than 10 minutes. Plan C coursework must include a minimum of two 8xxx-level courses.





### **Twin Cities Campus**

## **Geoengineering M.S.**

*CSENG Civil, Envrn & Geo-Eng (CEGE)*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Civil, Environmental, and Geo-Engineering, University of Minnesota, 122 Civil Engineering Building, 500 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-625-5522; fax: 612-626-7750)

Email: [cegesps@umn.edu](mailto:cegesps@umn.edu)

Website: <http://www.cege.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Emphases are in fundamental aspects of geomechanics and its applications. Research focuses on the use and development of discrete and continuum theories such as elasticity, plasticity, fracture mechanics, and poroelasticity for solving engineering problems. Numerical methods are being developed for obtaining solutions; experimental methods and novel apparatus are being developed for gathering physical evidence. Applications include processes of communication, flow of granular materials, hydraulic fracturing, and nondestructive testing.

The master of science (MS) degree balances education in engineering fundamentals and design with research and development. It is designed for students wishing to pursue a career in industry or to continue toward a PhD.

Students interested in pursuing doctoral studies should see the PhD program in civil engineering.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree in engineering, basic science, or mathematics is preferred.

Other requirements to be completed before admission:

Admission depends primarily on the applicant's academic record and letters of recommendation. Applicants who lack geoengineering training are often required to complete at least one appropriate course from the undergraduate program. Graduate degree credit is not awarded for such preparatory work.

Eligibility requirements for integrated BS/MS program:

Application is open to geoengineering undergraduates who:

- Are within 32 credits of completing the requirements for the bachelors degree;
- Have a faculty advisor selected prior to admission; and
- Hold a cumulative GPA of 3.3 or higher.

#### **Special Application Requirements:**

The application deadlines are December 3 for fall admission and August 31 for spring admission. All materials must be submitted to the online application.



Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is oral.

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N.

### Core Courses (12-30 credits)

Select at least 12 credits from the following in consultation with the advisor. One credit of CEGE 8300 seminar may be applied to this requirement.

- CEGE 4201 - Principles of Highway Design (3.0 cr)
- CEGE 4411 - Matrix Structural Analysis (3.0 cr)
- CEGE 4412 - Reinforced Concrete II (3.0 cr)
- CEGE 4413 - Steel Design II (3.0 cr)
- CEGE 4511 - Hydraulic Structures (3.0 cr)
- CEGE 4561 - Solids and Hazardous Wastes (3.0 cr)
- CEGE 4563 - Pollutant Fate and Transport: Processes and Modeling (3.0 cr)
- CEGE 5094 - Directed Research (1.0 - 4.0 cr)
- CEGE 5180 - Special Topics (1.0 - 4.0 cr)
- CEGE 5211 - Traffic Engineering (3.0 cr)
- CEGE 5212 - Transportation Policy, Planning, and Deployment (3.0 cr)
- CEGE 5213 - Transit Planning and Management (3.0 cr)
- CEGE 5341 - Wave Methods for Nondestructive Testing (3.0 cr)
- CEGE 5342 - Introduction to Inverse Problems (3.0 cr)
- CEGE 5351 - Advanced Engineering Mathematics I (3.0 cr)
- CEGE 5411 - Applied Structural Mechanics (3.0 cr)
- CEGE 5414 - Prestressed Concrete Design (3.0 cr)
- CEGE 5415 - Masonry Structures (3.0 cr)
- CEGE 5416 - Sensors in Infrastructure (3.0 cr)
- CEGE 5417 - Structural Engineering Design of Wood Buildings (3.0 cr)
- CEGE 5511 - Urban Hydrology and Water Quality (4.0 cr)
- CEGE 5512 - Stochastic Ecohydrology (3.0 cr)
- CEGE 5513 - Energy Conversion from Wind, Hydro and Solar Resources (3.0 cr)
- CEGE 5541 - Environmental Water Chemistry (3.0 cr)
- CEGE 5542 - Experimental Methods in Environmental Engineering (3.0 cr)



- CEGE 5543 - Introductory Environmental Fluid Mechanics (4.0 cr)  
CEGE 5551 - Environmental Microbiology (3.0 cr)  
CEGE 5552 - Environmental Microbiology Laboratory (1.0 cr)  
CEGE 5570 - Design for Sustainable Development - India (3.0 - 9.0 cr)  
CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)  
CEGE 8094 - Directed Research (1.0 - 4.0 cr)  
CEGE 8211 - Theory of Traffic Flow (4.0 cr)  
CEGE 8212 - Advanced Travel Demand Modeling and Supply Analysis (3.0 cr)  
CEGE 8213 - Advanced Transportation Technologies Seminar (1.0 cr)  
CEGE 8214 - Transportation Economics (4.0 cr)  
CEGE 8215 - Transportation Data Analysis (3.0 cr)  
CEGE 8216 - Urban Traffic Operations (3.0 cr)  
CEGE 8217 - Transportation Network Analysis (4.0 cr)  
CEGE 8218 - Dynamic Transportation Network Analysis (4.0 cr)  
CEGE 8231 - Advanced Pavement Engineering (3.0 cr)  
CEGE 8233 - Advanced Bituminous Materials Characterization (3.0 cr)  
CEGE 8300 - Seminar: Geomechanics (1.0 - 3.0 cr)  
CEGE 8301 - Fracture of Geomaterials (3.0 cr)  
CEGE 8302 - Soil/Rock Plasticity and Limit Analysis (4.0 cr)  
CEGE 8311 - Advanced Rock Mechanics (3.0 cr)  
CEGE 8321 - Thermoporoelasticity (4.0 cr)  
CEGE 8322 - Storage and Flow of Granular Materials (3.0 cr)  
CEGE 8331 - Modeling Geomechanical Processes (3.0 cr)  
CEGE 8336 - Boundary Element Methods I (3.0 cr)  
CEGE 8337 - Boundary Element Methods II (3.0 cr)  
CEGE 8341 - Wave Propagation in Solids and Structures (4.0 cr)  
CEGE 8351 - Advanced Engineering Mathematics II (3.0 cr)  
CEGE 8352 - Advanced Groundwater Mechanics II (3.0 cr)  
CEGE 8361 - Engineering Model Fitting (3.0 cr)  
CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)  
CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)  
CEGE 8411 - Plate Structures (3.0 cr)  
CEGE 8412 - Shell Structures (3.0 cr)  
CEGE 8413 - Fracture and Scaling (3.0 cr)  
CEGE 8421 - Structural Dynamics (3.0 cr)  
CEGE 8422 - Earthquake Engineering (3.0 cr)  
CEGE 8431 - Structural Stability (3.0 cr)  
CEGE 8432 - Analysis of Thin-Walled Members (3.0 cr)  
CEGE 8441 - Ductile Behavior of Steel Structures (3.0 cr)  
CEGE 8442 - Nonlinear Analysis of Structural Systems (3.0 cr)  
CEGE 8443 - Fracture of Materials and Structures (3.0 cr)  
CEGE 8451 - Behavior of Reinforced Concrete Structures (3.0 cr)  
CEGE 8461 - Structural Reliability (3.0 cr)  
CEGE 8490 - Special Topics (1.0 - 4.0 cr)  
CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)  
CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)  
CEGE 8503 - Environmental Mass Transport (4.0 cr)  
CEGE 8504 - Theory of Unit Operations (4.0 cr)  
CEGE 8505 - Biological Processes (3.0 cr)  
CEGE 8506 - Stochastic Hydrology (4.0 cr)  
CEGE 8507 - Advanced Methods in Hydrology (4.0 cr)  
CEGE 8508 - Ecological Fluid Mechanics (4.0 cr)  
CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)  
CEGE 8521 - The Atmospheric Boundary Layer (4.0 cr)  
CEGE 8541 - Aquatic Chemistry (3.0 cr)  
CEGE 8542 - Chemistry of Organic Pollutants in Environmental Systems (3.0 cr)  
CEGE 8551 - Environmental Microbiology: Molecular Theory and Methods (4.0 cr)  
CEGE 8552 - Groundwater Microbiology: Laboratory (4.0 cr)  
CEGE 8553 - Biofilms (3.0 cr)  
CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)  
CEGE 8562 - Analysis and Modeling of Aquatic Environments II (3.0 cr)  
CEGE 8563 - Industrial Waste Treatment (3.0 cr)  
CEGE 8571 - Hydraulic Measurements (3.0 cr)  
CEGE 8572 - Computational Environmental Fluid Dynamics (4.0 cr)  
CEGE 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)



CEGE 8601 - Introduction to Stream Restoration (3.0 cr)  
CEGE 8602 - Stream Restoration Practice (2.0 cr)

**Electives (0-18 credits)**

Select credits from the following, in consultation with the advisor, to complete the minimum number of course credits required. Other courses may be selected with director of graduate studies approval.

AEM 4511 - Mechanics of Composite Materials (3.0 cr)  
AEM 5501 - Continuum Mechanics (3.0 cr)  
AEM 5503 - Theory of Elasticity (3.0 cr)  
AEM 8211 - Theory of Turbulence I (3.0 cr)  
AEM 8525 - Elastic Stability of Materials (3.0 cr)  
AEM 8531 - Fracture Mechanics (3.0 cr)  
AEM 8551 - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)  
APEC 5031 - Methods of Economic Data Analysis (3.0 cr)  
ARCH 5391 - Design and Representation with BIM (3.0 cr)  
ARCH 5671 - Historic Preservation (3.0 cr)  
BBE 5513 - Watershed Engineering (3.0 cr)  
BBE 5523 - Ecological Engineering Design (3.0 cr)  
BBE 5535 - Assessment and Diagnosis of Impaired Waters (3.0 cr)  
BBE 5753 - Air Quality and Pollution Control Engineering (3.0 cr)  
BBE 8513 - Hydrologic Modeling of Small Watersheds (3.0 cr)  
BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
CHEM 5210 - Materials Characterization (4.0 cr)  
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
EEB 5601 - Limnology (3.0 cr)  
ESCI 8801 - Geomicrobiology (3.0 cr)  
ESPM 5071 - Ecological Restoration (4.0 cr)  
ESPM 5111 - Hydrology and Water Quality Field Methods (3.0 cr)  
FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
GCC 5005 - Innovation for the Public Good: Post-Pandemic Venture Design [GP] (3.0 cr)  
GEOG 5561 - Principles of Geographic Information Science (4.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
LAAS 5311 - Soil Chemistry and Mineralogy (3.0 cr)  
LAAS 5621 - Soil and Environmental Genomics (3.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8402 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
PA 5204 - Urban Spatial and Social Dynamics (3.0 cr)  
PA 5231 - Transit Planning and Management (3.0 cr)  
PA 5271 - Geographic Information Systems: Applications in Planning and Policy Analysis (3.0 cr)  
PA 5880 - Exploring Global Cities (1.0 - 3.0 cr)  
PA 5926 - Presentation Skills: How to Inspire Your Audience and Change the World (1.0 cr)  
PUBH 6132 - Air, Water, and Health (2.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
WRS 5101 - Water Policy (3.0 cr)  
WRS 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

**Plan Options**

**Plan A (10 credits)**

Complete 10 thesis credits.



CEGE 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan B (0-3 credits)**

Plan B requires completion of 1-3 Plan B papers as determined by the faculty adviser. Plan B papers can include computer programs, annotated bibliographies, field investigations, and analysis/design of special engineering problems. Up to 3 credits of CEGE 8094 may be applied to course credit requirements.

CEGE 8094 - Directed Research (1.0 - 4.0 cr)

-OR-

**Plan C**

Plan C requires completion of 100 hours of project work and an oral presentation of no less than 10 minutes. Plan C coursework must include a minimum of two 8xxx-level courses.

## Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

### Integrated B.GeoE./M.S. - Geoengineering

The department offers an integrated Bachelor of Geoengineering (B.GeoE.) and master of science (MS) in geoengineering. The integrated B.GeoE./MS program offers students the opportunity to earn the bachelors and masters degree in five years. These programs offer several benefits: streamlined admissions from the undergraduate to the graduate program (GRE not required); flexibility in fulfilling required courses for both degrees during the senior year (up to 16 credits can be transferred to the graduate program); and eligibility for teaching and research assistantships.

Both the B.GeoE. and MS degrees must be completed in their entirety, with no courses shared between them. The graduate degree cannot be earned before the undergraduate requirements are satisfied. Admitted students who decide not to complete the MS degree are permitted to count credits originally planned for the graduate program toward their B.GeoE. technical electives.

### Integrated B.C.E./M.S. - Geoengineering

The department offers an integrated bachelor of civil engineering (B.C.E) and master of science (MS) in geoengineering. Benefits, eligibility requirements, and degree-completion requirements outlined for the B.GeoE./MS integrated program also apply to the B.C.E./MS.

### Integrated B.Env.E./M.S. - Geoengineering

The department offers an integrated bachelor of environmental engineering (B.Env.E.) and master of science (MS) in geoengineering. Benefits, eligibility requirements, and degree-completion requirements outlined for the B.GeoE./MS integrated program also apply to the B.Env.E./MS.



### **Twin Cities Campus**

## **Geoengineering Minor**

*CSENG Civil, Envrn & Geo-Eng (CEGE)*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Civil, Environmental, and Geo-Engineering, University of Minnesota, 122 Civil Engineering Building, 500 Pillsbury Drive S.E., Minneapolis, MN 55455 (612-625-5522; fax: 612-626-7750)

Email: [cegesps@umn.edu](mailto:cegesps@umn.edu)

Website: <http://www.cege.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Emphases are in fundamental aspects of geomechanics and its applications. Research focuses on the use and development of discrete and continuum theories such as elasticity, plasticity, fracture mechanics, and poroelasticity for solving engineering problems. Numerical methods are being developed for obtaining solutions; experimental methods and novel apparatus are being developed for gathering physical evidence. Applications include processes of comminution, flow of granular materials, hydraulic fracturing, and nondestructive testing.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Geoengineering director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N.  
The minimum cumulative GPA for the minor is 3.00.

#### **Minor Courses (6 credits)**

In consultation with the advisor and Geoengineering director of graduate studies, select a minimum of 6 credits from the following:

[CEGE 5341](#) - Wave Methods for Nondestructive Testing (3.0 cr)

[CEGE 5351](#) - Advanced Engineering Mathematics I (3.0 cr)

[CEGE 8301](#) - Fracture of Geomaterials (3.0 cr)

[CEGE 8302](#) - Soil/Rock Plasticity and Limit Analysis (4.0 cr)

[CEGE 8311](#) - Advanced Rock Mechanics (3.0 cr)

[CEGE 8321](#) - Thermoporoelasticity (4.0 cr)

[CEGE 8322](#) - Storage and Flow of Granular Materials (3.0 cr)

[CEGE 8331](#) - Modeling Geomechanical Processes (3.0 cr)

[CEGE 8336](#) - Boundary Element Methods I (3.0 cr)

[CEGE 8337](#) - Boundary Element Methods II (3.0 cr)

[CEGE 8341](#) - Wave Propagation in Solids and Structures (4.0 cr)



[CEGE 8351](#) - Advanced Engineering Mathematics II (3.0 cr)  
[CEGE 8352](#) - Advanced Groundwater Mechanics II (3.0 cr)  
[CEGE 8361](#) - Engineering Model Fitting (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

#### Masters



### **Twin Cities Campus**

## **Industrial and Systems Engineering M.S.I.SY.E.**

*Industrial and Systems Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Industrial and Systems Engineering Graduate Program, University of Minnesota, 100 Union Street SE, Minneapolis, MN 55455 (612-624-1582; fax 612-624-0944)

Email: [isye@umn.edu](mailto:isye@umn.edu)

Website: <https://cse.umn.edu/isye/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 32
- This program does not require summer semesters for timely completion.
- Degree: Master of Science in Industrial & Systems Engr

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The industrial and systems engineering (ISyE) program offers coursework and research in industrial and systems engineering, operations research, and human factors. Special emphasis is on methodologies for design, planning, and management of service and manufacturing systems. Examples of research applications include logistics, transportation, healthcare delivery systems, revenue management, and supply chain management.

The Department of Industrial & Systems Engineering offers an MS degree with three tracks: Analytics; Industrial Engineering; or Systems Engineering. MS degree applicants must indicate which track they are applying for on the application form. Note that the admission requirements for the three tracks are different. In addition, the ISyE program also offers a dual MS in ISyE and Civil Engineering (Transportation Engineering focus) and an integrated bachelor's/master's program.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A baccalaureate degree in engineering or a closely related field is required.

Other requirements to be completed before admission:

Eligibility requirements for the integrated BS/MS program:

- Students must be enrolled in the Industrial and Systems Engineering undergraduate program at the University of Minnesota Twin Cities.
- Applicants must have a minimum cumulative GPA of at least 3.4 or a strong letter of recommendation from an ISyE faculty member.
- The following IE courses must be completed or in progress at the time of application: 1101, 2021, 3011, 3012, 3521, 3522, 4011, and 4551.

#### **Special Application Requirements:**

All application materials should be submitted electronically through the Graduate Admissions Office.

Applicants to the systems engineering track are required to have at least two years of professional work experience in a technical field. Promising candidates with less experience will be considered under exceptional circumstances. Applicants must submit a personal statement and three letters of recommendation. In addition to the academic record, the professional record of the applicant and the letters of recommendation carry weight in admission decisions. A GRE score is not required for applicants to the systems engineering track.

Applicants to the industrial engineering and analytics tracks must submit a GRE score. Letters of recommendation are not required, but are highly recommended if you want to be considered for financial aid.





Applications for the analytics track are accepted for fall semester only.

The application deadlines are February 15 for fall semester and October 15 for spring semester.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5

Key to [test abbreviations](#) (GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 16 to 24 major credits and 6 to 14 credits outside the major. The final exam is oral.

**Plan C:** Plan C requires 14 to 26 major credits and 6 to 16 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.8 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The Master of Science in Industrial and Systems Engineering (M.S.I.Sy.E.) is offered with three tracks: Analytics, Industrial Engineering, or Systems Engineering.

Students may replace a required course with a qualifying replacement course if they have taken the equivalent of the required course elsewhere.

**Joint- or Dual-degree Coursework:** Dual M.S. in ISyE and Civil Engineering (Transportation Engineering Focus): Student may take a total of 15 credits in common among the academic programs.

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Analytics

This sub-plan is limited to students completing the program under Plan C.

The analytics track is a coursework-only option (Plan C) requiring 30-32 credits. Students proceed through the program and advance as a cohort. The program requires 24 credits in core courses and a minimum of 6 credits in elective courses. In addition, non-native English speakers are required to take the 2-credit course ESL 5008.

### Required Courses (24 credits)

[IE 5531](#) - Engineering Optimization I (4.0 cr)



IE 5532 - Stochastic Models (4.0 cr)  
IE 5561 - Analytics and Data-Driven Decision Making (4.0 cr)  
IE 5773 - Practice-focused Seminar (1.0 cr)  
IE 5801 - Capstone Project (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
or CSCI 5523 - Introduction to Data Mining (3.0 cr)

#### Electives (6 credits)

In consultation with adviser, select a minimum of 6 credits from the following. Additional courses may be approved by the Director of Graduate Studies.

CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5751 - Big Data Engineering and Architecture (3.0 cr)  
IE 5441 - Financial Decision Making (4.0 cr)  
IE 5522 - Quality Engineering and Reliability (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 5551 - Production Planning and Inventory Control (4.0 cr)  
IE 5553 - Simulation (4.0 cr)  
PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)  
STAT 5421 - Analysis of Categorical Data (3.0 cr)  
STAT 5511 - Time Series Analysis (3.0 cr)  
STAT 5601 - Nonparametric Methods (3.0 cr)

#### English Proficiency (0-2 credits)

Non-native English speakers are required to take the following:  
ESL 5008 - Speaking for Professional Settings (2.0 cr)

#### Industrial Engineering

The industrial engineering track has three options:

- Plan A (thesis) requires 30 credits: 14 in the major, 6 outside IE, and 10 thesis credits.
- Plan B (project) requires 30 credits: 17 in the major, which may include 4 credits for the Plan B project course, 6 outside IE, and 7 additional elective credits.
- Plan C (coursework) requires 32 credits: 17 in the major, 6 outside IE, and 9 additional elective credits.

#### Required Courses (13-17 credits)

All students take IE 5531 and 5532 for 8 credits.

IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)

In addition, Plan A students choose a minimum of 1 course from the following, and Plan B and C students, choose a minimum of 2 courses.

IE 5511 - Human Factors and Work Analysis (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 5551 - Production Planning and Inventory Control (4.0 cr)

#### Seminar

Complete 1 seminar credit. The following may be used or consult with adviser for additional options.

IE 8773 - Graduate Seminar (1.0 cr)  
IE 8774 - Graduate Seminar (1.0 cr)

#### Electives (7-15 credits)

In consultation with adviser, select courses from the following to complete the minimum course credit requirements. A minimum of 6 credits must be from non-IE courses. Additional courses may be approved by the Director of Graduate Studies.

APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)  
APEC 8002 - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)  
APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)  
APEC 8211 - Econometric Analysis I (2.0 cr)  
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
ECON 8117 - Noncooperative Game Theory (2.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)



IE 5080 - Topics in Industrial Engineering (1.0 - 4.0 cr)  
IE 5111 - Systems Engineering I (2.0 cr)  
IE 5113 - Systems Engineering II (4.0 cr)  
IE 5441 - Financial Decision Making (4.0 cr)  
IE 5513 - Engineering Safety (4.0 cr)  
IE 5522 - Quality Engineering and Reliability (4.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 5551 - Production Planning and Inventory Control (4.0 cr)  
IE 5553 - Simulation (4.0 cr)  
IE 5561 - Analytics and Data-Driven Decision Making (4.0 cr)  
IE 5773 - Practice-focused Seminar (1.0 cr)  
IE 5801 - Capstone Project (4.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
IE 8532 - Stochastic Processes and Queuing Systems (4.0 cr)  
IE 8533 - Advanced Stochastic Processes and Queuing Systems (4.0 cr)  
IE 8534 - Advanced Topics in Operations Research (4.0 cr)  
IE 8552 - Advanced Topics in Production, Inventory, and Distribution Systems (4.0 cr)  
MATH 5615H - Honors: Introduction to Analysis I (4.0 cr)  
MATH 5616H - Honors: Introduction to Analysis II (4.0 cr)  
MATH 8651 - Theory of Probability Including Measure Theory (3.0 cr)  
MBA 6030 - Financial Accounting (3.0 cr)  
MBA 6220 - Supply Chain & Operations (3.0 cr)  
MGMT 6004 - Negotiation Strategies (2.0 cr)  
MILI 6990 - The Health Care Marketplace (2.0 cr)  
MKTG 8810 - Consumer Behavior Special Topics (2.0 cr)  
MOT 5001 - Technological Business Fundamentals (2.0 cr)  
MOT 5002 - Creating Technological Innovation (2.0 cr)  
PUBH 6325 - Data Processing with PC-SAS (1.0 cr)  
PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)  
PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)  
SCO 6041 - Project Management (2.0 cr)  
SCO 6056 - Managing Supply Chain Operations (4.0 cr)  
SCO 6059 - Quality Management and Lean Six Sigma (4.0 cr)  
SCO 6072 - Managing Technologies in the Supply Chain (2.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5302 - Applied Regression Analysis (4.0 cr)  
STAT 5401 - Applied Multivariate Methods (3.0 cr)

### Plan Options

#### Plan A (10 credits)

Complete 10 thesis credits.

IE 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B (0-4 credits)

Plan B students must either take the Plan B course IE 8794 or complete one to three Plan B papers, determined in consultation with the adviser.

IE 8794 - Industrial Engineering Research (1.0 - 6.0 cr)

-OR-

#### Plan C

Plan C students do not have additional requirements.

### Systems Engineering

This sub-plan is limited to students completing the program under Plan C.

The systems engineering track is a coursework-only option (Plan C) requiring 30 credits.

### Required Courses (14 credits)



- IE 5111 - Systems Engineering I (2.0 cr)
- IE 5113 - Systems Engineering II (4.0 cr)
- IE 5541 - Project Management (4.0 cr)
- IE 5553 - Simulation (4.0 cr)

**Electives (16 credits)**

In consultation with adviser, select courses from the following to complete course credit requirements. A minimum of 6 credits must be from non-IE courses. Additional courses may be approved by the Director of Graduate Studies.

- APEC 8001 - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)
- APEC 8002 - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)
- APEC 8206 - Dynamic Optimization: Applications in Economics and Management (3.0 cr)
- APEC 8211 - Econometric Analysis I (2.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
- CSCI 5521 - Introduction to Machine Learning (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5525 - Machine Learning (3.0 cr)
- CSCI 5801 - Software Engineering I (3.0 cr)
- ECON 8117 - Noncooperative Game Theory (2.0 cr)
- HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)
- IE 5080 - Topics in Industrial Engineering (1.0 - 4.0 cr)
- IE 5111 - Systems Engineering I (2.0 cr)
- IE 5113 - Systems Engineering II (4.0 cr)
- IE 5441 - Financial Decision Making (4.0 cr)
- IE 5513 - Engineering Safety (4.0 cr)
- IE 5522 - Quality Engineering and Reliability (4.0 cr)
- IE 5531 - Engineering Optimization I (4.0 cr)
- IE 5532 - Stochastic Models (4.0 cr)
- IE 5541 - Project Management (4.0 cr)
- IE 5545 - Decision Analysis (4.0 cr)
- IE 5551 - Production Planning and Inventory Control (4.0 cr)
- IE 5553 - Simulation (4.0 cr)
- IE 5561 - Analytics and Data-Driven Decision Making (4.0 cr)
- IE 5773 - Practice-focused Seminar (1.0 cr)
- IE 5801 - Capstone Project (4.0 cr)
- IE 8521 - Optimization (4.0 cr)
- IE 8531 - Discrete Optimization (4.0 cr)
- IE 8532 - Stochastic Processes and Queuing Systems (4.0 cr)
- IE 8533 - Advanced Stochastic Processes and Queuing Systems (4.0 cr)
- IE 8534 - Advanced Topics in Operations Research (4.0 cr)
- IE 8552 - Advanced Topics in Production, Inventory, and Distribution Systems (4.0 cr)
- MATH 5615H - Honors: Introduction to Analysis I (4.0 cr)
- MATH 5616H - Honors: Introduction to Analysis II (4.0 cr)
- MATH 8651 - Theory of Probability Including Measure Theory (3.0 cr)
- MBA 6030 - Financial Accounting (3.0 cr)
- MBA 6220 - Supply Chain & Operations (3.0 cr)
- MGMT 6004 - Negotiation Strategies (2.0 cr)
- MILI 6990 - The Health Care Marketplace (2.0 cr)
- MKTG 8810 - Consumer Behavior Special Topics (2.0 cr)
- MOT 5001 - Technological Business Fundamentals (2.0 cr)
- MOT 5002 - Creating Technological Innovation (2.0 cr)
- PUBH 6325 - Data Processing with PC-SAS (1.0 cr)
- PUBH 7461 - Exploring and Visualizing Data in R (2.0 cr)
- PUBH 7475 - Statistical Learning and Data Mining (3.0 cr)
- SCO 6041 - Project Management (2.0 cr)
- SCO 6056 - Managing Supply Chain Operations (4.0 cr)
- SCO 6059 - Quality Management and Lean Six Sigma (4.0 cr)
- SCO 6072 - Managing Technologies in the Supply Chain (2.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5401 - Applied Multivariate Methods (3.0 cr)

**Integrated B.I.Sy.E./M.S.I.Sy.E.**

This sub-plan is optional and does not fulfill the sub-plan requirement for this program.

This sub-plan is limited to students completing the program under Plan C.



The Department of Industrial and Systems Engineering offers an integrated bachelor's/master's degree program. The program makes it possible for students to earn both a bachelor's degree (B.I.Sy.E.) and a master's degree (M.S.I.Sy.E.) in Industrial and Systems Engineering in five years. The program has several benefits: a streamlined admissions process from the undergraduate to the graduate program; graduate student status granted in the senior year; eligibility for teaching and research assistantships; and, flexibility in fulfilling required courses for both degrees simultaneously in the last two years of study. The integrated program is available only for the Analytics Track.

Both the BISIyE and MSISyE degrees must be completed in their entirety, with no courses shared between them. The graduate degree cannot be earned before the undergraduate requirements are satisfied. Admitted students who decide not to complete the MSISyE degree are permitted to count credits originally planned for the graduate program toward their undergraduate technical electives.



### **Twin Cities Campus**

## **Industrial and Systems Engineering Minor**

*Industrial and Systems Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Industrial and Systems Engineering Graduate Program, University of Minnesota, 100 Union Street SE, Minneapolis, MN 55455 (612-624-1582; fax: 612-624-0944)

Email: [isye@umn.edu](mailto:isye@umn.edu)

Website: <https://cse.umn.edu/isye/>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The industrial and systems engineering (ISyE) program offers coursework and research in industrial and systems engineering, operations research, and human factors. Special emphasis is on methodologies for design, planning, and management of service and manufacturing systems. Examples of research applications include logistics, transportation, healthcare delivery systems, revenue management, and supply chain management.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

#### **Minor Courses (6-12 credits)**

Master's students select a minimum of 6 credits, and doctoral students select a minimum of 12 credits from the following in consultation with the Industrial and Systems Engineering director of graduate studies. Other courses may be chosen with minor director of graduate studies approval.

- [IE 5511](#) - Human Factors and Work Analysis (4.0 cr)
- [IE 5531](#) - Engineering Optimization I (4.0 cr)
- [IE 5532](#) - Stochastic Models (4.0 cr)
- [IE 5545](#) - Decision Analysis (4.0 cr)
- [IE 5551](#) - Production Planning and Inventory Control (4.0 cr)
- [IE 5561](#) - Analytics and Data-Driven Decision Making (4.0 cr)
- [IE 8521](#) - Optimization (4.0 cr)
- [IE 8531](#) - Discrete Optimization (4.0 cr)
- [IE 8532](#) - Stochastic Processes and Queuing Systems (4.0 cr)
- [IE 8533](#) - Advanced Stochastic Processes and Queuing Systems (4.0 cr)
- [IE 8534](#) - Advanced Topics in Operations Research (4.0 cr)
- [IE 8535](#) - Introduction to Network Science (4.0 cr)



[IE 8552](#) - Advanced Topics in Production, Inventory, and Distribution Systems (4.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### ***Twin Cities Campus***

## **Industrial and Systems Engineering Ph.D.**

*Industrial and Systems Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Industrial and Systems Engineering Graduate Program, University of Minnesota, 100 Union Street SE, Minneapolis, MN 55455 (612-624-1582; fax: 612-624-0944)

Email: [isye@umn.edu](mailto:isye@umn.edu)

Website: <http://cse.umn.edu/isye/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 68
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The industrial and systems engineering (ISyE) program offers coursework and research in industrial and systems engineering, operations research, and human factors. Special emphasis is on methodologies for design, planning, and management of service and manufacturing systems. Examples of research applications include logistics, transportation, healthcare delivery systems, revenue management, and supply chain management.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A baccalaureate degree in engineering or a closely related field is required.

#### **Special Application Requirements:**

All application materials should be submitted electronically through the online application system. Students whose native language is not English are required to submit scores from one of the following English proficiency examinations: TOEFL, MELAB, or IELTS. The GRE General Test is required for students applying to the PhD program.

The application deadlines are December 15 for fall semester and October 15 for spring semester.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.





## Program Requirements

32 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B- earned for each course.

Students may replace a required course with a qualifying replacement course if they have taken the equivalent of the required course elsewhere.

### Required Courses (16 credits)

Take the following courses:

[IE 8521](#) - Optimization (4.0 cr)

[IE 8532](#) - Stochastic Processes and Queuing Systems (4.0 cr)

Select 8 credits from the following:

[IE 5511](#) - Human Factors and Work Analysis (4.0 cr)

[IE 5545](#) - Decision Analysis (4.0 cr)

[IE 5551](#) - Production Planning and Inventory Control (4.0 cr)

### Seminars (2 credits)

Take 2 seminar credits from the following, or other seminars, in consultation with the advisor.

[IE 8773](#) - Graduate Seminar (1.0 cr)

[IE 8774](#) - Graduate Seminar (1.0 cr)

### Outside Coursework (12 credits)

Select 12 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with director of graduate studies approval.

[APEC 8001](#) - Applied Microeconomic Analysis of Consumer Choice and Consumer Demand (2.0 cr)

[APEC 8002](#) - Applied Microeconomic Analysis of Production and Choice Under Uncertainty (2.0 cr)

[CSCI 5211](#) - Data Communications and Computer Networks (3.0 cr)

[CSCI 5421](#) - Advanced Algorithms and Data Structures (3.0 cr)

[CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)

[CSCI 8980](#) - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)

[ECON 8101](#) - Microeconomic Theory (2.0 cr)

[ECON 8102](#) - Microeconomic Theory (2.0 cr)

[ECON 8117](#) - Noncooperative Game Theory (2.0 cr)

[ECON 8118](#) - Noncooperative Game Theory (2.0 cr)

[ECON 8119](#) - Cooperative Game Theory (2.0 cr)

[MATH 5485](#) - Introduction to Numerical Methods I (4.0 cr)

[MATH 5486](#) - Introduction To Numerical Methods II (4.0 cr)

[MATH 5615H](#) - Honors: Introduction to Analysis I (4.0 cr)

[MATH 5616H](#) - Honors: Introduction to Analysis II (4.0 cr)

[MATH 8601](#) - Real Analysis (3.0 cr)

[MATH 8602](#) - Real Analysis (3.0 cr)

[MATH 8651](#) - Theory of Probability Including Measure Theory (3.0 cr)

[MATH 8652](#) - Theory of Probability Including Measure Theory (3.0 cr)

[PUBH 8442](#) - Bayesian Decision Theory and Data Analysis (3.0 cr)

[STAT 5302](#) - Applied Regression Analysis (4.0 cr)

[STAT 5303](#) - Designing Experiments (4.0 cr)

[STAT 5401](#) - Applied Multivariate Methods (3.0 cr)

[STAT 8051](#) - Advanced Regression Techniques: linear, nonlinear and nonparametric methods (3.0 cr)

[STAT 8101](#) - Theory of Statistics 1 (3.0 cr)

[STAT 8102](#) - Theory of Statistics 2 (3.0 cr)

[STAT 8501](#) - Introduction to Stochastic Processes with Applications (3.0 cr)

### Electives

Select credits from the following to meet the minimum course credit requirement. Other courses may be selected with director of graduate studies approval.



- IE 5080 - Topics in Industrial Engineering (1.0 - 4.0 cr)
- IE 5511 - Human Factors and Work Analysis (4.0 cr)
- IE 5513 - Engineering Safety (4.0 cr)
- IE 5522 - Quality Engineering and Reliability (4.0 cr)
- IE 5545 - Decision Analysis (4.0 cr)
- IE 5551 - Production Planning and Inventory Control (4.0 cr)
- IE 5561 - Analytics and Data-Driven Decision Making (4.0 cr)
- IE 8531 - Discrete Optimization (4.0 cr)
- IE 8533 - Advanced Stochastic Processes and Queuing Systems (4.0 cr)
- IE 8534 - Advanced Topics in Operations Research (4.0 cr)
- IE 8535 - Introduction to Network Science (4.0 cr)
- IE 8536 - Advanced Topics in Engineering Management (4.0 cr)
- IE 8538 - Advanced Topics in Information Systems (4.0 cr)
- IE 8541 - Decision Support Systems (4.0 cr)
- IE 8552 - Advanced Topics in Production, Inventory, and Distribution Systems (4.0 cr)
- IE 8794 - Industrial Engineering Research (1.0 - 6.0 cr)

**Thesis Credits (24 credits)**

Take 24 credits after passing preliminary oral exam.

- IE 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

**Program Sub-plans**

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

**Industrial Engineering**



### **Twin Cities Campus**

## **Management of Technology M.S.M.O.T.**

*Technological Leadership Institute*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Technological Leadership Institute, University of Minnesota, 290 McNamara Alumni Center, 200 Oak Street SE, Minneapolis MN 55455  
(612-624-5474; fax: 612-624-7510)

Email: [MOT@umn.edu](mailto:MOT@umn.edu)

Website: <http://tli.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36
- This program does not require summer semesters for timely completion.
- Degree: Master of Science in Management of Technology

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of science in the management of technology (MSMOT) is a two-year, executive-format program that integrates the fields of technology and management and provides working engineers and scientists with management knowledge and skills needed to assume a technical leadership role within their organizations. The program focuses on management in technology-based environments in traditional and emerging industries. The curriculum includes technical and advanced management courses, such as pivotal technologies, technology forecasting, project management, management of innovation, intellectual property management, and strategic management of technology. The core management curriculum includes areas such as finance, marketing, accounting, strategic planning and decision making, and conflict management. Students proceed through the program and advance as a cohort, taking a prescribed sequence of courses together. Case studies, class discussions, and study-group interaction stimulate the learning process. Students also participate in off-campus residencies, including an international residency; complete individual and team projects; and develop final projects as part of a capstone course. Most students receive corporate financial support.

The program is offered in a format designed for full-time working professionals. Students take courses one day per week on alternating Fridays and Saturdays and complete the degree within two years.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A bachelor's degree in an engineering, science, or other technology-related field from an accredited program.

Other requirements to be completed before admission:

Applicants should have at least 5 years of professional experience in a technical field and have completed coursework (or show proficiency) in economics, mathematical modeling, statistics, and computer literacy.

In exceptional circumstances, promising candidates with less experience may be considered.

#### **Special Application Requirements:**

The program accepts applications on a rolling basis for fall semester of each year.

Applicants must submit three letters of recommendation, a resume, and a statement of purpose.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21



- Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 36 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required. **Capstone Project:** The capstone project consists of an independent, original investigation requiring between 110 and 130 hours of effort. Students use concepts and methods learned in the MOT program to research and develop an industry-based product, project, process, or venture. The capstone project enables students to directly apply their MOT education at work.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.25 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

Students attend the program as a cohort and complete their studies in four semesters.

### Required Courses (33.5 Credits)

Complete the following courses for a total of 33.5 credits. Take MOT 8218 for 1.5 credits and MOT 8960 twice for a total of 2 credits.

- [MOT 8111](#) - Marketing Management for Technology-based Organizations (2.0 cr)
- [MOT 8112](#) - Accounting for Decision Making (1.5 cr)
- [MOT 8113](#) - Operations Management for Competitive Advantage (1.5 cr)
- [MOT 8114](#) - Strategic Technology Analysis (1.5 cr)
- [MOT 8121](#) - Managing Organizations in a Technological Environment (2.0 cr)
- [MOT 8122](#) - Financial Management for Technology-based Organizations (1.5 cr)
- [MOT 8133](#) - Managerial Communication for Technological Leaders: Persuasive Writing and Speaking (2.0 cr)
- [MOT 8212](#) - Developing New Technology Products and Services (2.0 cr)
- [MOT 8214](#) - Technology Foresight and Forecasting (2.0 cr)
- [MOT 8218](#) - Digital Transformation (1.0 - 1.5 cr)
- [MOT 8221](#) - Project and Knowledge Management (1.5 cr)
- [MOT 8224](#) - Pivotal Technologies (1.0 cr)
- [MOT 8232](#) - Managing Technological Innovation (2.0 cr)
- [MOT 8233](#) - Strategic Management of Technology (2.0 cr)
- [MOT 8501](#) - Leading Individual & Team Performance (1.5 cr)
- [MOT 8502](#) - Innovation Leadership and Organizational Effectiveness (1.0 cr)
- [MOT 8900](#) - Conflict Management (0.5 cr)
- [MOT 8920](#) - Science and Technology Policy (1.5 cr)
- [MOT 8940](#) - Managing Intellectual Property (1.0 cr)
- [MOT 8950](#) - International Management of Technology Project (2.0 cr)
- [MOT 8960](#) - Seminars in Management of Technology (MOT) and Innovation (1.0 cr)

### Capstone Project (2.5 Credits)

Complete a total of 2.5 credits.

- [MOT 8234](#) - Capstone Project (0.5 - 2.5 cr)



### *Twin Cities Campus*

## Management of Technology Minor

*Technological Leadership Institute*

### College of Science and Engineering

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Technological Leadership Institute, College of Science and Engineering, University of Minnesota, Suite 290 McNamara Alumni Center, 200 Oak Street SE, Minneapolis MN 55455

Phone: 612-624-5747

Fax: 612- 624-7510

Email: [mot@umn.edu](mailto:mot@umn.edu)

Website: <http://www.tli.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The management of technology minor program integrates the fields of technology and management, allowing students in science and engineering majors to develop understanding and expertise in business principles. The curriculum includes basic business knowledge, with an emphasis on technology-intensive organizations. Topics include strategy, finance, marketing, intellectual property, innovation, and technology planning. Each class will include exercises that inform students on those business topics, and give them an opportunity to practice the fundamental skills of communications, teamwork, and project management.

### Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

### Prerequisites for Admission

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Management of Technology (MOT) director of graduate studies regarding feasibility and requirements. Approval of the MOT director of graduate studies to pursue the minor is required.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

MOT minor courses cannot be counted towards the Master of Science in Management of Technology degree requirements.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

#### **Core Courses (4 credits)**

[MOT 5001](#) - Technological Business Fundamentals (2.0 cr)

[MOT 5002](#) - Creating Technological Innovation (2.0 cr)

#### **Electives (2-8 credits)**

Master's students select a minimum of 2 credits, and doctoral students select a minimum of 8 credits in consultation with the MOT



director of graduate studies to complete credit requirements. Other courses may be counted toward the MOT minor with prior approval.

[ENTR 6020](#) - Business Formation (4.0 cr)  
[ENTR 6036](#) - Managing the Growing Business (2.0 cr)  
[HSCI 5401](#) - Ethics in Science and Technology (3.0 cr)  
[HSCI 5421](#) - Engineering Ethics (3.0 cr)  
[IDSC 6040](#) - Information Technology Management (2.0 cr)  
[IDSC 6423](#) - Enterprise Systems (2.0 cr)  
[IE 5111](#) - Systems Engineering I (2.0 cr)  
[IE 5441](#) - Financial Decision Making (4.0 cr)  
[IE 5541](#) - Project Management (4.0 cr)  
[MBA 6110](#) - Leading Others (2.0 cr)  
[MBA 6300](#) - Strategic Management (3.0 cr)  
[ME 8221](#) - New Product Design and Business Development I (4.0 cr)  
[ME 8222](#) - New Product Design and Business Development II (4.0 cr)  
[MGMT 6004](#) - Negotiation Strategies (2.0 cr)  
[MGMT 6040](#) - Competing Globally (2.0 cr)  
[MGMT 6084](#) - Management of Teams (2.0 cr)  
[MGMT 6305](#) - The International Environment of Business (4.0 cr)  
[MOT 5003](#) - Technological Business Planning Workshop (1.0 cr)  
[OLPD 5607](#) - Organization Development (3.0 cr)  
[PA 5711](#) - Science, Technology & Environmental Policy (3.0 cr)  
[PA 5741](#) - Risk, Resilience and Decision Making (1.5 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Materials Science and Engineering M.Mat.S.E.**

*Chemical Engineering & Materials Science*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Chemical Engineering and Materials Science, University of Minnesota, 151 Amundson Hall, 421 Washington Avenue SE, Minneapolis, MN 55455 (612-625-0382; fax: 612-626-7246)

Email: [cemsgrad@umn.edu](mailto:cemsgrad@umn.edu)

Website: <http://www.cems.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Materials Science And Engineering

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Research activities in the Chemical Engineering and Materials Science (CEMS) Department focus on the development of renewable energy technologies, the solution of important medical and biological engineering challenges, the development of advanced materials and characterization methods, and the application of sophisticated mathematical and theoretical models. Graduate courses offered cover core areas of chemical engineering (fluid mechanics, applied mathematics: linear and nonlinear analysis, transport, chemical thermodynamics, statistical thermodynamics and kinetics, and analysis of chemical reactors) and core areas of materials science (structure and symmetry of materials, thermodynamics and kinetics, transport, advanced mathematics, electronic properties of materials, and mechanical properties of materials). In addition, several specialized topics are offered, including biochemical engineering, biological transport processes, colloids, principles of mass transfer in engineering and biological engineering, rheology, process control, ceramics, polymers, scattering, and electrochemical engineering.

The Masters of Materials Science and Engineering (MMatSE), also known as the professional master's, is designed for working professionals who are interested in obtaining a master's degree part-time. This degree requires a design project. Part-time students may also choose the MSMatSE Plan C, which is coursework only.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A bachelor's degree in materials science or other related field.

Other requirements to be completed before admission:

The professional master's in engineering degree is designed for employees of local industries who wish to pursue their studies part-time. No financial support is available. Applicants should contact the program before applying for admission.

#### **Special Application Requirements:**

Applicants must submit scores from the General Test of the GRE; three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of official transcripts; and a clearly written statement summarizing research/work experience and motivation for graduate work. International students are required to provide TOEFL results.

Applications are accepted for fall semester only. December 15 is the application deadline; late applications are considered if space is available.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19



- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

In addition to the coursework, MMatSE students are required to complete a design project. The work-related MMatSE design project consists of an in-depth study of an engineering design. It need not represent a publishable research project. While the amount of work should be the same as for a master's thesis, the project can contain elements that the thesis would not, such as economic considerations, design consultation, and social relevance. The written design report must be approved by a three-person faculty committee. The final exam consists of the written design report and an oral presentation to the faculty committee.

### Core Courses (12 credits)

Select at least 12 credits from the following in consultation with the advisor:

- [MATS 8001](#) - Structure and Symmetry of Materials (3.0 cr)
- [MATS 8002](#) - Thermodynamics and Kinetics (3.0 cr)
- [MATS 8003](#) - Electronic Properties (3.0 cr)
- [MATS 8004](#) - Mechanical Properties (3.0 cr)
- [MATS 8201](#) - Applied Math (3.0 cr)
- [MATS 8301](#) - Physical Rate Processes I: Transport (3.0 cr)

### Outside Coursework (6 credits)

Select at least 6 credits from the following in consultation with the advisor. Other courses can be applied to this requirement with advisor and director of graduate studies approval.

- [AEM 4511](#) - Mechanics of Composite Materials (3.0 cr)
- [AEM 5321](#) - Modern Feedback Control (3.0 cr)
- [AEM 5451](#) - Optimal Estimation (3.0 cr)
- [AEM 5501](#) - Continuum Mechanics (3.0 cr)
- [AEM 5503](#) - Theory of Elasticity (3.0 cr)
- [AEM 5581](#) - Mechanics of Solids (3.0 cr)
- [AEM 8201](#) - Fluid Mechanics I (3.0 cr)
- [AEM 8202](#) - Fluid Mechanics II (3.0 cr)
- [AEM 8203](#) - Fluid Mechanics III (3.0 cr)
- [AEM 8251](#) - Finite-Volume Methods in Computational Fluid Dynamics (3.0 cr)
- [AEM 8421](#) - Robust Multivariable Control Design (3.0 cr)
- [AEM 8423](#) - Convex Optimization Methods in Control (3.0 cr)
- [AEM 8525](#) - Elastic Stability of Materials (3.0 cr)
- [AEM 8531](#) - Fracture Mechanics (3.0 cr)
- [AEM 8541](#) - Mechanics of Crystalline Solids (3.0 cr)
- [AEM 8551](#) - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)
- [BBE 5001](#) - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)
- [BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)
- [BIOC 5351](#) - Protein Engineering (3.0 cr)
- [BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)
- [BIOC 5528](#) - Spectroscopy and Kinetics (4.0 cr)
- [BIOC 6021](#) - Biochemistry (3.0 cr)
- [BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)
- [BIOL 5950](#) - Special Topics (1.0 - 4.0 cr)





BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5041 - Tissue Engineering (3.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)  
CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)  
CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)  
CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)  
CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)  
CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)  
CEGE 8504 - Theory of Unit Operations (4.0 cr)  
CEGE 8505 - Biological Processes (3.0 cr)  
CHEM 5210 - Materials Characterization (4.0 cr)  
CHEM 5755 - X-Ray Crystallography (4.0 cr)  
CHEM 8011 - Mechanisms of Chemical Reactions (4.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEM 8151 - Analytical Separations and Chemical Equilibria (4.0 cr)  
CHEM 8152 - Analytical Spectroscopy (4.0 cr)  
CHEM 8201 - Materials Chemistry (4.0 cr)  
CHEM 8211 - Physical Polymer Chemistry (4.0 cr)  
CHEM 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEM 8321 - Organic Synthesis (4.0 cr)  
CHEM 8322 - Advanced Organic Chemistry (4.0 cr)  
CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)  
CHEM 8551 - Quantum Mechanics I (4.0 cr)  
CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)  
CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)  
CHEN 4214 - Polymers (3.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 5753 - Advanced Biomedical Transport Processes (3.0 cr)  
CHEN 5771 - Colloids and Dispersions (3.0 cr)  
CHEN 8101 - Fluid Mechanics (3.0 cr)  
CHEN 8102 - Principles and Applications of Rheology (2.0 cr)  
CHEN 8104 - Coating Process Fundamentals (2.0 cr)  
CHEN 8201 - Applied Math (3.0 cr)  
CHEN 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)  
CHEN 8401 - Physical and Chemical Thermodynamics (3.0 cr)  
CHEN 8402 - Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 8501 - Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)  
CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
EE 5163 - Semiconductor Properties and Devices I (3.0 cr)  
EE 5164 - Semiconductor Properties and Devices II (3.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5173 - Basic Microelectronics Laboratory (1.0 cr)  
EE 5181 - Micro and Nanotechnology by Self Assembly (3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)



EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 5622 - Physical Optics Laboratory (1.0 cr)  
EE 5624 - Optical Electronics (4.0 cr)  
EE 5640 - Introduction to Nano-Optics (3.0 cr)  
EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)  
EE 5655 - Magnetic Recording (3.0 cr)  
EE 5657 - Physical Principles of Thin Film Technology (4.0 cr)  
EE 8161 - Physics of Semiconductors (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
GCD 4034 - Molecular Genetics and Genomics (3.0 cr)  
GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)  
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
IE 8532 - Stochastic Processes and Queuing Systems (4.0 cr)  
MATH 4428 - Mathematical Modeling (4.0 cr)  
MATH 4512 - Differential Equations with Applications (3.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)  
MATH 5535 - Dynamical Systems and Chaos (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8450 - Topics in Numerical Analysis (1.0 - 3.0 cr)  
ME 5113 - Aerosol/Particle Engineering (4.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5446 - Introduction to Combustion (4.0 cr)  
ME 8341 - Conduction (3.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
MEDC 8753 - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)  
MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)  
PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)  
PHYS 8711 - Solid-State Physics I (3.0 cr)  
PHYS 8712 - Solid-State Physics II (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)  
STAT 5303 - Designing Experiments (4.0 cr)  
STAT 5601 - Nonparametric Methods (3.0 cr)

### Electives

Select elective courses from the following to complete the minimum course credit requirement. Other courses can be selected with advisor and director of graduate studies approval.

MATS 4214 - Polymers (3.0 cr)  
MATS 5517 - Microscopy of Materials (3.0 cr)  
MATS 5531 - Electrochemical Engineering (3.0 cr)  
MATS 8201 - Applied Math (3.0 cr)  
MATS 8211 - Physical Chemistry of Polymers (4.0 cr)  
MATS 8217 - Transmission Electron Microscopy (3.0 cr)  
MATS 8221 - Synthetic Polymer Chemistry (4.0 cr)



[MATS 8301](#) - Physical Rate Processes I: Transport (3.0 cr)

**Thesis Credits**

Take 10 master's thesis credits for the design project.

[MATS 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Materials Science and Engineering M.S.Mat.S.E.**

*Chemical Engineering & Materials Science*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Chemical Engineering and Materials Science, University of Minnesota, 151 Amundson Hall, 421 Washington Avenue SE, Minneapolis, MN 55455 (612-625-0382; fax: 612-626-7246)

Email: [cemsgrad@umn.edu](mailto:cemsgrad@umn.edu)

Website: <http://www.cems.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science Materials Science And Engr

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Research activities in the Chemical Engineering and Materials Science (CEMS) Department focus on the development of renewable energy technologies, the solution of important medical and biological engineering challenges, the development of advanced materials and characterization methods, and the application of sophisticated mathematical and theoretical models. Graduate courses offered cover core areas of chemical engineering (fluid mechanics, applied mathematics: linear and nonlinear analysis, transport, chemical thermodynamics, statistical thermodynamics and kinetics, and analysis of chemical reactors) and core areas of materials science (structure and symmetry of materials, thermodynamics and kinetics, transport, advanced mathematics, electronic properties of materials, and mechanical properties of materials). In addition, several specialized topics are offered, including biochemical engineering, biological transport processes, colloids, principles of mass transfer in engineering and biological engineering, rheology, process control, ceramics, polymers, scattering, and electrochemical engineering.

The Materials Science and Engineering program offers two types of master's degrees: the MSMatSE (Plan A or C) and the MMatSE degree, also known as the professional master's. The MSMatSE Plan A degree is a thesis-based master's that requires the student to work in a faculty member's research laboratory. The MSMatSE Plan C degree is a coursework-based master's that is generally reserved only for current graduate students who choose not to seek a PhD. Working professionals who are interested in obtaining a master's degree part time should follow the requirements for the MMatSE degree, which requires a design project.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A bachelor's degree in materials science or other related field.

Other requirements to be completed before admission:

With the exception of the professional master's degree (the MMatSE) and the MSMatSE Plan C, the CEMS department focuses on the PhD and does not generally admit students directly to the MSMatSE Plan A degree.

#### **Special Application Requirements:**

Applicants must submit scores from the General Test of the GRE; three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of official transcripts; and a clearly written statement summarizing research/work experience and motivation for graduate work. International students are required to provide TOEFL results.

Applications are accepted for fall semester only. December 15 is the application deadline; late applications are considered if space is available.

Applicants must submit their test score(s) from the following:



- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is written and oral.

**Plan C:** Plan C requires 18 major credits and 12 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

### Core Courses (12 credits)

Select at least 12 credits from the following in consultation with the advisor:

- [MATS 8001](#) - Structure and Symmetry of Materials (3.0 cr)
- [MATS 8002](#) - Thermodynamics and Kinetics (3.0 cr)
- [MATS 8003](#) - Electronic Properties (3.0 cr)
- [MATS 8004](#) - Mechanical Properties (3.0 cr)
- [MATS 8201](#) - Applied Math (3.0 cr)
- [MATS 8301](#) - Physical Rate Processes I: Transport (3.0 cr)

### Outside Coursework (6-12 credits)

Plan A students select at least 6 credits, and Plan C students select at least 12 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with advisor and director of graduate studies approval.

- [AEM 4511](#) - Mechanics of Composite Materials (3.0 cr)
- [AEM 5451](#) - Optimal Estimation (3.0 cr)
- [AEM 5501](#) - Continuum Mechanics (3.0 cr)
- [AEM 5503](#) - Theory of Elasticity (3.0 cr)
- [AEM 5581](#) - Mechanics of Solids (3.0 cr)
- [AEM 8201](#) - Fluid Mechanics I (3.0 cr)
- [AEM 8202](#) - Fluid Mechanics II (3.0 cr)
- [AEM 8203](#) - Fluid Mechanics III (3.0 cr)
- [AEM 8251](#) - Finite-Volume Methods in Computational Fluid Dynamics (3.0 cr)
- [AEM 8421](#) - Robust Multivariable Control Design (3.0 cr)
- [AEM 8423](#) - Convex Optimization Methods in Control (3.0 cr)
- [AEM 8525](#) - Elastic Stability of Materials (3.0 cr)
- [AEM 8531](#) - Fracture Mechanics (3.0 cr)
- [AEM 8541](#) - Mechanics of Crystalline Solids (3.0 cr)
- [AEM 8551](#) - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)
- [BBE 5001](#) - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)
- [BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)
- [BIOC 5351](#) - Protein Engineering (3.0 cr)
- [BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)



BIOC 5528 - Spectroscopy and Kinetics (4.0 cr)  
BIOC 6021 - Biochemistry (3.0 cr)  
BIOC 8002 - Molecular Biology and Regulation of Biological Processes (3.0 cr)  
BIOL 5950 - Special Topics (1.0 - 4.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5041 - Tissue Engineering (3.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
BMEN 5351 - Cell Engineering (3.0 cr)  
BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)  
CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)  
CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)  
CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)  
CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)  
CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)  
CEGE 8504 - Theory of Unit Operations (4.0 cr)  
CEGE 8505 - Biological Processes (3.0 cr)  
CHEM 5210 - Materials Characterization (4.0 cr)  
CHEM 5755 - X-Ray Crystallography (4.0 cr)  
CHEM 8011 - Mechanisms of Chemical Reactions (4.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEM 8151 - Analytical Separations and Chemical Equilibria (4.0 cr)  
CHEM 8152 - Analytical Spectroscopy (4.0 cr)  
CHEM 8201 - Materials Chemistry (4.0 cr)  
CHEM 8211 - Physical Polymer Chemistry (4.0 cr)  
CHEM 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEM 8321 - Organic Synthesis (4.0 cr)  
CHEM 8322 - Advanced Organic Chemistry (4.0 cr)  
CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)  
CHEM 8551 - Quantum Mechanics I (4.0 cr)  
CHEM 8552 - Quantum Mechanics II (2.0 cr)  
CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)  
CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)  
CHEN 4214 - Polymers (3.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 5753 - Advanced Biomedical Transport Processes (3.0 cr)  
CHEN 5771 - Colloids and Dispersions (3.0 cr)  
CHEN 8101 - Fluid Mechanics (3.0 cr)  
CHEN 8102 - Principles and Applications of Rheology (2.0 cr)  
CHEN 8201 - Applied Math (3.0 cr)  
CHEN 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)  
CHEN 8401 - Physical and Chemical Thermodynamics (3.0 cr)  
CHEN 8402 - Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 8501 - Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)  
CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
EE 5163 - Semiconductor Properties and Devices I (3.0 cr)  
EE 5164 - Semiconductor Properties and Devices II (3.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5173 - Basic Microelectronics Laboratory (1.0 cr)  
EE 5181 - Micro and Nanotechnology by Self Assembly (3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)



EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 5622 - Physical Optics Laboratory (1.0 cr)  
EE 5624 - Optical Electronics (4.0 cr)  
EE 5640 - Introduction to Nano-Optics (3.0 cr)  
EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)  
EE 5655 - Magnetic Recording (3.0 cr)  
EE 5657 - Physical Principles of Thin Film Technology (4.0 cr)  
EE 8161 - Physics of Semiconductors (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
GCD 4034 - Molecular Genetics and Genomics (3.0 cr)  
GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)  
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
IE 8532 - Stochastic Processes and Queuing Systems (4.0 cr)  
MATH 4428 - Mathematical Modeling (4.0 cr)  
MATH 4512 - Differential Equations with Applications (3.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)  
MATH 5535 - Dynamical Systems and Chaos (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8450 - Topics in Numerical Analysis (1.0 - 3.0 cr)  
ME 5113 - Aerosol/Particle Engineering (4.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5446 - Introduction to Combustion (4.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
MEDC 8753 - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)  
MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)  
PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)  
PHYS 8711 - Solid-State Physics I (3.0 cr)  
PHYS 8712 - Solid-State Physics II (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)

#### Electives

Select electives from the following, in consultation with the advisor, to meet the minimum number of course credits required. Other courses can be selected with director of graduate studies approval.

MATS 4214 - Polymers (3.0 cr)  
MATS 5517 - Microscopy of Materials (3.0 cr)  
MATS 5531 - Electrochemical Engineering (3.0 cr)  
MATS 8001 - Structure and Symmetry of Materials (3.0 cr)  
MATS 8002 - Thermodynamics and Kinetics (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)



[MATS 8004](#) - Mechanical Properties (3.0 cr)  
[MATS 8201](#) - Applied Math (3.0 cr)  
[MATS 8211](#) - Physical Chemistry of Polymers (4.0 cr)  
[MATS 8217](#) - Transmission Electron Microscopy (3.0 cr)  
[MATS 8221](#) - Synthetic Polymer Chemistry (4.0 cr)  
[MATS 8301](#) - Physical Rate Processes I: Transport (3.0 cr)

#### Plan Options

##### Plan A

Take 10 master's thesis credits.

[MATS 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

##### Plan C

Plan C students do not have additional requirements.





### **Twin Cities Campus**

## **Materials Science and Engineering Minor**

*Chemical Engineering & Materials Science*

**College of Science and Engineering**

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Department of Chemical Engineering and Materials Science, University of Minnesota, 151 Amundson Hall, 421 Washington Avenue SE, Minneapolis, MN 55455 (612-625-0382; fax: 612-626-7246)

Email: [cemsgrad@umn.edu](mailto:cemsgrad@umn.edu)

Website: <http://www.cems.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Research activities in the Chemical Engineering and Materials Science (CEMS) Department focus on the development of renewable energy technologies, the solution of important medical and biological engineering challenges, the development of advanced materials and characterization methods, and the application of sophisticated mathematical and theoretical models. Graduate courses offered cover core areas of chemical engineering (fluid mechanics, applied mathematics: linear and nonlinear analysis, transport, chemical thermodynamics, statistical thermodynamics and kinetics, and analysis of chemical reactors) and core areas of materials science (structure and symmetry of materials, thermodynamics and kinetics, transport, advanced mathematics, electronic properties of materials, and mechanical properties of materials). In addition, several specialized topics are offered, including biochemical engineering, biological transport processes, colloids, principles of mass transfer in engineering and biological engineering, rheology, process control, ceramics, polymers, scattering, and electrochemical engineering.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

The minor must be approved by the director of graduate studies in Materials Science and Engineering.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

### **Minor Courses (6-12 credits)**

Master's students select two courses from the following for a minimum of 6 credits. Doctoral students must complete all four courses for 12 credits.

[MATS 8001](#) - Structure and Symmetry of Materials (3.0 cr)

[MATS 8002](#) - Thermodynamics and Kinetics (3.0 cr)

[MATS 8003](#) - Electronic Properties (3.0 cr)

[MATS 8004](#) - Mechanical Properties (3.0 cr)



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Materials Science and Engineering Ph.D.**

*Chemical Engineering & Materials Science*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Department of Chemical Engineering and Materials Science, University of Minnesota, 151 Amundson Hall, 421 Washington Avenue SE, Minneapolis, MN 55455 (612-625-0382; fax: 612-626-7246)

Email: [cemsgrad@umn.edu](mailto:cemsgrad@umn.edu)

Website: <http://www.cems.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 57
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Research activities in the Chemical Engineering and Materials Science (CEMS) Department focus on the development of renewable energy technologies, the solution of important medical and biological engineering challenges, the development of advanced materials and characterization methods, and the application of sophisticated mathematical and theoretical models. Graduate courses offered cover core areas of chemical engineering (fluid mechanics, applied mathematics: linear and nonlinear analysis, transport, chemical thermodynamics, statistical thermodynamics and kinetics, and analysis of chemical reactors) and core areas of materials science (structure and symmetry of materials, thermodynamics and kinetics, transport, advanced mathematics, electronic properties of materials, and mechanical properties of materials). In addition, several specialized topics are offered, including biochemical engineering, biological transport processes, colloids, principles of mass transfer in engineering and biological engineering, rheology, process control, ceramics, polymers, scattering, and electrochemical engineering.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

A bachelor's degree in materials science or other related field.

Other requirements to be completed before admission:

Applicants must submit scores from the general test of the GRE, three letters of recommendation from persons familiar with their scholarship and research potential, a complete set of official transcripts, and a clearly written statement summarizing research/work experience and motivation for graduate work. International students are required to provide TOEFL results.

#### **Special Application Requirements:**

Applications are accepted for fall semester only. Submission of all application materials by December 15 is strongly encouraged to ensure priority consideration for fellowships and assistantships; late applications are considered if space is available.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80



Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

21 credits are required in the major.

12 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

Students must attend, but not enroll in, the departmental seminar for six semesters. Informal attendance will be done within the department.

### Core Courses (12 credits)

Select 12 credits from the following in consultation with the advisor:

[MATS 8001](#) - Structure and Symmetry of Materials (3.0 cr)

[MATS 8002](#) - Thermodynamics and Kinetics (3.0 cr)

[MATS 8003](#) - Electronic Properties (3.0 cr)

[MATS 8004](#) - Mechanical Properties (3.0 cr)

[MATS 8201](#) - Applied Math (3.0 cr)

[MATS 8301](#) - Physical Rate Processes I: Transport (3.0 cr)

### Outside Coursework (12 credits)

Select 12 credits from the following in consultation with the advisor. Other courses may be applied to this requirement with advisor and director of graduate studies approval.

[AEM 4511](#) - Mechanics of Composite Materials (3.0 cr)

[AEM 5451](#) - Optimal Estimation (3.0 cr)

[AEM 5501](#) - Continuum Mechanics (3.0 cr)

[AEM 5503](#) - Theory of Elasticity (3.0 cr)

[AEM 5581](#) - Mechanics of Solids (3.0 cr)

[AEM 8201](#) - Fluid Mechanics I (3.0 cr)

[AEM 8202](#) - Fluid Mechanics II (3.0 cr)

[AEM 8203](#) - Fluid Mechanics III (3.0 cr)

[AEM 8251](#) - Finite-Volume Methods in Computational Fluid Dynamics (3.0 cr)

[AEM 8421](#) - Robust Multivariable Control Design (3.0 cr)

[AEM 8423](#) - Convex Optimization Methods in Control (3.0 cr)

[AEM 8525](#) - Elastic Stability of Materials (3.0 cr)

[AEM 8531](#) - Fracture Mechanics (3.0 cr)

[AEM 8541](#) - Mechanics of Crystalline Solids (3.0 cr)

[AEM 8551](#) - Multiscale Methods for Bridging Length and Time Scales (3.0 cr)

[BBE 5001](#) - Chemistry of Biomass and Biomass Conversion to Fuels and Products (4.0 cr)

[BIOC 4332](#) - Biochemistry II: Molecular Mechanisms of Signal Transduction and Gene Expression (4.0 cr)

[BIOC 5351](#) - Protein Engineering (3.0 cr)

[BIOC 5352](#) - Biotechnology and Bioengineering for Biochemists (3.0 cr)

[BIOC 5528](#) - Spectroscopy and Kinetics (4.0 cr)

[BIOC 6021](#) - Biochemistry (3.0 cr)

[BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)

[BIOL 5950](#) - Special Topics (1.0 - 4.0 cr)

[BMEN 5001](#) - Advanced Biomaterials (3.0 cr)

[BMEN 5041](#) - Tissue Engineering (3.0 cr)

[BMEN 5201](#) - Advanced Biomechanics (3.0 cr)

[BMEN 5311](#) - Advanced Biomedical Transport Processes (3.0 cr)

[BMEN 5321](#) - Microfluidics in Biology and Medicine (3.0 cr)

[BMEN 5351](#) - Cell Engineering (3.0 cr)



BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)  
BMEN 5701 - Cancer Bioengineering (3.0 cr)  
BMEN 8001 - Polymeric Biomaterials (3.0 cr)  
BMEN 8431 - Controlled Drug and Gene Delivery: Materials, Mechanisms, and Models (4.0 cr)  
BMEN 8511 - Systems and Synthetic Biology (3.0 cr)  
CEGE 8022 - Numerical Methods for Free and Moving Boundary Problems (3.0 cr)  
CEGE 8401 - Fundamentals of Finite Element Method (3.0 cr)  
CEGE 8402 - Nonlinear Finite Element Analysis (3.0 cr)  
CEGE 8501 - Environmental Fluid Mechanics I (4.0 cr)  
CEGE 8502 - Environmental Fluid Mechanics II (4.0 cr)  
CEGE 8504 - Theory of Unit Operations (4.0 cr)  
CEGE 8505 - Biological Processes (3.0 cr)  
CHEM 5210 - Materials Characterization (4.0 cr)  
CHEM 5755 - X-Ray Crystallography (4.0 cr)  
CHEM 8011 - Mechanisms of Chemical Reactions (4.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEM 8151 - Analytical Separations and Chemical Equilibria (4.0 cr)  
CHEM 8152 - Analytical Spectroscopy (4.0 cr)  
CHEM 8201 - Materials Chemistry (4.0 cr)  
CHEM 8211 - Physical Polymer Chemistry (4.0 cr)  
CHEM 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEM 8321 - Organic Synthesis (4.0 cr)  
CHEM 8322 - Advanced Organic Chemistry (4.0 cr)  
CHEM 8361 - Interpretation of Organic Spectra (4.0 cr)  
CHEM 8411 - Introduction to Chemical Biology (4.0 cr)  
CHEM 8412 - Chemical Biology of Enzymes (4.0 cr)  
CHEM 8551 - Quantum Mechanics I (4.0 cr)  
CHEM 8552 - Quantum Mechanics II (2.0 cr)  
CHEM 8561 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics I (4.0 cr)  
CHEM 8562 - Thermodynamics, Statistical Mechanics, and Reaction Dynamics II (4.0 cr)  
CHEN 4214 - Polymers (3.0 cr)  
CHEN 5751 - Biochemical Engineering (3.0 cr)  
CHEN 5753 - Advanced Biomedical Transport Processes (3.0 cr)  
CHEN 5771 - Colloids and Dispersions (3.0 cr)  
CHEN 8101 - Fluid Mechanics (3.0 cr)  
CHEN 8102 - Principles and Applications of Rheology (2.0 cr)  
CHEN 8201 - Applied Math (3.0 cr)  
CHEN 8221 - Synthetic Polymer Chemistry (4.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)  
CHEN 8401 - Physical and Chemical Thermodynamics (3.0 cr)  
CHEN 8402 - Statistical Thermodynamics and Kinetics (3.0 cr)  
CHEN 8501 - Chemical Rate Processes: Analysis of Chemical Reactors (3.0 cr)  
CHEN 8754 - Systems Analysis of Biological Processes (3.0 cr)  
CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)  
CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5521 - Introduction to Machine Learning (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)  
EE 5163 - Semiconductor Properties and Devices I (3.0 cr)  
EE 5164 - Semiconductor Properties and Devices II (3.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5173 - Basic Microelectronics Laboratory (1.0 cr)  
EE 5181 - Micro and Nanotechnology by Self Assembly (3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5531 - Probability and Stochastic Processes (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 5622 - Physical Optics Laboratory (1.0 cr)  
EE 5624 - Optical Electronics (4.0 cr)  
EE 5640 - Introduction to Nano-Optics (3.0 cr)  
EE 5653 - Physical Principles of Magnetic Materials (3.0 cr)



EE 5655 - Magnetic Recording (3.0 cr)  
EE 5657 - Physical Principles of Thin Film Technology (4.0 cr)  
EE 8161 - Physics of Semiconductors (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
ESCI 5353 - Electron Microprobe Theory and Practice (3.0 cr)  
GCD 4034 - Molecular Genetics and Genomics (3.0 cr)  
GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)  
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)  
IE 5531 - Engineering Optimization I (4.0 cr)  
IE 5532 - Stochastic Models (4.0 cr)  
IE 8521 - Optimization (4.0 cr)  
IE 8531 - Discrete Optimization (4.0 cr)  
IE 8532 - Stochastic Processes and Queuing Systems (4.0 cr)  
MATH 4428 - Mathematical Modeling (4.0 cr)  
MATH 4512 - Differential Equations with Applications (3.0 cr)  
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)  
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)  
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)  
MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)  
MATH 5535 - Dynamical Systems and Chaos (4.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)  
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8441 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8442 - Numerical Analysis and Scientific Computing (3.0 cr)  
MATH 8450 - Topics in Numerical Analysis (1.0 - 3.0 cr)  
ME 5113 - Aerosol/Particle Engineering (4.0 cr)  
ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)  
ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)  
ME 5446 - Introduction to Combustion (4.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
MEDC 8753 - MOLECULAR TARGETS OF DRUG DISCOVERY (3.0 cr)  
MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)  
PHYS 5001 - Quantum Mechanics I (4.0 cr)  
PHYS 5002 - Quantum Mechanics II (4.0 cr)  
PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)  
PHYS 5201 - Thermal and Statistical Physics (3.0 cr)  
PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)  
PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)  
PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)  
PHYS 8711 - Solid-State Physics I (3.0 cr)  
PHYS 8712 - Solid-State Physics II (3.0 cr)  
STAT 5021 - Statistical Analysis (4.0 cr)

#### Electives

Select elective credits from the following, in consultation with the advisor. Other courses can be selected with advisor and director of graduate studies approval.

MATS 4214 - Polymers (3.0 cr)  
MATS 5517 - Microscopy of Materials (3.0 cr)  
MATS 5531 - Electrochemical Engineering (3.0 cr)  
MATS 8001 - Structure and Symmetry of Materials (3.0 cr)  
MATS 8002 - Thermodynamics and Kinetics (3.0 cr)  
MATS 8003 - Electronic Properties (3.0 cr)  
MATS 8004 - Mechanical Properties (3.0 cr)  
MATS 8201 - Applied Math (3.0 cr)  
MATS 8211 - Physical Chemistry of Polymers (4.0 cr)  
MATS 8217 - Transmission Electron Microscopy (3.0 cr)  
MATS 8221 - Synthetic Polymer Chemistry (4.0 cr)  
MATS 8301 - Physical Rate Processes I: Transport (3.0 cr)

#### Thesis Credits (24 credits)

Complete 24 credits after passing preliminary oral exam  
MATS 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



UNIVERSITY OF MINNESOTA

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### **Twin Cities Campus**

## **Mathematics M.S.**

*School of Mathematics*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Mathematics, University of Minnesota, 127 Vincent Hall, 206 Church Street SE, Minneapolis, MN 55455 (612-624-6391; fax: 612-624-6702)

Email: [gradprog@math.umn.edu](mailto:gradprog@math.umn.edu)

Website: <http://www.math.umn.edu/grad/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The School of Mathematics offers a master of science (MS) in mathematics. Students may also earn the MS degree with emphasis in applied and industrial mathematics or with emphasis in mathematics education.

Special areas of research include ordinary and partial differential equations; probability; real, complex, harmonic, functional, and numerical analysis; differential and algebraic geometry; topology; number theory; commutative algebra; group theory; logic; combinatorics; mathematical physics; and applied and industrial mathematics, mathematical biology, and dynamical systems.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Undergraduate degree in mathematics or equivalent.

Other requirements to be completed before admission:

Applicants should have the prerequisite material of linear algebra, advanced calculus and differential equations, and should be ready for higher level courses in analysis and algebra.

GRE scores are not required for admission, but the Math subject test is strongly recommended.

To receive full consideration for financial support, international applicants should have a TOEFL score of at least 100 with a speaking score of at least 23.

#### **Special Application Requirements:**

Applications are accepted for fall semester only. The application deadline is February 1.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Internet Based - Speaking Score: 18

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.





## Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 15 to 30 major credits and 0 to 15 credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B earned for each course.

Students choose a program of coursework in consultation with their advisor and the director of graduate studies.

### Major Field Coursework (14-15 credits)

Plan A students select at least 14 credits, and Plan B students select at least 15 credits in consultation with advisor and director of graduate studies.

### Outside Coursework (6 to 15 credits)

Plan A students select at least 6 credits, and Plan B students select up to 15 credits in consultation with the advisor and director of graduate studies. Courses may include mathematics coursework outside the major research area.

### Plan Options

#### Plan A

Take 10 master's thesis credits.

[MATH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B



### **Twin Cities Campus**

## **Mathematics Minor**

*School of Mathematics*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

School of Mathematics, University of Minnesota, 127 Vincent Hall, 206 Church Street SE, Minneapolis, MN 55455 (612-624-6391, fax: 612-624-6702)

Email: [gradprog@math.umn.edu](mailto:gradprog@math.umn.edu)

Website: <http://www.math.umn.edu/grad/>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Special areas of research include ordinary and partial differential equations; probability; real, complex, harmonic, functional, and numerical analysis; differential and algebraic geometry; topology; number theory; commutative algebra; group theory; logic; combinatorics; mathematical physics; and applied and industrial mathematics, mathematical biology, and dynamical systems.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Mathematics director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B earned for each course.

The minimum cumulative GPA for the minor is 3.00.

Consult the Mathematics director of graduate studies in advance for course approval.

#### **Minor Coursework (6-12 credits)**

A minimum of 6 credits and 2 courses are required for a master's minor and a minimum of 12 credits and 4 courses are required for a doctoral minor. Coursework must be at the 5xxx or 8xxx level and must be approved by the advisor and by the Mathematics Director of Graduate Studies.

## **Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.



UNIVERSITY OF MINNESOTA

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Masters

Doctoral



### **Twin Cities Campus**

## **Mathematics Ph.D.**

*School of Mathematics*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

127 Vincent Hall, 206 Church Street SE, Minneapolis, MN 55455 (612-624-6391; fax: 612-624-6702)

Email: [gradprog@math.umn.edu](mailto:gradprog@math.umn.edu)

Website: <http://www.math.umn.edu/grad/>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The School of Mathematics offers a PhD in mathematics and a PhD in mathematics with emphasis in applied mathematics.

Special areas of research include ordinary and partial differential equations; probability; real, complex, harmonic, functional, and numerical analysis; differential and algebraic geometry; topology; number theory; commutative algebra; group theory; logic; combinatorics; mathematical physics; and applied and industrial mathematics, mathematical biology, and dynamical systems.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Undergraduate degree in mathematics or equivalent.

Other requirements to be completed before admission:

Applicants should have the prerequisite material of abstract algebra, analysis, and topology. GRE scores are not required for admission, but the Math subject test is strongly recommended. To receive full consideration for financial support, international applicants should have a TOEFL score of at least 100 with a speaking score of at least 23.

#### **Special Application Requirements:**

Applications are accepted for fall semester only. The application deadline is December 15.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Internet Based - Speaking Score: 18

Key to [test abbreviations](#)(TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

24 credits are required in the major.

12 credits are required outside the major.



24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

Language Requirement: French, German, Italian, or Russian.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B earned for each course.

Students choose a program of coursework in consultation with their advisor and the director of graduate studies that best prepares them for research in mathematics.

**Major Coursework (24 credits)**

A minimum of 24 major credits is required. Courses are selected with the advisor and director of graduate studies.

**Supporting Program (12 credits)**

A minimum of 12 credits in a minor or supporting program that supports the thesis research are required. If a supporting program is chosen, it may consist partly or entirely of mathematics courses outside the student's major research area. Coursework is selected with the advisor and director of graduate studies.

**Thesis Credits (24 credits)**

Complete 24 credits after passing preliminary oral exam.

[MATH 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### ***Twin Cities Campus***

## **Mechanical Engineering M.S.M.E.**

*Mechanical Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Mechanical Engineering Graduate Program, University of Minnesota, 1120 Mechanical Engineering, 111 Church Street S.E., Minneapolis, MN 55455 (612-625-2009; fax: 612-624-2010)

Email: [gardn032@umn.edu](mailto:gardn032@umn.edu), [hogan108@umn.edu](mailto:hogan108@umn.edu)

Website: <http://www.me.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science in Mechanical Engineering

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Coursework and research for all graduate degrees are offered in advanced & additive manufacturing; bioengineering; combustion; computer-aided design; computer-aided manufacturing; control systems; energy conservation; environmental control; environmental engineering; fluid mechanics; heat and mass transfer; lubrication; machine design; manufacturing engineering; nanoengineering & nanotechnology; particle technology; plasma chemistry; plasma heat transfer; power, propulsion, and applied thermodynamics; solar energy; sprays & multiphase flows; systems dynamics; thermal energy storage; thermal environmental engineering; thermodynamics; transportation; tribology; vibration; wind energy; and interdisciplinary finite element methodology. Additional instructional and research programs can be formulated.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A four-year BS degree in engineering, science, or mathematics.

Other requirements to be completed before admission:

Integrated BS/MS degree eligibility requirements:

- Students must be enrolled in the Mechanical Engineering undergraduate program at the University of Minnesota Twin Cities.
- Students who are within 32 semester credits completing the requirements for the bachelor's degree are eligible to apply.
- Students with a GPA of 3.25 or greater are preferred. For students who have transferred from another institution, at least one semester must be completed at the University of Minnesota Twin Cities before admission to the program will be granted.

#### **Special Application Requirements:**

The department offers two options for applying to the masters degree program. The standard application requires a full set of application materials and allows admission to any of the MSME degree options (Plan A, B, or C). The streamlined application offers an abbreviated application process and admission is only for the coursework-only masters degree (Plan C).

The GRE test is not required for applicants to the streamlined application. Students admitted through the streamlined process are not eligible for financial support from the department.

Applications are accepted for fall semester only. The standard application deadline is December 15 and the streamlined application deadline is April 15.

Applicants must submit their test score(s) from the following:

- GRE



International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and up to null credits outside the major. The final exam is oral.

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.8 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grading basis must be taken A/F, with a minimum grade of B- earned for each course.

No more than 6 4xxx-level course credits can be applied to degree requirements.

### Major Courses (14 to 24 credits)

Plan A and Plan B students select at least 14 credits, and Plan C students select at least 24 credits from the following in consultation with the advisor. All students must take 1 to 2 graduate seminar credits (ME 8773 or 8774) and 1 research and professional ethics course (ME 8001).

- [AEM 5401](#) - Intermediate Dynamics (3.0 cr)
- [AEM 5501](#) - Continuum Mechanics (3.0 cr)
- [AEM 8201](#) - Fluid Mechanics I (3.0 cr)
- [AEM 8202](#) - Fluid Mechanics II (3.0 cr)
- [EE 5231](#) - Linear Systems and Optimal Control (3.0 cr)
- [EE 8215](#) - Nonlinear Systems (3.0 cr)
- [ME 5103](#) - Thermal Environmental Engineering (4.0 cr)
- [ME 5113](#) - Aerosol/Particle Engineering (4.0 cr)
- [ME 5133](#) - Aerosol Measurement Laboratory (4.0 cr)
- [ME 5221](#) - Computer-Assisted Product Realization (4.0 cr)
- [ME 5223](#) - Materials in Design (4.0 cr)
- [ME 5228](#) - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)
- [ME 5229](#) - Finite Element Method for Computational Mechanics: Transient/Dynamic Applications (4.0 cr)
- [ME 5241](#) - Computer-Aided Engineering (4.0 cr)
- [ME 5243](#) - Advanced Mechanism Design (4.0 cr)
- [ME 5247](#) - Stress Analysis, Sensing, and Transducers (4.0 cr)
- [ME 5248](#) - Vibration Engineering (4.0 cr)
- [ME 5281](#) - Feedback Control Systems (4.0 cr)
- [ME 5286](#) - Robotics (4.0 cr)
- [ME 5312](#) - Solar Thermal Technologies (4.0 cr)
- [ME 5332](#) - Intermediate Fluid Mechanics (3.0 cr)
- [ME 5341](#) - Case Studies in Thermal Engineering and Design (4.0 cr)
- [ME 5344](#) - Thermodynamics of Fluid Flow With Applications (4.0 cr)
- [ME 5351](#) - Computational Heat Transfer (4.0 cr)
- [ME 5446](#) - Introduction to Combustion (4.0 cr)
- [ME 5461](#) - Internal Combustion Engines (4.0 cr)



ME 5462 - Gas Turbines (4.0 cr)  
ME 5666 - Modern Thermodynamics (4.0 cr)  
ME 8001 - Research Ethics and Professional Practice (0.0 cr)  
ME 8113 - Advanced Aerosol/Particle Engineering (3.0 cr)  
ME 8221 - New Product Design and Business Development I (4.0 cr)  
ME 8222 - New Product Design and Business Development II (4.0 cr)  
ME 8228 - Finite Elements in Multidisciplinary Flow/Thermal/Stress and Manufacturing Applications (4.0 cr)  
ME 8229 - Finite Element Methods for Computational Mechanics: Transient/Dynamic Problems (4.0 cr)  
ME 8243 - Topics in Design (4.0 cr)  
ME 8253 - Computational Nanomechanics (3.0 cr)  
ME 8254 - Fundamentals of Microelectromechanical Systems (MEMS) (4.0 cr)  
ME 8255 - Introduction to Nanotechnology (3.0 cr)  
ME 8281 - Advanced Control System Design (4.0 cr)  
ME 8283 - Design of Mechatronic Products (4.0 cr)  
ME 8285 - Advanced Control System Design, with Applications to Smart Vehicles (3.0 cr)  
ME 8287 - Topics in Dynamics and Control (2.0 - 4.0 cr)  
ME 8332 - Advanced Fluid Dynamics in Mechanical Engineering (3.0 cr)  
ME 8337 - Experimental Methods in the Thermal Sciences (3.0 cr)  
ME 8341 - Conduction (3.0 cr)  
ME 8342 - Convection (3.0 cr)  
ME 8343 - Radiation (3.0 cr)  
ME 8345 - Computational Heat Transfer and Fluid Flow (3.0 cr)  
ME 8350 - Heat Transfer Physics (3.0 cr)  
ME 8361 - Molecular Gas Dynamics (3.0 cr)  
ME 8362 - Introduction to Plasma Technology (3.0 cr)  
ME 8363 - Introduction to Reactive Flow Systems (3.0 cr)  
ME 8381 - Bioheat and Mass Transfer (3.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
ME 8446 - Advanced Combustion (3.0 cr)  
ME 8773 - Graduate Seminar (1.0 cr)  
ME 8774 - Graduate Seminar (1.0 cr)

#### Electives (6 to 16 credits)

Select credits from the following to complete minimum course credit requirements. Other courses, including additional coursework from the Major Courses list, can be selected with advisor and director of graduate studies approval.

AEM 4502 - Computational Structural Analysis (3.0 cr)  
AEM 4511 - Mechanics of Composite Materials (3.0 cr)  
AEM 4581 - Mechanics of Solids (3.0 cr)  
AEM 5253 - Computational Fluid Mechanics (3.0 cr)  
AEM 5401 - Intermediate Dynamics (3.0 cr)  
AEM 5451 - Optimal Estimation (3.0 cr)  
AEM 5501 - Continuum Mechanics (3.0 cr)  
AEM 5503 - Theory of Elasticity (3.0 cr)  
AEM 8201 - Fluid Mechanics I (3.0 cr)  
AEM 8202 - Fluid Mechanics II (3.0 cr)  
AEM 8207 - Hydrodynamic Stability (3.0 cr)  
AEM 8211 - Theory of Turbulence I (3.0 cr)  
AEM 8212 - Theory of Turbulence II (3.0 cr)  
AEM 8232 - Physical Gas Dynamics and Molecular Simulation (3.0 cr)  
AEM 8253 - Computational Methods in Fluid Mechanics (3.0 cr)  
AEM 8421 - Robust Multivariable Control Design (3.0 cr)  
AEM 8423 - Convex Optimization Methods in Control (3.0 cr)  
AEM 8442 - Aerospace Positioning, Navigation and Timing (3.0 cr)  
AEM 8451 - System Identification: Theory and Applications (3.0 cr)  
AEM 8531 - Fracture Mechanics (3.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5151 - Introduction to BioMEMS and Medical Microdevices (2.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
CHEM 4502 - Introduction to Quantum Mechanics and Spectroscopy (3.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEN 5771 - Colloids and Dispersions (3.0 cr)  
CHEN 8102 - Principles and Applications of Rheology (2.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)





CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)  
EE 4541 - Digital Signal Processing (3.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5173 - Basic Microelectronics Laboratory (1.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 8215 - Nonlinear Systems (3.0 cr)  
MATH 4512 - Differential Equations with Applications (3.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8402 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
PHYS 4051 - Methods of Experimental Physics I (5.0 cr)  
PHYS 4101 - Quantum Mechanics (4.0 cr)  
PHYS 4201 - Statistical and Thermal Physics (3.0 cr)  
PHYS 4211 - Introduction to Solid-State Physics (3.0 cr)

### Plan Options

#### Plan A

Take 10 master's thesis credits.

[ME 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

#### Plan B

Plan B requires completion of a project or 1-3 Plan B papers, determined in consultation with adviser. Up to 4 credits of [ME 8794](#), taken S/N, may be used for the Plan B project

[ME 8794](#) - Mechanical Engineering Research (1.0 - 4.0 cr)

-OR-

#### Plan C

Up to 4 credits of [ME 8794](#), taken S/N, may be applied to the degree requirements.

[ME 8794](#) - Mechanical Engineering Research (1.0 - 4.0 cr)

### Program Sub-plans

A sub-plan is not required for this program.

Students may not complete the program with more than one sub-plan.

#### Integrated B.M.E./M.S.M.E.

The Department of Mechanical Engineering offers an integrated bachelor's/master's degree program. The program makes it possible for students to earn a bachelor's degree (BME) and a master's degree (MSME) in Mechanical Engineering in five years. The program has several benefits: a streamlined admissions process from the undergraduate program to the graduate program; graduate student status granted in the senior year; eligibility for teaching and research assistantships; and flexibility in fulfilling required courses for both degrees simultaneously in the last two years of study.

Both the BME and MSME degrees must be completed in their entirety, with no courses shared between them. The graduate degree cannot be earned before the undergraduate requirements are satisfied. Admitted students who decide not to complete the MSME degree are permitted to count credits originally planned for the graduate program toward their undergraduate technical electives.



### **Twin Cities Campus**

## **Mechanical Engineering Minor**

*Mechanical Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Mechanical Engineering Graduate Program, University of Minnesota, 1120 Mechanical Engineering, 111 Church Street S.E., Minneapolis, MN 55455 (612-625-2009; fax: 612-624-2010)

Email: [gardn032@umn.edu](mailto:gardn032@umn.edu), [hogan108@umn.edu](mailto:hogan108@umn.edu)

Website: <http://www.me.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Coursework is offered in advanced & additive manufacturing; bioengineering; combustion; computer-aided design; computer-aided manufacturing; control systems; energy conservation; environmental control; environmental engineering; fluid mechanics; heat and mass transfer; lubrication; machine design; manufacturing engineering; nanoengineering & nanotechnology; particle technology; plasma chemistry; plasma heat transfer; power, propulsion, and applied thermodynamics; solar energy; sprays & multiphase flows; systems dynamics; thermal energy storage; thermal environmental engineering; thermodynamics; transportation; tribology; vibration; wind energy; and interdisciplinary finite element methodology. Additional instructional and research programs can be formulated.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Mechanical Engineering director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

#### **Minor Courses (6-12 credits)**

Master's students select 6 credits, and doctoral students select 12 credits from the following in consultation with the Mechanical Engineering director of graduate studies:

[ME 5103](#) - Thermal Environmental Engineering (4.0 cr)

[ME 5113](#) - Aerosol/Particle Engineering (4.0 cr)

[ME 5133](#) - Aerosol Measurement Laboratory (4.0 cr)

[ME 5221](#) - Computer-Assisted Product Realization (4.0 cr)

[ME 5223](#) - Materials in Design (4.0 cr)



- ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)
- ME 5229 - Finite Element Method for Computational Mechanics: Transient/Dynamic Applications (4.0 cr)
- ME 5241 - Computer-Aided Engineering (4.0 cr)
- ME 5243 - Advanced Mechanism Design (4.0 cr)
- ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)
- ME 5248 - Vibration Engineering (4.0 cr)
- ME 5281 - Feedback Control Systems (4.0 cr)
- ME 5286 - Robotics (4.0 cr)
- ME 5312 - Solar Thermal Technologies (4.0 cr)
- ME 5332 - Intermediate Fluid Mechanics (3.0 cr)
- ME 5341 - Case Studies in Thermal Engineering and Design (4.0 cr)
- ME 5344 - Thermodynamics of Fluid Flow With Applications (4.0 cr)
- ME 5351 - Computational Heat Transfer (4.0 cr)
- ME 5446 - Introduction to Combustion (4.0 cr)
- ME 5461 - Internal Combustion Engines (4.0 cr)
- ME 5462 - Gas Turbines (4.0 cr)
- ME 5666 - Modern Thermodynamics (4.0 cr)
- ME 8113 - Advanced Aerosol/Particle Engineering (3.0 cr)
- ME 8221 - New Product Design and Business Development I (4.0 cr)
- ME 8222 - New Product Design and Business Development II (4.0 cr)
- ME 8228 - Finite Elements in Multidisciplinary Flow/Thermal/Stress and Manufacturing Applications (4.0 cr)
- ME 8229 - Finite Element Methods for Computational Mechanics: Transient/Dynamic Problems (4.0 cr)
- ME 8243 - Topics in Design (4.0 cr)
- ME 8253 - Computational Nanomechanics (3.0 cr)
- ME 8254 - Fundamentals of Microelectromechanical Systems (MEMS) (4.0 cr)
- ME 8255 - Introduction to Nanotechnology (3.0 cr)
- ME 8281 - Advanced Control System Design (4.0 cr)
- ME 8283 - Design of Mechatronic Products (4.0 cr)
- ME 8285 - Advanced Control System Design, with Applications to Smart Vehicles (3.0 cr)
- ME 8287 - Topics in Dynamics and Control (2.0 - 4.0 cr)
- ME 8332 - Advanced Fluid Dynamics in Mechanical Engineering (3.0 cr)
- ME 8337 - Experimental Methods in the Thermal Sciences (3.0 cr)
- ME 8341 - Conduction (3.0 cr)
- ME 8342 - Convection (3.0 cr)
- ME 8343 - Radiation (3.0 cr)
- ME 8345 - Computational Heat Transfer and Fluid Flow (3.0 cr)
- ME 8350 - Heat Transfer Physics (3.0 cr)
- ME 8361 - Molecular Gas Dynamics (3.0 cr)
- ME 8362 - Introduction to Plasma Technology (3.0 cr)
- ME 8363 - Introduction to Reactive Flow Systems (3.0 cr)
- ME 8381 - Bioheat and Mass Transfer (3.0 cr)
- ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)
- ME 8446 - Advanced Combustion (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Mechanical Engineering Ph.D.**

*Mechanical Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Mechanical Engineering and Industrial Engineering Graduate Programs, University of Minnesota, 1120 Mechanical Engineering, 111 Church Street S.E., Minneapolis, MN 55455 (612-625-2009; fax: 612-624-2010)

Email: [gardn032@umn.edu](mailto:gardn032@umn.edu), [hogan108@umn.edu](mailto:hogan108@umn.edu)

Website: <http://www.me.umn.edu>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 62
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Coursework and research for all graduate degrees are offered in advanced & additive manufacturing; bioengineering; combustion; computer-aided design; computer-aided manufacturing; control systems; energy conservation; environmental control; environmental engineering; fluid mechanics; heat and mass transfer; lubrication; machine design; manufacturing engineering; nanoengineering & nanotechnology; particle technology; plasma chemistry; plasma heat transfer; power, propulsion, and applied thermodynamics; solar energy; sprays & multiphase flows; systems dynamics; thermal energy storage; thermal environmental engineering; thermodynamics; transportation; tribology; vibration; wind energy; and interdisciplinary finite element methodology. Additional instructional and research programs can be formulated.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A four-year BS degree in engineering, science, or mathematics.

#### **Special Application Requirements:**

Applications are accepted for fall semester only. The application deadline is December 15.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

38 credits are required in the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

A minimum of 12 course credits at the 8000-level are required (seminars and ethics courses may not be included).

### Major Courses (18 credits)

Select a minimum of 18 credits from the following. The credits must include 2-3 graduate seminar credits (ME 8773 or 8774) and one research and professional ethics course (ME 8001).

- AEM 5401 - Intermediate Dynamics (3.0 cr)
- AEM 5501 - Continuum Mechanics (3.0 cr)
- AEM 8201 - Fluid Mechanics I (3.0 cr)
- AEM 8202 - Fluid Mechanics II (3.0 cr)
- EE 5231 - Linear Systems and Optimal Control (3.0 cr)
- EE 8215 - Nonlinear Systems (3.0 cr)
- ME 5103 - Thermal Environmental Engineering (4.0 cr)
- ME 5113 - Aerosol/Particle Engineering (4.0 cr)
- ME 5133 - Aerosol Measurement Laboratory (4.0 cr)
- ME 5221 - Computer-Assisted Product Realization (4.0 cr)
- ME 5223 - Materials in Design (4.0 cr)
- ME 5228 - Introduction to Finite Element Modeling, Analysis, and Design (4.0 cr)
- ME 5229 - Finite Element Method for Computational Mechanics: Transient/Dynamic Applications (4.0 cr)
- ME 5241 - Computer-Aided Engineering (4.0 cr)
- ME 5243 - Advanced Mechanism Design (4.0 cr)
- ME 5247 - Stress Analysis, Sensing, and Transducers (4.0 cr)
- ME 5248 - Vibration Engineering (4.0 cr)
- ME 5281 - Feedback Control Systems (4.0 cr)
- ME 5286 - Robotics (4.0 cr)
- ME 5312 - Solar Thermal Technologies (4.0 cr)
- ME 5332 - Intermediate Fluid Mechanics (3.0 cr)
- ME 5341 - Case Studies in Thermal Engineering and Design (4.0 cr)
- ME 5344 - Thermodynamics of Fluid Flow With Applications (4.0 cr)
- ME 5351 - Computational Heat Transfer (4.0 cr)
- ME 5446 - Introduction to Combustion (4.0 cr)
- ME 5461 - Internal Combustion Engines (4.0 cr)
- ME 5462 - Gas Turbines (4.0 cr)
- ME 5666 - Modern Thermodynamics (4.0 cr)
- ME 8001 - Research Ethics and Professional Practice (0.0 cr)
- ME 8113 - Advanced Aerosol/Particle Engineering (3.0 cr)
- ME 8221 - New Product Design and Business Development I (4.0 cr)
- ME 8222 - New Product Design and Business Development II (4.0 cr)
- ME 8228 - Finite Elements in Multidisciplinary Flow/Thermal/Stress and Manufacturing Applications (4.0 cr)
- ME 8229 - Finite Element Methods for Computational Mechanics: Transient/Dynamic Problems (4.0 cr)
- ME 8243 - Topics in Design (4.0 cr)
- ME 8253 - Computational Nanomechanics (3.0 cr)
- ME 8254 - Fundamentals of Microelectromechanical Systems (MEMS) (4.0 cr)
- ME 8255 - Introduction to Nanotechnology (3.0 cr)
- ME 8281 - Advanced Control System Design (4.0 cr)
- ME 8283 - Design of Mechatronic Products (4.0 cr)
- ME 8285 - Advanced Control System Design, with Applications to Smart Vehicles (3.0 cr)
- ME 8287 - Topics in Dynamics and Control (2.0 - 4.0 cr)
- ME 8332 - Advanced Fluid Dynamics in Mechanical Engineering (3.0 cr)
- ME 8337 - Experimental Methods in the Thermal Sciences (3.0 cr)
- ME 8341 - Conduction (3.0 cr)
- ME 8342 - Convection (3.0 cr)
- ME 8343 - Radiation (3.0 cr)
- ME 8345 - Computational Heat Transfer and Fluid Flow (3.0 cr)



ME 8350 - Heat Transfer Physics (3.0 cr)  
ME 8361 - Molecular Gas Dynamics (3.0 cr)  
ME 8362 - Introduction to Plasma Technology (3.0 cr)  
ME 8363 - Introduction to Reactive Flow Systems (3.0 cr)  
ME 8381 - Bioheat and Mass Transfer (3.0 cr)  
ME 8390 - Advanced Topics in the Thermal Sciences : Biostabilization in Biomedicine, and Biotechnology (1.0 - 3.0 cr)  
ME 8446 - Advanced Combustion (3.0 cr)  
ME 8773 - Graduate Seminar (1.0 cr)  
ME 8774 - Graduate Seminar (1.0 cr)

#### Electives (20 credits)

Select courses from the following, in consultation with the advisor, to complete minimum course credit requirements. Other courses may be applied with director of graduate studies approval.

AEM 4502 - Computational Structural Analysis (3.0 cr)  
AEM 4511 - Mechanics of Composite Materials (3.0 cr)  
AEM 4581 - Mechanics of Solids (3.0 cr)  
AEM 5253 - Computational Fluid Mechanics (3.0 cr)  
AEM 5401 - Intermediate Dynamics (3.0 cr)  
AEM 5451 - Optimal Estimation (3.0 cr)  
AEM 5501 - Continuum Mechanics (3.0 cr)  
AEM 5503 - Theory of Elasticity (3.0 cr)  
AEM 8201 - Fluid Mechanics I (3.0 cr)  
AEM 8202 - Fluid Mechanics II (3.0 cr)  
AEM 8207 - Hydrodynamic Stability (3.0 cr)  
AEM 8211 - Theory of Turbulence I (3.0 cr)  
AEM 8212 - Theory of Turbulence II (3.0 cr)  
AEM 8232 - Physical Gas Dynamics and Molecular Simulation (3.0 cr)  
AEM 8253 - Computational Methods in Fluid Mechanics (3.0 cr)  
AEM 8421 - Robust Multivariable Control Design (3.0 cr)  
AEM 8423 - Convex Optimization Methods in Control (3.0 cr)  
AEM 8442 - Aerospace Positioning, Navigation and Timing (3.0 cr)  
AEM 8451 - System Identification: Theory and Applications (3.0 cr)  
AEM 8531 - Fracture Mechanics (3.0 cr)  
BMEN 5001 - Advanced Biomaterials (3.0 cr)  
BMEN 5151 - Introduction to BioMEMS and Medical Microdevices (2.0 cr)  
BMEN 5201 - Advanced Biomechanics (3.0 cr)  
BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)  
BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)  
CHEM 4502 - Introduction to Quantum Mechanics and Spectroscopy (3.0 cr)  
CHEM 8021 - Computational Chemistry (4.0 cr)  
CHEN 5771 - Colloids and Dispersions (3.0 cr)  
CHEN 8102 - Principles and Applications of Rheology (2.0 cr)  
CHEN 8301 - Physical Rate Processes I: Transport (3.0 cr)  
CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)  
EE 4541 - Digital Signal Processing (3.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5173 - Basic Microelectronics Laboratory (1.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 8215 - Nonlinear Systems (3.0 cr)  
MATH 4512 - Differential Equations with Applications (3.0 cr)  
MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)  
MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)  
MATH 8401 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
MATH 8402 - Mathematical Modeling and Methods of Applied Mathematics (3.0 cr)  
PHYS 4051 - Methods of Experimental Physics I (5.0 cr)  
PHYS 4101 - Quantum Mechanics (4.0 cr)  
PHYS 4201 - Statistical and Thermal Physics (3.0 cr)  
PHYS 4211 - Introduction to Solid-State Physics (3.0 cr)

#### Thesis Credits (24 credits)

Complete 24 thesis credits after passing preliminary oral exam.

ME 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Medical Device Innovation M.S.**

*Technological Leadership Institute*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Technological Leadership Institute, College of Science and Engineering, University of Minnesota, Suite 290 McNamara Alumni Center, 200 Oak Street SE, Minneapolis MN 55455

Phone: 612-624-5747

Fax: 612- 624-7510

Email: [mdj@umn.edu](mailto:mdj@umn.edu)

Website: <http://www.tli.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 34
- This program requires summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of science in medical device innovation is an interdisciplinary program comprised of courses in the core areas of technology innovation management and medical industry dynamics. Students experiences are enhanced through therapeutic area-based group activities and hands-on experiences in innovative biodesign through practicums at the Medical Devices Center. Students have the opportunity to specialize in an area of interest by taking 9 credits of electives in medical, technical, or business courses. The 14-month program draws upon the fields of technology innovation, product development, project and business management, intellectual property, regulatory affairs, clinical needs, entrepreneurship, emerging trends, globalization, reimbursement, and public policy. This program provides students with a full understanding of medical device innovation from start to finish. In doing so, it goes well beyond the traditional technology focus of most master's programs.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree in a related field, such as biological or physical sciences, engineering, computer science, mathematics, statistics, or business is preferred.

Other requirements to be completed before admission:

A strong background in science, engineering, and math, with at least two to five years of work experience, is preferred.

#### **Special Application Requirements:**

Applications are accepted on a rolling basis for the program's start in fall of each year.

Students may choose to complete the program by the Traditional option, which is 4 semesters long; or by the Extended option, which is 5 semesters and provides additional time to complete the final project and elective courses. The required credits and tuition are the same for both options.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5



- MELAB  
- Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan B:** Plan B requires 28 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The capstone project is independent, original, and applied research on a relevant subject, problem, or issue in areas of medical device technologies, policy, business, or innovation. The capstone project is rooted in real-world topics in the industry, and is usually framed in cooperation with the students organization or employer. The capstone is the students opportunity to demonstrate mastery of the concepts and methods (quantitative as well as qualitative) that have been learned in the MDI program, and to apply them to an industry-based medical device technology, venture, process, or organizational challenge.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

4xxx-level courses may be used towards program requirements with prior approval from the Director of Graduate Studies.

### Core Courses (26 Credits)

Complete the following courses. Take MDI 5001 for 1 credit.

- MDI 5001 - Technical Writing Essentials (0.0 - 1.0 cr)
- MDI 5002 - Technology Foresight and Forecasting (3.0 cr)
- MDI 5004 - Clinical Foundations of Medical Device Innovation (3.0 cr)
- MDI 5006 - Finance, Valuation, and Entrepreneurship (3.0 cr)
- MDI 5008 - Quality, Regulatory and Manufacturing Management (2.0 cr)
- MDI 5010 - Product Innovation & Development Management (3.0 cr)
- MDI 5012 - Medical Industry Macro Environment (3.0 cr)
- MDI 5013 - Medical Device Center Practicum I (2.0 cr)
- MDI 5014 - Medical Device Center Practicum II (2.0 cr)
- MDI 5015 - Medical Device Center Practicum III (2.0 cr)
- MDI 5050 - Interpersonal & Team Effectiveness (1.0 cr)
- MDI 5051 - Leading Innovation & Change (1.0 cr)

### Electives (6 Credits)

Complete a minimum of six credits of electives from the following in consultation with adviser.

- BMEN 5001 - Advanced Biomaterials (3.0 cr)
- BMEN 5041 - Tissue Engineering (3.0 cr)
- BMEN 5101 - Advanced Bioelectricity and Instrumentation (3.0 cr)
- BMEN 5151 - Introduction to BioMEMS and Medical Microdevices (2.0 cr)
- BMEN 5201 - Advanced Biomechanics (3.0 cr)
- BMEN 5311 - Advanced Biomedical Transport Processes (3.0 cr)
- BMEN 5321 - Microfluidics in Biology and Medicine (3.0 cr)
- BMEN 5351 - Cell Engineering (3.0 cr)
- BMEN 5401 - Advanced Biomedical Imaging (3.0 cr)
- BMEN 5411 - Neural Engineering (3.0 cr)
- BMEN 5412 - Neuromodulation (3.0 cr)
- BMEN 5413 - Neural Decoding and Interfacing (3.0 cr)
- BMEN 5421 - Introduction to Biomedical Optics (3.0 cr)
- BMEN 5501 - Biology for Biomedical Engineers (3.0 cr)
- BMEN 5701 - Cancer Bioengineering (3.0 cr)





BMEN 8101 - Biomedical Digital Signal Processing (3.0 cr)  
BTHX 5100 - Introduction to Clinical Ethics (3.0 cr)  
BTHX 5210 - Ethics of Human Subjects Research (3.0 cr)  
BTHX 5300 - Foundations of Bioethics (3.0 cr)  
BTHX 5325 - Biomedical Ethics (3.0 cr)  
BTHX 5400 - Intro Ethics in Hlth Policy (3.0 cr)  
BTHX 5411 - Health Law and Policy (3.0 cr)  
BTHX 5453 - Law, Biomedicine, and Bioethics (3.0 cr)  
BTHX 5610 - Research & Publication Seminar (1.0 cr)  
BTHX 5620 - Social Context of Health and Illness (3.0 cr)  
BTHX 8114 - Ethical and legal Issues in Genetic Counseling (3.0 cr)  
BTHX 8510 - Gender and the Politics of Health (3.0 cr)  
BTHX 8610 - Medical Consumerism (3.0 cr)  
CSCI 5103 - Operating Systems (3.0 cr)  
CSCI 5105 - Introduction to Distributed Systems (3.0 cr)  
CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)  
CSCI 5143 - Real-Time and Embedded Systems (3.0 cr)  
CSCI 5204 - Advanced Computer Architecture (3.0 cr)  
CSCI 5211 - Data Communications and Computer Networks (3.0 cr)  
CSCI 5221 - Foundations of Advanced Networking (3.0 cr)  
CSCI 5231 - Wireless and Sensor Networks (3.0 cr)  
CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)  
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)  
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)  
CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)  
CSCI 5609 - Visualization (3.0 cr)  
CSCI 5707 - Principles of Database Systems (3.0 cr)  
CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)  
CSCI 5801 - Software Engineering I (3.0 cr)  
CSCI 5802 - Software Engineering II (3.0 cr)  
CSCI 8725 - Databases for Bioinformatics (3.0 cr)  
DES 5185 - Human Factors in Design (3.0 cr)  
EE 5121 - Transistor Device Modeling for Circuit Simulation (3.0 cr)  
EE 5141 - Introduction to Microsystem Technology (4.0 cr)  
EE 5163 - Semiconductor Properties and Devices I (3.0 cr)  
EE 5164 - Semiconductor Properties and Devices II (3.0 cr)  
EE 5171 - Microelectronic Fabrication (4.0 cr)  
EE 5181 - Micro and Nanotechnology by Self Assembly (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5364 - Advanced Computer Architecture (3.0 cr)  
EE 5371 - Computer Systems Performance Measurement and Evaluation (3.0 cr)  
EE 5393 - Circuits, Computation, and Biology (3.0 cr)  
EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5545 - Digital Signal Processing Design (3.0 cr)  
EE 5551 - Multiscale and Multirate Signal Processing (3.0 cr)  
EE 5581 - Information Theory and Coding (3.0 cr)  
EE 5583 - Error Control Coding (3.0 cr)  
EE 5585 - Data Compression (3.0 cr)  
EE 8367 - Parallel Computer Organization (3.0 cr)  
ENTR 6020 - Business Formation (4.0 cr)  
HINF 5502 - Python Programming Essentials for the Health Sciences (1.0 cr)  
HINF 5510 - Applied Health Care Databases: Database Principles and Data Evaluation (3.0 cr)  
HINF 5520 - Informatics Methods for Health Care Quality, Outcomes, and Patient Safety (2.0 cr)  
HINF 5530 - Health Care Software Management (2.0 cr)  
HINF 5531 - Health Data Analytics and Data Science (3.0 cr)  
IE 5111 - Systems Engineering I (2.0 cr)  
IE 5113 - Systems Engineering II (4.0 cr)  
IE 5522 - Quality Engineering and Reliability (4.0 cr)  
IE 5541 - Project Management (4.0 cr)  
IE 5545 - Decision Analysis (4.0 cr)  
IE 5551 - Production Planning and Inventory Control (4.0 cr)  
IE 5553 - Simulation (4.0 cr)  
IMBA 6405 - Industry Vertical: Health (2.0 cr)



MBA 6110 - Leading Others (2.0 cr)  
MBA 6300 - Strategic Management (3.0 cr)  
ME 5223 - Materials in Design (4.0 cr)  
ME 5341 - Case Studies in Thermal Engineering and Design (4.0 cr)  
ME 8262 - Topics in Modeling and Analysis of Manufacturing Processes (4.0 cr)  
ME 8381 - Bioheat and Mass Transfer (3.0 cr)  
ME 8775 - Technical Communication (1.0 cr)  
MGMT 6050 - Management of Innovation and Change (2.0 cr)  
MGMT 6100 - Topics in Management (1.0 - 4.0 cr)  
MILI 6235 - Pharmaceutical Industry: Business and Policy (2.0 cr)  
MILI 6562 - Information Technology in Health Care (2.0 cr)  
MILI 6589 - Medical Technology Evaluation and Market Research (2.0 cr)  
MILI 6726 - Medical Device Industry: Business and Public Policy (2.0 cr)  
MILI 6990 - The Health Care Marketplace (2.0 cr)  
MILI 6991 - Anatomy and Physiology for Managers (2.0 cr)  
MILI 6992 - Healthcare Delivery Innovations: Optimizing Cost and Quality (2.0 cr)  
MILI 6995 - Medical Industry Valuation Laboratory (2.0 cr)  
MKTG 6088 - Strategic Marketing (2.0 cr)  
NEUR 5230 - Cerebrovascular Hemodynamics and Diseases I (4.0 cr)  
PDES 5701 - User-Centered Design Studio (3.0 cr)  
PDES 5702 - Visual Communication (3.0 cr)  
PDES 5704 - Computer-Aided Design Methods (3.0 cr)  
PHSL 5061 - Principles of Physiology for Biomedical Engineering (4.0 cr)  
PHSL 5510 - Advanced Cardiac Physiology and Anatomy (2.0 - 3.0 cr)  
PHSL 5525 - Anatomy and Physiology of the Pelvis and Urinary System (1.0 - 2.0 cr)  
PSY 5065 - Functional Imaging: Hands-on Training (3.0 cr)  
PUBH 6751 - Principles of Management in Health Services Organizations (2.0 cr)  
PUBH 6832 - Economics of the Health Care System (3.0 cr)  
PUBH 6862 - Cost-Effectiveness Analysis in Health Care (3.0 cr)  
RSC 5101 - Mathematical Tools for Research Applications in Health, Rehab, and Human Movement Sciences (1.0 cr)  
RSC 5106 - Introduction to Rehabilitation Science (1.0 cr)  
RSC 5135 - Advanced Biomechanics I: Kinematics (3.0 cr)  
RSC 5200 - Introduction to Neuromodulation (1.0 - 3.0 cr)  
RSC 5231 - Clinical Biomechanics (2.0 - 5.0 cr)  
RSC 5281 - Physiology for Physical Rehabilitation (2.0 - 4.0 cr)  
SCB 8181 - Stem Cell Biology (3.0 cr)  
ST 8109 - Cybersecurity Foundations - Technology, Risk & Communication (2.0 cr)  
ST 8110 - Security Science and Technology Foundations (3.0 cr)  
ST 8111 - Methods, Theory, and Applications (2.5 cr)  
ST 8113 - Information and Cyber Security (2.0 cr)  
ST 8220 - Vulnerability, Risk and Threat Assessment and Management (3.0 cr)  
ST 8330 - Critical Infrastructure Protections (3.0 cr)  
ST 8331 - Dynamic Systems Modeling and Simulation Tools (2.0 cr)  
ST 8513 - Cyber Threat Intelligence (2.0 cr)  
ST 8661 - Securing Cyberspace (Fundamentals) (3.0 cr)  
ST 8662 - Securing Cyberspace - Advanced (3.0 cr)

**Capstone Project (2 Credits)**

Complete 2 credits of MDI 5020.

MDI 5020 - Medical Device Innovation Capstone (1.0 - 2.0 cr)



### **Twin Cities Campus**

## **Neuroengineering Minor**

*Department of Biomedical Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Graduate Minor in Neuroengineering, 7-105 Nils Hasselmo Hall, 312 Church Street S.E., Minneapolis, MN 55455 (612-624-8396; fax 612-626-6583)

Email: [bmengp@umn.edu](mailto:bmengp@umn.edu)

Website: <http://cne.umn.edu/>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate minor in neuroengineering (NE) is motivated by the notion that future breakthroughs in this rapidly-growing area of research will be made by engineers who understand the fundamental issues and principles of neuroscience that occur during neural interventions, and by neuroscientists who are truly competent in engineering concepts and tools. The minor trains doctoral students to develop the skills to revolutionize technologies for interfacing with the brain and to advance our understanding of the neuroscience processes that arise when we interface with and modulate the brain.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

Enrollment in the neuroengineering minor is open to all currently enrolled PhD students in biomedical engineering, electrical engineering, mechanical engineering, and neuroscience. PhD students majoring in other programs may obtain approval from the neuroengineering director of graduate studies to participate in the minor program if they have the necessary science background to complete the coursework and are in good standing in their major program.

Students must officially declare the minor before taking the Oral Preliminary Examination (OPE).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Coursework must be approved by the neuroengineering director of graduate studies.

For any course listed in multiple categories, students must choose which requirement that course will fulfill. A single course cannot be counted simultaneously toward multiple categories.

Courses must be completed for a letter grade (A-F), with a minimum grade of B- required to be counted toward the minor.

The minimum cumulative GPA for the minor is 3.0

#### **Neuroengineering Seminar (1-2 credits)**

One credit of seminar is required, but it may be taken for credit twice.

[BMEN 8411](#) - Neuroengineering Seminar (2.0 cr)



### Neuroengineering Course (3 credits)

It is strongly recommended that students take BMEn 5411 Neural Engineering, unless they have previously completed a neural engineering course.

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- [BMEN 5411](#) - Neural Engineering (3.0 cr)
- [BMEN 5412](#) - Neuromodulation (3.0 cr)

### Neuroscience Course (3-4 credits)

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

- [NSCI 5101](#) - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)
- [NSC 5561](#) - Systems Neuroscience (4.0 cr)

### Electives (3-5 credits)

Complete additional coursework to meet the 12 credit minimum for the minor. Additional courses may be approved by the neuroengineering DGS.

- [BMEN 5401](#) - Advanced Biomedical Imaging (3.0 cr)
- [BMEN 5411](#) - Neural Engineering (3.0 cr)
- [BMEN 5412](#) - Neuromodulation (3.0 cr)
- [BMEN 5413](#) - Neural Decoding and Interfacing (3.0 cr)
- [BMEN 8101](#) - Biomedical Digital Signal Processing (3.0 cr)
- [BMEN 8151](#) - Biomedical Electronics and Implantable Microsystems (3.0 cr)
- [BMEN 8411](#) - Neuroengineering Seminar (2.0 cr)
- [BMEN 8502](#) - Physiological Control Systems (3.0 cr)
- [EE 5231](#) - Linear Systems and Optimal Control (3.0 cr)
- [EE 5239](#) - Introduction to Nonlinear Optimization (3.0 cr)
- [EE 5542](#) - Adaptive Digital Signal Processing (3.0 cr)
- [ME 5281](#) - Feedback Control Systems (4.0 cr)
- [ME 5286](#) - Robotics (4.0 cr)
- [MPHY 5178](#) - Physical Principles of Magnetic Resonance Imaging (3.0 cr)
- [MPHY 8147](#) - Advanced Physics of Magnetic Resonance Imaging (MRI) (3.0 cr)
- [NSC 8111](#) - Quantitative Neuroscience (3.0 cr)
- [NSC 8217](#) - Systems and Computational Neuroscience (2.0 cr)
- [PSY 5036W](#) - Computational Vision [WI] (3.0 cr)
- [PSY 5038W](#) - Introduction to Neural Networks [WI] (3.0 cr)
- [PSY 5063](#) - Introduction to Functional MRI (3.0 cr)
- [PSY 5065](#) - Functional Imaging: Hands-on Training (3.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Doctoral



### **Twin Cities Campus**

## **Physics M.S.**

*School of Physics & Astronomy*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies in Physics, School of Physics and Astronomy, University of Minnesota, 116 Church St. SE, Minneapolis, MN 55455 (612-626-5982; fax: 612-624-4578)

Email: [physics@umn.edu](mailto:physics@umn.edu)

Website: <http://www.physics.umn.edu/grad>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Physics is the study of the fundamental structure and interactions of matter. Research areas in the program include experimental and theoretical studies in astrophysics and cosmology, biological physics, condensed matter physics, elementary particle physics, nuclear physics, space and planetary physics, and physics education research. Interdisciplinary study is also available with the programs in astrophysics, biological sciences, chemistry, chemical engineering and materials science, electrical and computer engineering, mechanical engineering, and the history of science and technology.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.30.

Other requirements to be completed before admission:

Upper division courses in the core areas of classical mechanics, electricity and magnetism, quantum mechanics, and statistical and thermal physics are required. It is advisable to have taken an upper division course in experimental methods in physics.

Students applying for a terminal M.S. degree are not admitted, unless they arrange for their own financial support. Students admitted to the Physics Ph.D. program are automatically eligible for the M.S.

#### **Special Application Requirements:**

GRE scores are not required but are strongly recommended. Applications are accepted for fall semester only. The application deadline is December 15.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 30 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project is a self-contained research problem performed in conjunction with the student's advisor. Students register for 4 credits of Physics 8500: Plan B project, which count toward the program requirement of 30 credits. The project is described in a written paper. Examples of Plan B projects include carrying out a specific calculation, writing and documenting a computer program, analyzing a set of experimental data, designing and/or constructing experimental instrumentation, and designing and/or constructing an undergraduate laboratory experiment. The alternative to the Plan B project is writing 1-3 Plan B papers. The Plan B papers are related to three courses that the student has taken and do not require original research. It's expected that completion of either the project or the Plan B papers require a nominal three weeks of full-time effort.

**Plan C:** Plan C requires 30 major credits and 0 credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Physics 4001, 4002, 4101, 4201, and 4303 cannot be used to satisfy degree requirements.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

### Required Courses (8-16 credits)

Plan A and Plan B students complete either the quantum mechanics sequence or the classical physics sequence. Plan C students must complete both sequences.

#### Quantum Mechanics Sequence

PHYS 5001 - Quantum Mechanics I (4.0 cr)

PHYS 5002 - Quantum Mechanics II (4.0 cr)

#### Classical Physics Sequence

PHYS 5011 - Classical Physics I (4.0 cr)

PHYS 5012 - Classical Physics II (4.0 cr)

### Elective Courses (11-22 credits)

Plan A students select 12 credits, Plan B students select up to 22 credits, and Plan C students select 11 credits from the following, in consultation with the advisor. Additional courses may be approved by the director of graduate studies.

#### Atomic Physics and Optics

PHYS 8161 - Atomic and Molecular Structure (3.0 cr)

#### Biophysics and Medical Physics

PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)

PHYS 8311 - Biological Physics of Single Molecules (3.0 cr)

PHYS 8312 - Biological Physics of Macroscopic Systems (3.0 cr)

PHYS 8300 - Seminar: Biological and Medical Physics. (1.0 cr)

#### Condensed Matter Physics

PHYS 4211 - Introduction to Solid-State Physics (3.0 cr)

PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)

PHYS 8014 - Quantum many Body Systems (3.0 cr)

PHYS 8700 - Seminar: Condensed Matter Physics (1.0 cr)

PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)

PHYS 8711 - Solid-State Physics I (3.0 cr)

PHYS 8712 - Solid-State Physics II (3.0 cr)

PHYS 8750 - Advanced Topics in Condensed Matter Physics (3.0 cr)

#### Elementary Particle Physics

PHYS 4511 - Introduction to Nuclear and Particle Physics (3.0 cr)

PHYS 8011 - Quantum Field Theory I (3.0 cr)

PHYS 8012 - Quantum Field Theory II (3.0 cr)

PHYS 8013 - Special Topics in Quantum Field Theory (3.0 cr)

PHYS 8901 - Elementary Particle Physics I (3.0 cr)

PHYS 8902 - Elementary Particle Physics II (3.0 cr)

PHYS 8911 - Introduction to Supersymmetry (3.0 cr)



PHYS 8950 - Advanced Topics in Elementary Particle Physics (3.0 cr)

PHYS 8900 - Seminar: Elementary Particle Physics (1.0 cr)

**Mathematical, Advanced Quantum, and Computational Physics**

PHYS 5041 - Mathematical Methods for Physics (4.0 cr)

PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)

PHYS 8301 - Symmetry and Its Application to Physical Problems (3.0 cr)

**Nuclear Physics**

PHYS 8800 - Seminar: Nuclear Physics (1.0 cr)

PHYS 8801 - Nuclear Physics I (3.0 cr)

PHYS 8802 - Nuclear Physics II (3.0 cr)

PHYS 8850 - Advanced Topics in Nuclear Physics (3.0 cr)

**Plasma and Space Physics**

PHYS 4611 - Introduction to Space Physics (3.0 cr)

PHYS 4621 - Introduction to Plasma Physics (3.0 cr)

PHYS 5621 - Introduction to Plasma Physics (3.0 cr)

PHYS 8600 - Seminar: Space Physics (1.0 cr)

PHYS 8601 - Plasma Physics I (3.0 cr)

PHYS 8602 - Plasma Physics II (3.0 cr)

PHYS 8611 - Cosmic Rays and Plasma Astrophysics (3.0 cr)

PHYS 8650 - Advanced Topics in Space and Plasma Physics (3.0 cr)

**Relativity and Cosmology**

PHYS 5022 - Relativity, Cosmology, and the Universe (4.0 cr)

PHYS 8501 - General Relativity and Cosmology I (3.0 cr)

PHYS 8502 - General Relativity and Cosmology II (3.0 cr)

PHYS 8200 - Seminar: Cosmology and High Energy Astrophysics (1.0 cr)

**Physics Education**

PHYS 5071 - Physics for High School Teachers: Experimental Foundations and Historical Perspectives (3.0 cr)

PHYS 5072 - Best Practices in College Physics Teaching (1.0 - 3.0 cr)

PHYS 8100 - Seminar: Problems of Physics Teaching and Higher Education (1.0 cr)

**Plan Options**

**Plan A (10 credits)**

Complete 10 thesis credits. The minimum GPA to remain in good standing is 2.8

PHYS 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

**Plan B (0-4 credits)**

Up to 4 credits of PHYS 8500 may be used for the Plan B project. The minimum GPA to remain in good standing is 2.8.

PHYS 8500 - Plan B Project (4.0 cr)

-OR-

**Plan C (3 credits)**

Plan C students must complete PHYS 5201. Plan C students must also pass the Physics Graduate Written Exam. The minimum GPA to remain in good standing is 3.3.

PHYS 5201 - Thermal and Statistical Physics (3.0 cr)



### **Twin Cities Campus**

## **Physics Minor**

*School of Physics & Astronomy*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies in Physics, School of Physics and Astronomy, University of Minnesota, 116 Church St. SE, Minneapolis, MN 55455 (612-626-5982; fax: 612-624-4578)

Email: [physics@umn.edu](mailto:physics@umn.edu)

Website: <http://www.physics.umn.edu/grad>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Physics is the study of the fundamental structure and interactions of matter. Research areas in the program include experimental and theoretical studies in astrophysics and cosmology, biological physics, condensed matter physics, elementary particle physics, nuclear physics, space and planetary physics, and physics education research. Interdisciplinary study is also available with the programs in astrophysics, biological sciences, chemistry, chemical engineering and materials science, electrical and computer engineering, mechanical engineering, and the history of science and technology.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

Other requirements to be completed before admission:

A physics minor requires a background in differential and integral calculus and one year of calculus-level college physics.

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Physics director of graduate studies regarding feasibility and requirements.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

The following courses cannot be used to satisfy the requirements: Physics 4001, 4002, 4101, 4201, and 4303.

#### **Elective Courses (2-4 credits)**

In addition to the required courses, master's students select 2 credits, and doctoral students select 4 credits from the following in consultation with the Physics director of graduate studies to complete minimum credit requirements.

#### **Atomic Physics and Optics**





PHYS 8161 - Atomic and Molecular Structure (3.0 cr)

**Biophysics and Medical Physics**

PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)

PHYS 8311 - Biological Physics of Single Molecules (3.0 cr)

PHYS 8312 - Biological Physics of Macroscopic Systems (3.0 cr)

PHYS 8300 - Seminar: Biological and Medical Physics. (1.0 cr)

**Condensed Matter Physics**

PHYS 4211 - Introduction to Solid-State Physics (3.0 cr)

PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)

PHYS 8014 - Quantum many Body Systems (3.0 cr)

PHYS 8700 - Seminar: Condensed Matter Physics (1.0 cr)

PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)

PHYS 8711 - Solid-State Physics I (3.0 cr)

PHYS 8712 - Solid-State Physics II (3.0 cr)

PHYS 8750 - Advanced Topics in Condensed Matter Physics (3.0 cr)

**Elementary Particle Physics**

PHYS 4511 - Introduction to Nuclear and Particle Physics (3.0 cr)

PHYS 8011 - Quantum Field Theory I (3.0 cr)

PHYS 8012 - Quantum Field Theory II (3.0 cr)

PHYS 8013 - Special Topics in Quantum Field Theory (3.0 cr)

PHYS 8901 - Elementary Particle Physics I (3.0 cr)

PHYS 8902 - Elementary Particle Physics II (3.0 cr)

PHYS 8911 - Introduction to Supersymmetry (3.0 cr)

PHYS 8950 - Advanced Topics in Elementary Particle Physics (3.0 cr)

PHYS 8900 - Seminar: Elementary Particle Physics (1.0 cr)

**Mathematical, Advanced Quantum, and Computational Physics**

PHYS 5041 - Mathematical Methods for Physics (4.0 cr)

PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)

PHYS 8301 - Symmetry and Its Application to Physical Problems (3.0 cr)

**Nuclear Physics**

PHYS 8800 - Seminar: Nuclear Physics (1.0 cr)

PHYS 8801 - Nuclear Physics I (3.0 cr)

PHYS 8802 - Nuclear Physics II (3.0 cr)

PHYS 8850 - Advanced Topics in Nuclear Physics (3.0 cr)

**Plasma and Space Physics**

PHYS 4611 - Introduction to Space Physics (3.0 cr)

PHYS 4621 - Introduction to Plasma Physics (3.0 cr)

PHYS 5621 - Introduction to Plasma Physics (3.0 cr)

PHYS 8600 - Seminar: Space Physics (1.0 cr)

PHYS 8601 - Plasma Physics I (3.0 cr)

PHYS 8602 - Plasma Physics II (3.0 cr)

PHYS 8611 - Cosmic Rays and Plasma Astrophysics (3.0 cr)

PHYS 8650 - Advanced Topics in Space and Plasma Physics (3.0 cr)

**Relativity and Cosmology**

PHYS 5022 - Relativity, Cosmology, and the Universe (4.0 cr)

PHYS 8501 - General Relativity and Cosmology I (3.0 cr)

PHYS 8502 - General Relativity and Cosmology II (3.0 cr)

PHYS 8200 - Seminar: Cosmology and High Energy Astrophysics (1.0 cr)

**Physics Education**

PHYS 5071 - Physics for High School Teachers: Experimental Foundations and Historical Perspectives (3.0 cr)

PHYS 5072 - Best Practices in College Physics Teaching (1.0 - 3.0 cr)

PHYS 8100 - Seminar: Problems of Physics Teaching and Higher Education (1.0 cr)

## Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

### Masters

#### Required Courses (4 credits)

Complete either Physics 5001 or 5011 for 4 credits.

PHYS 5001 - Quantum Mechanics I (4.0 cr)

or PHYS 5011 - Classical Physics I (4.0 cr)



Doctoral

**Required Courses (8 credits)**

Complete either the classical physics sequence or the quantum mechanics sequence for 8 credits.

**Quantum Mechanics Sequence**

[PHYS 5001](#) - Quantum Mechanics I (4.0 cr)

[PHYS 5002](#) - Quantum Mechanics II (4.0 cr)

or **Classical Physics Sequence**

[PHYS 5011](#) - Classical Physics I (4.0 cr)

[PHYS 5012](#) - Classical Physics II (4.0 cr)



### ***Twin Cities Campus***

## **Physics Ph.D.**

*School of Physics & Astronomy*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Director of Graduate Studies in Physics, School of Physics and Astronomy, University of Minnesota, 116 Church St. SE, Minneapolis, MN 55455 (612-626-5982; fax: 612-624-4578)

Email: [physics@umn.edu](mailto:physics@umn.edu)

Website: <http://www.physics.umn.edu/grad>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 64
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

Physics is the study of the fundamental structure and interactions of matter. Research areas in the program include experimental and theoretical studies in astrophysics and cosmology, biological physics, condensed matter physics, elementary particle physics, nuclear physics, space and planetary physics, and physics education research. Interdisciplinary study is also available with the programs in astrophysics, biological sciences, chemistry, chemical engineering and materials science, electrical and computer engineering, mechanical engineering, and the history of science and technology.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.50.

Other requirements to be completed before admission:

Courses at the upper division level in the core areas of classical mechanics, electricity and magnetism, quantum mechanics, and statistical and thermal physics are required. It is advisable to have taken an upper division course in experimental methods in physics.

Students admitted to the Ph.D. program are automatically eligible for the Physics M.S. program.

#### **Special Application Requirements:**

Applicants are required to submit three letters of recommendation from persons familiar with their scholarship and research potential; a complete set of transcripts; and a clearly written statement of career interests, goals, and objectives. GRE scores are not required but are strongly recommended. Applications are accepted for fall semester only. The application deadline is December 15.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

40 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.30 is required for students to remain in good standing.

Physics 4001, 4002, 4101, 4201, and 4303 cannot be used to satisfy the requirements.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

### Required Courses (19 credits)

PHYS 5001 - Quantum Mechanics I (4.0 cr)

PHYS 5002 - Quantum Mechanics II (4.0 cr)

PHYS 5011 - Classical Physics I (4.0 cr)

PHYS 5012 - Classical Physics II (4.0 cr)

PHYS 5201 - Thermal and Statistical Physics (3.0 cr)

### Seminars (2 credits)

Take 2 or more course(s) totaling 2 or more credit(s) from the following:

- PHYS 8100 - Seminar: Problems of Physics Teaching and Higher Education (1.0 cr)
- PHYS 8200 - Seminar: Cosmology and High Energy Astrophysics (1.0 cr)
- PHYS 8300 - Seminar: Biological and Medical Physics. (1.0 cr)
- PHYS 8600 - Seminar: Space Physics (1.0 cr)
- PHYS 8700 - Seminar: Condensed Matter Physics (1.0 cr)
- PHYS 8800 - Seminar: Nuclear Physics (1.0 cr)
- PHYS 8900 - Seminar: Elementary Particle Physics (1.0 cr)

### Electives (19 credits)

Select courses from the following, in consultation with the advisor, to complete the 40 course credits required. Students whose financial support comes from TA assignments are also required to complete 3 credits of PHYS 5072 over two semesters. Additional courses may be approved by the director of graduate studies.

#### Atomic Physics and Optics

PHYS 8161 - Atomic and Molecular Structure (3.0 cr)

#### Biophysics and Medical Physics

PHYS 5081 - Introduction to Biopolymer Physics (3.0 cr)

PHYS 8311 - Biological Physics of Single Molecules (3.0 cr)

PHYS 8312 - Biological Physics of Macroscopic Systems (3.0 cr)

PHYS 8300 - Seminar: Biological and Medical Physics. (1.0 cr)

#### Condensed Matter Physics

PHYS 4211 - Introduction to Solid-State Physics (3.0 cr)

PHYS 5701 - Solid-State Physics for Engineers and Scientists (4.0 cr)

PHYS 8014 - Quantum many Body Systems (3.0 cr)

PHYS 8700 - Seminar: Condensed Matter Physics (1.0 cr)

PHYS 8702 - Statistical Mechanics and Transport Theory (3.0 cr)

PHYS 8711 - Solid-State Physics I (3.0 cr)

PHYS 8712 - Solid-State Physics II (3.0 cr)

PHYS 8750 - Advanced Topics in Condensed Matter Physics (3.0 cr)

#### Elementary Particle Physics

PHYS 4511 - Introduction to Nuclear and Particle Physics (3.0 cr)

PHYS 8011 - Quantum Field Theory I (3.0 cr)

PHYS 8012 - Quantum Field Theory II (3.0 cr)

PHYS 8013 - Special Topics in Quantum Field Theory (3.0 cr)

PHYS 8901 - Elementary Particle Physics I (3.0 cr)

PHYS 8902 - Elementary Particle Physics II (3.0 cr)

PHYS 8911 - Introduction to Supersymmetry (3.0 cr)

PHYS 8950 - Advanced Topics in Elementary Particle Physics (3.0 cr)

PHYS 8900 - Seminar: Elementary Particle Physics (1.0 cr)



**Mathematical, Advanced Quantum, and Computational Physics**

- PHYS 5041 - Mathematical Methods for Physics (4.0 cr)
- PHYS 8001 - Advanced Quantum Mechanics (3.0 cr)
- PHYS 8301 - Symmetry and Its Application to Physical Problems (3.0 cr)

**Nuclear Physics**

- PHYS 8801 - Nuclear Physics I (3.0 cr)
- PHYS 8802 - Nuclear Physics II (3.0 cr)
- PHYS 8850 - Advanced Topics in Nuclear Physics (3.0 cr)
- PHYS 8800 - Seminar: Nuclear Physics (1.0 cr)

**Plasma and Space Physics**

- PHYS 4611 - Introduction to Space Physics (3.0 cr)
- PHYS 4621 - Introduction to Plasma Physics (3.0 cr)
- PHYS 5621 - Introduction to Plasma Physics (3.0 cr)
- PHYS 8600 - Seminar: Space Physics (1.0 cr)
- PHYS 8601 - Plasma Physics I (3.0 cr)
- PHYS 8602 - Plasma Physics II (3.0 cr)
- PHYS 8611 - Cosmic Rays and Plasma Astrophysics (3.0 cr)
- PHYS 8650 - Advanced Topics in Space and Plasma Physics (3.0 cr)

**Relativity and Cosmology**

- PHYS 5022 - Relativity, Cosmology, and the Universe (4.0 cr)
- PHYS 8501 - General Relativity and Cosmology I (3.0 cr)
- PHYS 8502 - General Relativity and Cosmology II (3.0 cr)
- PHYS 8200 - Seminar: Cosmology and High Energy Astrophysics (1.0 cr)

**Physics Education**

- PHYS 5071 - Physics for High School Teachers: Experimental Foundations and Historical Perspectives (3.0 cr)
- PHYS 5072 - Best Practices in College Physics Teaching (1.0 - 3.0 cr)
- PHYS 8100 - Seminar: Problems of Physics Teaching and Higher Education (1.0 cr)

**Thesis Credits**

Take 24 credits (maximum 14 credits per term) after passing preliminary oral exam.

- PHYS 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Quaternary Paleoecology Minor**

Department of Earth Sciences

College of Science and Engineering

Link to a [list of faculty](#) for this program.

### **Contact Information:**

Quaternary Paleoecology Graduate Program, University of Minnesota, John T. Tate Hall-Suite 150, 116 Church St. SE, Minneapolis, MN 55455 (612-624-7881; fax: 612-625-3819)

Email: [qpminor@umn.edu](mailto:qpminor@umn.edu)

Website: <http://lrc.geo.umn.edu/qpminor/index.html>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The faculty of the graduate minor in quaternary paleoecology (QP) hold appointments in several departments. Students in this unique program benefit from the broad range of expertise and experience available at a large research university. From their coursework in the minor, graduate students learn techniques and approaches from other areas that can be applied to their own research.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

Other requirements to be completed before admission:

Students must be enrolled in a graduate program (master's or doctoral) at the University of Minnesota.

### **Special Application Requirements:**

Students apply by sending a letter of application to the director of graduate studies ([qpminor@umn.edu](mailto:qpminor@umn.edu)) as well as a letter of endorsement from their major adviser. Application may be made at any time.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

The Quaternary Paleoecology minor curriculum is developed in consultation with the major advisor and the Quaternary Paleoecology director of graduate studies. Courses must be from relevant disciplines outside the major field.

Courses offered on both the A/F and S/N grade basis must be taken A/F.

The minimum cumulative GPA for the minor is 3.00.

### **Minor Courses (6-12 credits)**

Masters students select at least 6 credits, and doctoral students select at least 12 credits from the following list. Alternative coursework can be applied to the minor with approval from the major advisor and Quaternary Paleoecology director of graduate studies.

[ANTH 4077](#) - Neanderthals: Biology and Culture of Humanity's Nearest Relative (3.0 cr)

[ANTH 4329](#) - Primate Ecology and Social Behavior (3.0 cr)

[ANTH 5009](#) - Human Behavioral Biology (3.0 cr)

[ANTH 5015W](#) - Biology, Evolution, and Cultural Development of Language & Music [SOCS, WI] (3.0 cr)



ANTH 5041 - Ecological Anthropology (3.0 cr)  
ANTH 5269 - Analysis of Stone Tool Technology (4.0 cr)  
ANTH 5401 - The Human Fossil Record (3.0 cr)  
ANTH 5402 - Zooarchaeology Laboratory (3.0 cr)  
ANTH 5403 - Quantitative Methods in Biological Anthropology (4.0 cr)  
ANTH 5405 - Human Skeletal Analysis (4.0 cr)  
ANTH 5442 - Archaeology of the British Isles (3.0 cr)  
CEGE 5541 - Environmental Water Chemistry (3.0 cr)  
CEGE 5551 - Environmental Microbiology (3.0 cr)  
CEGE 8508 - Ecological Fluid Mechanics (4.0 cr)  
CEGE 8511 - Mechanics of Sediment Transport (3.0 cr)  
CEGE 8551 - Environmental Microbiology: Molecular Theory and Methods (4.0 cr)  
CEGE 8552 - Groundwater Microbiology: Laboratory (4.0 cr)  
CEGE 8553 - Biofilms (3.0 cr)  
CEGE 8561 - Analysis and Modeling of Aquatic Environments I (3.0 cr)  
CEGE 8562 - Analysis and Modeling of Aquatic Environments II (3.0 cr)  
CEGE 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)  
CEGE 8601 - Introduction to Stream Restoration (3.0 cr)  
CEGE 8602 - Stream Restoration Practice (2.0 cr)  
EEB 4329 - Primate Ecology and Social Behavior (3.0 cr)  
EEB 4611 - Biogeochemical Processes (3.0 cr)  
EEB 5221 - Molecular Evolution (3.0 cr)  
EEB 5371 - Principles of Systematics (3.0 cr)  
EEB 5601 - Limnology (3.0 cr)  
EEB 5605 - Limnology Laboratory (2.0 cr)  
EEB 5609 - Ecosystem Ecology (3.0 cr)  
ESCI 4102W - Vertebrate Paleontology: Evolutionary History and Fossil Records of Vertebrates [WI] (3.0 cr)  
ESCI 4103W - Fossil Record of Mammals [WI] (3.0 cr)  
ESCI 4401 - Aqueous Environmental Geochemistry (3.0 cr)  
ESCI 4402 - Biogeochemical Cycles in the Ocean (3.0 cr)  
ESCI 4602 - Sedimentology and Stratigraphy (3.0 cr)  
ESCI 4703 - Glacial Geology (4.0 cr)  
ESCI 5102 - Climate Change and Human History (3.0 cr)  
ESCI 5201 - Time-Series Analysis of Geological Phenomena (3.0 cr)  
ESCI 5204 - Geostatistics and Inverse Theory (3.0 cr)  
ESCI 5302 - Isotope Geology (3.0 cr)  
ESCI 5705 - Limnogeology and Paleoenvironment (3.0 cr)  
ESCI 8243 - Principles of Rock Magnetism (1.0 - 3.0 cr)  
ESCI 8511 - Mechanics of Sediment Transport (3.0 cr)  
ESPM 5402 - Biometeorology (3.0 cr)  
FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)  
FNRM 5153 - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)  
FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)  
FNRM 5204 - Landscape Ecology and Management (3.0 cr)  
FNRM 5205 - Productivity and Ecology of Forest Soils (3.0 cr)  
FNRM 5218 - Measuring and Modeling Forests (3.0 cr)  
FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)  
FNRM 5462 - Advanced Remote Sensing and Geospatial Analysis (3.0 cr)  
GEOG 5401 - Geography of Environmental Systems and Global Change (3.0 cr)  
GEOG 5426 - Climatic Variations (3.0 cr)  
GEOG 5431 - Plant and Animal Geography (3.0 cr)  
GEOG 5531 - Numerical Spatial Analysis (4.0 cr)  
GEOG 5561 - Principles of Geographic Information Science (4.0 cr)  
GEOG 5839 - Introduction to Dendrochronology (3.0 cr)  
LAAS 5050 - Integrated Topics in Land & Atmospheric Science (3.0 cr)  
LAAS 5425 - Atmospheric Processes I: Thermodynamics and Dynamics of the Atmosphere (3.0 cr)  
LAAS 5426 - Atmospheric Processes II: Radiation, Composition, and Climate (3.0 cr)  
SOIL 4511 - Field Study of Soils (2.0 cr)  
SOIL 5555 - Wetland Soils (3.0 cr)  
SOIL 8510 - Advanced Topics in Pedology (2.0 - 4.0 cr)  
SOIL 8541 - Aquatic and Soil Chemistry (3.0 cr)



## Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral





### **Twin Cities Campus**

## **Robotics M.S.**

*College of Science and Engineering - Adm*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Minnesota Robotics Institute, Shepherd Laboratories, 100 Union St SE, Minneapolis, MN 55455

Email: [mnri@umn.edu](mailto:mnri@umn.edu)

Website: <https://cse.umn.edu/mnri>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Master of Science (MS) in Robotics program provides a strong foundation in Robotics by gathering in a single program the knowledge, expertise, and educational assets in the areas relevant to robotics, which include robot modeling and control, perception using cameras and other sensors, and cognition to reason, plan, and make decisions.

Students who graduate from this regular 2-year masters program will learn the state-of-the-art methods for developing and using robots, be exposed to the cutting edge technologies and theory forming the basis for the next generation of robots and their applications in areas such as agriculture, underwater exploration, autonomous driving, and manufacturing applications.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must have a bachelors degree from an accredited college or university in engineering (any), computer science, physics, or mathematics.

Other requirements to be completed before admission:

Programming experience including basic algorithms and data structures normally taught in beginning computer science courses either as part of the undergraduate degree or subsequent work experience is required. Students who are missing some of the background preparation can be admitted but will be required to complete some of the relevant undergraduate courses.

In lieu of GRE scores, an applicant may use industry experience. At least three years of demonstrated industry experience are needed in this case.

#### **Special Application Requirements:**

Applications are accepted on a rolling basis.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5



- Reading Score: 6.5
- Writing Score: 6.5

Key to [test abbreviations](#)(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 21 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 31 major credits and up to null credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The capstone project, completed in consultation with the advisor, covers a theoretical or practical problem in robotics. It includes a written report and a poster-session presentation in spring semester.

**Plan C:** Plan C requires 31 major credits and up to null credits outside the major. There is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

### Required courses (9 credits)

Select one course from each emphasis area in consultation with the advisor.

#### Cognition (3 credits)

- [CSCI 5511](#) - Artificial Intelligence I (3.0 cr)
- [CSCI 5512](#) - Artificial Intelligence II (3.0 cr)
- [CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)
- [CSCI 5525](#) - Machine Learning (3.0 cr)

#### Perception (3 credits)

- [CSCI 5561](#) - Computer Vision (3.0 cr)
- [EE 5561](#) - Image Processing and Applications (3.0 cr)

#### Robot Modeling and Control (3 credits)

- [AEM 5321](#) - Modern Feedback Control (3.0 cr)
- [CSCI 5551](#) - Introduction to Intelligent Robotic Systems (3.0 cr)
- [CSCI 5552](#) - Sensing and Estimation in Robotics (3.0 cr)
- [EE 5231](#) - Linear Systems and Optimal Control (3.0 cr)
- [ME 5286](#) - Robotics (4.0 cr)

### Colloquium (1 credit)

Take 1 colloquium credit.

- [ROB 8970](#) - Robotics Colloquium (1.0 cr)

### Electives (10-21 credits)

Select credits from the following, in consultation with the advisor, to complete minimum course credit requirements. Directed Research 5994 is limited to 3 credits total. For CSCI 8980 Special Topics, only topics in the areas of robotics, computer vision, and cognition may be used. Other courses may be selected with approval of the director of graduate studies.

- [AEM 5321](#) - Modern Feedback Control (3.0 cr)
- [AEM 5333](#) - Design-to-Flight: Small Uninhabited Aerial Vehicles (3.0 cr)
- [AEM 5451](#) - Optimal Estimation (3.0 cr)
- [AEM 8411](#) - Advanced Dynamics (3.0 cr)
- [AEM 8421](#) - Robust Multivariable Control Design (3.0 cr)
- [AEM 8423](#) - Convex Optimization Methods in Control (3.0 cr)
- [AEM 8495](#) - Advanced Topics in Aerospace Systems (1.0 - 4.0 cr)
- [CSCI 5231](#) - Wireless and Sensor Networks (3.0 cr)
- [CSCI 5511](#) - Artificial Intelligence I (3.0 cr)
- [CSCI 5512](#) - Artificial Intelligence II (3.0 cr)
- [CSCI 5521](#) - Introduction to Machine Learning (3.0 cr)



CSCI 5523 - Introduction to Data Mining (3.0 cr)  
CSCI 5525 - Machine Learning (3.0 cr)  
CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)  
CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)  
CSCI 5561 - Computer Vision (3.0 cr)  
CSCI 5609 - Visualization (3.0 cr)  
CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)  
CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)  
EE 5231 - Linear Systems and Optimal Control (3.0 cr)  
EE 5235 - Robust Control System Design (3.0 cr)  
EE 5239 - Introduction to Nonlinear Optimization (3.0 cr)  
EE 5251 - Optimal Filtering and Estimation (3.0 cr)  
EE 5391 - Computing With Neural Networks (3.0 cr)  
EE 5542 - Adaptive Digital Signal Processing (3.0 cr)  
EE 5561 - Image Processing and Applications (3.0 cr)  
EE 5621 - Physical Optics (3.0 cr)  
EE 5622 - Physical Optics Laboratory (1.0 cr)  
EE 5624 - Optical Electronics (4.0 cr)  
EE 5705 - Electric Drives in Sustainable Energy Systems (3.0 cr)  
EE 5707 - Electric Drives in Sustainable Energy Systems Laboratory (1.0 cr)  
EE 5940 - Special Topics in Electrical Engineering I (1.0 - 4.0 cr)  
EE 8215 - Nonlinear Systems (3.0 cr)  
EE 8231 - Optimization Theory (3.0 cr)  
EE 8581 - Detection and Estimation Theory (3.0 cr)  
EE 8591 - Predictive Learning from Data (3.0 cr)  
ME 5241 - Computer-Aided Engineering (4.0 cr)  
ME 5243 - Advanced Mechanism Design (4.0 cr)  
ME 5248 - Vibration Engineering (4.0 cr)  
ME 5286 - Robotics (4.0 cr)  
ME 8281 - Advanced Control System Design (4.0 cr)  
ME 8283 - Design of Mechatronic Products (4.0 cr)  
ME 8285 - Advanced Control System Design, with Applications to Smart Vehicles (3.0 cr)  
ROB 5994 - Directed Research (1.0 - 3.0 cr)

#### Plan Options

##### Plan A (10 credits)

Take 10 thesis credits.

ROB 8777 - Thesis Credits Master's (1.0 - 18.0 cr)

-OR-

##### Plan B (3 credits)

Take a minimum of 3 credits in the capstone course, in consultation with adviser.

ROB 8760 - Capstone Project (1.0 - 3.0 cr)

-OR-

##### Plan C

Students must complete one class project totaling 100 hours or two projects of 50 hours each.



### **Twin Cities Campus**

## **Robotics Minor**

*College of Science and Engineering - Adm*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Minnesota Robotics Institute, Shepherd Laboratories, 100 Union St SE, Minneapolis, MN 55455

Email: <https://cse.umn.edu/mnri>

Website: <http://mnri@umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Robotics minor is designed to familiarize students with the areas relevant to robotics, such as robot modeling and control; perception using cameras and other sensors; and cognition to reason, plan, and make decisions. Students will learn state-of-the-art methods for developing and using robots, and be exposed to cutting edge technologies and theories forming the basis for the next generation of robots and their applications in areas such as agriculture, underwater exploration, autonomous driving, and manufacturing applications.

## **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

## **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

#### **Required courses (9 credits)**

Students must take one course from each emphasis area for a minimum of 9 credits.

##### **Cognition**

Take 1 or more course(s) from the following:

- **CSCI 5511** - Artificial Intelligence I (3.0 cr)
- **CSCI 5512** - Artificial Intelligence II (3.0 cr)
- **CSCI 5521** - Introduction to Machine Learning (3.0 cr)
- **CSCI 5525** - Machine Learning (3.0 cr)

##### **Perception**

Take 1 or more course(s) from the following:

- **CSCI 5561** - Computer Vision (3.0 cr)
- **EE 5561** - Image Processing and Applications (3.0 cr)

##### **Robot Modeling and Control**

Take 1 or more course(s) from the following:

- **AEM 5321** - Modern Feedback Control (3.0 cr)
- **CSCI 5551** - Introduction to Intelligent Robotic Systems (3.0 cr)
- **CSCI 5552** - Sensing and Estimation in Robotics (3.0 cr)



- [EE 5231](#) - Linear Systems and Optimal Control (3.0 cr)
- [ME 5286](#) - Robotics (4.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters Minor



### ***Twin Cities Campus***

## **Security Technologies M.S.S.T.**

*Technological Leadership Institute*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Technological Leadership Institute, University of Minnesota, 290 McNamara Alumni Center, 200 Oak Street SE, Minneapolis MN 55455 (612-624-5474; fax: 612-624-7510)

Email: [msst@umn.edu](mailto:msst@umn.edu)

Website: <http://tli.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 32
- This program requires summer semesters for timely completion.
- Degree: Master of Science in Security Technologies

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The master of science in security technologies (MSST) shapes tomorrow's analytical and risk management policy makers and innovators through a multi-disciplinary graduate program developed in response to growing demand in many levels of industry and government. During the 14-month program and through a multidisciplinary systems approach, the program synthesizes core learning in four areas: security methods and foundations; application expertise (including cyber, bio, food, infrastructure, global supply chains); systems science (interdependency among critical networks, components, human capital, organizational dimensions); and social and policy dimensions. Through elective courses, students also choose a learning track in either security systems technologies or security risk management. Students can further specialize through a range of elective courses. This program bridges disciplines to address local, regional, national, and global areas of need, seeding innovative capabilities while enabling interdisciplinary connections through direct links to industry, business, and government partners.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree in a related field, e.g. in biological or physical sciences, engineering, computer science, mathematics, statistics, social sciences, or public policy, is preferred.

#### **Special Application Requirements:**

Applications are accepted on a rolling basis for the program's start in the summer of each year. Applicants must successfully complete a background check prior to final program admission.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.



## Program Requirements

**Plan B:** Plan B requires 26 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The Plan B project is an independent applied investigation on a relevant issue in security technologies or homeland security.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.0 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

### Core Courses (24 credits)

Complete the following courses. Take 0.5 credits of ST 8440.

- ST 8109 - Cybersecurity Foundations - Technology, Risk & Communication (2.0 cr)
- ST 8110 - Security Science and Technology Foundations (3.0 cr)
- ST 8111 - Methods, Theory, and Applications (2.5 cr)
- ST 8113 - Information and Cyber Security (2.0 cr)
- ST 8220 - Vulnerability, Risk and Threat Assessment and Management (3.0 cr)
- ST 8221 - Communications of Risk and Security (1.0 cr)
- ST 8330 - Critical Infrastructure Protections (3.0 cr)
- ST 8331 - Dynamic Systems Modeling and Simulation Tools (2.0 cr)
- ST 8440 - Security Practicum (0.5 - 2.0 cr)
- ST 8510 - Psychology/Behavior Intelligence for Homeland Security (2.0 cr)
- ST 8511 - Public Policy (1.0 cr)
- ST 8512 - Partnership in Conflict Management: Security/Privacy Law, Social Responsibility and Ethics (2.0 cr)

### Electives (6 credits)

Select a minimum of 6 credits from the following. Other courses may be applied to this requirement with director of graduate studies approval.

- CI 5301 - Foundations of Computer Applications for Business and Education (3.0 cr)
- CSCI 5221 - Foundations of Advanced Networking (3.0 cr)
- CSCI 5271 - Introduction to Computer Security (3.0 cr)
- CSCI 5471 - Modern Cryptography (3.0 cr)
- CSCI 8715 - Spatial Data Science Research (3.0 cr)
- ESPM 5604 - Environmental Management Systems and Strategy (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- GEOG 5561 - Principles of Geographic Information Science (4.0 cr)
- GEOG 5563 - Advanced Geographic Information Science (3.0 cr)
- GEOG 5564 - Urban Geographic Information Science and Analysis (3.0 cr)
- GIS 5574 - Web GIS and Services (3.0 cr)
- GIS 5577 - Spatial Database Design and Administration (3.0 cr)
- IDSC 6040 - Information Technology Management (2.0 cr)
- IDSC 6050 - Information Technologies and Solutions (2.0 cr)
- IDSC 6423 - Enterprise Systems (2.0 cr)
- IDSC 6444 - Business Analytics for Managers I (2.0 cr)
- IDSC 6481 - Managerial Decision Making (2.0 cr)
- IDSC 8003 - Accounting and Information Systems (4.0 cr)
- LAW 6022 - LL.M. Legal Writing and Legal Skills II (3.0 cr)
- LAW 6103 - Data Privacy Law (3.0 cr)
- LAW 6705 - Information Governance (2.0 cr)
- LAW 6832 - Cybercrime and Cybersecurity (2.0 cr)
- MATH 5248 - Cryptology and Number Theory (4.0 cr)
- MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)
- MGMT 6004 - Negotiation Strategies (2.0 cr)
- MGMT 6034 - Strategic Leadership (2.0 cr)
- MGMT 6084 - Management of Teams (2.0 cr)
- MGMT 6402 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- OLPD 5611 - Facilitation and Meeting Skills (1.0 cr)



- OLPD 5619 - Planning and Decision-Making Skills (1.0 cr)
- OLPD 6402 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- PA 5011 - Management of Organizations (3.0 cr)
- PA 5105 - Integrative Leadership: Leading Across Sectors to Address Grand Challenges (3.0 cr)
- PA 5405 - Public Policy Implementation (3.0 cr)
- PA 5701 - Science and State (3.0 cr)
- PA 5711 - Science, Technology & Environmental Policy (3.0 cr)
- PA 5741 - Risk, Resilience and Decision Making (1.5 cr)
- PA 5822 - International Security (3.0 cr)
- POL 5885 - International Conflict and Security (3.0 cr)
- POL 8402 - International Security (3.0 cr)
- PUBH 5231 - Emergency Preparedness: A Public Health Perspective (2.0 cr)
- PUBH 6112 - Environmental Health Risk Assessment: Application to Human Health Risks from Exposure to Chemicals (2.0 cr)
- PUBH 6123 - Violence Prevention and Control: Theory, Research, and Application (2.0 cr)
- PUBH 6182 - Emerging Infectious Disease: Current Issues, Policies, and Controversies (3.0 cr)
- PUBH 6571 - Quality, Patient Safety, and Performance Improvement (2.0 cr)
- PUBH 6702 - Integrative Leadership Seminar (3.0 cr)
- PUBH 7214 - Principles of Risk Communication (1.0 cr)
- PUBH 7221 - Planning for Urgent Threats (1.0 cr)
- PUBH 7223 - Concepts of Disaster Behavioral Health (1.0 cr)
- PUBH 7225 - Communication and Information Technology Tools for Public Health Emergency Response (1.0 cr)
- PUBH 7227 - Incident Management Systems: The Public Health Role (1.0 cr)
- PUBH 7230 - Topics in Infectious Disease (0.5 - 4.0 cr)
- PUBH 7233 - Food System Defense: Vulnerabilities in the Food System (1.5 cr)
- PUBH 7242 - War and Public Health (1.0 cr)
- SCO 6059 - Quality Management and Lean Six Sigma (4.0 cr)
- SCO 8892 - Readings in Operations and Management Science (1.0 - 8.0 cr)
- SOC 8412 - Social Network Analysis: Theory and Methods (3.0 cr)
- ST 8200 - Special Topics in Security Technologies (0.5 cr)
- ST 8441 - Internship (optional) (0.5 cr)
- VMED 5920 - Food Defense: Prepare, Respond, Recover (3.0 cr)
- WRIT 5001 - Introduction to Graduate Studies in Scientific and Technical Communication (3.0 cr)
- WRIT 5112 - Information Design: Theory and Practice (3.0 cr)
- WRIT 5561 - Editing and Style for Technical Communicators (3.0 cr)

**Capstone Project (2 credits)**

- Complete a total of 2 credits
- ST 8620 - Capstone (0.5 - 2.0 cr)





### **Twin Cities Campus**

## **Security Technologies Minor**

*Technological Leadership Institute*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Technological Leadership Institute, University of Minnesota, 290 McNamara Alumni Center, 200 Oak Street SE, Minneapolis MN 55455  
(612-624-5474; fax: 612-624-7510)

Email: [msst@umn.edu](mailto:msst@umn.edu)

Website: <http://tli.umn.edu>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- Length of program in credits (Masters): 9
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The security technologies graduate program shapes tomorrow's analytical and risk management policy makers and innovators through a multi-disciplinary graduate program developed in response to growing demand in many levels of industry and government. Through a multidisciplinary systems approach, the program synthesizes core learning in four areas: security methods and foundations; application expertise (including cyber, bio, food, infrastructure, global supply chains); systems science (interdependency among critical networks, components, human capital, organizational dimensions); and social and policy dimensions. Through elective courses, students choose a learning track in either security systems technologies or security risk management. Students can further specialize through a range of elective courses. This program bridges disciplines to address local, regional, national, and global areas of need, seeding innovative capabilities while enabling interdisciplinary connections through direct links to industry, business, and government partners.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

#### **Special Application Requirements:**

Students interested in the minor are strongly encouraged to confer with their major field advisor and director of graduate studies, and the Security Technologies director of graduate studies regarding feasibility and requirements. Applicants must be interviewed for admission (in person or by telephone) by the Security Technologies director of graduate studies or designate. An exception to the interview requirement may be waived, but only in rare circumstances.

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses towards program requirements is not permitted.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of B- earned for each course.

The minimum cumulative GPA for the minor is 3.00.

#### **Required Courses (9-12 credits)**

Master's students select at least 9 credits, and doctoral students select at least 12 credits from the following in consultation with the Security Technologies director of graduate studies.

[ST 8109](#) - Cybersecurity Foundations - Technology, Risk & Communication (2.0 cr)



- ST 8110 - Security Science and Technology Foundations (3.0 cr)
- ST 8111 - Methods, Theory, and Applications (2.5 cr)
- ST 8113 - Information and Cyber Security (2.0 cr)
- ST 8200 - Special Topics in Security Technologies (0.5 cr)
- ST 8220 - Vulnerability, Risk and Threat Assessment and Management (3.0 cr)
- ST 8221 - Communications of Risk and Security (1.0 cr)
- ST 8330 - Critical Infrastructure Protections (3.0 cr)
- ST 8331 - Dynamic Systems Modeling and Simulation Tools (2.0 cr)
- ST 8510 - Psychology/Behavior Intelligence for Homeland Security (2.0 cr)
- ST 8511 - Public Policy (1.0 cr)
- ST 8512 - Partnership in Conflict Management: Security/Privacy Law, Social Responsibility and Ethics (2.0 cr)
- ST 8661 - Securing Cyberspace (Fundamentals) (3.0 cr)

### Program Sub-plans

Students are required to complete one of the following sub-plans.  
Students may not complete the program with more than one sub-plan.

Masters

Doctoral



### **Twin Cities Campus**

## **Software Engineering M.S.S.E.**

*Computer Science and Engineering*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

MSSE Program, Department of Computer Science and Engineering, College of Science and Engineering, 4-192 Keller Hall, 200 Union Street S.E., Minneapolis, MN 55455 (612-625-1381; msse@umn.edu)

Email: [msse@umn.edu](mailto:msse@umn.edu)

Website: <http://www.msse.umn.edu>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science in Software Engineering

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The Master of Science in Software Engineering (MSSE) program provides a thorough understanding of the fundamental issues related to software development and the software development process. The MSSE curriculum provides a solid grounding in theoretical methods, principles, and tools, and an examination of fundamental software development issues and processes. These concepts are explored using realistic and relevant case examples and projects to ensure that the theory works in practice. The MSSE program is an interdisciplinary program administered by the College of Science and Engineering's Department of Computer Science and Engineering.

The program is offered in a format designed for full-time working professionals. Students take courses one day per week (alternating Fridays and Saturdays) and move through the curriculum as a cohort, taking all classes together for four semesters.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

Prospective students should have an undergraduate degree in computer science or a closely related field.

Other requirements to be completed before admission:

Students with degrees in other fields may be considered for admission based on relevant work experience.

Prospective applicants must have a minimum of one year of professional experience working in the software industry.

Because the MSSE program is designed for full-time working professionals, international applicants typically hold an H-1B visa.

#### **Special Application Requirements:**

The early application deadline is March 31. The final deadline is July 1. Applications are accepted for fall semester only.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB



- Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan C:** Plan C requires 30 major credits and up to null credits outside the major. There is no final exam.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Courses must be taken on the A/F grade basis, unless only offered S/N, with a minimum grade of C earned for each course.

The MSSE curriculum is fixed for the first three semesters. The fourth semester offers electives, including an optional independent project. The project requirement can be met by a combination of class projects or by the independent project elective SENG 8891.

### Core Courses (24 credits)

Complete all courses for 24 credits. Take SENG 5899 twice for a total of 2 credits.

[SENG 5115](#) - Graphical User Interface Design, Evaluation, and Implementation (2.0 cr)

[SENG 5707](#) - The Principles of Database Systems (3.0 cr)

[SENG 5801](#) - Software Engineering I: Overview, Requirements, and Modeling (3.0 cr)

[SENG 5802](#) - Software Engineering II: Software Design (3.0 cr)

[SENG 5811](#) - Software Testing and Verification (3.0 cr)

[SENG 5851](#) - Software Project Management (3.0 cr)

[SENG 5852](#) - Quality Assurance and Process Improvement (2.0 cr)

[SENG 5861](#) - Introduction to Software Architecture (3.0 cr)

[SENG 5899](#) - Software Engineering Seminar (1.0 cr)

### Electives (6 credits)

Choose a minimum of 6 credits in consultation with adviser

[SENG 5130](#) - Introduction to Internet of Things: Systems-Level Design and Experimentation (3.0 cr)

[SENG 5199](#) - Topics in Software Engineering (2.0 - 3.0 cr)

[SENG 5271](#) - Cybersecurity (3.0 cr)

[SENG 5511](#) - Artificial Intelligence (2.0 - 3.0 cr)

[SENG 5708](#) - Data Analytics (2.0 - 3.0 cr)

[SENG 5709](#) - Big Data Engineering and Analytics (3.0 cr)

[SENG 5831](#) - Software Development for Real-Time Systems (2.0 - 3.0 cr)

[SENG 5841](#) - Model-based Development (3.0 cr)

[SENG 8891](#) - Independent Project (2.0 - 6.0 cr)



### **Twin Cities Campus**

## **Stream Restoration Science and Engineering Postbaccalaureate Certificate**

*CSENG Civil, Envrn & Geo-Eng (CEGE)*

### **College of Science and Engineering**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

Stream Restoration Graduate Certificate Program, National Center for Earth-surface Dynamics, Saint Anthony Falls Laboratory, 2 Third Avenue SE, Minneapolis, MN 55414 (612-624-4363)

Email: [volle001@umn.edu](mailto:volle001@umn.edu)

Website: <http://www.nced.umn.edu/apply-certificate-program-stream-restoration>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 16
- This program does not require summer semesters for timely completion.
- Degree: Stream Rest. Science & Engineering PBacc Cert

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The postbaccalaureate certificate in stream restoration science and engineering is a three-semester program producing graduates who understand how to blend engineering, physical, biological, and social sciences in prioritizing, designing, implementing, and evaluating stream restoration projects. Two courses, including an introduction to stream restoration and a restoration design experience are required. The remaining courses are chosen from a specified list of relevant courses taught across a number of University departments.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree in a field related to ecology, civil engineering, or environmental and earth sciences from an accredited US institution or its foreign equivalent.

Other requirements to be completed before admission:

In addition to the University's online application form, students must submit a program application and one letter of reference.

Applications are accepted throughout the year, however, it is preferable to start the program in fall semester.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### **Program Requirements**

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.



A minimum GPA of 3.00 is required for students to remain in good standing.

Courses offered on both the A/F and S/N grade basis must be taken A/F.

The minimum cumulative GPA for coursework is 3.00.

#### **Foundation Course (3 credits)**

Students pursuing a degree in Civil Engineering, Ecology, Evolution and Behavior, or Earth Sciences should register for the foundation course under a designator other than that of their major.

[CEGE 8601](#) - Introduction to Stream Restoration (3.0 cr)  
or [EEB 8601](#) - Introduction to Stream Restoration (3.0 cr)  
or [ESCI 8601](#) - Introduction to Stream Restoration (3.0 cr)

#### **Elective Coursework (11 credits)**

Elective credits are chosen from four theme areas in consultation with adviser.

##### **River and Floodplain Science and Engineering**

Students must take a minimum of one course from this theme area.

[BBE 5513](#) - Watershed Engineering (3.0 cr)  
[BBE 8513](#) - Hydrologic Modeling of Small Watersheds (3.0 cr)  
[CEGE 4501](#) - Hydrologic Design (4.0 cr)  
[CEGE 4511](#) - Hydraulic Structures (3.0 cr)  
[CEGE 4512](#) - Open Channel Hydraulics (4.0 cr)  
[CEGE 8511](#) - Mechanics of Sediment Transport (3.0 cr)  
[ESCI 4701](#) - Geomorphology (4.0 cr)  
[FNRM 5114](#) - Hydrology and Watershed Management (3.0 cr)  
[FNRM 5153](#) - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)

##### **River and Floodplain Ecology**

[CEGE 8508](#) - Ecological Fluid Mechanics (4.0 cr)  
[EEB 5601](#) - Limnology (3.0 cr)  
[FW 8465](#) - Fish Habitats and Restoration (3.0 cr)  
[FW 8459](#) - Stream and River Ecology (3.0 cr)  
[HORT 5071](#) - Ecological Restoration (4.0 cr)

##### **Water Quality**

[CEGE 5541](#) - Environmental Water Chemistry (3.0 cr)  
[CEGE 8541](#) - Aquatic Chemistry (3.0 cr)  
[CEGE 8561](#) - Analysis and Modeling of Aquatic Environments I (3.0 cr)  
[CEGE 8562](#) - Analysis and Modeling of Aquatic Environments II (3.0 cr)  
[ESCI 4702](#) - General Hydrogeology (4.0 cr)  
[ESPM 5111](#) - Hydrology and Water Quality Field Methods (3.0 cr)

##### **Water Policy and Management**

A maximum of 4 credits may be taken from this theme area.

[ESPM 4295W](#) - GIS in Environmental Science and Management [WI] (4.0 cr)  
[ESPM 5061](#) - Water Quality and Natural Resources (3.0 cr)  
[ESPM 5202](#) - Environmental Conflict Management, Leadership, and Planning (3.0 cr)  
[WRS 5101](#) - Water Policy (3.0 cr)

#### **Capstone Course (2 credits)**

The capstone requires students to participate in a stream restoration design experience. Students pursuing a degree in Civil Engineering, Ecology, Evolution and Behavior, or Earth Sciences should register for the capstone course under a designator other than that of their major.

[CEGE 8602](#) - Stream Restoration Practice (2.0 cr)  
or [EEB 8602](#) - Stream Restoration Practice (2.0 cr)  
or [ESCI 8602](#) - Stream Restoration Practice (2.0 cr)



### **Twin Cities Campus**

## **Comparative and Molecular Biosciences M.S.**

*College of Veterinary Medicine - Adm*

### **College of Veterinary Medicine**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Veterinary Medicine, 1365 Gortner Avenue, Room 443 VMC, Saint Paul, MN 55108 (612-625-3770; fax: 612-626-2825)

Email: [cvmmsphd@umn.edu](mailto:cvmmsphd@umn.edu)

Website: <http://www.cvm.umn.edu/cmb>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The mission of the Comparative and Molecular Biosciences (CMB) program is to train outstanding scientists in the basic mechanisms of animal and human health and disease. The CMB program embraces a One Health approach and investigates a wide range of species, including humans, laboratory animals, companion animals, and livestock species.

The CMB program is transdisciplinary, bringing together basic, applied, and clinical scientists from a number of departments to provide students with individualized, cutting-edge biomedical research training. Areas of emphasis include genetic and infectious diseases, and comparative aspects of biology and pathology across animal species and humans. Students receive scientific training that prepares them for careers as independent investigators and educators in academia, industry, and government.

The purpose of the master's degree is to provide technical training and scientific competence in the basic mechanisms of animal and human health and disease.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.25.

A bachelor's degree in a biological or basic science is required. Previous laboratory experience is strongly preferred.

Other requirements to be completed before admission:

Applicants must submit a C.V. or résumé; three letters of recommendation from persons familiar with their scholarship and research potential; and a statement of any research experience, as well as career interests, goals, and objectives.

#### **Special Application Requirements:**

Submission of all application materials by December 1 is required to ensure consideration for fall semester admission.

<https://www.vetmed.umn.edu/education-training/ms-phd-programs/ms-phd-comparative-and-molecular-biosciences>

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5



- Reading Score: 6.5
- Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#) (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

### CMB Program Courses (11 credits)

Take the following courses. CMB 8550 must be taken twice for a total of 2 credits.

- [CMB 8134](#) - Ethical Conduct of Animal Research (3.0 cr)
- [CMB 8202](#) - Mechanisms of Animal Health and Disease II (3.0 cr)
- [CMB 8303](#) - Comparative Models of Disease (2.0 cr)
- [CMB 8550](#) - Comparative and Molecular Biosciences Seminar (1.0 cr)
- [CMB 8560](#) - Research and Literature Reports (1.0 cr)

### Statistics (3 to 4 credits)

Select one of the following courses in consultation with adviser.

- [CMB 5200](#) - Statistical Genetics and Genomics (4.0 cr)
- or [CMB 5915](#) - Essential Statistics for Life Sciences (3.0 cr)
- or [CMB 8910](#) - Statistical Principles of Research Design (3.0 cr)
- or [PUBH 6450](#) - Biostatistics I (4.0 cr)
- or [PUBH 6451](#) - Biostatistics II (4.0 cr)
- or [STAT 5021](#) - Statistical Analysis (4.0 cr)
- or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- or [STAT 5303](#) - Designing Experiments (4.0 cr)
- or [STAT 5421](#) - Analysis of Categorical Data (3.0 cr)

### Additional coursework (5 to 6 credits)

Select coursework, in consultation with the advisor, to complete the 20 course credits required. Other courses may be selected with advisor approval.

- [MICA 8002](#) - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
- or [MICA 8003](#) - Immunity and Immunopathology (4.0 cr)
- or [MICA 8004](#) - Cellular and Cancer Biology (4.0 cr)
- or [MICA 8009](#) - Biochemical Aspects of Normal and Abnormal Cell Growth and Cell Death (2.0 cr)
- or [MICA 8010](#) - Microbial Pathogenesis (3.0 cr)
- or [BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)
- or [BIOC 6021](#) - Biochemistry (3.0 cr)
- or [BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)
- or [BIOC 8216](#) - Signal Transduction and Gene Expression (3.0 cr)
- or [GCD 5036](#) - Molecular Cell Biology (3.0 cr)
- or [GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)
- or [GCD 8073](#) - Genetics & Genomics in Human Health (3.0 cr)
- or [GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)
- or [GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- or [GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)
- or [CMB 5200](#) - Statistical Genetics and Genomics (4.0 cr)
- or [CMB 5340](#) - Structural Biology in Biomedical Research (2.0 cr)
- or [CMB 5571](#) - Pathogenomics and Molecular Epidemiology - Learning to Fly (3.0 cr)
- or [CMB 5594](#) - Directed Research in Comparative and Molecular Biosciences (1.0 - 4.0 cr)





- or [CMB 5910](#) - Grantwriting: What Makes a Winning Proposal? (2.0 cr)
- or [CMB 8208](#) - Neuropsychopharmacology (3.0 cr)
- or [CMB 8344](#) - Mechanisms of Hormone Action (2.0 cr)
- or [CMB 8361](#) - Neuro-Immune Interactions (3.0 cr)
- or [CMB 8371](#) - Mucosal Immunobiology (3.0 cr)
- or [CMB 8481](#) - Advanced Neuropharmaceutics (4.0 cr)
- or [CMB 8571](#) - Pathogenomics and Molecular Epidemiology - Learning to Fly (3.0 cr)

**Thesis credits**

Take 10 master's thesis credits.

[CMB 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Comparative and Molecular Biosciences Ph.D.**

College of Veterinary Medicine - Adm

### **College of Veterinary Medicine**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Veterinary Medicine, 1365 Gortner Avenue, Room 443 VMC, Saint Paul, MN 55108 (612-625-3770; fax: 612-626-2825)

Email: [cvmmsphd@umn.edu](mailto:cvmmsphd@umn.edu)

Website: <https://vetmed.umn.edu/education-training/ms-phd-programs/ms-phd-comparative-and-molecular-bioscienc>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program requires summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The mission of the Comparative and Molecular Biosciences (CMB) program is to train outstanding scientists in the basic mechanisms of animal and human health and disease. The CMB program embraces a One Health approach and investigates a wide range of species, including humans, laboratory animals, companion animals, and livestock species.

The CMB program is transdisciplinary, bringing together basic, applied, and clinical scientists from a number of departments to provide students with individualized, cutting-edge biomedical research training. Areas of emphasis include genetic and infectious diseases, cancer biology, and comparative aspects of biology and pathology across animal species and humans. Students receive scientific training that prepares them for careers as independent investigators and educators in academia, industry, and government.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.25.

A bachelor's degree in a biological or basic science is required. Previous research experience is expected.

Other requirements to be completed before admission:

Applicants must submit a C.V. or résumé; three letters of recommendation from persons familiar with their scholarship and research potential; and a statement of any research experience, as well as career interests, goals, and objectives.

#### **Special Application Requirements:**

Submission of all application materials by December 1 is required to ensure consideration for admission, fellowships, and research assistantships awarded for the next academic year. <https://www.vetmed.umn.edu/education-training/ms-phd-programs/ms-phd-comparative-and-molecular-biosciences>

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5



- MELAB  
- Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.  
0 credits are required outside the major.  
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

The PhD requires a minimum of 24 course credits and 24 thesis credits. The 24 course credits include 15 credits of CMB program courses. A statistics course is required. A minimum of 6 additional course credits from the biological sciences are also required. In addition, all students are required to complete a teaching experience.

### CMB program courses

A minimum of 15 course credits are required. CMB 8100 must be taken twice and CMB 8550 must be taken twice.

- [CMB 5910](#) - Grantwriting: What Makes a Winning Proposal? (2.0 cr)
- [CMB 8100](#) - Research Rotation in Comparative and Molecular Biosciences (1.0 cr)
- [CMB 8134](#) - Ethical Conduct of Animal Research (3.0 cr)
- [CMB 8202](#) - Mechanisms of Animal Health and Disease II (3.0 cr)
- [CMB 8303](#) - Comparative Models of Disease (2.0 cr)
- [CMB 8550](#) - Comparative and Molecular Biosciences Seminar (1.0 cr)
- [CMB 8560](#) - Research and Literature Reports (1.0 cr)

### Statistics

One of the following statistics courses is required.

- [CMB 5200](#) - Statistical Genetics and Genomics (4.0 cr)
- or [CMB 5915](#) - Essential Statistics for Life Sciences (3.0 cr)
- or [CMB 8910](#) - Statistical Principles of Research Design (3.0 cr)
- or [PUBH 6450](#) - Biostatistics I (4.0 cr)
- or [PUBH 6451](#) - Biostatistics II (4.0 cr)
- or [STAT 5021](#) - Statistical Analysis (4.0 cr)
- or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)
- or [STAT 5303](#) - Designing Experiments (4.0 cr)
- or [STAT 5421](#) - Analysis of Categorical Data (3.0 cr)

### Additional courses

A minimum of 6 course credits are required, selected from the following list or in consultation with the advisor. Students may take GRAD 8101 OR GRAD 8200 but not both, and these cannot be applied toward the degree requirements.

- [BIOC 5361](#) - Microbial Genomics and Bioinformatics (3.0 cr)
- or [BIOC 6021](#) - Biochemistry (3.0 cr)
- or [BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)
- or [BIOC 8216](#) - Signal Transduction and Gene Expression (3.0 cr)
- or [CMB 5200](#) - Statistical Genetics and Genomics (4.0 cr)
- or [CMB 5340](#) - Structural Biology in Biomedical Research (2.0 cr)
- or [CMB 5571](#) - Pathogenomics and Molecular Epidemiology - Learning to Fly (3.0 cr)
- or [CMB 8208](#) - Neuropsychopharmacology (3.0 cr)
- or [CMB 8344](#) - Mechanisms of Hormone Action (2.0 cr)
- or [CMB 8361](#) - Neuro-Immune Interactions (3.0 cr)
- or [CMB 8371](#) - Mucosal Immunobiology (3.0 cr)
- or [CMB 8394](#) - Research in Comparative Biomedical Sciences (1.0 - 6.0 cr)
- or [CMB 8481](#) - Advanced Neuropharmaceutics (4.0 cr)
- or [CMB 8571](#) - Pathogenomics and Molecular Epidemiology - Learning to Fly (3.0 cr)
- or [GCD 5036](#) - Molecular Cell Biology (3.0 cr)



- or [GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)
- or [GCD 8073](#) - Genetics & Genomics in Human Health (3.0 cr)
- or [GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)
- or [GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- or [GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)
- or [GRAD 8101](#) - Teaching in Higher Education (3.0 cr)
- or [GRAD 8200](#) - Teaching and Learning Topics in Higher Education (1.0 cr)
- or [MICA 8002](#) - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
- or [MICA 8003](#) - Immunity and Immunopathology (4.0 cr)
- or [MICA 8004](#) - Cellular and Cancer Biology (4.0 cr)
- or [MICA 8009](#) - Biochemical Aspects of Normal and Abnormal Cell Growth and Cell Death (2.0 cr)
- or [MICA 8010](#) - Microbial Pathogenesis (3.0 cr)

**Thesis Credits**

Take at least 24 doctoral thesis credits

[CMB 8888](#) - Thesis Credit: Doctoral (1.0 - 24.0 cr)



### **Twin Cities Campus**

## **Veterinary Medicine M.S.**

*College of Veterinary Medicine - Adm*

### **College of Veterinary Medicine**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Veterinary Medicine, 1365 Gortner Avenue, Room 443 VMC, Saint Paul, MN 55108 (612-625-3770; fax: 612-626-2825)

Email: [cvmmsphd@umn.edu](mailto:cvmmsphd@umn.edu)

Website: <http://www.vetmed.umn.edu/education-training/ms-phd-programs>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The veterinary medicine graduate program focuses on the scientific study of the mechanisms of transmission and progression of diseases of importance to domestic animals, wildlife and humans with applications to diagnosis, prevention, and treatment. Includes training in infectious and noninfectious disease, epidemiology, environmental biology, ethology, anatomical, clinical and molecular pathobiology.

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.25.

DVM or equivalent; students with a BA or BS in biological sciences may be considered. Previous laboratory experience is preferred.

Other requirements to be completed before admission:

Applicants must submit a CV or résumé, three letters of recommendation from persons familiar with their scholarship and research potential, and a statement of any research experience, as well as career interests, goals, and objectives.

#### **Special Application Requirements:**

Submission of all application materials by December 1 is required to ensure consideration for admission, fellowships, and research assistantships awarded for the next academic year.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the



catalog website.

## Program Requirements

**Plan A:** Plan A requires 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is written and oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

### Required Courses (9 credits)

Take the following courses. VMED 8550 must be taken twice for a total of 2 credits.

- VMED 5190 - Seminar and Presentation Development (2.0 cr)
- VMED 5910 - Grant Writing: What Makes a Winning Proposal? (2.0 cr)
- VMED 8134 - Ethical Conduct of Animal Research (3.0 cr)
- VMED 8550 - Veterinary Medicine Seminar (1.0 cr)

### Statistics

Select at least 3 credits from the following in consultation with the advisor. Two statistics are recommended, but not required.

- VMED 5915 - Essential Statistics for Life Sciences (3.0 cr)
- VMED 8910 - Statistical Principles of Research Design (3.0 cr)
- PUBH 6414 - Biostatistical Literacy (3.0 cr)
- PUBH 6450 - Biostatistics I (4.0 cr)
- PUBH 6451 - Biostatistics II (4.0 cr)
- STAT 5021 - Statistical Analysis (4.0 cr)
- STAT 5302 - Applied Regression Analysis (4.0 cr)
- STAT 5303 - Designing Experiments (4.0 cr)
- STAT 5421 - Analysis of Categorical Data (3.0 cr)

### 8xxx-level Coursework

Select at least 1 course from the following in consultation with the advisor. CMB 8202 is recommended.

- BIOC 8002 - Molecular Biology and Regulation of Biological Processes (3.0 cr)
- BIOC 8216 - Signal Transduction and Gene Expression (3.0 cr)
- GCD 8008 - Mammalian Gene Transfer and Genome Engineering (2.0 cr)
- GCD 8073 - Genetics & Genomics in Human Health (3.0 cr)
- GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)
- GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)
- GCD 8161 - Advanced Cell Biology and Development (2.0 cr)
- CMB 8202 - Mechanisms of Animal Health and Disease II (3.0 cr)
- CMB 8303 - Comparative Models of Disease (2.0 cr)
- CMB 8344 - Mechanisms of Hormone Action (2.0 cr)
- CMB 8571 - Pathogenomics and Molecular Epidemiology - Learning to Fly (3.0 cr)
- VMED 8192 - Dairy Health Management: Critical Thinking (1.0 cr)
- VMED 8394 - Research in Veterinary Medicine (1.0 - 3.0 cr)
- VMED 8492 - Seminar: Infectious Diseases and Swine Medicine (1.0 cr)
- VMED 8592 - Infectious Disease Journals: Critical Thinking (1.0 cr)

### Additional Biological Sciences Coursework

Select at least 7 credits from the following in consultation with the advisor:

- VPM 4131 - Immunology (3.0 cr)
- VMED 5165 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)
- VMED 5180 - Ecology of Infectious Disease (3.0 cr)
- VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)
- VMED 5182 - Molecular biology for the Public Health Professional (2.0 cr)
- VMED 5190 - Seminar and Presentation Development (2.0 cr)
- VMED 5442 - Quantitative Methods for Population Health (3.0 cr)
- VMED 5594 - Research in Veterinary Medicine (1.0 - 4.0 cr)
- VMED 5910 - Grant Writing: What Makes a Winning Proposal? (2.0 cr)
- VMED 5920 - Food Defense: Prepare, Respond, Recover (3.0 cr)
- VMED 5921 - Seminar in Food Protection and Defense (1.0 cr)



CMB 5200 - Statistical Genetics and Genomics (4.0 cr)  
CMB 5340 - Structural Biology in Biomedical Research (2.0 cr)  
CMB 5571 - Pathogenomics and Molecular Epidemiology - Learning to Fly (3.0 cr)  
PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
PUBH 6343 - Epidemiologic Methods III (4.0 cr)  
PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)  
PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)  
BIOC 8002 - Molecular Biology and Regulation of Biological Processes (3.0 cr)  
BIOC 8216 - Signal Transduction and Gene Expression (3.0 cr)  
GCD 8008 - Mammalian Gene Transfer and Genome Engineering (2.0 cr)  
GCD 8073 - Genetics & Genomics in Human Health (3.0 cr)  
GCD 8131 - Advanced Molecular Genetics and Genomics (3.0 cr)  
GCD 8151 - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)  
GCD 8161 - Advanced Cell Biology and Development (2.0 cr)  
CMB 8202 - Mechanisms of Animal Health and Disease II (3.0 cr)  
CMB 8303 - Comparative Models of Disease (2.0 cr)  
CMB 8344 - Mechanisms of Hormone Action (2.0 cr)  
CMB 8571 - Pathogenomics and Molecular Epidemiology - Learning to Fly (3.0 cr)  
VMED 8192 - Dairy Health Management: Critical Thinking (1.0 cr)  
VMED 8394 - Research in Veterinary Medicine (1.0 - 3.0 cr)  
VMED 8492 - Seminar: Infectious Diseases and Swine Medicine (1.0 cr)  
VMED 8592 - Infectious Disease Journals: Critical Thinking (1.0 cr)  
VMED 5440 - Using Risk Analysis Tools: Estimating Food Safety Risks on the Farm to Table Continuum (2.0 cr)

#### Thesis Credits

Take 10 master's thesis credits.

CMB 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)



### **Twin Cities Campus**

## **Veterinary Medicine Ph.D.**

*College of Veterinary Medicine - Adm*

### **College of Veterinary Medicine**

Link to a [list of faculty](#) for this program.

#### **Contact Information:**

College of Veterinary Medicine, 1365 Gortner Avenue, Room 443 VMC, Saint Paul, MN 55108 (612-625-3770; fax: 612-626-2825)

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Website: <https://vetmed.umn.edu/education-training/ms-and-phd-programs/ms-and-phd-veterinary-medicine>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program requires summer semesters for timely completion.
- NO
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The veterinary medicine graduate program focuses on the scientific study of the mechanisms of transmission and progression of diseases of importance to companion animals, livestock, and humans with applications to diagnosis, prevention, and treatment. Includes training in infectious and noninfectious disease, epidemiology, environmental biology, ethology, anatomical, clinical and molecular pathobiology.

### **Accreditation**

This program is accredited by NA

### **Program Delivery**

This program is available:

- via classroom (the majority of instruction is face-to-face)

### **Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.25.

DVM or equivalent; students with a BA or BS in biological sciences may be considered. Previous laboratory experience is strongly preferred.

Other requirements to be completed before admission:

Applicants must submit a CV or resume; three letters of recommendation from persons familiar with their scholarship and research potential; and a statement of any research experience, as well as career interests, goals, and objectives.

#### **Special Application Requirements:**

Submission of all application materials by December 1 is required to ensure consideration for fellowships and research assistantships awarded for the next academic year.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5





- Writing Score: 6.5
- MELAB
- Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#)(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

## Program Requirements

24 credits are required in the major.

0 credits are required outside the major.

24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

### VMED Program Courses

Take the following courses for 9 credits. VMED 8550 must be taken twice.

[VMED 5190](#) - Seminar and Presentation Development (2.0 cr)

[VMED 5910](#) - Grant Writing: What Makes a Winning Proposal? (2.0 cr)

[VMED 8134](#) - Ethical Conduct of Animal Research (3.0 cr)

[VMED 8550](#) - Veterinary Medicine Seminar (1.0 cr)

### Statistics Requirement

Take at least one statistics course, in consultation with the advisor. Two statistics courses are preferred.

[VMED 5915](#) - Essential Statistics for Life Sciences (3.0 cr)

or [VMED 8910](#) - Statistical Principles of Research Design (3.0 cr)

or [PUBH 6414](#) - Biostatistical Literacy (3.0 cr)

or [PUBH 6450](#) - Biostatistics I (4.0 cr)

or [PUBH 6451](#) - Biostatistics II (4.0 cr)

or [STAT 5302](#) - Applied Regression Analysis (4.0 cr)

or [STAT 5303](#) - Designing Experiments (4.0 cr)

or [STAT 5421](#) - Analysis of Categorical Data (3.0 cr)

### 8000-Level Coursework Requirement

Take at least 3 8000-level biological sciences courses from the following list, or select others, in consultation with the advisor. CMB 8202 is recommended.

[BIOC 8002](#) - Molecular Biology and Regulation of Biological Processes (3.0 cr)

or [BIOC 8216](#) - Signal Transduction and Gene Expression (3.0 cr)

or [GCD 8008](#) - Mammalian Gene Transfer and Genome Engineering (2.0 cr)

or [GCD 8073](#) - Genetics & Genomics in Human Health (3.0 cr)

or [GCD 8131](#) - Advanced Molecular Genetics and Genomics (3.0 cr)

or [GCD 8151](#) - Cellular Biochemistry and Cell Biology (2.0 - 4.0 cr)

or [GCD 8161](#) - Advanced Cell Biology and Development (2.0 cr)

or [CMB 8100](#) - Research Rotation in Comparative and Molecular Biosciences (1.0 cr)

or [CMB 8202](#) - Mechanisms of Animal Health and Disease II (3.0 cr)

or [CMB 8303](#) - Comparative Models of Disease (2.0 cr)

or [CMB 8344](#) - Mechanisms of Hormone Action (2.0 cr)

or [CMB 8571](#) - Pathogenomics and Molecular Epidemiology - Learning to Fly (3.0 cr)

or [VMED 8192](#) - Dairy Health Management: Critical Thinking (1.0 cr)

or [VMED 8394](#) - Research in Veterinary Medicine (1.0 - 3.0 cr)

or [VMED 8492](#) - Seminar: Infectious Diseases and Swine Medicine (1.0 cr)

or [VMED 8592](#) - Infectious Disease Journals: Critical Thinking (1.0 cr)

### Additional Coursework

Take additional courses from the following list, or select others in consultation with the advisor, to complete the minimum course credit requirement.



VPM 4131 - Immunology (3.0 cr)  
or VMED 5165 - Surveillance of Foodborne Diseases and Food Safety Hazards (2.0 cr)  
or VMED 5180 - Ecology of Infectious Disease (3.0 cr)  
or VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)  
or VMED 5182 - Molecular biology for the Public Health Professional (2.0 cr)  
or VMED 5190 - Seminar and Presentation Development (2.0 cr)  
or VMED 5442 - Quantitative Methods for Population Health (3.0 cr)  
or VMED 5594 - Research in Veterinary Medicine (1.0 - 4.0 cr)  
or VMED 5596 - Swine Diseases and Diagnostics (2.0 - 3.0 cr)  
or VMED 5910 - Grant Writing: What Makes a Winning Proposal? (2.0 cr)  
or VMED 5921 - Seminar in Food Protection and Defense (1.0 cr)  
or CMB 5200 - Statistical Genetics and Genomics (4.0 cr)  
or CMB 5340 - Structural Biology in Biomedical Research (2.0 cr)  
or CMB 5571 - Pathogenomics and Molecular Epidemiology - Learning to Fly (3.0 cr)  
or PUBH 6341 - Epidemiologic Methods I (3.0 cr)  
or PUBH 6342 - Epidemiologic Methods II (3.0 cr)  
or PUBH 6343 - Epidemiologic Methods III (4.0 cr)  
or PUBH 6350 - Epidemiologic Methods III: Lab (1.0 cr)  
or PUBH 6385 - Epidemiology and Control of Infectious Diseases (2.0 cr)

**Thesis Credits**

Take at least 24 doctoral thesis credits.

VMED 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)