



California State University, Los Angeles
Department of Civil Engineering

Undergraduate Student Handbook
B.S. in Civil Engineering

Although every attempt has been made to keep this handbook up to date and accurate, it is an advising tool and not an official University policy statement. Therefore, in cases where there are contradictions, the official university rules take precedence over statements in this handbook.

Prepared by the Faculty of the Department of Civil Engineering

2006

Undergraduate Student Handbook
 Department of Civil Engineering
 2006

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I. INTRODUCTION

THE CIVIL ENGINEERING PROFESSION

Civil engineering is the broadest of the engineering disciplines, extending across many technical specialties that interact with each other. As a civil engineer, you plan, design, and supervise the construction of facilities that vary widely in nature, size, and scope. Space satellites and launching facilities, offshore structures, bridges, buildings, tunnels, highways, transit systems, dams, airports, irrigation projects, treatment and distribution facilities for water, and collection and treatment facilities for wastewater are just some of the projects in which you could be involved.

In addition to facility design and construction, you will also have options to teach and to participate in research. As you develop your skills, you will have the opportunity to move into the area of engineering management, overseeing the completion of entire projects.

As we enter the new millennium, the growth of the world population to six billion people will create demands for energy producing, food supplying, land stabilizing, water preserving, transportation providing, materials handling, waste disposing, earth moving, health caring, environmental cleansing, living, working and structural facilities on an unprecedented scale. As always, the skills of civil engineers will be needed to accomplish this. The civil engineer builds to advance civilization and make possible the higher standards of living that lie ahead.

You will be in the forefront of high-technology's newest applications and will be using the latest concepts in computer-aided design (CAD) during design, construction, project scheduling, and cost control. You will be working with architects, owners, contractors, city councils, planning commissions, government officials, and others involved in the many aspects of design and construction.

One of the greatest rewards of civil engineering is the personal satisfaction derived from the creation of enduring construction to make our communities better places in which to live and work.

AREAS OF SPECIALIZATION

Structural Engineering

Structural engineers plan and design all types of structures including bridges, buildings, dams, tunnels, tanks, power plants, transmission line towers, offshore drilling platforms, and space satellites. Structural engineers analyze the forces that a structure will encounter and develop a design that will withstand those forces. The structural engineer selects structural components, systems, and materials that will provide adequate strength, stability, and durability. Structural dynamics is a specialty within structural engineering that accounts for dynamic forces on structures such as those resulting from earthquakes. (Prof. Bhaumik, Prof. Purasinghe, Prof. Taly)

Hydraulic and Water Resources Engineering

Hydraulic and water resources engineers deal with all aspects of the physical control of water. They analyze and predict water demand, supply, and run-off, and they work to prevent floods, supply water, protect beaches, and manage rivers. They construct and maintain hydroelectric power systems, canals, locks, port facilities, and offshore structures. (Prof. Jeng, Prof. Kim)

Geotechnical Engineering

Geotechnical engineers analyze the properties of soil and rock that support and affect the behavior of structures, pavements, and underground facilities. They evaluate the potential settling of buildings, the stability of slopes and fills, the seepage of groundwater, and the effects of earthquakes. They assist in the design and construction of earth structures, building foundations, offshore platforms, tunnels, and dams. (Prof. Tufenkjian)

Transportation Engineering

Transportation engineers are involved with the safe and efficient movement of both people and goods. They design and maintain all types of transportation facilities, including highways, mass transit systems, railroads and airfields, ports, and harbors. (Prof. Hashemian, Prof. Kett)

Environmental Engineering

Environmental engineers design and supervise systems to provide safe drinking water and to prevent and control pollution of air, water, ground water, and land. They are involved in the design of water treatment and distribution systems, wastewater collection and treatment facilities, and the containment of hazardous wastes. (Prof. Khachikian)

CHOOSING YOUR TECHNICAL SPECIALTY

Introductory courses in all areas of civil engineering are included in the Upper Division Required Courses. These courses will give you an overview of the field and help you select an area in which you would like to specialize.

If you decide to concentrate on a specialty at this stage, you will be able to pursue it in more detail by choosing the appropriate Upper Division Electives. You may, however, continue taking courses in several areas if you wish and wait until after graduation before deciding on a specialty.

Almost one-third of the civil engineering graduates today go straight into a master's degree program and others pursue a master's degree later while in practice. This postgraduate study is widely supported by many employers. Significant and increasing numbers continue on to earn a doctorate degree, primarily to prepare for careers in research and teaching.

In the master's degree program at Cal State L.A., you can specialize in structural engineering, geotechnical engineering, hydraulic and water resources engineering, transportation engineering, and environmental engineering.

STUDENT ORGANIZATIONS

Honor Societies

Chi Epsilon and Tau Beta Pi are undergraduate honor societies. Election to honor societies represents outstanding scholarship as well as participation in other activities. Tau Beta Pi is for all engineering disciplines, while Chi Epsilon is for civil engineers only. (Prof. Jeng)

Professional Societies

The student chapters of professional societies conduct regular meetings, invite speakers, arrange field trips, and participate in local competitions. ASCE Student Chapter members actively participate in contests, such as concrete canoe design and race and steel bridge design, for the Pacific Southwest Conference.

Student Organization

American Society of Civil Engineers (ASCE)
Structural Engineers Association of Southern California (SEASC)
Institute of Transportation Engineers (ITE)
Society of the Advancement of Materials and Process Engineering
(SAMPE)

Faculty Advisor

Prof. Irving Kett
Prof. Rupa Purasinghe
Prof. Hassan Hashemian
Prof. Narendra Taly

PROFESSIONAL REGISTRATION

All civil engineers in charge of a project must be licensed or registered in the state or states in which the project will be constructed. To use the term "Professional Engineer" you must complete the requirements for professional registration or licensure established by the state. Registration requires education and experience and the successful completion of the Engineer in Training (EIT/FE) examination (Prof. Kim) and the Professional Engineering (PE) examination (Prof. Purasinghe and Prof. Bhaumik). The department offers a review course to help students prepare for the FE/EIT examination and reimburses the application fees to undergraduate students who successfully pass the exam.

II. UNDERGRADUATE DEGREE REQUIREMENTS

CIVIL ENGINEERING PROGRAM OBJECTIVES AND OUTCOMES

The following describe the characteristics the Civil Engineering program is seeking to produce in its graduates. The characteristics are categorized into the following three areas:

- *The knowledge they will have*
- *The skills they will possess*
- *The attitudes they will hold*

Knowledge

Educational Objective - After 3 to 5 years, graduates of the B.S. program in Civil Engineering will be knowledgeable in both practical and theoretical approaches to engineering design, problem solving, have an understanding of project management, and be aware of the effect of economics, humanities, and social sciences on engineering practices.

Measurable outcomes:

- i. a knowledge of mathematics, science, and engineering principles (ABET a)
- ii. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (ABET h)
- iii. a knowledge of civil engineering design principles
- iv. a knowledge of current design specifications
- v. a knowledge of computer-aided design

- vi. a knowledge of current events and societal contemporary issues—non-engineering-related (ABET j)
- vii an understanding of civil engineering professional practice issues (ASCE criteria)
- viii an understanding of professional and ethical responsibility (ABET f)
 - ix. an understanding of principles of project management
 - x. an understanding of the role of a leader and leadership principles.

Skills

Educational objective – After 3 to 5 years, graduates of the Civil Engineering program will have the skills necessary to work individually and in teams to define, formulate, and solve problems efficiently by applying engineering fundamentals and modern tools, including computers, and be able to clearly communicate their work.

Measurable outcomes:

- i. an ability to identify, formulate, and solve civil engineering problems (ABET e)
- ii. an ability to plan and design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, constructibility, and sustainability (ABET c)
- iii. an ability to work individually and in multidisciplinary teams (ABET d)
- iv. an ability to communicate effectively orally (ABET g)
- v. an ability to communicate effectively in written reports (ABET g)
- vi. an ability to design and conduct experiments as well as to analyze and interpret data (ABET b)
- vii. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, including computer tools and information technology (ABET k)
- viii. an ability to manage time.

Attitudes

Educational Objective – After 3 to 5 years, graduates of the Civil Engineering program will maintain ethical standards in practice, with a positive attitude towards working in cross-cultural settings and toward lifelong professional development through continuing education and professional registration. They will also have an appreciation that their engineering education was a worthwhile endeavor.

Measurable outcomes:

- i. positive outlook on life
- ii. desire to work in cross-cultural settings
- iii. understanding of professional and ethical responsibility (ABET f)
- iv. willingness to adapt to professional and societal changes
- v. a recognition of the need for, and an ability to engage in lifelong learning (ABET i)
- vi. desire to be successful in Fundamentals of Engineering Examination and become a registered professional civil engineer
- vii. appreciation of the role of professional engineering societies in the discipline of civil engineering.

Our program is structured to achieve these learning objectives and outcomes. The Civil Engineering program provides instruction in the basic sciences and in engineering analysis and design. Areas of

interest within civil engineering include: environmental and sanitary engineering, geotechnical engineering, highway and transportation engineering, hydraulics and hydrology, ocean engineering, and structural analysis and design.

The program leading to the Bachelor of Science degree in Civil Engineering is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET).

REQUIREMENTS FOR THE MAJOR (146 UNITS MINIMUM)

Lower Division Required Courses (76 units minimum)

MATH 206-209	Calculus I-IV (4 each)
MATH 215	Differential Equations (4)
PHYS 201-203	General Physics I-III (4 each)
PHYS 204 or CHEM 102	General Physics (4) or General Chemistry II (5)
CHEM 101	General Chemistry I (5)
ENGR 100	Introduction to Engineering (1)
ENGR 207	Materials Science and Engineering (4)
EE 204	Circuit Analysis (4)
CE/ME 201	Statics (4)
CE/ME 205	Strength of Materials I (4)
CE/ME 210	Matrix Algebra for Engineers (2)
CE/ME 211	Statistics and Probability for Engineers (2)
CS 290	Introduction to FORTRAN Programming (2)
CE 190	Introduction to CAD (1)
CE 195	Civil Engineering Design I (4)
CE 202	Plane Surveying (4)
CE 290	Numerical Methods for Engineers (3)

Upper Division Required Courses (53 units)

CE 303	Fluid Mechanics I (4)
CE 312	Strength of Materials Laboratory I (1)
CE 313	Fluid Mechanics Laboratory I (1)
CE 320	Dynamics I (4)
CE 360	Structural Mechanics I (4)
CE 361	Introduction to Structural Design I (4)
CE 364	Concrete Laboratory (1)
CE 366	Soil Mechanics I (4)
CE 368	Soil Mechanics Laboratory (1)
CE 370	Transportation Engineering (4)
CE 384	Introduction to Environmental Engineering (4)
CE 386	Design of Water Resources systems (4)
CE 496A	Civil Engineering Design Project I (3)
CE 496B	Civil Engineering Design Project II (2)
ENGR 300	Economics for Engineers (4)
ENGR 301	Ethics and Professionalism in Engineering (1)
CE 306	Communication for Civil Engineers (3)
ME 326A	Thermodynamics I (4)

Upper Division Electives (17 units)

Select a coherent program of 16 units in lecture and design electives, which may include a maximum of 4 units from related fields with departmental approval, plus 1 unit of laboratory elective. A minimum of 8 units must be selected from the group designated as design electives. *A minimum of 12 units in upper division electives must be taken in residence at Cal State L.A.*

Design Electives (8-16 units)

- CE 461 Design of Steel Structures (4)
- CE 462 Reinforced Concrete Design I (4)
- CE 463 Timber and Masonry Design (4)
- CE 465 Seismic Design (4)
- CE 467 Foundations I (4)
- CE 471 Highway Engineering (4)
- CE 472 Highway and Airport Pavement Design (4)

Lecture Electives (0-8 units)

- CE 365 Specifications and Cost Estimating (4)
- CE 387 Hydraulics I (4)
- CE 402 Strength of Materials II (4)
- CE 460 Structural Mechanics II (4)
- CE 474 Traffic Engineering (4)
- CE 475 Advanced Surveying (4)
- CE 483 Hydrology I (4)
- CE 484 Sewerage and Sewage Treatment
- CE 485 Water Supply (4)
- CE 486 Groundwater Contamination and Remediation (4)

Laboratory Electives (1 unit)

- CE 372 Asphaltic Materials Laboratory (1)
- CE 381 Computer Aided Design Laboratory (1)
- CE 413 Fluid Mechanics Laboratory II (1)
- CE 473 Pavement Design Laboratory (1)
- CE 499 Undergraduate Directed Study (1)
- ME 412 Strength of Materials Laboratory II (1)

NOTE: No subject credit is allowed for transferred upper division courses with "D" grades.

LOWER DIVISION GENERAL EDUCATION COURSES (32 UNITS)

A: Basic Subjects (8 units)

- A1: ENGL 101 (4) (C or higher grade required)
- A2: COMM. 150 (4)

American Institutions (8 units)

- HIST 202A (4) Or 202B (4)
- POLS 150 (4)

C: Humanities (12 units; select one course each from three different areas)

C1 LITERATURE AND DRAMA

ANTH/ENGL 245 ENGL 207, 250, 258, (d)260, (d)270, 280
SPAN 242 TA 152

C2 ARTS

ART 101ABC, 150, 152, 155, 156, 157, 159, 209 TVF/DANC/TA 210
TVF/ENGL 225 (d)CHS 112 (d)CHS/PAS 260
DANC 157 (d) LBS 234
MUS 150, 151, 152, 156, 157, 160

C3 PHILOSOPHY AND RELIGIOUS STUDIES

PHIL 151, 152 (d) PHIL/RELS 200 (d) PHIL 220

C4 LANGUAGES OTHER THAN ENGLISH

COMD 150 CHIN 100ABC, 101ABC, 200ABC, 201ABC
FREN 100ABC, 130, 200AB GERM 100ABC, 200ABC
ITAL 100ABC, 200ABC JAPN 100ABC, 130, 200ABC, 230
KOR 100ABC LATN 100ABC, 222
PAS 120 PORT 100ABC
RUSS 101AB SPAN 100ABC, 105, 130, 200ABC, 205ABC, 230

C-5 INTEGRATED HUMANITIES

TVF/ENGL/TA 240
ENGL/PHIL 210

E: Lifelong Understanding and Self-Development (4 units, one course)

ANTH 265 (d) ART 240 BUS 200 (d) CHDV/SOC 120
HS 150 KIN 150 (d) PHIL 230 POLS 120
PSY 160 COMM 230 SOC 202 TECH 250

- A minimum *C grade average in general education* is required of all students following the 1987-1989 or any later catalog.
- Students must complete *two diversity courses* which may be selected from blocks C, D, E or from GE upper division themes.
- ENGL 102 is required of all students who entered Cal State L.A. Summer 1993 or later, and who are subject to the requirements of the 1993-95 or later GE catalog. *A minimum C grade is required. A 'C-' grade is not acceptable.*
- (d) Courses with the course number **preceded by the designation (d)** indicate those approved to meet the 2-course **Diversity** requirement.

GENERAL EDUCATION UPPER DIVISION THEME (12 UNITS)

Students are required to complete a 12-unit upper division theme as part of the General Education program. Courses in each theme are distributed among three areas including: Natural Sciences and Mathematics, Social Sciences and Humanities. Students must select one course from each area for the theme selected. Completion of the lower division basic subjects requirement is prerequisite to all upper division theme courses.

- Students must complete two diversity courses which may be selected from blocks C, D, E or from GE upper division themes.
- (d) Courses with the course number **preceded by the designation (d)** indicate those approved to meet the 2-course **Diversity** requirement.

Students may choose from the following themes, in consultation with an adviser.

A. Challenge of Change in the Developing World

Natural Sciences and Mathematics

- | | |
|----------|--|
| GEOG 333 | Environment and Development in the Third World (4) |
| GEOL 351 | Environmental Geology of Developing Nations (4) |

Social Sciences

- | | |
|------------------|---|
| ECON 360 | Developing Countries and the New Global Economy (4) |
| HIST 360 | Revolution and Society in Developing Countries (4) |
| LAS/PAS/POLS 360 | Dynamics of Change in the Developing World (4) |
| EDFN/LAS/PAS/380 | Education and Development in the Third World (4) |

Humanities

- | | |
|-----------------|--|
| TVF 324 | Third Cinema/Video (4) |
| (d) LAS/PAS 342 | Cultural Impact of Development (4) |
| PHIL 334 | Post-Colonial Values and Modernization in the Developing World (4) |

B. Perspectives on Violence

Natural Sciences and Mathematics

- | | |
|--------------|--|
| ANTH 315 | Evolutionary Perspectives on Violence (4) |
| HS/NURS 308 | Psychophysiology of Substance Abuse and Violence (4) |
| NURS/PSY 307 | Physiology and Psychology of Violence and Aggression (4) |

Social Sciences

- | | |
|---------------|--|
| HIST/POLS 351 | Beyond Conflict, Violence and War (4) |
| NURS/SW 355 | Strategies for Preventing and Intervening in Family Violence and Abuse (4) |
| COMD/PSY 309 | Human Violence and Individual Change (4) |
| SOC 383 | Violence in American Society (4) |

Humanities

- | | |
|----------|---------------------------------------|
| TVF 366 | Violence and the Media (4) |
| ENGL 382 | Violence and Literature (4) |
| PHIL 325 | Violence and Ethics (4) |
| TA 314 | Staging Violence in World Theatre (4) |

C. Gender in the Diversity of Human Experience

Natural Sciences and Mathematics

- BIOL 388N/PSY 388 Sex and Gender (4)
 ANTH 310 Evolutionary Perspectives on Gender (4)
 NURS 330 Human Reproductive Health (4)
- Social Sciences
 (d) SOC 341 Sociology of Gender Roles (4)
 (d) ANTH 338 Gender Roles in Cross-Cultural Perspectives (4)
 (d) HIST 357 Gender in History (4)
 (d) POLS 310 Gender, Politics, and Government (4)
- Humanities
 (d) PHIL 327 Philosophy, Gender and Culture (4)
 (d) ENGL/COMM 385 Sex and Gender in Language and Literature (4)
 (d) ENGL/TVF 379 Gender and Sexuality in Popular Culture (4)
 (d) RELS 335 Gender in the Diversity of World Religions (4)
- D. Urban Life and Environment
- Natural Sciences and Mathematics
 CE 352 Technological Aspects of the Urban Environment (4)
 GEOG 310 Urban Climatology (4)
 GEOL 357 Urban Geology (4)
- Social Sciences
 (d) CHDV 321 Urban Families: Contemporary Issues (4)
 (d) GEOG 376 Urban Spatial Processes and Patterns (4)
 HIST 383 Rise of Urban America (4)
 SOC 330 Social Issues in the Urban Setting (4)
- Humanities
 ART 317 Visual Arts in Urban Contexts (4)
 ML 300 Language Diversity in Urban America (4)
 (d) COMM 389 Intercultural Communication in the Urban Environment (4)
 TAD 316 Theatre and Dance in the 20th Century Urban Contexts (4)
- E. The Diversity of Human Emotions
- Natural Sciences and Mathematics
 ANTH 300 Evolutionary Perspectives on Emotions (4)
 PSY 323 Psychology of Emotion (4)
- Social Sciences
 (d) HIST 356 History of Emotions (4)
 (d) SOC 300 Cultural Emotion (4)
 (d) RELS 380 Emotion in Religion (4)
- Humanities
 (d) CHS/ENGL/PAS 327 Ethnicity and Emotions in U.S. Film (4)
 PHIL 372 Philosophy and the Emotions (4)
 TA/TVF 380 Emotion in Theatre and Film (4)
 ENGL/ML 389 Human Emotions in Literary Expression (4)
- F. Human Maturity and Aging Processes and Problems
- Natural Sciences and Mathematics
 BIOL 384N Biology of Human Aging (4)
 NTRS 351 Adult Nutrition (4)

KIN 345	Physiological Effects of Exercise During Aging (4)
Social Sciences	
(d)ANTH 335	Maturity and Aging in Cross-Cultural Perspectives (4)
POLS 330	Politics of Aging (4)
PSY 362	Psychological and Psychosocial Developmental Stages in Maturity and Aging (4)
SOC 323	Socialization: Maturity and Aging (4)
Humanities	
ENGL 383	Narratives of Maturity and Aging (4)
ML 382	Maturity and Aging in East Asia and Romance Literatures (4)
(d) PHIL 373	Themes of Adult Life in Philosophy (4)
(d) RELS 325	Themes of Adult Life in the World's Religions (4)

G. The Global Environment: Past, Present, and Future

Note: Effective Fall Quarter 2004, Theme G is discontinued. Only students who started Theme G prior to Fall, 2004 may enroll in Theme G courses.

Natural Sciences and Mathematics

BIOL 341N/GEOL 341	Evolution of Earth and Life through Time (4)
CE/GEOL 358	Environment, Earth Systems and Technology (4)

Social Sciences

GEOG/POLS 322	Global Change and the Human Condition (4)
GEOG 341	World Resources and Environmental Issues (4)

Humanities

ART 315	The Arts and the Environment (4)
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H. Race, Diversity, and Justice

Natural Sciences and Mathematics

ANTH 361	Race, Racism, and Human Variation (4)
ANTH/PHIL 385	Measurement of Human Difference (4)
HS 370	Environmental Racism (4)

Social Sciences

(d) HIST 352	Civil Rights in the United States (4)
(d)POLS/COMM 342	Rights and Justice in Communication and Politics (4)
(d) SOC 348	Class, Race/Ethnicity and Gender (4)
(d)SW 362	From Institutional Racism to Cultural Competency (4)

Humanities

(d)TVF 334	"Race," Justice and Mass Media (4)
(d)ENGL/PAS 377	Literary Explorations of Justice and Racism (4)
(d)LAS 335	Race and Culture in the Americas (4)
(d)PHIL 323	Human Diversity and Justice (4)

I. Ancients and Moderns

Natural Sciences and Mathematics

CHEM 380N/HIST/PHIL 380	Ancient and Modern Science (4)
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ENGR/TECH 383	Ancient and Modern Technology (4)
ASTR 360	Ancient and Modern View of the Universe (4)
Social Sciences	
ANTH 355	Cultural Evolution and Ancient Civilizations (4)
HIST 311	Classical Civilization and the Modern World (4)
Humanities	
AAAS 350	Ancient East Asian Literature and the Modern World (4)
CHS/ML 312	Mediterranean and Pre-Columbian Myths in Latin American Literature (4)
ENGL 381	Legacy of Greek and Roman Literature (4)
PHIL 321	Ancient Thought and its Modern Legacy (4)

Effective Fall 1998, the Biology requirement can be met by successfully completing a biology course from the Natural Sciences and Mathematics component of an upper division theme, (Themes C, G, or F), **or** by taking a course from GE Bock B1.

B1 BIOLOGICAL (with lab, 4 units) *BIOL 155, 156 MICR 151*

UNIVERSITY REQUIREMENTS (4 UNITS)

ENGL 102 Composition II: Analytical and Persuasive Writing (4)

WRITING SKILLS REQUIREMENTS

All CSU students must demonstrate competence in writing skills as a requirement for graduation. Students must satisfy lower and upper division writing skills requirements.

Lower Division Writing Requirement

The English Placement Test (EPT), described in the *Admissions* chapter of this catalog, must be taken before enrolling in any courses at Cal State L.A. The EPT is prerequisite to all lower division English writing courses.

All baccalaureate students who enter Cal State L.A. Summer 1993 or later, and who are subject to requirements of the 1993-95 or later general education catalog, are required to take two quarters of English composition (ENGL 101 and 102), which must be taken in sequence. Students entering Cal State L.A. as freshmen must complete these courses before they reach upper division standing (90 quarter units). Transfer students entering above the freshmen level who are required to take one or both of these composition courses must do so before they complete 45 quarter units at Cal State L.A. Only the first of the two courses (ENGL 101) is applied to General Education. The second course (ENGL 102) is prerequisite to UNIV 400 (WPE).

Upper Division Writing Requirements

WPE/GWAR

All Cal State L.A. students who entered Summer 1984 or later and are pursuing a degree or credential must satisfy the Graduation Writing Assessment Requirement (GWAR) by passing the Writing Proficiency Examination (WPE). Students must first pass ENGL 101 and 102 (or their equivalents) with a minimum grade of C prior to taking the WPE. The WPE must be taken and passed prior to completion of the 135 quarter units. Transfer students who have completed 135 units upon entrance must pass the WPE during their first quarter of residence at Cal State L.A. Students who have satisfied the upper division writing proficiency requirement at another CSU campus shall be considered to have met the Cal State L.A. requirement.

Students who fail to take and pass the WPE within the required time limit of 135 units will have a hold placed on their records, which will preclude them from enrolling in any courses until the WPE requirement is satisfied. Students who receive a No Credit (NC) grade on the WPE must meet with a WPE consultant in the University Writing Center to discuss deficiencies identified by the exam and receive recommendations of activities to correct these deficiencies. Based on the recommendations from the WPE consultant, students may re-take the WPE or enroll in UNIV 401, the upper division writing proficiency course.

To take the WPE, students must register for UNIV 400 by the add deadline of each quarter. Additional information about the WPE is available in the *Schedule of Classes* and at the University Writing Center

III. GENERAL INFORMATION: PROCEDURES AND REGULATION

PLACEMENT TEST REQUIREMENTS

The California State University requires each entering undergraduate, except those who qualify for an exemption, to take the CSU Entry Level Mathematics (ELM) examination and the CSU English Placement Test (EPT) prior to enrollment. These placement tests are not a condition for admission to the CSU, but they are a condition of enrollment. They are designed to identify entering students who may need additional support in acquiring basic English and mathematics skills necessary to succeed in CSU baccalaureate-level courses. Undergraduate students who do not demonstrate college-level skills both in English and in mathematics will be placed in appropriate remedial programs and activities during the first term of their enrollment. Students placed in remedial programs in either English or mathematics must complete all remediation in their first year of enrollment. Failure to complete remediation by the end of the first year may result in denial of enrollment for future terms.

Students register for the EPT and/or ELM at their local CSU campus. Questions about test dates and registration materials may be addressed to the Cal State L.A. Testing Center, Library, Palmer Wing 2098, (323) 343-3160.

All nonexempt undergraduates must complete the EPT and ELM after admission and before first enrollment in courses at Cal State L.A.

English Placement Test (EPT)

The CSU English Placement Test (EPT) is designed to assess the level of reading and writing skills of entering undergraduate students so that they can be placed in appropriate baccalaureate-level courses. The CSU EPT must be completed by all entering undergraduates, with the exception of those who present proof of one of the following:

- A score of "Exempt" on the augmented English CST, i.e. the CSU Early Assessment Program (EAP), taken in grade 11.
- A score of 550 or above on the verbal section of the College Board SAT I Reasoning Test taken April 1995 or later.
- A score of 24 or above on the enhanced ACT English Test taken October 1989 or later.
- A score of 680 or above on the re-centered and adjusted College Board SAT II: Writing Test taken May 1998 or later.
- A score of 3, 4, or 5 on either the Language and Composition or the Composition and Literature examination of the College Board Scholastic Advanced Placement program.
- Completion and transfer of a course that satisfies the General Education-Breadth or Intersegmental General Education Transfer Curriculum (IGETC) written communication requirement, provided such course was completed with a grade of C or better.

Verification of successful completion of the appropriate course may be required either before registration or by the document deadline date specified at the time of admission. Students who

do not submit the required documentation by the time specified are subject to having their admission rescinded and, if enrolled, being dropped from all courses.

The results of the EPT will not affect admission eligibility, but will be used to identify students who need special help in reading and writing to complete college-level work. Information bulletins for the EPT will be mailed to all students subject to this requirement or may be obtained at the Cal State L.A. Testing Center, Library, Palmer Wing 2098, (323) 343-3160.

Entry Level Mathematics (ELM) Placement Examination

The ELM examination is designed to assess the skill levels of entering CSU students in the areas of mathematics typically covered in three years of rigorous college preparatory mathematics courses in high school (Algebra I, Algebra II, and Geometry). The CSU ELM must be completed by all entering undergraduates, with the exception of those who present proof of one of the following:

- A score of "Exempt" on the augmented mathematics CST, i.e., the CSU Early Assessment Program (EAP), taken in grade 11.
- A score of 550 or above on the mathematics section of the College Board SAT I Reasoning Test or on the College Board SAT II

Mathematics Tests Level I, IC (Calculator), II, or IIC (Calculator).

- A score of 23 or above on the American College Testing Mathematics Test.
- A score of 3 or above on the College Board Advanced Placement mathematics examination (AB or BC) or Statistics examination.
- Completion and transfer of a course that satisfies the General Education-Breadth or Intersegmental General Education Transfer
- Curriculum (IGETC) quantitative reasoning requirement, provided such course was completed with a grade of C or better.

Verification of successful completion of the appropriate course may be required either before registration or by the document deadline date specified at the time of admission. Students who do not submit the required documentation by the time specified are subject to having their admission rescinded and, if enrolled, being dropped from all courses.

Students who are required to take this examination should do so as soon as possible after admission and before they enroll in courses. The results of this examination do not affect admission, but will be used to identify students who need special help in mathematics to do college-level work.

Students who cannot demonstrate basic competence on the examination are required to take steps to overcome deficiencies the first quarter of their enrollment. Any course work undertaken primarily to acquire the required competence shall not be applicable to the baccalaureate

Information bulletins for the EPT and ELM examinations are mailed to all students subject to the requirements. The materials may also be obtained from the Cal State L.A. Testing Center, Library, Palmer Wing 2098, (323) 343-3160.

STUDY LOAD

Undergraduate students must carry a study load of 12 units for full-time enrollment certification by the University. The recommended full-time study load for undergraduates is 16 units. Students on scholastic probation must limit their study load to 12 units.

CAMPUS IDENTIFICATION NUMBER (CIN)

California State University, Los Angeles will randomly assign a nine-digit Campus Identification Number (CIN) to all students in the University. This number is used as a means of identifying records and offering services pertaining to students. The students' Social Security Number will continue to be retained for purposes of financial aid eligibility and other debts payable to the institution.

REGISTRATION

Continuing students at California State University, Los Angeles receive a registration notification form in the mail before the scheduled registration dates for each quarter. Complete information about registration procedures is provided in the *Schedule of Classes*, issued each quarter before the registration period and available for purchase at the University Square Bookstore. Student Telephone-Assisted Registration (STAR) is available to all eligible continuing students.

Absence for more than two of any four consecutive quarters without an approved leave of absence will cancel continuing registration eligibility. Attendance in University extension courses does not constitute continuous attendance.

ACADEMIC ADVISEMENT

Academic advisement is required for all new students before or during their first quarter in attendance. Before registering for their first quarter at Cal State L.A., students must consult an adviser in their major department/division or college-based advisement center to plan a program of study. After the first advisement session, students must consult an academic adviser at least annually or more often as necessary to enhance academic success.

Annual, or more often as needed, consultation with an academic adviser *in* the major department required. Newly admitted students should bring a copy of all high school and/or college transcripts when seeking advisement. They should consult the *Department of Civil Engineering* for making an appointment with their academic adviser.

REPEATING COURSES

Unless otherwise indicated, students may not repeat for credit any course they have already completed with a grade of *C* (2.0 grade points) or higher nor may they, in any case, receive units earned more than once for each passing attempt.

REMOVAL OF WORK FROM DEGREE CONSIDERATION

Under certain circumstances, up to two semesters or three quarters of previous undergraduate course work taken at any college may be disregarded from all considerations associated with requirements for the baccalaureate. Detailed eligibility and procedural information is provided in the *Schedule of Classes*. The basic criteria are listed below:

- Five years must have elapsed since the completion of the most recent work to be disregarded;
- Any previous removal of work from degree consideration must be included in applying the limits on work that may be disregarded;
- Since completion of the work to be disregarded, students must have maintained the following grade point averages at Cal State L.A. at the time of petition: 3.0 for students with 22–44 quarter units completed; 2.5 with 45–66 units completed; and 2.0 with 67 or more units completed; *and* there must be evidence that the student would find it necessary to complete additional units and enroll for one or more additional quarters to qualify for the baccalaureate if the request was not approved.
- There must be evidence that the student would find it necessary to complete additional units and enroll for one or more additional quarters to qualify for the baccalaureate if the request was not approved.

REPEATING COURSES FOR ACADEMIC RENEWAL

Effective Summer 1983, students who are pursuing a baccalaureate may repeat a course one time for purposes of academic renewal if the grade of record is below a *C* (2.0 grade points). This procedure is limited to a maximum of 20 quarter units. *All repetitions must be done at Cal State L.A.*

Students who are pursuing a second or subsequent bachelor's degree may repeat only courses leading to the present degree objective (not courses used for prior bachelor's degrees) for purposes of academic renewal. In computing grade point averages for graduation with a baccalaureate from Cal State L.A., units attempted, units earned (if any), and grade points (if any) for previous attempts of the same or equivalent courses shall be excluded when specified conditions are met.

Students are advised that repeating a course under this policy does not result in removal of the original record and grade from the transcript. However, the earlier grade is disregarded in calculating the grade point average. The repeated course form, available at Administration 146, must be on file when a student enrolls in the course to be repeated and no later than the add deadline.

WITHDRAWAL FROM COURSES

Within the first seven days of the quarter, students may withdraw from any course with no record of the individual course withdrawal on their permanent academic record. After the “*no-record drop*” deadline, students may withdraw with a *W* grade from any course, but only for serious and compelling reasons. These requests are granted only with the approval of the instructor and the

department/division chair on *program change* forms available at Administration 146. Complete information about withdrawals, as well as a sample *program change* form and withdrawal deadlines for each academic quarter, appears in the *Schedule of Classes*.

Withdrawals during the final three weeks of instruction are permitted only when the cause of withdrawal (such as accident or serious illness) is clearly beyond the student's control and assignment of an *I* (Incomplete) is not practicable. Ordinarily, such withdrawals also involve total withdrawal from the University, except that *CR* (credit) or *I* (Incomplete) may be assigned for courses in which the student has completed sufficient work to permit an evaluation. Requests to withdraw under these circumstances are handled as described above, except that such requests must also be endorsed by the dean of the college.

COURSE PREREQUISITES AND COREQUISITES

Students are responsible for fulfilling prerequisites and corequisites. *A prerequisite waiver must be approved for students taking Civil Engineering courses without the necessary prerequisite(s) and/or corequisite(s).*

GRADES REQUIRED FOR CREDIT

The grade point average (GPA) is computed by dividing the total number of grade points earned by the total number of units attempted. Students are advised that they receive no credit for any course in which they do not earn a grade of *D-* or higher.

GRADE POINT AVERAGE REQUIREMENTS

Undergraduate students are expected to maintain a *C* (2.0) average in all courses attempted at Cal State L.A. and any other college or university attended and to make satisfactory progress toward their academic objectives. Students who receive financial aid should inform themselves of additional criteria defining satisfactory progress by consulting the Center for Student Financial Aid.

PROBATION FOR UNDERGRADUATE STUDENTS

Probation is determined separately for academic and administrative-academic deficiencies. Students' probation status is indicated on their grade report.

ACADEMIC PROBATION

Students are placed on academic probation at the end of a quarter if either their grade point average at Cal State L.A. or their cumulative grade point average in all college work attempted falls below *C* (2.0). They are continued on academic probation until their Cal State L.A. and cumulative grade point average is 2.0 or higher or until they are disqualified in accordance with the regulations for academic disqualification.

DISQUALIFICATION OF UNDERGRADUATE STUDENTS

Disqualification is determined separately for academic and administrative-academic deficiencies. Students' disqualification status is indicated on their grade report.

Academic Disqualification: Students currently on probation or special probation whose Cal State L.A. or cumulative grade point average reaches the following levels are disqualified:

<i>Class Level</i>	Grade Point Average
Freshman (0-44 units completed)	<1.50
Sophomores (45-89 units completed)	<1.70
Juniors (90-134 units completed)	<1.85
Seniors (135+ units completed)	<1.95

Immediate Reinstatement: Disqualified students may submit a petition for immediate reinstatement to their college dean or designee (department chair in the Colleges of Engineering, Computer Science, and Technology and Natural and Social Sciences) after the exit interview has taken place. The University Academic Advisement Center will rule on petitions for immediate reinstatement for undeclared majors after their exit interview has taken place. Students' approved petitions must be received in Enrollment Services, Administration 146, by the end of the third week of the quarter after disqualification.

Immediate reinstatement may be granted for not more than two successive quarters to students who are pursuing the program in which disqualification was incurred, including an undeclared major. Students who are admitted with a grade point average less than 2.0 on transfer work and whose grades at Cal State L.A. alone are not the basis for disqualification may qualify for immediate reinstatement in additional quarters.

Students who are enrolled but not officially reinstated for the quarter after disqualification should file a request for complete withdrawal and full refund of fees by the end of the third week of the quarter. Official withdrawal and refund application forms are available at Administration 146. Complete withdrawal may also be accomplished by writing to the Registrar's Office. Registration will be cancelled for disqualified students who are enrolled and do not file a withdrawal request; fees are not returned in these cases.

Special Probation: All disqualified students who are reinstated or readmitted are placed on special probation because their grade point average is less than is allowed for their class level as outlined above. These students are required to earn better than a C (2.0) grade point average each quarter until their grade point average is increased to a level that is higher than that which would normally cause them to be disqualified according to their class level. Students who withdraw completely from any quarter while on special probation will again be disqualified.

Readmission of Disqualified Students

Readmission after disqualification is not automatic. Disqualified students will not be considered for readmission until at least two quarters have elapsed.

RESIDENCE REQUIREMENT

Undergraduate students must complete a minimum of 45 quarter units, including at least 36 upper division units, 18 units in the major, and 12 units in general education courses, in residence at Cal State L.A. for the baccalaureate. Credit earned in special sessions may be applied toward this residence requirement. However, only 36 residence units may be earned

through Open University. Credit earned in extension courses or by examination may not apply toward the residence requirement. *A minimum of 12 units in CE upper division electives must be taken in residence at Cal State L.A.*

SCHOLARSHIP REQUIREMENTS

In addition to meeting total unit requirements for graduation, students must also satisfy specific scholarship requirements. These include achievement of a minimum 2.0 grade point average (C on a scale in which A=4.0) in all units attempted, including those accepted by transfer from another institution, all courses required for the major, all courses used to meet General Education requirements, and all units attempted at Cal State L.A.

UNDERGRADUATE CREDIT FOR GRADUATE COURSES

Under extraordinary academic circumstances as specified below, the University Curriculum Subcommittee may approve the granting of baccalaureate credit for 500-level course work to a maximum of two courses not to exceed a total of 8 quarter units. The following conditions must be met:

- Senior standing at the time of petition (completion of 135 quarter units);
- grade point average of 3.5 in the major;
- submission of a petition to the Curriculum Subcommittee at least one full quarter in advance of the quarter in which the courses are to be taken; and
- submission of a letter of recommendation from the instructor of the 500-level course(s), endorsed by the chair of the student's major department, division or college and by the chair of the host department, division or college if the proposed course is not in the student's major department, division or college.

GRADUATE CREDIT FOR UNDERGRADUATE STUDENTS

Except for provisions for outstanding seniors described above and for vocational teachers enrolled for the community college credential and the BVE degree, graduate course credit may not be applied toward a baccalaureate. In their final quarter of undergraduate study, students may apply toward graduate credit a maximum of eight units in courses beyond the minimum requirements for the baccalaureate, provided they have maintained a minimum 2.5 grade point average in all upper division work. Students with a 3.0 average or higher may include in this allowance one 500-level course. Any course for which graduate credit is requested must be approved in advance by the graduate adviser in the department, division or college in which the master's degree is to be taken.

The approved application must be delivered to the Graduation Office, Administration 409, during the quarter before that in which courses are to be taken. Graduate credit is allowed for courses numbered in the 400 and 500-series only.

APPLICATION FOR GRADUATION (DEGREE CHECK)

Once a minimum of 135-quarter units is earned, students may apply for graduation. Application for graduation (degree check) is made on a form available at the Cal State L.A. Graduation Office Website, academic department / division / college, the college advisement centers and at Enrollment Services in Administration 146. These forms are available five days prior to the application filing period. Candidates take their completed application form for payment to the Cashiers Office. Once payment is made, candidates take their application to their department, division or college for approval and processing. Filing periods are published in the Graduation Information section of the Schedule of Classes.

Students arrange to meet with their faculty adviser who will complete the Bachelors Degree Worksheet and approve the candidate's major program. The department, division or college will forward all documentation to the Graduation office for processing. The Graduation Office notifies students of the receipt of their graduation application and supporting documents.

Graduation check results are sent to the students in the mail prior to their final anticipated quarter. Students who are enrolled in the quarter they expect to graduate but do not complete all degree requirements will have their graduation application "automatically" transferred to the following quarter for processing. All questions regarding the graduation check or final results are to be directed to the student's major department, division or college.

Degrees dates are posted at the end of the quarter in which all requirements are met.

IV. LIST OF COURSES

Courses in Civil Engineering

CE 154 Special Topic in Civil Engineering (1-4) Prerequisites: Instructor consent and as needed for specific topic. Current topics of special interest to students in engineering, as announced in the Schedule of Classes. May be repeated to maximum of 8 units.

CE 190 Introduction To CAD (1) Prerequisite: MATH 103. Use of computers in 2 and 3 dimensional drafting and pictorial representation using CAD software. Computer graphics fundamentals and descriptive geometry. Laboratory 3 hours.

CE 195 Civil Engineering Design I (4) Prerequisites: CE 190, CE 202, PHYS 201. Introduction to civil engineering design including problem identification, data gathering, analysis, feasibility study, alternative design, decision making and communication. Lecture 2 hours, Laboratory 2 hours.

CE 201 Statics (4) (also listed as ME 201) Prerequisites: MATH 207, PHYS 201. Fundamental principles of statics, resolution and composition of forces, algebraic and graphic solutions, friction, center of gravity, moment of inertia.

CE 202 Plane Surveying (4) Prerequisite: MATH 103 or satisfactory score on mathematics placement test. Principles and practices of measurement of distances, directions, and elevations; care and use of level, transit, plane table; mapping practice, and symbols. Lecture 2 hours, laboratory 6 hours.

CE 205 Strength of Materials I (4) (also listed as ME 205) Prerequisite: CE/ME 201. Stresses and strains under axial, shearing, and torsional forces; flexural stresses and deflections of simple beams; columns; and combined stresses.

CE 208 Statics and Strength of Materials (4) (also listed as ME 208) Prerequisites: MATH 207, PHYS 201. Principles of statics, force systems and equilibrium, structures, machines, distributed force, centroid, moment of inertia, stresses, strains, and deformations under axial, torsional, and bending loads. For Electrical Engineering students only.

CE 210 Matrix Algebra for Engineers (2) (also listed as ME 210) Prerequisites: MATH 208, PHYS 201. Introduction to calculations using vectors; matrix operation; solution of linear simultaneous equations; coordinate transformation; application to engineering problems.

CE 211 Statistics and Probability for Engineers (2) (also listed as ME 211) Prerequisites: MATH 208, PHYS 201. Introduction to calculations using probability distributions and densities; concepts in statistics; application to engineering problems.

CE 220 Our Oceans and Our Future (4) The engineering aspects of ocean environment, its effect on humankind, and our future. Intended for all majors. **GE B3**

CE 290 Numerical Methods for Engineers (3) Prerequisite: CE/ME 210. Applied numerical methods for engineers with microcomputer applications. Lecture 2 hours, laboratory 1 hour.

CE 303 Fluid Mechanics I (4) (also listed as ME 303) Prerequisite: PHYS 202. Fundamental principles and methods of fluid mechanics; thermodynamics of fluid flow; Newtonian fluids; equations of fluid flow; laminar and turbulent flow; applications.

CE 306 Communication for Civil Engineers (3) Prerequisites: Satisfactory completion of the Graduation Writing Assessment Requirement (GWAR), COMM 150. Exposure to key communication skills encountered in civil engineering practice. Integration of oral and written communication skills centered around a civil engineering design project. Individual and team assignments. Lecture 2 hours, laboratory 3 hours.

CE 312 Strength of Materials Laboratory I (1) (also listed as ME 312) Prerequisites: CE/ME 205 (may be taken concurrently). Tests of engineering materials in tension, compression, bending, and torsion; verification by experiment; basic theories learned in strength of materials. Laboratory 3 hours.

CE 313 Fluid Mechanics Laboratory I (1) (also listed as ME 313) Prerequisites: CE/ME 303. Experiments on fluid properties, fluid statics, conservation of mass, energy, and momentum, and fluid resistance. Laboratory 3 hours.

CE 320 Dynamics I (4) (also listed as ME 320) Prerequisite: CE/ME 201. Kinematics and kinetics of rigid bodies; work, kinetic energy, impulse, momentum in two and three dimensions; applications to space mechanics.

CE 352 Technological Aspects of Urban Environment (4) Prerequisites: Completion of Basic Subjects (Block A) and one course from Block B. Current engineering practice in dealing with urban problems such as financial, transportation, pollution, communications, public utilities, land use planning and public health. Not acceptable for engineering technical elective credit. **GE Theme D**

CE 358 Environment, Earth Systems and Technology (4) (also listed as GEOG 358)
Prerequisites: Completion of Basic Subjects (Block A) and one course from Block B. Consider the role of technology in the changing relationships between human societies and their environment; studies the impact of the agricultural, industrial and information revolutions on natural systems and sustainability. **GE Theme G**

CE 360 Structural Mechanics I (4) Prerequisite: CE/ME 205. Analysis of determinate structures: beams, frames, and cables. Introduction to influence lines and analysis of indeterminate structures.

CE 361 Introduction to Structural Design I (4) Prerequisite: CE 360. Loads on buildings and load distribution in framed structures, codes and specifications, design of simple beams, columns and tension members made from steel, concrete, and timber.

CE 364 Concrete Laboratory (1) Prerequisites or corequisites: CE 361, CE/ME 312. Physical tests of cement, concrete aggregates, tensile strength test of cement, proportioning of concrete mixtures, slump test, compressive and flexural strength tests. Laboratory 3 hours.

CE 365 Specifications and Cost Estimating (4) Prerequisite: Senior standing in engineering. Building specifications and codes, estimating costs, materials handling and transport, excavation, concrete, wood, masonry, and steel construction.

CE 366 Soil Mechanics I (4) Prerequisites: CE/ME 205; prerequisite or corequisite: CE/ME 303. Physical and mechanical properties of soils, classifications, permeability, seepage, capillarity, consolidation, settlement, stresses, pressures, strength theories, and testing methods.

CE 368 Soil Mechanics Laboratory (1) Prerequisites: CE 366, CE/ME 312. Physical properties of soils, soil classification, mechanical analysis, permeability, shearing strength, and consolidation tests. Laboratory 3 hours.

CE 370 Transportation Engineering (4) Prerequisites: CE 202, CE/ME 210, CE/ME 211. Fundamental principles for analysis, planning, design, and operation of transportation systems.

CE 372 Asphaltic Materials Laboratory (1) Prerequisite: CE/ME 312. Laboratory tests on asphalt cement and aggregates; design of asphaltic mixtures; proportioning of asphalt cement and aggregates; preparation of test specimens. Laboratory 3 hours.

CE 381 Computer Aided Design Laboratory (1) Prerequisites: CE 303, 361, 370. Use of computer-aided visualization, comprehension and graphical representation in planning and design of civil engineering projects.

CE 384 Introduction to Environmental Engineering (4) Prerequisites: CE/ME 303, CHEM 101. Introduction to environmental engineering; environmental and ecological systems; physical, chemical, and biological processes; water and wastewater treatment; air pollution; solid and hazardous wastes; regulations and impact assessment.

CE 386 Design of Water Resources Systems (4) Prerequisite: CE 195, CE /ME 303. Develops of water resources and demand of water, availability of water, storage and control structures, conveyance system, and drainage system.

CE 387 Hydraulics I (4) Prerequisite: CE/ ME 303. Introduction to open channel flow, gradually varied flow, hydraulic machinery, and introduction to unsteady flow.

CE 398 Cooperative Education (1-4) Prerequisites: Approval of student adviser and department chair. Integration of civil engineering work experience with academic program, individually planned through coordinator. Minimum of 10 hours per week required for each unit. Graded CR/NC.

CE 402 Strength of Materials II (4) Prerequisites: CE/ME 205, MATH 215. Stress-strain relationship in three dimensions, energy principles; theories of failure, curved beams, thick wall cylinders, shear center, unsymmetrical bending, and torsion in noncircular sections.

CE 413 Fluid Mechanics Laboratory II (1) (also listed as ME 413) Prerequisite: CE/ME 313; prerequisite or corequisite: CE 387 or ME 408. Experiments on subsonic and supersonic flow, free surface flow, pumps, turbines, fans, and unsteady flow. Laboratory 3 hours.

CE 454 Special Topics in Civil Engineering (1-4) Prerequisites: Senior standing in engineering; enrollment subject to approval of instructor in charge. Group study of selected topics not currently offered as technical electives; study groups may be organized in advanced civil engineering subjects upon approval of instructor.

CE 454L Special Topics in Civil Engineering (1) Prerequisites: Senior standing in engineering; enrollment subject to approval of instructor in charge. Group study of selected topics not currently offered as technical electives; study groups may be organized in advanced civil engineering subjects upon approval of instructor. Tests include physical tests of cement, aggregates and other agents, mix design; workability and strength tests. Concrete canoe design and construction.

CE 460 Structural Mechanics II (4) Prerequisite: CE 360. Analysis of indeterminate structures; moment distribution, slope deflection, and approximation methods; three dimensional frames and long span structures.

CE 461 Design of Steel Structures (4) Prerequisites: CE 360, 361. Design of steel structures; lateral buckling of beams and frames, built-up beams, girders and trusses; moment connections, torsion and unsymmetrical bending; diaphragms and lateral force designs.

CE 462 Reinforced Concrete Design I (4) Prerequisites: CE 360, 361. Strength design of reinforced concrete structures, beams, slabs, frames, columns, footings, and retaining walls.

CE 463 Timber and Masonry Design (4) Prerequisites: CE 360, 361. Wood properties and design of wood structural elements, plywood and glulam products; reinforced masonry (brick and concrete) units, material properties, design of reinforced masonry structural elements.

CE 465 Seismic Design (4) Prerequisites: CE 460 and CE 461 or CE 462. Earthquake and ground motion characteristics, structural response to support motions, lateral force resisting systems, determination of seismic forces, design of buildings for lateral loads.

CE 467 Foundations I (4) Prerequisite: CE 366. Site exploration, bearing capacity, slope stability, lateral earth pressure, types of foundations, footings, caissons, piles, retaining walls, and cofferdams.

CE 471 Highway Engineering (4) Prerequisites: CE 370, CE 202. Introduction to principles of highway design including route location, geometric of horizontal and vertical curves, earthwork computations, drainage designs; computer applications.

CE 472 Highway and Airport Pavement Design (4) Prerequisites: CE 368, 370. Theory and principles of pavement design for highways and airports; effects of soil characteristics and physical properties of basic materials; testing procedures. Grading ABC/NC.

CE 473 Pavement Design Laboratory (1) Prerequisite: CE 312. Basic tests performed in evaluation of treated and untreated bases, subbases, and subgrades necessary for pavement thickness design. Laboratory 3 hours.

CE 474 Traffic Engineering (4) Prerequisite: CE 370. Elements of traffic engineering; vehicle, driver, and road characteristics; capacity and flow determination; signalized intersections; parking and accident studies; street, freeway, and mass transit operations.

CE 475 Advanced Surveying (4) Prerequisite: CE 202. Advanced surveying, including triangulation, practical astronomy, and land and construction surveying. Lecture 2 hours, laboratory 6 hours.

CE 483 Hydrology I (4) Prerequisite: CE/ME 303. Precipitation, evaporation, infiltration, transpiration, and runoff; methods of predicting discharge from precipitation, flood routing, and measurement of hydrologic processes.

CE 484 Sewerage and Sewage Treatment (4) Prerequisite or Corequisite: CE 384. Sanitary and storm sewer systems, sewage treatment and disposal, stream sanitation, and treatment plant design.

CE 485 Water Supply (4) Prerequisite: CE/ME 303. Sources and collection of surface and ground water, distribution systems, water quality, water treatment plants, sedimentation, filtration, softening, and disinfection.

CE 486 Groundwater Contamination and Remediation (4) Prerequisite: CE 384. Study of the fate of contaminants in the subsurface environment. Focus is on the transport of chemicals through porous media including possible transformations (chemical, physical, and biological).

CE 496A Civil Engineering Design Project I (3) Prerequisites: CE 306,361,366,370,384, 386, ENGR 300, 301. Initial phases of planning and designing typical civil engineering project as encountered in practice; project requires integration and synthesis of acquired knowledge, consideration of alternative solutions, methods, and constraints such as economic, environmental, health and safety, social, political, sustainability, constructability, and ethical. Individual and group work required. A preliminary report and oral presentation required. Lecture 2 hours and Laboratory 3 hours. CE 496A and 496B must be taken in consecutive quarters in the same academic year.

CE 496B Civil Engineering Design Project II (2) Prerequisite: CE 496A. Continuation of design project initiated in CE 496A. Complete analysis and design of system including application of constraints. Preparation of final design report, including: memoranda, computations, drawings, cost estimates etc. Individual and group work required. Final written and oral report is required. Laboratory 6 hours. CE 496A and 496B must be taken in consecutive quarters in the same academic year.

CE 499 Undergraduate Directed Study (1-4) Prerequisite: Consent of an instructor to act as sponsor. Project selected in conference with the sponsor before registration; progress meetings held regularly, and a final report submitted. May be repeated for credit.

Courses in Computer Science

CS 290 Introduction to FORTRAN Programming (2) Prerequisite: MATH 206. Elementary computer programming using FORTRAN language. Lecture 1 hour, laboratory 3 hours.

Courses in Electrical Engineering

EE 204 Circuit Analysis (4) Prerequisites: MATH 208, PHYS 203. Electric circuit analysis, transient and steady state; and introduction to frequency response.

Courses in Engineering

ENGR 100 Introduction to Engineering (1) Introduction to profession of engineering; ethical and legal aspects of engineering profession; engineering design process; communication and computer skills in engineering. Laboratory 3 hours. Graded CR/NC.

ENGR 154 Special Topics in Engineering (1-4) Prerequisites: Instructor consent and as needed for specific topic. Current topics of special interest to students in engineering, as announced in Schedule of Classes. May be repeated to maximum of 8 units.

ENGR 207 Materials Science and Engineering (4) Prerequisites: CHEM 101, MATH 206. Understanding structure and fundamental atomic and molecular mechanisms of engineering materials, atom and electron movement, physical and mechanical properties; overview of engineering materials, semiconductors, metals, ceramics, polymers, and composites.

Courses in Mechanical Engineering

ME 326A Thermodynamics I (4) Prerequisites: MATH 208, PHYS 202. Concepts of equilibrium and temperature; first and second laws of thermodynamics. Properties of pure substances; ideal gases; application of thermodynamic principles to closed and open systems.

Courses in Mathematics

MATH 206 Calculus I: Differentiation (4) Prerequisites: Satisfactory score on (or exemption from) ELM; MATH 102 and 103, each with a minimum C grade *or* satisfactory score on placement examination; students with a grade less than B- in either MATH 102 or MATH 103 must enroll concurrently in MATH 206P. Functions, graphs, conics, limits, and continuity, derivatives, antidifferentiation, and applications.

MATH 206P Calculus I Workshop (1) Activity for Math 206 students with emphasis on problem solving. Concurrent registration in Math 206 required. Open to all Math 206 students but mandatory for students whose grade in Math 102 and Math 103 is less than B-. Graded CR/NC

MATH 207 Calculus II: Integration (4) Prerequisite: MATH 206 with minimum C grade; students with a grade less than B- in MATH 206 must enroll concurrently in MATH 207P. The definite integral, Fundamental Theorem of Calculus, transcendental functions, methods of integration, applications to physics and biology.

MATH 207P Calculus II Workshop (1) Activity for Math 207 students with emphasis on problem solving. Concurrent registration in Math 207 required. Open to all Math 207 students but mandatory for students whose grade in Math 206 is less than B-. Graded CR/NC

MATH 208 Calculus III: Sequences, Series, and Coordinate Systems (4) Prerequisite: MATH 207 with minimum C grade; students with a grade less than B- in MATH 207 must enroll concurrently in MATH 208P. Limits of sequences and series, indeterminate forms, Taylor Series, plane coordinate systems, and change of coordinates.

MATH 208P Calculus III Workshop (1) Activity for Math 208 students with emphasis on problem solving. Concurrent registration in Math 208 required. Open to all Math 208 students but mandatory for students whose grade in Math 207 is less than B-. Graded CR/NC

MATH 209 Calculus IV: Several Variables (4) Prerequisite: MATH 208 with minimum C grade. Three-dimensional analytic geometry, partial differentiation, multiple integration, spherical and cylindrical coordinate systems, line integrals.

MATH 215 Differential Equations (4) Prerequisite: MATH 209. Ordinary differential equations with concentration on methods of finding solutions; applications in science and engineering.

Courses in Chemistry

CHEM 101† General Chemistry I (5) Prerequisite: High school chemistry and physics; two years of high school algebra; satisfactory performance on chemistry diagnostic examination given during registration period. Physical concepts, stoichiometry, structure of atom, periodic table, chemical bonding. Lecture 3 hours, recitation 1 hour, laboratory 3 hours.

CHEM 102† General Chemistry II (5) Prerequisite: CHEM 101. Structure of molecules, states of matter, acids and bases, equilibrium, oxidation-reduction, electrochemistry, coordination compounds. Lecture 3 hours, recitation 1 hour, laboratory 3 hours.

Courses in Physics

PHYS 201–205 General Physics (4 each) Two-year sequence for physical science and engineering majors, using calculus. Lecture 3 hours, laboratory 3 hours.

PHYS 201 General Physics Prerequisites: High school physics or permission of department; MATH 206 (may be taken concurrently). Vectors, mechanics of particles and rigid bodies, basic conservation laws of mechanics.

PHYS 201P: Physics Recitation (1) Prerequisite: Concurrent registration in PHYS 201. Recitation for PHYS 201 with emphasis on techniques of problem solving. Graded CR/NC.

PHYS 202 General Physics Prerequisite: PHYS 201; prerequisite or corequisite: MATH 207. Mechanical vibrations and sound, elementary thermodynamics.

PHYS 202P: Physics Recitation (1) Corequisite: PHYS 202. Recitation for PHYS 202 with emphasis on techniques of problem solving. Graded CR/NC.

PHYS 203 General Physics Prerequisite: PHYS 202. Prerequisite or corequisite: MATH 208. Elementary field theory, basic electricity and magnetism, DC and AC circuits.

PHYS 203P: Physics Recitation Corequisite: Concurrent registration in PHYS 203. Recitation for PHYS 203 with emphasis on techniques of problem solving. Graded CR/NC.

PHYS 204 General Physics: Prerequisite: PHYS 203. Prerequisite or corequisite: MATH 209. Continuation of electricity and magnetism including oscillations and waves; geometrical and physical optics.

PHYS 204P Physics Recitation (1) Corequisite: Concurrent registration in PHYS 204. Recitation for PHYS 204 with emphasis on techniques of problem solving. Graded *CR/NC*.

PHYS 205 General Physics: Prerequisite: PHYS 204; prerequisite or corequisite: MATH 209. Topics in modern physics including special relativity, elementary quantum physics, atomic theory, Schrödinger's equation.

V. FACULTY AND AREAS OF SPECIALIZATION

Anjan Bhaumik, Ph.D.	University of Minnesota Structural Engineering; Computer Applications
Hassan Hashemian, Ph.D.	University of California, Berkeley Registered Professional Civil Engineer Transportation; City Planning
Raymond I. Jeng, Ph.D.	Colorado State University Registered Professional Civil Engineer Hydraulic Engineering; Water Resources
Irving Kett, D. Eng. Sc.	New York University Registered Professional Civil Engineer and Licensed Land Surveyor Transportation; Surveying
Crist Khachikian, Ph.D.	University of California, Los Angeles Environmental Engineering
Young C. Kim, Ph.D.	University of Southern California Coastal Engineering; Hydraulic Engineering
Rupa Purasinghe, Ph.D.	Case Western Reserve University Registered Professional Civil Engineer Structural Engineering, Computer Aided Structural Analysis and Design; Finite Element, Method
Narendra Taly, Ph.D.	West Virginia University Registered Professor Civil Engineer Structural Engineering; Bridge Design
Mark R. Tufenkjian, Ph.D.	University of California, Los Angeles Registered Professor Civil Engineer Geotechnical Engineering

VI. FORMS

B.S IN CIVIL ENGINEERING: SUGGESTED 4-YEAR PROGRAM

B.S. in CIVIL ENGINEERING Suggested 4-Year Program (Effective Fall 2005)

QUARTER	1ST YEAR		2ND YEAR		3RD YEAR		4TH YEAR	
FALL	MATH 206	4	MATH 209	4	EE 204	4	CE 306	3
	PHYS 201	4	CHEM. 101	5	CE/ME 312	1	CE 364	1
	ENGR 100	1	CE/ME 210	2	CE 360	4	CE 386	4
	ENGL 101	4	CE/ME 211	2	CE/ME 303	4	Design Elective	4
	COMM. 150	4	HIST 202 A OR B	4	GE BLK-C	4	UD THEME	4
	TOTAL	17	TOTAL	17	TOTAL	17	TOTAL	16
WINTER	MATH 207	4	MATH 215	4	ENGR 207	4	ME 326A	4
	PHYS 202	4	Phys 204/Chem 102	4 /5	CE 361	4	Design Elective	4
	CE 190	1	CE/ME 201	4	CE 366	4	LAB Elective	1
	CE 202	4	GE BLK-E	4	CE/ME 313	1	UD THEME	4
	POLS 150	4	WPE	0	GE BLK-C	4	CE 496 A	3
	TOTAL	17	TOTAL	16 /17	TOTAL	17	TOTAL	16
SPRING	MATH 208	4	CS 290	2	ENGR 300	4	ENGR 301	1
	PHYS 203	4	CE/ME 205	4	CE 370	4	CE 496 B	2
	CE 195	4	CE 290	3	CE 368	1	Lect/Dsgn Elec.	4
	ENGL 102	4	CE/ME 320	4	CE 384	4	Lect/Dsgn Elec.	4
			GE BLK-C	4	**GE BLK-B1	4	UD THEME	4
	TOTAL	16	TOTAL	17	TOTAL	17	TOTAL	15

** FALL 1998 or later catalogs:.

*GE BLOCK-B1 is not required. However, a Biology Upper division Theme course must be completed.
Diversity Requirement: Students must complete two courses certified as diversity courses.
These courses may be completed at either the lower division level or upper division level.*

California State University, Los Angeles
College of Engineering, Computer Science, and Technology
Civil Engineering Department

WAIVER OF PREREQUISITES

Quarter: Fall Winter Spring Summer Year: _____

Last Name: _____ First Name: _____ SID: _____

This is to request the waiver of the pre-requisites for

	Taken	
Course	Quarter	Year

based on the indicated reason(s) below:

Equivalent course taken at other institution

Course	Institution

Others

Justification:

Requested by:

Instructor: _____ Date: _____

Approved by:

Department Chair: _____ Date: _____

California State University, Los Angeles
College of Engineering, Computer Science, and Technology

Course Overlap/Override Petition

Quarter _____

Name of Student _____, SID _____
is requesting permission to register for the following two courses that overlap,

- | | |
|-------------------------------------|-------------------------------------|
| 1. _____
Department and Course # | 2. _____
Department and Course # |
| _____
Day and Time | _____
Day and Time |
| _____
Professor Signature | _____
Professor Signature |

Student will make up time/work by completing the following:

APPROVALS:

Advisor _____ Date: _____

Department Chair _____ Date: _____

Associate Dean _____ Date: _____

After obtaining all signatures, please submit this form to Administration Building, Room 146.

GE for Engineering Majors

Effective: Fall Quarter, 1998

A Basic Subjects	American Institutions	B Natural Sciences	C Humanities	D Social Sciences	E Lifelong Understanding and Self-Development
UNITS: 16	8	0	12	0	4
<p><u>A1 WRITTEN COMM</u> ENGL 101</p> <p><u>A2 ORAL COMM</u> COMM 150</p> <p><u>A3 CRITICAL THINKING</u> <i>exempt</i></p> <p><u>A4 MATH CONCEPTS</u> fulfilled in major</p> <p>minimum C grade in these classes is required.</p>	<p><u>U.S. HISTORY</u> HIST 202A or 202b</p> <p><u>U.S. CONSTITUTION</u> +POLS 150</p> <p><u>STAE/LOCAL GOV'T</u> +POLS 150 or 200</p> <p>+POLS 150 meets both areas.</p>	<p><u>B1 BIOLOGICAL</u> (with lab)</p> <p>BIOL 155, 156 MICR 151</p> <p>(for exemption from this requirement, engineering majors must successfully complete a biology course as part of their upper division theme)</p>	<p><u>C1 LITERATURE AND DRAMA</u> ANTH/ENGL 245</p> <p>ENGL 207, 250, 258, (d)260, (d)270, 280</p> <p>SPAN 242</p> <p><u>C2 ARTS</u> ART 101ABC, 150, 152, 155 156, 157, 159, 209 CHS 112 DANC 157 ENGL 225//TVF MUS 150, 151, 152, 156, 157, 160</p> <p><u>C3 PHILOSOPHY AND RELIGIOUS STUDIES</u> PHIL 151, 152, (d) PHIL 22C (d) PHIL/RELS 200</p> <p><u>C4 LANGUAGES OTHER THAN ENGLISH</u> COMD 150 KOR 100ABC LATN 100ABC, 222 CHIN 100ABC, 101ABC, 200ABC, 201ABC FREN 100ABC, 130, 200AB GERM 100ABC, 200ABC ITAL 100ABC, 200ABC PAS 120 PORT 100ABC JAPN 100ABC, 130, 200ABC, 230 RUSS 101AB SPAN 100ABC, 105, 130, 200ABC, 205AB, 230</p> <p><u>C5: INTEGRATED HUMANITIES</u> BCST / ENGL / TA 240 ENGL / PHIL 210</p>	<p>ENGR 300 fulfilled in major</p>	<p>ANTH 265 (d) ART 240 BUS 200 (d) CHDV/SOC 120 COMM 230 HS 150 KIN 150 (d) PHIL 230 POLS 120 PSY 160 (d) SOC 202 TECH 250</p> <p>(d) Courses with the course number preceded by the designation (d) indicate those approved to meet the 2-course Diversity requirement.</p>
<p>A minimum C grade average in general education for all students following 1987-89 or any later catalog</p> <p>ENGL 102 is required of all students who entered Cal State LA Summer 1993 or later & who are subject to the requirements of the 1993-95 or later GE catalog.</p> <p>A minimum C grade is required in ENGL 102.</p>		<p><u>B2 PHYSICAL (with lab)</u> fulfilled in major</p> <p><u>B3 APPLIED NATURAL</u> <i>exempt</i></p> <p><u>INTEGRATED NATURAL</u> <i>exempt</i></p>			
<p>Students must complete two diversity courses which may be selected from blocks C, E, or from GE upper division themes.</p> <p>Engineering students must complete the Introduction to Higher Education requirement, ENGR 100, within their first two quarters at CSULA.</p> <p>MESA/MEP students must take the ENGR 154 sequence</p>					



California State University, Los Angeles

Department of Civil Engineering

DEPARTMENT OF CIVIL ENGINEERING FUNDAMENTALS OF ENGINEERING (F.E.) EXAM RESULTS REPORTING FORM

A. Your Personal Information

1. Last Name: _____ First Name: _____

2. Address: _____

3. Telephone Number Day: _____ Evening: _____

E-mail address: _____

4. Expected Graduation Date: _____

B. F.E. Exam Information

F.E. Exam Status: Passed Yes No

Date Taken: _____

Please attach a copy of your results. If you pass FE while an undergraduate, you will get a refund of \$60.00 (exam fee) from the College of Engineering, Computer Science and Technology. To get your refund, you need to submit this form together with:

- I) A copy of your results indicating a pass.
- II) Confirmation of payment to state board (i.e. a copy of cancelled check, or a receipt from the state board). If you do not have this, please call the state board at **(916) 263-2222** and ask for a duplicate receipt.

If you need more information, please contact Professor Purasinghe at (323) 343-4459.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES



COLLEGE OF ENGINEERING, COMPUTER SCIENCE, AND TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

Application for independent study (CE 499)

DATE: _____ Call #: _____ Section: _____
(Leave Blank) (Leave Blank)

Quarter: Fall Winter Spring Summer Year: _____

Last Name: _____ First Name: _____ CIN: _____

Address: _____

City/State: _____ Zip Code: _____

Telephone: (Home) _____ Business: _____ Email: _____

WPE Date: _____ Taken (WPE must have been completed) GPA: _____

Title of Proposed Independent Study

Units: _____ Specify: Lab Elective Technical Elective

Brief Description of Project: _____

Sponsor's Approval: _____ Date: _____

Advisor's Approval: _____ Date: _____

Department Chair Approval: _____ Date: _____

The work taken under CE 499 shall be of such caliber that it is acceptable as the equivalent of the type of formal course with which it will be classified. One to four (1-4) units may be used as a technical elective or one (1) unit may be used for a laboratory elective. Laboratory Electives can only be obtained when work is experimental in nature.

To take on one (1) unit, the student **must have a 2.00 grade point average (GPA)** in a minimum of twenty (20) units of engineering subjects taken at California State University, Los Angeles. To take more than one (1) unit, the grade point average (GPA) **must be 2.76 in a minimum of twenty (20) units** of engineering taken at California State University, Los Angeles.

In order to receive a grade, four (4) copies of a formal report on the study must be submitted to the sponsor no later than the last day of classes in the quarter in which the study is conducted.



CALIFORNIA STATE UNIVERSITY, LOS ANGELES

COLLEGE OF ENGINEERING, COMPUTER SCIENCE, AND TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

DATE:

TO: Joan Woosley, Registrar
Registrar's Office

FROM: Benjamin L. Lee, Acting Associate Dean
College of Engineering, Computer Science, and Technology

SUBJECT: EXCEPTION TO 18 UNIT STUDY LOAD

EXCEPTION TO 18 UNIT STUDY LOAD

The student listed has been approved to exceed the 18 unit study load limit.

CIN #: Department: **Civil Engineering**

Last Name:		First Name:			
Course Number	Course Titled:	Section Number:	Units:		
			Total Units with overload course:		

Reason for Overload

- Student is graduating this quarter.
- Course is not available to student for another year.
- Student is taking a 5-unit course.
- Other (explain):

Department Approval:	
	Rupa Purasinghe, Department Chair Signature
College Approval:	Benjamin L. Lee, Associate Dean Signature

CALIFORNIA STATE UNIVERSITY, LOS ANGELES



COLLEGE OF ENGINEERING, COMPUTER SCIENCE, AND TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

APPLICATION FOR ACADEMIC CREDIT: CE 398 COOPERATIVE EDUCATION

Date: _____

Last Name: _____ First Name: _____ SID: _____

Address: _____

City and State: _____ Zip Code: _____

Telephone: (Home) _____ (Business): _____ Email: _____

Quarter Beginning Study: Fall Winter Spring Summer Year: _____

Units: 1 2 3 4 # of Quarters Requested: 1 2 3 4

Specify: Lab Elective _____ Technical Elective _____ GPA: __

Name & Address of Employer: _____

Name of Supervisor: _____

Description of Job (explain how it fits your academic career objectives):

Sponsor's Approval: _____ Date: _____

Advisor's Approval: _____ Date: _____

Department Chair's Approval: _____ Date: _____

The work taken under CE 398 shall be of such caliber that it is acceptable as the equivalent of the type of formal course with which it will be classified. One to four (1-4) units may be used as a technical elective or one (1) unit may be used for a laboratory elective. These may be earned one (1) unit at a time. Laboratory electives can only be obtained when the work is experimental in nature.

To take one (1) unit, the student must have a 2.00 grade point average in a minimum of twenty (20) units of Civil Engineering subjects taken at CSULA. To take more than one (1) unit the grade point average must be a 2.75 in a minimum of twenty (20) units of Civil Engineering taken at CSULA.

In order to receive a grade, a Cooperation Education Student Progress Report must be submitted to the sponsor no later than the last day of classes in the quarter in which the study is conducted.

This application is valid for the number of quarters of credit requested up to a maximum of four (4) quarters. A change of job or failure to register for CE 398 for more than one (1) quarter requires a new application and approval.