Explore New Opportunities!

Department of **S**tatistical & **A**ctuarial **S**ciences
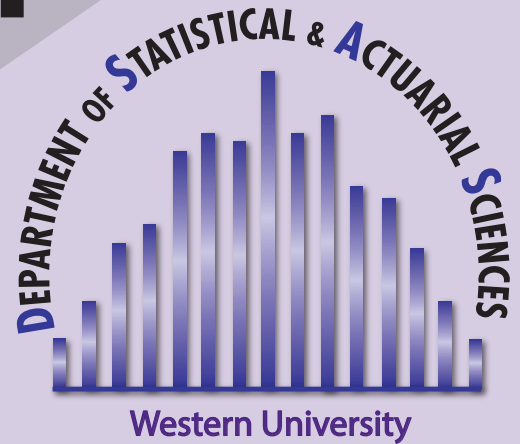
Western University

- **Actuarial Science**
- **Data Science ****
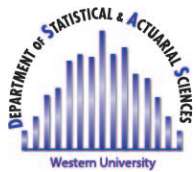- **Financial Modelling**
- **Statistics**

Our degrees open doors to business, finance, research, industry, health care & so much more...

**Offered jointly with Computer Science

For more information visit:
www.uwo.ca/stats

Western
Science

Potential Areas of Employment for Students Graduating from our Programs

Actuarial Science
1. **Insurance Industry** - Life and Property and Casualty Insurance Companies
2. **Employee Benefits Consulting** – particularly Retirement (Pension) & Group Benefits Consulting
3. **Other Financial Institutions** such as Investment firms, Banks and Trust Companies
4. **Government –** this work may involve supporting the ongoing analysis of the various government social security programs and any related financial modeling, including looking at demographic trends and implications
5. **Education** –Research and/or teaching
6. **Several other areas** - include actuarial recruiting for the forensic sciences and employers in the Environmental Analysis sector, as well as other employers looking for expertise in financial modeling and/or risk management

Companies from the above sectors come to our campus annually to recruit students from our actuarial science programs. Opportunities exist both in Canada and abroad, particularly in the U.S. Recently there has been increased interest in recruiters from the U.S. who, in addition to Canadian employers, are now very actively recruiting our students. Websites of interest are www.beanactuary.org/, as well as the Canadian Institute of Actuaries website (www.cia-ica.ca/home) and the Society of Actuaries website (www.soa.org/).

Data Science

1. Banks, Insurance Companies, Investment Firms and other Financial Institutions
2. Health Care and Medical Research Firms
3. Marketing Firms
4. Sports Agencies
5. Tech Companies and numerous other Industries

Statistics
1. **Government** - both at the federal (Stats Canada and Health Welfare) and provincial levels
2. **Public and Private Statistical Consulting firms**
3. **Biostatistical and Pharmaceutical fields**
4. **Various sectors of the Financial Industry**, including banks, investment firms and insurance companies.
Students with Statistics degrees may be hired for several different role types, including marketing research & analysis.
Recently, several have been recruited for opportunities in the financial modeling area
5. **Public and Private Industry employment opportunities exist** for those wishing to specialize in
areas such as qualify control and/or operations research areas. Potential employers here would include well known firms such as 3M,GM, Bell, and IBM amongst others.
6. **Education and other areas** – include Research and/or teaching, as well as employers looking for expertise in financial modeling and/or risk management

Several companies from the above sectors including **Stats Canada**, come to our campus annually to recruit students from our respective statistical science programs. Opportunities exist both in Canada and abroad, particularly in the U.S. The Statistical Society of Canada (SSC) posts job opportunities in the statistical field on their website at www.ssc.ca Students possessing an Honors degree in Statistics will be well prepared to continue their education at the Master's level.

Financial Modeling

1. **Banks** - Analyst in Currencies and Commodities, Investments, Risk Management, Securities
2. **Brokerage Firms**
3. **Education** –Research and/or teaching
4. **Pension Fund Management Companies**
5. **Insurance Firms**

This program is designed for people who wish to combine a solid quantitative grounding, chiefly in applied mathematics and in statistical sciences but with a bit of actuarial science as well, with a view to applying this quantitative grounding in a business career.   As well as receiving a good quantitative and business-friendly education, graduates of this program will be very well prepared for Master's programs in business administration or in quantitative finance. We also strongly encourage those entering this program to explore the possibility of combining it with an HBA in a five year B.Sc-HBA concurrent degree.

Internship Program

As part of the Science Internship Program, 3rd year students participate in 8 - 16 month career-related placements, before returning to UWO to complete Year 4 of their program.

As a Science intern, you will not only benefit from the *paid* hands-on work experience, but you will also be mentored by a professional in the field. This interaction will help identify long-term goals, as well as allow you to "try a career on for size." In a number of cases, Internship placements have led to full-time employment upon graduation.

Statistical & Actuarial Sciences Internship Partners include:

- Great West Life/London Life
- Sunlife Financial
- Willis Towers Watson
- Economical Insurance
- IBM
- Reinsurance Mgmt Association (RMA)
- AON
- Ontario Ministries
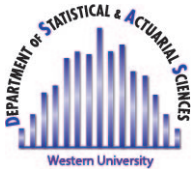- Ontario Power Generation (OPG)

Summer Jobs

Each fall approximately 13 - 15 companies hold recruitment sessions aimed specifically at students enrolled in Statistical and Actuarial Sciences. These employers are typically hiring for both summer and post graduate positions. Our students have the opportunity to attend resume writing and interview workshops in advance of these *sessions and learn how to put their best foot forward.*

International Exchange Programs

Western is committed to internationalization and encourages all students to become global citizens. By studying on exchange, students learn the dynamics between the developing and the developed world and build familiarity and connections with different world regions. A cosmopolitan worldview is rated as one of the top three skills needed in future leaders & by going on exchange, students gain valuable skills for succeeding in a global economy.

An exchange involves students applying to the program to study at one of the universities with whom Western has an exchange agreement. Students pay regular Western tuition fees to participate, thus not being subjected to international student fees. Full details about the Exchange Program can be viewed at:
http://www.sdc.uwo.ca/int/exchange

Class of '49 Scholarship	One award annually to a first year student who has obtained the highest mark in SS1023a/b and who, in the opinion of the Dept. of Stats & Act Sci has achieved a high overall academic standing. No application required.	$125
London Life Actuarial Career Scholarship, Three Year Continuing	Awarded annually to a student in second year, pursuing an Honors Specialization or Double Major, including Actuarial Science.	$5,000 annually continuing for 3 years plus 2 x 4 month summer internships
London Life Actuarial Career Scholarship, Two Year Continuing	Awarded annually to two students in third year, pursuing an Honors Specialization or Double Major, including Actuarial Science.	$5,000 annually continuing for 2 years plus 4 month summer internship
Manulife Financial Scholarships in Actuarial Sciences	Awarded annually to a student in third year of an Honors Specialization module in Actuarial Science or an Honors Degree with contains an Actuarial Science module.	$5,200
Morneau Shepell Continuing Career Scholarship	Awarded annually to a student in second year of an Honors Specialization module in Actuarial Science.	$3,000 annually continuing for 2 years plus 2 summer internships.
V. M. Joshi Memorial Scholarship	Awarded to any undergraduate in any Honours Statistics program who has maintained minimum 80% average and demonstrates financial need.	$750
Mercer Human Resource Consulting 125th Anniversary Alumni Scholarship	Awarded to a full-time student in year 3 or 4 of an Honors degree in one of our programs based on a minimum 70% average, financial need, and university and community involvement.	$2,000
TD Women in Data Analysis Undergraduate Bursary	Awarded to a full-time undergraduate female student in any year of an Honours Specialization or Major in Data Science or Double Major that includes Data Science, based on financial need. **Online financial assistance applications are available through Student Centre and must be completed by October 31**. The Office of the Registrar will select the recipients. This bursary was established by TD Bank Group	Value: 4 at $5,000 annually

The Department of Statistical and Actuarial Sciences - Awards

The Northern Life Assurance Gold Medal	Awarded to a full time student in a Statistics program with the highest average in their graduating year.
The U.W.O. Gold Medals in Honors Actuarial Science and Statistical Programs	Awarded to a full time student in the respective Honors program with the highest graduating average, minimum 80%.
The John Mereu Book Prize	Awarded to the student with the highest average in the life contingency courses (which now includes AS327,AS329 & AS422).

*in addition to UWO entrance scholarships

University of Western Ontario
Actuarial & Statistical Undergraduate Association

- Resume writing seminars & Interview workshops

- Mentorship Program

- Summer Job Seminars

- Society of Actuaries Exam Seminars and Help Sessions

- SOA Study Manuals

- Travel Subsidies for the Annual Actuarial Student National Association Convention

- Volunteer Opportunities at Seminars, Conferences, and Outreach Events

Bowling Parties, Professor Meet & Greet, Movie Nights, Study Groups, Holiday Parties, and lots more

ASUA provides opportunities to network make lasting friendships, take on leadership roles, and enrich your undergraduate experience.

What is an Actuary?

The future is full of uncertainty. Some of the events that can happen are undesirable. "Risk" is the possibility that an undesirable event will occur. Actuaries are experts in:

• evaluating the likelihood of future events,
• designing creative ways to reduce the likelihood of undesirable events,
• decreasing the impact of undesirable events that do occur.

The impact of undesirable events can be both emotional and financial. Reducing the likelihood of these events helps relieve emotional pain. But some events, such as car accidents or house fires, cannot be totally avoided. So, reducing the financial impact of these adverse events is very important. Actuaries are the leading professionals in finding ways to manage risk. It takes a combination of strong analytical skills, business knowledge and understanding of human behaviour to design and manage programs that control risk.

Where do actuaries work?

• Insurance Companies
• Employee Benefits Consulting Companies
• Reinsurance Companies
• Investment Firms
• Trust Companies/Banks
• Governments
• Universities: Research/Teaching

What should I have taken in first year?

• Calculus 1000A/B or 1500A/B
• Calculus 1501A/B (recommended) or Calculus 1301A/B with a mark of at least 85%
• Math 1600A/B
• Economics 1021A/B and Economics 1022A/B (can complete in upper year)

Why choose Actuarial Science?

• "Actuary" regularly appears on the list of top five professions
• Internship program: you will not only benefit from the paid hands-on work experience, but you will also be mentored by a professional in the field
• Dynamic undergraduate student association
• High faculty/student ratio, undergraduate opportunities for summer funded research
• Combined Ivey HBA degree option
• Some courses may count towards professional accreditation requirements

Honors Specialization in Actuarial Science Module (20.0 courses)

This is a guide only. For complete information, see the <u>current online Academic Calendar</u>

Last updated July 18, 2018

Year 1 (5.0 Courses)

Calculus 1000A/B or 1500A/B

Calculus 1501A/B (recommended) or Calculus 1301A/B with a mark of 85%+

Math 1600A/B

Economics 1021A/B and Economics 1022A/B

0.5 other principal course

2.0 options

NOTE: At least 1.0 course must be chosen from two of Category A, B, and C as listed in the Academic Calendar(e.g. 1.0 from A and 1.0 from C)

Admission to Honors Specialization Module:

Complete first year (5.0 courses) with no failures including:

- Minimum average of 70% on 3.0 principal courses with no mark less than 60% in any of the 3 principal courses:
  - Calculus 1000A/B or 1500A/B
  - Calculus 1501A/B or Calculus 1301A/B with a mark of at least 85%
  - Mathematics 1600A/B Economics 1021A/B and Economics 1022A/B
  - 0.5 other principal course

<u>Recommended (but not required) first year courses;</u> AS1021A/B, Business 1220, Philosophy 1200

NOTE 1: If not taken in first year, Math 1600A/B must be completed prior to the second term of second year.

NOTE 2: AM1413 may be substituted for the 1.0 Calculus course requirements and AM1411 A/B may be substituted for Mathematics 1600 A/B.

NOTE 3: Economics 1021A/B and Economics 1022A/B, if not taken in first year, must be completed in one of your upper years.

MODULE (10.5 Courses) **

2.5 courses: Actuarial Science 2553A/B, 2427A/B, 3429A/B, 3431A/B, 4426F/G.

4.5 courses: Statistical Sciences 2503A/B, 2857A/B, 2858A/B, 2864A/B, 3657A/B, 3843A/B, 3858A/B, 3859A/B, 4861A/B.

1.5 courses: Financial Modeling 2555A/B, 2557A/B, 3520A/B.

0.5 courses: Calculus 2402A/B.

0.5 course from: Actuarial Science 3424A/B or 4824A/B.

1.0 courses from: Any Actuarial Science course(s) at the 4000 level or Statistical Sciences 4960F/G or Financial Modeling 4521A/B (or any other course at the 4000 level approved by the Department).

**Calculus 2402A/B may be replaced by (Calculus 2502A/B+ Calculus 2503A/B. When such a replacement occurs, the module will include 11.0 courses.

OPTIONS (4.5 Courses)

These may also include any additional major or minor module in the Academic Calendar, but *excluding both Financial Modelling and Applied Statistics.*

If taking another module that includes an intro stats course (anti-req to S2858), please consult with other department regarding course substitution.

Also, you must complete any additional module with a minimum 60% average.

Notes:

Courses common to more than one module taken require substitution.

However, if both modules are from faculty of science, up to 1.0 courses *explicitly required for each module* can be counted towards both modules.

2nd Degree students should meet with a faculty counsellor to review other degree requirements (e.g. other than modular courses needed).

Progression Requirements

- Minimum cumulative modular average of 70%
- Minimum mark of 60% in each course of module
- Passing grade in each course

Graduation Requirements

Breadth Requirement:
- At least 1.0 course from each of Category A, B, and C as listed in the Academic Calendar.

Essay Requirement:
- 2.0 essay courses (1.0 must be senior course). Note that any modular essay course taken can be used towards this requirement

Senior Courses:
- 13.0 senior courses (numbered 2000-4999)

Average Requirements:
- Minimum overall average of 65% on the 20.0 courses
- Minimum cumulative modular average of 70% and a minimum mark of 60% in each course of the module
- Passing grade in each course
- Minimum cumulative modular average of 60% in any additional Major or Minor module completed

Residency Requirement:
- The majority of your modular courses must be competed at Western. Please check academic calendar for other residency requirements.

Note:

To graduate with an Honors BSc, at least 11.0 of your 20.0 courses must be taken from the Faculty of Science.

Department Recommendation for order in which <u>modular</u> courses should be taken

Second Year

AS2553A Mathematics of Finance
FM2555A Corporate Finance
Calculus 2402A Calculus with Analysis for Statistics
SS2857A Probability and Statistics I

AS2427B Life Contingencies I
FM2557B Financial Markets & Investments
SS2503B Advanced Mathematics for Statistical Applications
SS2858B Probability & Statistics II
SS2864B Statistical Programming*

* May be taken in 3rd year

Third Year

AS3429A Life Contingencies II
SS3657A Intermediate Probability
SS3843A Introduction to Study Design
SS3859A Regression

AS3424B Loss Models I**
AS3431B Life Contingencies II
FM3520B Financial Modelling I
SS3858B Mathematical Statistics

** One of AS3424A/B or 4824A/B is required for the module

Fourth Year

AS4426F Actuarial Practice I
SS4861B Time Series

0.5 courses: **AS3424A/B or 4824A/B** (if not previously completed)

1.0 courses: Any **4000 level Actuarial Sciences course or FM4521A/B or SS4960F/G**

Major in Actuarial Science Module (20.0 courses)

This is a guide only. For complete information, see the <u>current online Academic Calendar</u>

Year 1 (5.0 Courses)

Calculus 1000A/B or 1500A/B

Calculus 1501A/B (recommended) or Calculus 1301A/B with a mark of 85%+

Mathematics 1600A/B

Economics 1021A/B and Economics 1022A/B

0.5 other principal course

2.0 options

NOTE: At least 1.0 course must be chosen from two of Category A, B, and C as listed in the Academic Calendar(e.g. 1.0 from A and 1.0 from C)

Admission to the Major Module:

Complete first year (5.0 courses) with no failures including:

- Minimum grade of 60% in each of:
  - Calculus 1000A/B or 1100A/B or 1500A/B
  - Calculus 1501A/B or Calculus 1301A/B with a mark of at least 85%
  - Mathematics 1600A/B or the former Linear Algebra 1600A/B
  - Economics 1021A/B and Economics 1022A/B
  - 0.5 other principal course

Recommended (but not required) first year courses; AS1021A/B, Business 1220E, Philosophy 1200

NOTE 1: If not taken in first year, Math 1600A/B must be completed prior to the second term of second year.

NOTE 2: AM1413 may be substituted for the 1.0 Calculus course requirements and AM1411 A/B may be substituted for Mathematics 1600 A/B.

NOTE 3: Economics 1021A/B and Economics 1022A/B, if not taken in first year, must be completed in one of your upper years.

MODULE (6.0 courses) **

1.5 courses: Actuarial Science 2553A/B, 2427A/B, 3429A/B.
0.5 courses: FM2555A.
2.5 courses: Statistical Sciences 2503A/B, 2857A/B, 2858A/B, 2864A/B, 3657A/B.
0.5 course: Calculus 2402A/B.
1.0 additional Actuarial Sciences courses at the 3000 level or higher.
Statistical Sciences 4960F/G can be used to meet this requirement.

**Calculus 2402A/B may be replaced by (Calculus 2502A/B+ Calculus 2503A/B. When such a replacement occurs, the module will include 6.5 courses.

OPTIONS(9.0)Courses- 4 year general/honors degree only

These may also include any additional major or minor module in the Academic Calendar, *excluding Financial Modelling.*

If taking another module that includes an intro stats course (anti-req to S2858), please consult with other department regarding course substitution.

Also, you must complete any additional module with a minimum 60% average.

Notes:

Courses common to more than one module taken require substitution.

However, if both modules are from faculty of science, up to 1.0 courses *explicitly required for each module* can be counted towards both modules.

2ⁿᵈ Degree students should meet with a faculty counsellor to review other degree requirements (e.g other than modular courses needed).

Progression Requirements

- Satisfy the progression requirements for the University (Level 1 and Level II as described in the Academic Calendar) if completing a 4 year degree
- See graduation requirements for an honors degree(with double major)
- **Note :** most modular course pre-requisites stipulate min. grade of 60%.

Graduation Requirements

Breadth Requirement:
- At least 1.0 course from each of Category A, B, and C as listed in the Academic Calendar

Essay Requirement:
- 2.0 essay courses (1.0 must be senior course). Note that any modular essay course taken can be used towards this requirement

Senior Courses:
- 13.0 senior courses (numbered 2000-4999)

Average Requirements-for a general degree:**
- Minimum overall average of 60% on the 20.0 courses
- Minimum cumulative modular average of 60% in the major module
- Passing grade in each course
- Minimum cumulative modular average of 60% in any additional Major or Minor module completed

Residency Requirement:
- The majority of your modular courses must be completed at Western. Please check the academic calendar for any other residency requirements.

Note:
- ** **honors degree(with double major) requires a 70% average within each of the 2 modules**, with no Ds in any required course

To graduate with either a 4 year general or Honors BSc degree, at least 11.0 of your 20.0 courses must be taken from the Faculty of Science.

Department Recommendation for order in which modular courses should be taken:

Second Year

AS2553A Mathematics of Finance
FM2555A Corporate Finance
Calculus 2402A Calculus with Analysis for Statistics
SS2857A Probability and Statistics I

AS2427B Life Contingencies I
SS2503B Advanced Mathematics for Statistical Applications
SS2858B Probability and Statistics II
SS2864B Statistical Programming *
* Can take in 3ʳᵈ year

Third Year

AS3429A Life Contingencies II
SS3657A Intermediate Probability

Fourth Year

1.0 courses: Any Actuarial Science courses at the 3000+ level or Stats 4960F/G

(Note: Students completing a double major can complete these courses in the same year as the recommended modular 3ʳᵈ year courses)

What is Data Science?

Data Science is inherently interdisciplinary, with the two dominant disciplines being Computer Science and Statistical Science.

Data science refers to the development and application of methodologies for inspecting, cleaning, managing, transform, visualizing and modeling data with a view to discovering useful information, reaching conclusions and supporting decision making.

There is a big demand for Data Scientists and that demand is still growing as the rate of data collection is increasing in every discipline. Being able to efficiently generate, manage and analyze digital information, data scientists are widely sought after in numerous fields of scientific investigation.

Where do Data Scientists work?

- Airline and Auto Industry
- Banks, Investment Firms and other Financial Institutions
- Insurance Companies
- Health Care and Medical Research Firms
- Marketing Firms
- Sports Agencies
- Tech Companies and numerous other industries

What should I have taken in first year?

- Computer Science 1026A/B
- Computer Science 1027 A/B
- Calculus 1000A/B or 1500 A/B
- Calculus 1501A/B (Recommended) or 1301 A/B(min 85%)
- Math 1600 A/B

Why choose Data Science?

Students graduating with a Data Science module will have solid data and analytical literacy and these skills are in very high demand in the work place. The following are just some of the opportunities available to you while completing a program at Western in Data Science:

- Internship program; you will not only benefit from the paid hands-on work experience, but you will also be mentored by a professional in the field
- undergraduate opportunities for summer funded research in either the Computer Science or Statistical and Actuarial Sciences Department
- Dynamic undergraduate students association and clubs in both departments
- Combined Ivey HBA degree option as well as concurrent degree option with engineering
- Data Science modules can be combined with other modules including Biology, Economics, Actuarial Science and Financial Modeling to name a few

Honors Specialization in Data Sciences Module (20.0 courses)

This is a guide only. For complete information, see the <u>current online Academic Calendar</u>

Last updated July 18, 2018

Year 1 (5.0 Courses)

Calculus 1000A/B or 1500A/B

Calculus 1501A/B (recommended) or Calculus 1301A/B with a mark of 85%[+]

Mathematics 1600A/B

Computer Science 1026 A/B *and* Computer Science 1027A/B (min 65%)

0.5 other principal courses

2.0 options

NOTE: At least 1.0 course must be chosen from two of Category A, B, and C as listed in the Academic Calendar(e.g. 1.0 from A and 1.0 from C)

Admission to Honors Specialization Module:

Complete first year (5.0 courses) with no failures including:
- Minimum average of 70% on 3.0 principal courses with no mark less than 60% in any of the 3.0 principal courses:
  o Calculus 1000A/B or Calculus 1500A/B
  o Calculus 1501A/B or Calculus 1301A/B with a mark of at least 85%
  o Mathematics 1600A/B
  o Computer Science 1026 A/B *and* Computer Science 1027 A/B **
  o 0.5 other principal course

** min 65% grade required. Note: CS1027 also now requires min 65% in CS1026.

Recommended (but not required) first year course; Statistics 1023A/B

NOTE 1: If not taken in first year, Math 1600A/B must be completed prior to the second term of second year.

NOTE 2: AM1413 may be substituted for the 1.0 Calculus course requirements and AM1411 A/B may be substituted for Mathematics 1600 A/B.

MODULE is a joint program with CS: 10.0 courses

3.5 courses: Computer Science 2035A/B, 2210A/B, 2211A/b, 2214A/b, 3319A/b, 3340A/b, 4414A/B.

4.5 courses: Statistical Sciences 2857A/B, 2858A/B, 2864A/B, 3843A/B, 3850F/G, 3859A/B, 3860A/B, 4844A/B, 4850F/G.

1.5 courses from: Computer Sciences 3377A/B (or Science 3377A/B),Computer Science 4411A/B, 4412A/B, 4416A/B,4417A/B, 4418A/B, Statistical Sciences 4860A/B, Statistical Sciences 4864 A/B, Statistical Sciences 4960 F/G

0.5 courses from: Any 4000-level course offered by the Department of Computer Science or the Department of Statistical and Actuarial Sciences

<u>NOTE</u>: A minimum of 4.5 modular courses must be competed from each of the Departments of Computer Science, and Statistical and Actuarial Sciences.

OPTIONS (5.0) Courses

These may also include any additional module *other than Applied Statistics* [##].

If taking another module that includes an intro stats course (anti-req to SS2858), please consult with other department regarding course substitution.

[##] Consult Computer Science (CS) department if considering a CS module..

Also, you must complete any additional module with a minimum 60% average.

Notes:

Courses common to more than one module taken require substitution.

However, if both modules are from faculty of science, a maximum of 1.0 courses *explicitly required for each module* can be counted towards both modules.

2nd Degree students should meet with a faculty counsellor to review other degree requirements (e.g. other than modular courses needed)

Progression Requirements

- Minimum cumulative modular average of 70%
- Minimum mark of 60% in each course of module
- Passing grade in each option (elective) course

Graduation Requirements

Breadth Requirement:
- At least 1.0 course from each of Category A, B, and C as listed in the Academic Calendar.

Essay Requirement:
- 2.0 essay courses (1.0 must be senior course).   Note that any modular essay course taken can be used towards this requirement**.**

Senior Courses:
- 13.0 senior courses(numbered 2000-4999) for a 4 yr degree

Average Requirements:
- Minimum overall average of 65% on the 20.0 courses
- Minimum cumulative modular average of 70% and a minimum mark of 60% in each course of the module
- Passing grade in each course
- Minimum cumulative modular average of 60% in any additional Major or Minor module completed

Residency Requirement:
- The majority of your modular courses must be completed at Western. Please check academic calendar for other residency requirements.

Note:

To graduate with an Honors BSc, at least 11.0 of your 20.0 courses must be taken from the Faculty of Science.

Notes for students interested in graduate programs:

If interested in Stats grad programs should take SS3657a & SS3858b

If interested in Comp Sci grad programs should take CS2212A/B

Department Recommendation for order in which <u>modular</u> courses should be taken:

Second Year

CS2210A/B	Data Structure and Algorithms
CS2211A/B	Software Tools and Systems Programming
SS2857A	Probability and Statistics I
CS2035B	Dealing with Data: Analysis and Visualization
CS2214B	Discrete Structures for Computing
SS2858B	Probability & Statistics II
SS2864B	Statistical Programming

<u>Third Year</u>

CS3319A	Databases I
SS3843A	Introduction to Study Design
SS3859A	Regression
CS3340B	Analysis of Algorithms I
SS3850G	Data Analysis
SS3860A/B	Generalized Linear Models

0.5 courses from either the "1.5 or 0.5 course selection lists"

Fourth Year

CS4414A	Data Science 1
SS4844B	Statistical Consulting
SS4850G	Advanced Data Analysis

1.0 courses from the "1.5 modular course selection list" [##]
0.5 courses from the "0.5 modular course selection list" [##]
([##] less if some were taken in 3rd year)

Major in Data Sciences Module (15.0 or 20.0 courses)

This is a guide only. For complete information, see the <u>current online Academic Calendar</u>

Last updated July 18, 2018

Year 1 (5.0 Courses)

Calculus 1000A/B or 1500A/B

Calculus 1501A/B (recommended) or Calculus 1301B with a mark of at least 85%

Mathematics 1600A/B

Computer Science 1026 A/B *and* Computer Science 1027A/B

0.5 other principal course

2.0 options

NOTE: At least 1.0 course must be chosen from two of Category A, B, and C as listed in the Academic Calendar(e.g. 1.0 from A and 1.0 from C)

Admission to the Major Module:

Complete first year (5.0 courses) with no failures including:

- Minimum grade of 60% in each of:
  - Calculus 1000A/B or Calculus 1500A/B
  - Calculus 1501A/B or Calculus 1301B with a mark of at least 85%
  - Mathematics 1600A/B
  - Computer Science 1026 A/B *and* Computer Science 1027 A/B**
  - 0.5 other principal course

** min 65% grade required. Note: CS1027 also now requires min 65% in CS1026.

<u>Recommended (but not required) first year courses:</u> Statistics 1024A/B or Statistics 1023A/B.

NOTE 1: If not taken in first year, Math 1600A/B must be completed prior to the second term of second year.

NOTE 2: AM1413 may be substituted for the 1.0 Calculus course requirements and AM1411 A/B may be substituted for Mathematics 1600 A/B.

MODULE is a joint program with CS: 7.0 courses

3.5 courses: Statistical Science 2857A/B, 2858A/B, 2864A/B, 3843A/B, 3850F/G, 3859A/B, 3860 A/B.

3.5 courses: Computer Science 2210A/B, 2211A/b, 2214A/b, 3319A/b, 3340A/b, 4414A/B, and one of Computer Science 2035A/B *or* 3377A/B (or Science 3377A/B)

OPTIONS (8.0) Courses for a 4 year Degree @@

These may also include any additional module *other than Applied Statistics* ##.

If taking another module that includes an intro stats course (anti-req to SS2858), please consult with other department regarding course substitution.

Consult Computer Science (CS) department if considering a CS module..

Also, you must complete any additional module with a minimum 60% average.

Notes:

@@ A 3 year degree requires only 4.0 optional courses.

Courses common to more than one module taken require substitution.
However, if both modules are from faculty of science, a maximum of 1.0 courses *explicitly required for each module* can be counted towards both modules.

2nd Degree students should meet with a faculty counsellor to review other degree requirements (e.g. other than modular courses needed)

Progression Requirements

- Satisfy the progression requirements for the University (Level 1 and Level II as described in the Academic Calendar)
- See graduation requirements for honors degree (with double major)
- **Note:** some modular course pre-requisites stipulate min. grade of 60%

Graduation Requirements

Breadth Requirement:
- At least 1.0 course from each of Category A, B, and C as listed in the Academic Calendar

Essay Requirement:
- 2.0 essay courses (1.0 must be senior course). Note that any modular essay course taken can be used towards this requirement

Senior Courses:
- 13.0 senior courses (numbered 2000-4999)

Average Requirements-for a general degree **:
- Minimum cumulative overall average of 60%
- Minimum cumulative modular average of 60% in the major module **
- Passing grade in each course
- Minimum cumulative modular average of 60% in any additional Major or Minor module completed

Residency Requirement:
- The majority of your modular courses must be completed at Western. Please check academic calendar for other residency requirements.

Notes:

- **** honors degree(with double major) requires a 70% average within each module, with no Ds in any modular course**
- **To graduate with either a 4 year general or honors BSc degree,** at least 11.0 of your 20.0 courses must be taken from the Faculty of Science
- **To graduate with a 3 year BSc degree,** at least 8.0 of your 15.0 courses must be taken from the Faculty of Science.

Department Recommendation for order in which <u>modular</u> courses should be taken:

Second Year

CS2210A/B   Data Structure and Algorithms
CS2211A/B   Software Tools and Systems Programming
SS2857A   Probability and Statistics I

CS2035B   Dealing with Data: Analysis and Visualization *
CS2214B   Discrete Structures for Computing
SS2858B   Probability & Statistics II
SS2864B   Statistical Programming

* student may choose to take CS3377 instead in year 3 (and should check CS3377 pre-reqs if they plan to do so)

Third Year

CS3319A   Databases I
CS4414A   Data Science I (pending scheduling)
SS3843A   Introduction to Study Design
SS3859A   Regression

CS3340B   Analysis of Algorithms I
SS3850G   Data Analysis
SS3860A/B   Generalized Linear Models

Fourth Year

Any modular courses not yet completed

What is Financial Modeling?

Over the past two decades, new quantitative techniques have transformed the investor decision-making process and the financial industry. Today banks, insurance companies, securities and investment firms turn to technical innovation to gain the competitive advantage. Sophisticated mathematical models are used to support investment decisions, to develop and price new securities or to manage risk.

Financial institutions but also energy companies, utilities and corporations with exposure to exchange rate or commodities risk are hiring quantitatively sophisticated employees.

Where do financial mathematicians work?

- Banks
- Analyst in Currencies and Commodities
- Investments
- Risk Management
- Securities
- Brokerage Firms
- Universities - Research/Teaching
- Pension Fund Management Companies
- Insurance Firms

What should I have taken in first year?

- Calculus 1000A/B or 1500A/B
- Calculus 1501A/B (Recommended) or Calculus 1301A/B with a mark of at least 85%
- Math 1600A/B

Why choose a Financial Modelling Module?

- Gateway to dynamic, fascinating, and lucrative positions in the financial industry
- Internship program: you will not only benefit from the paid hands-on work experience, but you will also be mentored by a professional in the field
- Dynamic undergraduate student association
- High faculty/student ratio, undergraduate opportunities for summer funded research
- Great combination with modules in Economics
- combined Ivey HBA degree option

Honors Specialization in Financial Modeling Module (20.0 courses)

This is a guide only. For complete information, see the <u>current Online Academic Calendar</u>

Last updated July 18, 2018

Year 1 (5.0 Courses)

Calculus 1000A/B or 1500A/B

Calculus 1501A/B(recommended) or Calculus 1301A/B with a mark of 85%+

Math 1600 A/B

1.5 other principal courses

2.0 options

NOTE: At least 1.0 course must be chosen from two of Category A, B, and C as listed in the Academic Calendar(e.g. 1.0 from A and 1.0 from C)

Admission to Honors Specialization Module:

Complete first year (5.0 courses) with no failures including:
- Minimum average of 70% on 3.0 principal courses with no mark less than 60% in any of the 3 principal courses:
  - Calculus 1000A/B or 1500A/B
  - Calculus 1501A/B or Calculus 1301A/B with a mark of at least 85%
  - Mathematics 1600 A/B
  - 1.5 other principal course

Recommended (but not required) first year courses;
Economics 1021A/B and 1022A/B, Computer Science 1026 A/B and/or Computer Science 1027A/B, Philosophy 1200

NOTE 1: If not taken in first year, Math 1600A/B must be completed prior to the second term of second year.

NOTE 2: AM1413 may be substituted for the 1.0 Calculus course requirements and AM1411 A/B may be substituted for Mathematics 1600 A/B.

MODULE (9.5 Courses) **

3.5 courses: Statistical Sciences 2503A/B, 2857A/B, 2858A/B, 2864A/B, 3657A/B, 3858A/B, 4861A/B.
0.5 courses: Actuarial Science 2553A/B.
3.0 courses: Financial Modelling 2555A/B, 2557A/B, 3520A/B, 3613A/B, 3817A/B, 4521A/B.
2.0 courses: Calculus 2402A/B, Applied Math 2811B, 2814F/G, 3815A/B
0.5 courses from: Applied Math 3611F/G, 4613A/B##, 4617A/B#, 4999Z, Financial Modeling 4998F/G/Z, Statistical Sciences 4960F/G, 4999F/G/Z or Actuarial Science 4997F/G/Z.

**Calculus 2402A/B may be replaced by (Calculus 2502A/B + Calculus 2503A/B).   When such a replacement occurs, the module will include 10.0 courses.

 # May be offered only in odd-numbered academic years.
May be offered only in even-numbered academic years.

OPTIONS (5.5 Courses)

These may also include any additional module *other than Actuarial Science.*

If taking another module that includes an intro stats course (anti-req to SS2858), please consult with other department regarding course substitution.

Also, you must complete any additional module with a minimum 60% average.

Notes:

Courses common to more than one module taken require substitution.

However if both modules are from faculty of science, a maximum of 1.0 courses *explicitly* required for each module can be counted towards both modules

2nd Degree students should meet with a faculty counsellor to review other degree requirements (e.g. other than modular courses needed)

Progression Requirements

- Minimum cumulative modular average of 70%
- Minimum mark of 60% in each course of module
- Passing grade in each optional course

Graduation Requirements

Breadth Requirement:
- At least 1.0 course from each of Category A, B, and C as listed in the Academic Calendar.

Essay Requirement:
- 2.0 essay courses (1.0 must be senior course).   Note that any modular essay course taken can be used towards this requirement

Senior Courses:
- 13.0 senior courses (numbered 2000-4999)

Average Requirements:
- Minimum overall average of 65% on the 20.0 courses
- Minimum cumulative modular average of 70% and a minimum mark of 60% in each course of the module
- Passing grade in each course
- Minimum cumulative modular average of 60% in any additional Major or Minor module completed

Residency Requirement:
- The majority of your modular courses must be completed at Western University. Please check academic calendar for other residency requirements.

Note:

To graduate with an Honors BSc, at least 11.0 of your 20.0 courses must be taken from the Faculty of Science

Department Recommendation for order in which <u>modular</u> courses should be taken:

Second Year

AS2553A Mathematics of Finance
FM2555A Corporate Finance
Cal2402A Calculus with Analysis for Statistics
SS2857A Probability and Statistics I
FM2557B Financial Markets and Investments
SS2503B Advanced Mathematics with Statistical Applications
AM2811B Linear Algebra II
AM2814G Numerical Analysis*
SS2858B Probability and Statistics II
SS2864B Statistical Programming*

*can be taken in 3rd year

Third Year

AM3815A Partial Differential Equations I
SS3657A Intermediate Probability
FM3613B Mathematics of Financial Options**
FM3817B Optimization Methods for Financial Modelling**
FM3520B Financial Modelling I
SS3858B Mathematical Statistics
Any 2000 level modular courses not yet completed

**can be taken in 4th year

Fourth Year

FM4521B Advanced Financial Modelling
SS4861B Time Series
0.5 courses from the "0.5 modular course selection list"

Major in Financial Modelling Module (15.0 or 20.0 courses)

This is a guide only. For complete information, see the <u>current</u> *Online Academic Calendar*

Last updated July 18, 2018

Year 1 (5.0 Courses)

Calculus 1000A/B or 1500A/B

Calculus 1501A/B(recommended) or Calculus 1301A/B with a mark of 85%+

Mathematics 1600 A/B

1.5 other principal courses

2.0 options

NOTE: At least 1.0 course must be chosen from two of Category A, B, and C as listed in the Academic Calendar(e.g. 1.0 from A and 1.0 from C)

Admission to the Major Module:

Complete first year (5.0 courses) with no failures including:
- Minimum grade of 60% in each of:
  - Calculus 1000A/B or Calculus 1100A/B
  - Calculus 1301A/B with a mark of at least 85% or Calculus 1501A/B
  - Mathematics 1600 A/B
  - 1.5 other principal courses

<u>Recommended (but not required) first year courses:</u> Economics 1021A/B and Economics 1022A/B, Philosophy 1200, Computer Science 1026A/B.

NOTE 1: If not taken in first year, Math 1600A/B must be completed prior to the second term of second year.

NOTE 2: AM1413 may be substituted for the 1.0 Calculus course requirements and AM1411 A/B may be substituted for Mathematics 1600 A/B.

Graduation Requirements

Breadth Requirement:
- At least 1.0 course from each of Category A, B, and C as listed in the Academic Calendar

Essay Requirement:
- 2.0 essay courses (1.0 must be senior course). Note that any modular essay course taken can be used towards this requirement

Senior Courses:
- 13.0 senior courses (numbered 2000-4999)

Average Requirements-for a general degree **:
- Minimum overall average of 60% on the 20.0 courses
- Minimum cumulative modular average of 60% in the major module
- Passing grade in each course
- Minimum cumulative modular average of 60% in any additional Major or Minor module completed

Residency Requirement
- The majority of your modular courses must be completed at Western University. Please check academic calendar for other residency requirements.

Notes:
- **** honors degree(with double major) requires a 70% average within each module**, with no Ds in any modular course
- **To graduate with a 4 year general or honors BSc degree,** at least 11.0 of 20.0 courses must be from Faculty of Science
- **To graduate with a 3 year BSc degree,** at least 8.0 of your 15.0 courses must be taken from the Faculty of Science.

MODULE (6.0 courses)**

0.5 courses: Actuarial Science 2553A/B.
1.5 courses: Calculus 2402A/B, Applied Math 2814F/G, 3815A/B.
1.5 courses: Financial Modelling 2555A/B, 2557A/B, 3817A/B.
2.0 courses: Statistical Sciences 2503A/B, 2857A/B, 2858A/B, 3657A/B.
0.5 course from: Financial Modelling 3613B, Financial Modelling 3520A/B.

** Calculus 2402A/B may be replaced by either (Calculus 2502A/B and Calculus 2503A/B) or (Calculus 2502A/B and Mathematics 2123A/B). When such a replacement occurs, the module will include 6.5 courses.

Department Recommendation for order in which <u>modular</u> courses should be taken:

Second Year

AS2553A   Mathematics of Finance
FM2555A   Corporate Finance
Calc2402A Calculus with Analysis for Statistics
SS2857A   Probability and Statistics I
FM2557B   Financial Markets and Investments
SS2503B   Advanced Mathematics for Statistical Applications
AM2814G   Numerical Analysis
SS2858B   Probability and Statistics II

OPTIONS (9.0) Courses for a 4 year Degree @@

These may also include any additional module *other than Actuarial Science.*

If taking another module that includes an intro stats course (anti-req to SS2858), please consult with other department regarding course substitution.

Also, you must complete any additional module with a minimum 60% average.

Notes:

@@ A 3 year degree requires only 4.0 optional courses.

Courses common to more than one module taken require substitution. However, if both modules are from faculty of science, a maximum of 1.0 courses *explicitly required for each module* can be counted towards both modules.

2nd Degree students should meet with a faculty counsellor to review other degree requirements (e.g. other than modular courses needed)

Third Year

AM3815A   Partial Differential Equations
SS3657A   Intermediate Probability
FM3817B   Optimization Methods for Financial Modeling

0.5 of FM3613b Mathematics of Financial Options, **FM3520b** Financial Modelling I

Progression Requirements

- Satisfy the progression requirements for the University (Level 1 and Level II as described in the Academic Calendar)
- See graduation requirements for honors degree (with double major)
- **Note:** some modular course pre-requisites stipulate min. grade of 60%

Fourth Year

Any modular courses not yet completed

What is a Statistician?

Statisticians collect data and analyze it, looking for patterns that explain behaviour or describe the world as it is. They design and build models using data. The models can be used to help understand the world and to make predictions.

Where do statisticians work?

• Banks & Investment Firms
• Chemical & Pharmaceutical Manufacturers
• Colleges/Universities
• Computer Service & Software Firms
• Engineering Firms
• Environmental Agencies
• Government Offices and Labs
• Marketing Firms
• Medical Research Firms
• Psychological Research Firms
• Sports Agencies

What should I have taken in first year?

• Calculus 1000A/B or 1500A/B
• Calculus 1501A/B (Recommended) or Calculus 1301A/B with a mark of at least 85%
• Math 1600A/B

Why choose a Statistics Module?

The world is becoming increasingly data driven, and many jobs in industry, finance, government, and even sports management require a statistics background.

• Internship program: you will not only benefit from the paid hands-on work experience, but you will also be mentored by a professional in the field
• Dynamic undergraduate student association
• High faculty/student ratio, undergraduate opportunities for summer funded research
• Our modules make great combinations with modules in Biology, Psychology, Economics, and many other subjects
• Combined Ivey HBA degree option
• Courses may count towards Statistical Sciences Society education accreditation

Honors Specialization in Statistics (20.0 courses)

This is a guide only. For complete information, see the <u>current online Academic Calendar</u>

Last updated July 18, 2018

Year 1 (5.0 Courses)

Calculus 1000A/B or 1500A/B

Calculus 1501A/B(recommended) or Calculus 1301A/B with a mark of 85%+

Mathematics 1600A/B

1.5 other principal courses

2.0 options

NOTE: At least 1.0 course must be chosen from two of Category A, B, and C as listed in the Academic Calendar(e.g. 1.0 from A and 1.0 from C)

Admission to Honors Specialization Module:

Complete first year (5.0 courses) with no failures including:
- Minimum average of 70% on 3.0 principal courses with no mark less than 60% in any of the 3 principal courses:
  - Calculus 1000A/Bor 1500A/B
  - Calculus 1501A/B or Calculus 1301A/B with a mark of at least 85%
  - Mathematics 1600A/B 1.5 other principal course

Recommended (but not required) first year courses;
Statistics 1023A/B

NOTE 1: If not taken in first year, Math 1600A/B must be completed prior to the second term of second year.

NOTE 2: AM1413 may be substituted for the 1.0 Calculus course requirements and AM1411 A/B may be substituted for Mathematics 1600 A/B.

MODULE (9.0 Courses) **

6.0 courses: Statistical Sciences 2503A/B, 2857A/B, 2858A/B, 2864A/B, 3657A/B, 3843A/B, 3858A/B, 3859A/B, 3850F/G, 4846A/B or 4853A/B, 4850F/G, 4861A/B.

0.5 courses: Calculus 2402A/B.

1.5 courses from: Actuarial Science 3424A/B, 4824A/B, 4823A/B, one of Statistical Sciences 4846A/B or 4853A/B.

1.0 courses from: Actuarial Science 3424A/B, 4824A/B, 4823A/B, Financial Modelling 3520A/B, 3613A/B, 3817B, AM3815A/B, any Statistical science course at the 4000 level, or any course at the 4000 level approved by the Department of Statistical and Actuarial Sciences.

**Calculus 2402A/B may be replaced by (Calculus2502A/B+Calculus 2503A/B). When such a replacement occurs, the module will include 9.5 courses.

OPTIONS (6.0 Courses)

These may also include any additional module in the calendar, *excluding any other modules offered by the Department of Statistical and Actuarial Science.*

If taking another module that includes an intro stats course (anti-req to S2858), please consult with other department regarding course substitution.

Also, you must complete any additional module with a minimum 60% average.

Notes:

Courses common to more than one module taken require substitution.

However, if both modules are from faculty of science, a maximum of 1.0 courses *explicitly required for each module* can be counted towards both modules.

2nd Degree students should meet with a faculty counsellor to review other degree requirements (e.g other than modular courses needed).

Progression Requirements
- Minimum cumulative modular average of 70%
- Minimum mark of 60% in each course of module
- Passing grade in each option

Graduation Requirements

Breadth Requirement:
- At least 1.0 course from each of Category A, B, and C as listed in the Academic Calendar.

Essay Requirement:
- 2.0 essay courses (1.0 must be senior course). Note that any modular essay course taken can be used towards this requirement

Senior Courses:
- 13.0 senior courses (numbered 2000-4999)

Average Requirements:
- Minimum overall average of 65% on the 20.0 courses
- Minimum cumulative modular average of 70% and a minimum mark of 60% in each course of the module
- Passing grade in each course
- Minimum cumulative modular average of 60% in any additional Major or Minor module completed

Residency Requirement:
- The majority of your modular courses must be completed at Western University. Please check academic calendar for other requirements.

Note:

To graduate with an Honors BSc, at least 11.0 of your 20.0 courses must be taken from the Faculty of Science

Department Recommendation for order in which <u>modular</u> courses should be taken:

Second Year
Calculus 2402A Calculus with Analysis for Statistics
SS2857A Probability and Statistics I

SS2503B Advanced Mathematics for Statistical Applications
SS2858B Probability & Statistics II
SS2864B Statistical Programming

Third Year
SS3843A Introduction to Study Design
SS3859A Regression
SS3657A Intermediate Probability

SS3850G Data Analysis
SS3858B Mathematical Statistics

1.0 courses from the 1.0 and/or the 1.5 modular course selection lists

Fourth Year
SS4850F/G Advanced Data Analysis
SS4861B Time Series
0.5 of SS4846A/B Experimental Design
or SS4853A/B Sampling Theory and Methods

1.5 courses from the 1.0 and/or the 1.5 modular course selection lists

Major in Applied Statistics Module (20.0 courses)

This is a guide only. For complete information, see the <u>current onlline Academic Calendar</u>

Last updated July 18, 2018

Year 1 (5.0 Courses)

Calculus 1000A/B or 1500A/B

Calculus 1501A/B (recommended) or Calculus 1301B with a mark of 85%+

Mathematics 1600A/B

1.0 courses from Psychology 1000, Biology 1001A or 1201A, Biology 1002B or 1202B, or Sociology 1020

0.5 other principal course

2.0 options

NOTE: At least 1.0 course must be chosen from two of Category A, B, and C as listed in the Academic Calendar(e.g. 1.0 from A and 1.0 from C)

Admission to the Major Module:

Complete first year (5.0 courses) with no failures including:

- Minimum grade of 60% in each of:
  - Calculus 1000A/B or Calculus 1500A/B
  - Calculus 1501A/B or Calculus 1301B with a mark of at least 85%
  - Mathematics 1600A/B
  - 1.0 courses from Psychology 1000, Biology 1001A or 1201A, Biology 1002B or 1202B, or Sociology 1020
  - 0.5 other principal course

Recommended (but not required) first year courses: Statistical Science 1024A/B and/or Statistical Science 1023A/B.

NOTE 1: If not taken in first year, Math 1600A/B must be completed prior to the second term of second year.

NOTE 2: AM1413 may be substituted for the 1.0 Calculus course requirements and AM1411 A/B may be substituted for Mathematics 1600 A/B.

MODULE (6.0 courses) **

3.0 courses: Statistical Science 2857A,2858B 2864A/B,3843A/B,3850F/G, 3859A.
0.5 course: Calculus 2402A/B.
0.5 course from: Biology 2290F/G, Sociology 2206A/B, Psych 2800E. **#**
0.5 course: Epidemiology 2200B.
1.0 course from: Applied Mathematics 2402A, 3615A/B, Financial Modelling 3817A/B; Psychology 3800F/G, 3840F/G; Sociology 2236A/B, 4441A/B; Statistical Science 4846A/B, 4850F/G, 4853A/B, or any approved Statistics course at the 3000-level or higher.
0.5 course from: Statistical Science 4846A/B, 4853A/B.

**Calculus 2402A/B may be replaced by (Calculus 2502A/B + 2503A/B). When such a replacement occurs, the module will include 6.5 courses.

If Psych 2800E is taken, the module will include 6.5 courses.

OPTIONS(9.0)Courses: `4 year general/honors degree only`

These may also include any additional module, *excluding Data Science.*

If taking another module that includes an intro stats course (anti-req to SS2858), please consult with other department regarding course substitution.

Also, you must complete any additional module with a minimum 60% average.

Notes:

Courses common to more than one module taken require substitution.

However, if both modules are from faculty of science, a maximum of 1.0 courses *explicitly required for each module* can be counted towards both modules.

2nd Degree students should meet with a faculty counsellor to review other degree requirements (e.g other than modular courses needed).

Progression Requirements

- Satisfy the progression requirements for the University (Level 1 and Level II as described in the Academic Calendar)
- See graduation requirements for honors degree (with double major)
- **Note:** many modular course pre-requisites stipulate min. grade of 60%

Graduation Requirements

Breadth Requirement:

- At least 1.0 course from each of Category A, B, and C as listed in the Academic Calendar

Essay Requirement:

- 2.0 essay courses (1.0 must be senior course**).** Note that any modular essay course taken can be used towards this requirement

Senior Courses:

- 13.0 senior courses (numbered 2000-4999)

Average Requirements- for a 4 yr general degree **:

- Minimum overall average of 60% on the 20.0 courses
- Minimum cumulative modular average of 60% in the major module
- Passing grade in each course
- Minimum cumulative modular average of 60% in any additional Major or Minor module completed

Residency Requirement:

- The majority of your modular courses must be completed at Western University. Please check academic calendar for any other residency requirements

Notes:

- **** honors degree(with double major) requires a 70% average within each of the 2 modules**, with no Ds in any required course
- **To graduate with either a 4 year general or Honors BSc degree,** at least 11.0 of your 20.0 courses must be taken from the Faculty of Science.

Department Recommendation for order in which <u>modular</u> courses should be taken:

Second Year

Calculus 2402A Calculus with Analysis for Statistics
SS2857A Probability and Statistics I
SS2858B Probability & Statistics II
SS2864B Statistical Programming

One of:
Biology 2290F/G-Scientific method in Biology **or**
Sociology 2206A/B-Research Methods in Sociology, **or**
Psych2800E- Research methods in Psychology

Third Year

SS3843A Introduction to Study Design
SS3859A Regression

SS3850G Data Analysis
Epidemiology 2200B* Introduction to Epidemiology

1.0 Courses from modular selection list(s).   Note that Statistics 3860b may be used for this purpose

* this course can be taken concurrently with Stats 2858b

Fourth Year

One of Stats 4846A/B or Stats 4853A/B

Any modular courses not yet completed