

**SCHOOL OF EDUCATION
ASSOCIATE DEAN (ACTING)**

L.Y. (Mickey) Hollis

**DEPARTMENT OF EDUCATIONAL
LEADERSHIP**

DEPARTMENT CHAIR

Dr. Louise Adler

DEPARTMENT OFFICE

Education Classroom Building 531

DEPARTMENT WEBSITE

<http://hdcs.fullerton.edu/edleadership>

PROGRAMS OFFERED

Master of Science in Education

Concentration in Educational
Administration

Preliminary Administrative Credential

Professional Administrative Credential

School Business Management Certificate
(University Extension)

Doctorate of Education (Approval pending)

Educational Leadership and Policy

FACULTY

Louise Adler, Joyce Lee, Ron Oliver,
Linda Orozco, Ken Stichter

MISSION

Our mission is to prepare school leaders who demonstrate strategic, instructional, organizational, political and community leadership; and to provide the community a source of scholarship and assistance in interpretation and application of scholarship.

GOALS OF THE DEPARTMENT

The goals of the department are to prepare educational leaders who demonstrate a wide array of knowledge, skills, attributes, and commitment.

Strategic Leadership

Leadership requires the ability to develop with others vision and purpose, utilize information, frame problems, exercise leadership processes to achieve common goals, and act ethically for educational communities.¹

A school administrator is an educational leader who promotes the success of all students by facilitating the development, articulation, implementation, and stewardship of a vision of learning that is shared and supported by the school community.²

A school administrator is an educational leader who promotes the success of all students by modeling a personal code of ethics and developing professional leadership capacity.²

Instructional Leadership

Leadership requires the ability to design appropriate curricula and instructional programs, to develop learner-centered school cultures, to assess outcomes, to provide student personnel services, and to plan with faculty professional development activities aimed at improving instruction.¹

A school administrator is an educational leader who promotes the success of all students by advocating, nurturing, and sustaining a school culture and instructional program conducive to student learning and staff professional growth.²

Organizational Leadership

Leadership requires the ability to understand, initiate and/or improve the organization, implement operational plans, manage financial resources, and apply effective management processes and procedures.¹

A school administrator is an educational leader who promotes the success of all students by ensuring management of the organization, operations, and resources for a safe, efficient, and effective learning environment.²

Political Leadership

Leadership requires the ability to act in accordance with legal provisions and statutory requirements, to apply regulatory standards, to develop and apply appropriate policies, to understand and act professionally regarding the ethical implications of policy initiatives and political actions, to regulate public policy initiatives to student welfare, to understand.¹

A school administrator is an educational leader who promotes the success of all students by understanding, responding to, and influencing the larger political, social, economic, legal, and cultural context.²

Community Leadership

Leaders must collaborate with parents and community members; work with community agencies, foundations, and the private sector; respond to community interests and needs in performing administrative responsibilities; develop effective staff communications and public relations programs; and act as mediators for the various groups and individuals who are part of the school community.

A school administrator is an educational leader who promotes the success of all students by collaborating with families and community members, responding to diverse community interests and needs, and mobilizing community resources.²

PHILOSOPHY OF THE DEPARTMENT

Administration of schools for the 21st Century demands that education leaders demonstrate:

- Commitment to high standards;
- Strong ethical values;
- Credible instructional leadership;
- Understanding of social and political trends and the changing role of education in our society;
- Problem solving ability and the skills necessary to promote and adapt to change and use collaboration to build a shared vision for schools;
- Capacity to collaborate effectively with a wide range of non-school agencies and community organizations which can help schools achieve their mission;



- Commitment to life long learning which empowers students, staff, and themselves. We believe that: every child must achieve academic success in school;
- Every school must educate for an American democ-

cracy that values the norms and practices of diverse groups and at the same time celebrates shared community values;

- School leaders must be reflective practitioners;
- Knowledge is evolving and socially constructed and that learning is produced through an interaction of different perspectives that enable students to connect their education to their experiences.

Policies of the Department

Candidates for our programs will be selected on the basis of leadership potential and commitment to the improvement of education, and will engage in a rigorous course of study.

The department is committed to a continual effort to plan and revise programs in collaboration with university colleagues, our students, and the leaders of the schools in the communities we serve.

Students who wish to apply for credential programs must complete a separate applicant portfolio. Contact the School of Education Admission Office, 278-4028, for a copy of the requirements and information.

Students applying for the Preliminary Administrative Credential Program are required to have three years teaching experience when entering the program. Waiver requests for 1-2 years of experience are considered for those starting a second career or under unusual circumstances.

¹ NCATE-Approved Curriculum Guidelines for Advance Program in Educational Leadership 1995.

² California Professional Standards for Educational Leaders 2001.

The courses offered by the department are arranged in a specific order, which must be followed by all students. Cohorts of students are formed and move through the courses as a group.

The department expects every student to maintain an email address and have access to the World Wide Web while they are enrolled in our programs. The university has computing facilities that can be used by students to email or access the web.

ADMINISTRATIVE SERVICES CREDENTIAL

The Administrative Services Credential programs of the Department of Educational Leadership are approved by the California Commission on Teacher Credentialing. Because regulations governing these programs change, students should contact the department office for current information and requirements.

Preliminary Credential

The Preliminary Administrative Services Certificate/Credential is the "Tier I" administrative credential in California, requiring a total of 26-31 units of work (which may be incorporated into the master's degree program). Upon receipt of the Preliminary credential, one is eligible for employment as an administrator in California public schools. A Master's Degree is required for California State University to recommend a candidate for this credential.

Professional Credential

The Professional Administrative Services Credential is the "Tier II" administrative credential, requiring a total of 26 semester hours. Please note that holding a job as administrator and the Preliminary Credential are prerequisites to entry to the program for the Professional Credential. For Further Information, please contact the Department office (EC-531), phone 278-7673.

SCHOOL BUSINESS MANAGEMENT CERTIFICATE

This certificate is offered through Cal State Fullerton's University Extended Education program. It provides a 25-unit specialization for people who work in or want to move into the field of school business management. Classes reflect general skills and specific functions of school business management, capped by a practicum designed to demonstrated what has been gained in classroom study. The instructors are practitioners with successful experience as school business managers.

For further information on the program including program objectives, eligibility, and registration, please visit the University Extended Education website at <http://www.csufextension.org> or contact Pat Puleo at 714-278-4645, ppuleo@fullerton.edu.

MASTER OF SCIENCE IN EDUCATION (EDUCATIONAL ADMINISTRATION)

The principal objective of the curriculum is to prepare carefully selected individuals for leadership positions in public schools. The program is designed to help these individuals gain the technical knowledge and scholarship requisite to high achievement in these positions.

Application Deadlines

Applications need to be postmarked no later than March 1st for fall semester and October 1st for the spring semester. However, deadlines may be changed based upon enrollment projections. Check the university graduate studies website for current information at <http://www.fullerton.edu/graduate/>.

Admission to Graduate Standing: Conditionally Classified

University requirements include: a baccalaureate degree from an accredited institution and a grade-point average of at least 2.5 in the last 60 semester units attempted (see "Graduate Regulations" section of this catalog for complete statement and procedures). In addition, an applicant should have a successful teaching experience in an elementary or secondary school. (If such experience is not available, other experience in related fields is an alternative if approved by a graduate adviser before starting the program). A candidate portfolio is also required.

Graduate Standing: Classified

A student who meets the admission requirements and has a minimum 2.5 GPA in previous academic work may be granted classified graduate standing upon the development and approval of a study plan.

Study Plan

The study plan must include 30 units of course work. Course requirements include field experience and a project.

No more than nine units of postgraduate work taken prior to classified standing may be applied to a student's master's degree program.

The adviser-approved 30 units (minimum) on the study plan will include:

Core Course Work (8 units)

Ed Admin 503 Organizational Leadership (3)

Ed Admin 505 Curriculum, Instruction and Assessment (3)

Ed Admin 510 Research Design (3)

Concentration Course Work (20 units)

Ed Admin 561 Policy, Governance, Community Relations (3)

Ed Admin 563 Human Resource Administration (2)

Ed Admin 564 School Law and Regulatory Process (3)

Ed Admin 565 School Finance (3)

Ed Admin 566 Leadership in Public Schools (3)

Ed Admin 567 Fieldwork (1,1,1)

Ed Admin 593 Meeting the Needs of Diverse Populations (2)

Project (2 units)

Ed Admin 597 Project (1,1)

For advisement and further information, consult the graduate program adviser.

Cohort Order of Classes

Once students are admitted to the Tier I/Preliminary Administrative Credential Program, they are required to take all of the courses in a prescribed order shown below.

FALL START	SPRING START
Fall 593	Spring 593
Fall 505	Spring 593
Fall 567	Spring 567
Spring 510*	Summer 561
Spring 503	Summer 564
Summer 564	Summer 597*
Summer 561	Fall 510*
Summer 597*	Fall 503

Fall 563	Spring 563
Fall 565	Spring 565
Fall 567	Spring 567
Spring 566	Summer 566
Spring 567	Summer 567
Spring 597*	Summer 597*

* may not be required of credential only students.

Prior approval is required from the cohort leader and department chair to change the order or timing of courses.

DOCTORATE OF EDUCATION (ED.D.)

Educational Leadership and Policy

As of catalog press-time, approval for this new doctorate program is still pending. The program will be jointly offered with the University of California, Irvine. For current information, please contact the Educational Leadership Department Chair, Dr. Louise Adler, ladler@fullerton.edu (714.278.7673).

General Components of the Degree

- The program is designed for professionals who are or will become educational leaders.
- The program will include current and/or revised requirements for the California Professional Administrative Services Credential (Tier II).
- The degree can be completed in three years.
- Research training will focus on data-driven decision-making and the utility of research methods for education leaders who must act to improve student learning.
- A master's degree in education or related field is required for admission.
- University of California admission standards including the GRE will be used.
- Courses will be scheduled during evenings, summers, and via distance modes.
- Classes will be taught by both University of California, Irvine and Cal State Fullerton faculty.
- Students will be charged the University of California rates for units.

EDUCATIONAL ADMINISTRATION COURSES

Courses are designated as EDAD in the class schedule.

Students who desire only isolated courses from the program are normally denied admission to such courses.

501 Collaborative Professional Portfolio Assessment of Competence for School Leaders (6) (Formerly 501A,B)

Prerequisite: one year of experience as a school administrator. Comprehensive course for Professional Administrative Services (Tier II) credential candidates. Candidates will demonstrate mastery of fieldwork performance standards by preparing a professional portfolio of work-embedded artifacts, evidences and documentation. A collaborative assessment process (student, university faculty, mentor, colleagues in the course) will establish the candidate's competency in each of the California Standards for Educational Leaders adopted by the California Commission on Teacher Credentialing. Successful completion of the course provides for university-approval and recommendation to the CCTC for the full and clear Professional Administrative Services Credential (Tier II).

503 Organizational Leadership (3)

Prerequisite: admission to Preliminary Credential and/or master's program. The focus of this class is on using organizational theory and leadership studies to understand schools and how to bring about change in schools. The course includes study of the organization, structure, and cultural context of schools and the study of techniques used to guide, motivate, delegate, build consensus, and lead others in the achievement of goals.

505 Curriculum, Instruction and Assessment (3)

Study of alternative designs for school curriculum, delivery and evaluation of instructional programs, current trends in supervision and assessment of student progress. Exploration of the works of major educational theorists and reviews of research. Study of the dynamics of curriculum change.

510 Research Design (3)

Prerequisite: admission to Preliminary Credential and/or master's program and a grade of "C" or better in Ed Admin 505. Introduces students to the major forms of both quantitative and qualitative research used in education. Students will learn how to select an appropriate research method and the characteristics of sound research. Stress will be placed on making reasoned judgments as consumers of research as well as selecting appropriate information collection strategies as school leaders.

537T Advanced Issues in School Leadership (1)

Prerequisite: Ed Admin 501A. This is a variable topic course for students in the professional Administrative Credential Program which deals with advanced issues emerging in the field of educational leadership. Course may be repeated for credit.

546 Leadership Through Communication (3)

Learn to identify key internal and external constituent groups, and optimal means of communication with them. Develop leadership skills in facilitating these groups' contributions to organizational success.

561 Policy, Governance, Community Relations (3)

Prerequisite: Ed Admin 503. In this course students study the factors which determine public policy with regard to education, the roles of the various levels of government in controlling public education, how to identify various interest group, and how to communicate effectively about school programs.

563 Human Resource Administration (2)

Prerequisite: Ed Admin 503. This course focuses on the importance and dimensions of human resource administration and the need to attract, retain, develop, and motivate school personnel in ways that enhance learning and professional development and that lead to positive and productive school settings. Includes study of collective bargaining and employee evaluation in public schools.

564 School Law and Regulatory Process (3)

Prerequisite: Ed Admin 503. This course reviews the federal, state and local educational laws, regulations and other policies that govern schools and the requirements that administrators act in accordance with these laws and regulations in ways that are ethically and legally defensible.

565 School Finance (3)

Prerequisite: Ed Admin 503. Course reviews effective management of fiscal resources and business services. The course covers the sources of income to public schools: federal, state, local, and private (including grants and foundations). It also reviews sound budgetary and business procedures for schools.

566 Leadership in Public Schools (3)

The course focuses on the leadership roles of principals, co-administrators, and supervisors in public schools. Content includes leadership, reflective practice, human relations, the administrator's role in group process, site based decision-making, school climate change agent roles, and planning models. Violence and school safety issues such as gangs will be studied.

567 Fieldwork (1) (Formerly 567 A,B,C)

Prerequisite: admission to credential and/or master's program. Directed fieldwork in administrative areas in school.

593 Meeting the Needs of Diverse Populations (2)

Prerequisite: Ed Admin 503. The course examines effective administrative practices and leadership in working with teachers and students of differing gender or ethnicity or with disabilities so as to promote equal learning opportunities. The course includes study of diverse cultural patterns among families and appropriate mechanisms for involving all families in school programs.

597 Project (1-2)

Prerequisites: Ed Admin 510. Individual research on a graduate project, with conferences with a faculty adviser, culminating in a project.

599 Independent Graduate Research (1-3)

Prerequisite: consent of instructor. Independent inquiry for qualified students.



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L.Y. (Mickey) Hollis

DEPARTMENT OF ELEMENTARY AND BILINGUAL EDUCATION

DEPARTMENT CHAIR

Carmen Zuniga Dunlap

DEPARTMENT OFFICE

Education Classroom Building 190

DEPARTMENT WEBSITE

hdcs.fullerton.edu/EIEd/Intro.html

PROGRAMS OFFERED

Master of Science in Education

Concentrations:

Bilingual/Bicultural (Spanish-English)

Educational Technology

Elementary Curriculum and

Instruction

Reading

Basic Teacher Credential Programs

Professional Teacher Preparation

Program for the Multiple Subject

Credential

Professional Teacher Preparation

Program for the Multiple Subject

Credential with Bilingual Cross

Cultural and Academic

Development (BCLAD)

Emphasis.

FACULTY

Carol Barnes, Donna Bennett, Abbie Brown, Kim Case, Amy Cox-Peterson, Teresa Crawford, Mildred Donoghue, Carmen Zuniga Dunlap, Barb Finnell, Susana Flores, Ana Garza-Dargatz, Earl Gotts, Tim Green, Andrea Guillaume, Laurie Hansen, Karen Ivers, Gale Kahn, Patricia Keig, Lisa Kirtman, Carol Lionello, Christine Mayfield, Kathy Murphy, Kim Norman, Terri Patchen, Nawang Phuntsog, Kristine Quinn, Chris Renne, Beth Schipper, Brenda Spencer, Christine Valenciana, Evelyn Weisman, Ruth Yopp-Edwards, Hallie Yopp Slowik

Awards in Education

Outstanding Graduate Student

Emma H. Holmes Mathematics Award

Bernard Kravitz Multicultural Project Award

Outstanding Curriculum Project

Edwin Carr Fellowship

Application Deadlines

University applications to credential programs or master's program need to be postmarked no later than March 1st for the fall semester and October 1st for the spring semester. However, deadlines may be changed based upon enrollment projections. Check the university graduate studies website for current information at <http://www.fullerton.edu/graduate/>.

THE PROFESSIONAL TEACHER PREPARATION PROGRAM FOR THE MULTIPLE SUBJECT (ELEMENTARY) CREDENTIAL PROGRAM

The Professional Teacher Preparation Program for the Multiple Subject (Elementary) Credential prepares individuals to teach in self-contained classrooms at the elementary or middle school level where multiple subjects are taught. Candidates may select either a two or three-semester credential program sequence, or a three-semester sequence that can include teaching on an internship credential. The Department also offers two Bilingual Crosscultural and Academic Development (BCLAD) Emphasis options - the Asian BCLAD and the Spanish BCLAD. Applicants to the credential program must either hold a bachelor's degree or have completed the major, including a minimum of 80% of the Multiple Subject Matter Preparation Program (MSMPP) or have passed the California Subject Examinations for Teachers (CSET).

Freshman may opt to simultaneously pursue an undergraduate major and a teaching credential through the Blended Teacher Education Program, which leads to a Multiple Subject Credential or to a basic Education Specialist Credential. The section on Credentials in this catalog contains more information on the Blended Teacher Education Program.

California law requires an academic major; there is no major in education. Students who opt for the Blended Teacher Education Program select a Liberal Studies or Child and Adolescent Studies major. Students who opt for the fifth-year Multiple Subject Credential Program devote their first three or four years of work to completing requirements for the baccalaureate degree with an academic major, and possibly requirements for the Multiple Subject Matter Preparation Program (discussed later). Majors in the social sciences, humanities, or natural sciences provide excellent background for careers in elementary school teaching. Individuals interested in working as bilingual teachers may consider a major in a non-English language. Students are encouraged to attend a program overview during the junior and senior year. Overview schedules may be obtained through the Office of Admissions to Teacher Education. Applications for admission to BTEP are processed through the Center for Careers in Teaching in Humanities 113 or by phone at (714) 278-7130.

Two-Semester Program Sequence

The Multiple Subject Credential Program two-semester sequence is as follows:

First Semester

Ed El 430A Foundations in Elementary School Teaching (3)

- Ed El 430B Curriculum and Instruction in Elementary School Teaching (Math, Science, Social Studies) (2)
- Ed El 430C Supervised Fieldwork in Elementary Teacher Education (2)
- Ed El 433 Language Arts and Reading Instruction in the Public Schools (3)
- Ed El 434 Methods and Inquiry for Teaching English Learners (2)
- Ed El 439A Student Teaching in the Elementary School (5)
- Ed El 439B Seminar in Elementary Student Teaching (Visual and Performing Arts) (1)

Second Semester

- Ed El 429 Integrated Curriculum and Instruction in the Elementary School (3)
- Ed El 430B Curriculum and Instruction in Elementary School Teaching (Math, Science, Social Studies) (4)
- Ed El 439A Student Teaching in the Elementary School (9)
- Ed El 439B Seminar in Elementary Student Teaching Current Issues, Mainstreaming Health and Physical Education (4)

Three-Semester Credential Program Sequence

A three-semester program is also available. This sequence is designed for individuals who wish to take classes during evenings and Saturdays,

with limited though required daytime involvement in elementary schools. Student teaching requires a full daytime commitment.

First Semester

- Ed El 430A Foundations in Elementary School Teaching (3)



- Ed El 430B Curriculum and Instruction in Elementary School Teaching (Math, Science, Social Studies) (2)
- Ed El 430C Supervised Fieldwork in Elementary Teacher Education (1)
- Ed El 433 Language Arts and Reading Instruction in the Public Schools (3)
- Ed El 439A Student Teaching in the Elementary School (for interns) (5)
- Ed El 446 Methods and Inquiry for BCLAD Candidates (BCLAD only) (3)

Second Semester

- Ed El 429 Integrated Curriculum and Instruction in the Elementary School (3)
- Ed El 434 Methods and Inquiry for Teaching English Learners (2)
- Ed El 439B Seminar in Elementary Student Teaching (Current Issues and Visual and Performing Arts) (2)
- Ed El 439A Student Teaching in Elementary School (4-9)
- Ed El 430C Supervised Fieldwork in Elementary Teacher Education (1)

Third Semester

- Ed El 430B Curriculum and Instruction in Elementary School Teaching (Math, Science, Social Studies) (4)
- Ed El 439A Student Teaching in the Elementary School (5-9)
- Ed El 439B Seminar in Elementary Student Teaching (Mainstreaming, Health and Physical Education) (2)

Three-Semester Internship Program

The three-semester Intern Credential Programs for Multiple Subject and Multiple Subject BCLAD credentials are three-semester programs to which candidates may apply while completing the first semester of the regular credential preparation program. Admission is contingent on approved full-time employment with a participating district, superior standing in first-semester coursework and student teaching, and recommendations from University and district personnel. The remaining two semesters involve paid teaching internship positions and University coursework. Additionally, some opportunities may arise for candidates in the three-semester non-internship program to pursue internship status. Questions may be directed to the Intern Coordinator. Information about these programs is available in the Office of Admission to Teacher Education.

Both the two-and three-semester credential programs require substantial time commitments. The three-semester credential program requires evening course work and may require Saturday course work.

Admission Procedures and Criteria

Admission to the University does not include admission to the Multiple Subject Credential Program. Students must apply for admission to the Multiple Subject Credential Program the semester prior to anticipated enrollment in the program. Filing deadlines are February 28 (to begin the program the following fall) and September 30 (to begin the program the following spring).

Applicants for admission into the Multiple Subject Credential Program are evaluated according to many criteria. These include scholarship, breadth of understanding, professional aptitude, physical and mental fitness, fundamental skills, and character. Evidence related to these criteria is submitted at time of application and include the following:

1. Overall grade point average of greater than 2.67, or a grade point average of 2.75 for the last 60 units.
2. Prior to student teaching: completion of at least 80% of an approved subject matter program (Multiple Subject Matter Preparation Program) or passage of the PRAXIS Multiple Subject Assessment for Teachers (MSAT) or California Subject Examination for Teachers (CSET). Information regarding the Multiple Subject Matter Preparation Program is available from the Center for Careers in Teaching (714-278-7130) located in Humanities 113.
3. Completion of the California Basic Education Skills Test (CBEST) and passage of the written portion of this test.
4. Satisfactory completion of prerequisite courses:
 - a. Child/Adolescent Studies 312 Human Growth and Development (3)

OR

- b. Child/Adolescent Studies 325A Conception Through age 8 (3),
AND
Child/Adolescent Studies 325B Age 9 Through Adolescence (3)
OR
 - c. Psych 361 Developmental Psychology (3).
 - d. Ed El 315A (2) and Ed El 315B (1) Introduction to Elementary Classroom Teaching” Lecture and Fieldwork
 - e. Ed El 425 (3) Cultural Pluralism in Elementary Schools
5. Recommendations from academic faculty, school personnel, and/or other appropriate persons.
6. Autobiography.
7. Interview with an Education Faculty member

Program faculty and staff also conduct informal assessments of applicants’ suitability for teaching throughout prerequisite courses and the application process. Further evidence is provided subsequent to application when opportunity is provided for verification of tuberculosis screening and certificate of clearance which verifies the absence of a criminal record.

Details concerning admission procedures and criteria are available in the Office of Admission to Teacher Education.

Admissions to Teacher Education

Admission to the subsequent semesters of the program is based on continuous and satisfactory progress in the prior semester(s). CBEST must be passed prior to student teaching or intern teaching.

Bilingual Cross-cultural Language And Academic Development (BCLAD) Emphasis

A Multiple Subject Credential with a bilingual-bicultural (Spanish-English) emphasis or with an Asian language emphasis is available. Information about these programs is available in the Office of Admissions to Teacher Education.

Application for Teaching Credentials

Upon completion of a multiple subject credential program the credential candidate must submit an application to the Commission on Teacher Credentialing through the CSUF credential analyst and verify passage of the Reading Instruction Competence Assessment (RICA). The credential analyst is located in the Credential Preparation Center in College Park 740. Additional information on the credential application process is available in the Credential Preparation Center.

MASTER OF SCIENCE IN EDUCATION (BILINGUAL/BICULTURAL EDUCATION CONCENTRATION)

The program is designed to develop qualified bilingual/bicultural instructors (Spanish-English) who can work as classroom or resource teachers and staff developers. It will help individuals teach others how to provide experiences in the cultural heritage of the target population and develop specific teaching techniques and methods in teaching reading and English as a second language. The program will also help individuals to interpret and implement research related to bilingual/bicultural children. Individuals will become skilled in their abilities to diagnose learning needs for such students and to develop and implement sound educational strategies.

Admission to Graduate Standing: Conditionally Classified

University requirements include: a baccalaureate from an accredited institution and a grade-point average of at least 2.5 in the last 60 semester units attempted (see “Graduate Regulations” section for complete statement and procedures).

Graduate Standing: Classified

A student who meets the admission requirements and the following requirements may be granted classified graduate standing:

1. The development of an approved study plan
2. A basic teaching credential or equivalent experience
3. An approved major (minimum of 24 units upper division or graduate)
4. A 2.5 grade-point average on previous academic and related work
5. Language competence (English and Spanish) as determined by satisfactory interviews or course work
6. Completion of Spanish 466

Credit will be given for previous postbaccalaureate studies when possible. Otherwise well-qualified students may be admitted with limited subject or grade deficiencies, but these deficiencies must be removed. Grade-point average deficiencies may be removed by a demonstration of competency in the graduate program.

Study Plan

The adviser-approved 30 units (minimum) on the study plan will include the following:

Core Course Work (9 units)

Ed El 500 Bilingual Multicultural Curriculum (3)

Ed El 511 Survey of Educational Research (3)

Ed El 541 Psychological and Sociological Foundations of Bilingual-Bicultural Education (3)

Required Teacher Education Course (3 units)

Ed El 542 Current Issues and Problems in Bilingual-Bicultural Education (3)

Course Work Outside Bilingual-Bicultural Education (12 units)

Chicano 450 The Chicano and Temporary Issues (3)

Chicano 480 The Immigrant and the Chicano (3)

One of the following:

For Lang 509 Advanced Principles of TESOL: Listening/Speaking Focus (3)

For Lang 510 Advanced Principles of TESOL: Reading/Writing Focus (3)

One of the following:

For Lang Ed 527 Second Language Acquisition (3)

For Lang Ed 595 Curriculum and Program Design for TESOL (3)

Elective (3 units)

Elective units are chosen in consultation with and approved by the graduate adviser.

Culminating Experience (3 units)

One of the following:

Ed El 594 Research Seminar (3)

OR Ed El 597 Project (3)

OR Ed El 598 Thesis (3)

For further information consult the graduate program adviser.

MASTER OF SCIENCE IN EDUCATION (EDUCATIONAL TECHNOLOGY CONCENTRATION)

The Concentration in Educational Technology within the Master of Science in Education is designed to (1) help classroom teachers upgrade their skills and knowledge about new educational technologies and their role in the classroom and (2) prepare teachers for technology leadership roles in public and private schools.

Admission to Graduate Standing: Conditionally Classified

University and department admissions requirements include:

1. Baccalaureate from an accredited institution
2. Grade-point average of at least 2.5 in the last 60 semester units attempted
3. A basic teaching credential or equivalent experience
4. An approved major (minimum of 24 units upper-division or graduate)
5. 2.5 grade-point average on previous academic and related work.
Credit will be given for previous post-baccalaureate studies when possible.

Otherwise well-qualified students may be admitted with limited subject or grade deficiencies, but these deficiencies must be removed. Grade-point average deficiencies may be removed by a demonstration of competency in the graduate program.

Graduate Standing: Classified

Classified standing will be granted when all admissions deficiencies or prerequisites have been met and a study plan developed.

Study Plan

Core Classes (9 units)

Ed El 511 Survey of Educational Research (3) [meets writing requirement]

Ed El 529 Learning Theory for Classroom Use (3)

Ed El 536 Curriculum Theory and Development (3)

Concentration Courses (18 units)

Ed El 419 Advanced Technologies (3)

Ed El 515 Problem Solving Including Logo (3)

Ed El 518A Issues in Instructional Design of Classroom Software (3)

Ed El 518B Multimedia Development and Instruction in the Classroom (3)

Ed El 522 Web Design and Instruction (3)

Ed El 590 Practicum: Elementary School Teachers and Computers (3)

Culminating Experience (3 units)

One of the following:

Ed El 594 Research Seminar Including Project (3)

OR Ed El 597 Project (3)

OR Ed El 598 Thesis (3)

MASTER OF SCIENCE IN EDUCATION (ELEMENTARY CURRICULUM AND INSTRUCTION CONCENTRATION)

The program is designed to help career classroom teachers upgrade their skills, become informed about new ideas in elementary teaching, and prepare for curriculum and instructional leadership in one or more of the following areas: elementary classroom teaching, computer education, meeting the needs of diverse learners, early childhood education, and staff development in public and private schools. Students may follow the study plan outlined below for the concentration in Elementary Curriculum and Instruction or they may elect to specialize in one of five emphasis areas: Computer Education, Diversity, Early Childhood Education, Professional Inquiry and Practice, and Staff Development.

Admission to Graduate Standing: Conditionally Classified

University requirements include a baccalaureate from an accredited institution and a grade-point average of at least 2.5 in the last 60 semester units attempted (see "Graduate Regulations" for complete statement and procedures).

Graduate Standing: Classified

A student who meets the admission requirements and the following requirements may be granted classified graduate standing upon the development of an approved study plan: a basic teaching credential or equivalent experience, and an approved major (minimum of 24 units upper-division or graduate), a 2.5 grade-point average on previous academic and related work. Credit will be given for previous post-baccalaureate studies when possible. Otherwise well-qualified students may be admitted with limited subject or grade deficiencies, but these deficiencies must be removed. Grade-point average deficiencies may be removed by a demonstration of competency in the graduate program.

Study Plan

The adviser-approved 30 units (minimum) on the study plan will include the following:

Core Course Work (9 units)

Ed El 511 Survey of Educational Research (3)

Ed El 529 Graduate Studies: Learning Theory for Classroom Use (3)

Ed El 536 Curriculum Theory and Development (3)

Course Work in Concentration (12 units)

Six units from following instruction-focused courses:

Ed El 492A,B Gender Issues in Math and Science (2,1)

Ed El 515 Problem Solving Strategies Including Logo (3)

Ed El 521 The Study of Teaching (3)

Ed El 527 Graduate Seminar in Developmental Psychology: The Human from Conception Through Eight Years (3)

- Ed El 528 Reading/Language Arts in the Early Childhood Curriculum (3)
- Ed El 538 Graduate Studies: Early Childhood Education (3)
- Ed El 539 Clinical Supervision: Analyzing Effective Teaching (3)
- Ed El 541 Psychological and Sociological Foundations of Bilingual-Bicultural Education (3)
- Ed El 542 Current Issues and Problems in Bilingual-Bicultural Education (3)
- Ed El 548 Social Studies, Science, and Math in Early Childhood Education (3)
- Ed El 551 Assessment Across the Curriculum (3)
- Ed El 552 Family, Community, and Professional Partnership (3)
- Ed El 553 Models of Teaching (3)

Six units from the following curriculum-focused courses:

- Ed El 530 Graduate Studies in Elementary Education: Second Languages (3)
- Ed El 531 Graduate Studies in Elementary Education: Integrated Language Arts (3)
- Ed El 532 Graduate Studies in Elementary Education: Mathematics (3)
- Ed El 533 Graduate Studies in Elementary Education: Science (3)
- Ed El 534 Graduate Studies in Elementary Education: Social Studies (3)
- Ed El 535 Graduate Studies in Elementary Education: Reading in the Language Arts Program (3)
- Ed El 537 Graduate Studies: Current Issues and Problems (3)
- Ed El 571 Graduate Studies in Elementary Education: Science Education Practicum (3)

Electives (6 units)

Electives are chosen in consultation with and approved by the graduate adviser.

Culminating Experience (3 units)

One of the following:

- Ed El 594 Research Seminar (3)
- OR Ed El 597 Graduate Project (3)
- OR Ed El 598 Thesis (3)

For further information, consult the graduate program adviser.

MASTER OF SCIENCE IN EDUCATION ELEMENTARY CURRICULUM AND INSTRUCTION CONCENTRATION (EMPHASIS IN COMPUTER EDUCATION)

This emphasis has been designed to provide elementary school teachers with a broad understanding of the applications of computers in the elementary school classroom. Competencies will enable participants to become computer curriculum specialists who will guide the integration of computers into the elementary school curriculum, their uses in instruction, and their applications in instructionally related activities.

Admission to Graduate Standing: Conditionally Classified/Classified

The requirements for admission to conditionally classified and classified standing are the same as those for the M.S. in Education concentration in Elementary Curriculum and Instruction.

Study Plan

The study plan consists of 30 units of adviser-approved course work:

Core Course Work (9 units)

- Ed El 511 Survey of Educational Research (3)
- Ed El 529 Graduate Studies: Learning Theory for Classroom Use (3)
- Ed El 536 Curriculum Theory and Development (3)

Course Work in Computer Education Emphasis (12 units)

- Ed El 419 Advanced Technology in Education (3)
- Ed El 515 Problem Solving Strategies Including Logo (3)
- Ed El 522 Web Design and Instruction (3)
- Ed El 590 Practicum: Elementary School Teachers and Computers (3)

Curriculum-Focused Course Work (6 units)

- Ed El 530 Graduate Studies in Elementary Education: Second Languages (3)
- Ed El 531 Graduate Studies in Elementary Education: Integrated Language Arts (3)
- Ed El 532 Graduate Studies in Elementary Education: Mathematics (3)
- Ed El 533 Graduate Studies in Elementary Education: Science (3)
- Ed El 534 Graduate Studies in Elementary Education: Social Studies (3)
- Ed El 535 Graduate Studies in Elementary Education: Reading in the Language Arts Program (3)
- Ed El 537 Graduate Studies: Current Issues and Problems (3)
- Ed El 571 Graduate Studies in Elementary Education: Science Education Practicum (3)

Culminating Experience (3 units)

One of the following:

- Ed El 594 Research Seminar (3)
- OR Ed El 597 Project (3)
- OR Ed El 598 Thesis (3)

MASTER OF SCIENCE IN EDUCATION ELEMENTARY CURRICULUM AND INSTRUCTION CONCENTRATION (EMPHASIS IN DIVERSITY)

The Diversity emphasis is designed to help career classroom teachers become informed about appropriate curriculum and instruction for the diverse student population in the public schools in the state of California. It will help individuals to provide educational experiences and develop curriculum appropriate to linguistically and culturally diverse populations.

Admission to Graduate Standing: Conditionally Classified/Classified

The requirements for admission to conditionally classified and classified standing are the same as those for the M.S. in Education concentration in Elementary Curriculum and Instruction.

Study Plan

Core Course Work (9 units)

- Ed El 500 Bilingual Multicultural Curriculum (3)
- Ed El 511 Survey of Educational Research (3)
- Ed El 529 Graduate Studies: Learning Theory for Classroom Use (3)

Diversity Emphasis Course Work (9 units)

- Ed El 530 Graduate Studies in Elementary Education: Second Languages (3)
- Ed El 541 Psychological and Sociological Foundations of Bilingual-Bicultural Education (3)
- Ed El 542 Current Issues and Problems in Bilingual-Bicultural Education (3)

Curriculum-Focused Course Work (15 units)

Two of the following:

- Ed El 531 Graduate Studies in Elementary Education: Integrated Language Arts (3)
- Ed El 532 Graduate Studies in Elementary Education: Mathematics (3)
- Ed El 533 Graduate Studies in Elementary Education: Science (3)
- Ed El 534 Graduate Studies in Elementary Education: Social Sciences (3)
- Ed El 535 Graduate Studies in Elementary Education: Reading in the Language Arts Program (3)
- Ed El 571 Graduate Studies in Elementary Education: Science Education Practicum (3)

Elective (3 units)

Elective units are chosen in consultation with and approved by the graduate adviser.

Culminating Experience (3 units)

- Ed El 594 Research Seminar (3)
- OR Ed El 597 Project (3)
- OR Ed El 598 Thesis (3)

MASTER OF SCIENCE IN EDUCATION ELEMENTARY CURRICULUM AND INSTRUCTION CONCENTRATION (EMPHASIS IN EARLY CHILDHOOD EDUCATION)

This emphasis is designed to meet the greater community and professional need for quality education during the critical early years of school. The educational demand for sound planning and instruction in preschool, kindergarten, and the primary grades has increased the need for effective specialists in Early Childhood Education.

Admission to Graduate Standing: Conditionally Classified/Classified

The requirements for admission to conditionally classified or classified standing are the same as for the M.S. in Education concentration in Elementary Curriculum and Instruction.

Study Plan

The adviser-approved 30 units (minimum) on the study plan will include the following:

Core Course Work (9 units)

- Ed El 511 Survey of Educational Research (3)
- Ed El 529 Graduate Studies: Learning Theory for Classroom Use (3)
- Ed El 536 Curriculum Theory and Development (3)

Course Work in Early Childhood Emphasis (9 units)

- Ed El 528 Reading/Language Arts in the Early Childhood Curriculum (3)
- Ed El 538 Graduate Studies: Early Childhood Education (3)
- Ed El 548 Social Sciences, Science, and Math in Early Childhood Education (3)

Curriculum-Focused Course Work (6 units)

Two of the following:

- Ed El 530 Graduate Studies in Elementary Education: Second Languages (3)
- Ed El 531 Graduate Studies in Elementary Education: Integrated Language Arts (3)
- Ed El 532 Graduate Studies in Elementary Education: Mathematics (3)
- Ed El 533 Graduate Studies in Elementary Education: Science (3)
- Ed El 534 Graduate Studies in Elementary Education: Social Studies (3)
- Ed El 535 Graduate Studies in Elementary Education: Reading in the Language Arts Program (3)
- Ed El 537 Graduate Studies: Current Issues and Problems (3)
- Ed El 571 Graduate Studies in Elementary Education: Science Education Practicum (3)

Elective (3 units)

Elective units are chosen in consultation with and approved by the graduate adviser.

Culminating Experience (3 units)

One of the following:

- Ed El 594 Research Seminar (3)
- OR Ed El 597 Project (3)
- OR Ed El 598 Thesis (3)

For further information, consult the graduate program adviser.

MASTER OF SCIENCE IN EDUCATION ELEMENTARY CURRICULUM AND INSTRUCTION CONCENTRATION (EMPHASIS IN PROFESSIONAL INQUIRY AND PRACTICE)

The Professional Inquiry and Practice emphasis is designed to help career classroom teachers become informed about appropriate curriculum and instruction for students in the public schools of California. They will develop reflective and analytical thinking and initiate cycles of goal setting, professional practice, and reflection. The base of skills and knowledge will support their growing involvement in school reform including systematic reforms. Courses in this emphasis provide a foundation for teachers who wish to prepare for certification by the National Board for Professional Standards.

Admission to Graduate Standing: Conditionally Classified/Classified

The requirements for admission to conditionally classified or classified standing are the same as for the M.S. in Education concentration in Elementary Curriculum and Instruction.

Study Plan

Core Courses (9 units)

Ed El 511 Survey of Educational Research (3)

Ed El 529 Graduate Studies: Learning Theory for Classroom Use (3)

One of the following:

Ed El 536 Curriculum Theory and Development (3)

Ed El 500 Bilingual Multicultural Curriculum (3)

Emphasis Courses (9 units)

Ed El 521 The Study of Teaching (3)

Ed El 551 Assessment Across the Curriculum (3)

Ed El 552 Family, Community, and Professional Partnerships (3)

Curriculum Course (3 units)

One of the following:

Ed El 530 Graduate Studies in Elementary Education: Second Language (3)

Ed El 531 Graduate Studies in Elementary Education: Integrated Language Arts (3)

Ed El 532 Graduate Studies in Elementary Education: Mathematics (3)

Ed El 533 Graduate Studies in Elementary Education: Science (3)

Ed El 534 Graduate Studies in Elementary Education: Social Studies (3)

Ed El 535 Graduate Studies in Elementary Education: Reading in the Language Arts Program (3)

Electives (6 adviser-approved units)

Culminating Experience (3 units)

One of the following:

Ed El 594 Research Project (3)

OR Ed El 597 Graduate Project (3)

OR Ed El 598 Thesis (3)

**MASTER OF SCIENCE IN EDUCATION
ELEMENTARY CURRICULUM AND
INSTRUCTION CONCENTRATION
(EMPHASIS IN STAFF DEVELOPMENT)**

This program is designed to enable educators to assume leadership roles in staff development in school districts. The sequence of courses is also designed to help teacher leaders and master teachers to understand contemporary trends and research findings in elementary curriculum and instruction.

Admission to Graduate Standing: Conditionally Classified/Classified

The requirements for admission to conditionally classified or classified standing are the same as for the M.S. in Education concentration in Elementary Curriculum and Instruction.

Study Plan

The adviser-approved 30 units (minimum) on the study plan will include the following:

Core Course Work (9 units)

Ed El 511 Survey of Educational Research (3)

Ed El 529 Graduate Studies: Learning Theory for Classroom Use (3)

Ed El 536 Curriculum Theory and Development (3)

Course Work in Staff Development Emphasis (9 units)

Ed El 521 The Study of Teaching (3)

Ed El 539 Clinical Supervision: Analyzing Effective Teaching (3)

Ed El 553 Models of Teaching (3)

Curriculum-Focused Course Work (6 units)

Two of the following:

Ed El 530 Graduate Studies in Elementary Education: Second Languages (3)

Ed El 531 Graduate Studies in Elementary Education: Integrated Language Arts (3)

Ed El 532 Graduate Studies in Elementary Education: Mathematics (3)

Ed El 533 Graduate Studies in Elementary Education: Science (3)

Ed El 534 Graduate Studies in Elementary Education: Social Studies (3)

Ed El 535 Graduate Studies in Elementary Education: Reading in the Language Arts Program (3)

Ed El 537 Graduate Studies: Current Issues and Problems (3)

Ed El 571 Graduate Studies in Elementary Education: Science Education Practicum (3)

Elective (3 units)

Elective units are chosen in consultation with and approved by the graduate adviser.

Culminating Experience (3 units)

One of the following:

Ed El 594 Research Seminar (3)

OR Ed El 597 Project (3)

OR Ed El 598 Thesis (3)

MASTER OF SCIENCE IN EDUCATION

Reading

Please refer to Reading Department section of this catalog.

COMPUTING CERTIFICATE FOR ELEMENTARY SCHOOL TEACHERS

The purpose of this certificate program is to provide participants with a broad understanding of the applications of microcomputers in the elementary school classroom and the instructionally related tasks in the public schools. The certificate program is designed to provide the needed competencies for participants to become curriculum specialists who will guide the integration of computers into the elementary school curriculum, their uses in instruction, and their applications in instructionally related activities at the elementary school. This certificate requires 12 units.

Required Courses (12 units)

Ed El 419 Advance Technologies in Education (3)

Ed El 515 Problem Solving Strategies Including Logo (3)

Ed El 522 Web Design and Instruction (3)

Ed El 590 Practicum: Elementary School Teachers and Computers (3)

For further information, consult the Elementary Education graduate program adviser.

ELEMENTARY AND BILINGUAL EDUCATION COURSES

Courses are designated EDEL in the class schedule.

110 Explorations in Education (2-3)

(Same as Ed Sec 110)

315A Introduction to Elementary Classroom Teaching:

Lecture (2)

An exploratory course required for students considering careers in elementary school teaching. Includes on campus seminars and overview of admission requirements for the Multiple Subject Credential Program. Must be taken concurrently with 315B. Must be taken Credit/ No Credit. A "B" or better is required to receive a grade of credit.

315B Introduction to Elementary Classroom Teaching:

Fieldwork (1)

An exploratory field assignment consisting of 45 hours as a volunteer aide in a public, K-6, elementary classroom where all subject areas are taught. Requires a journal and evaluation by the classroom teacher. Must be taken concurrently with 315A. Must be taken Credit/No Credit. A "B" or better is required to receive a grade of credit.

419 Advanced Technologies in Education (3) (Formerly 519)

Prerequisite: Teaching Credential. Theoretical basis and strategies for improving teaching of elementary students through use of multimedia technologies. Emphasis on HyperStudio, telecommunications and other digital media. Meets Level II (Induction) technology requirement.

425 Cultural Pluralism in Elementary Schools (3)

Culture and cultural pluralism in elementary schools. Topics: Examination of one's own beliefs and values, classroom practices and materials that promote equity, strategies for learning about students, history/traditions of cultural groups, and assessment of multicultural education programs. Fieldwork required.

429 Integrated Curriculum and Instruction in the

Elementary School (3)

Prerequisite: admission to second semester of Multiple Subject Credential Program. Additional study of elementary curriculum with emphasis on language arts, integrated instruction across the curriculum, and assessment of learning outcomes. Must be taken Credit/ No Credit. A "B" or better is required to receive a grade of credit.

430A Foundations in Elementary School Teaching (3)

Prerequisite: admission to Multiple Subject Credential Program. A focus on the curriculum of the elementary school, instructional planning, principles of effective teaching, generic instructional strategies, classroom management, and legal issues in education. To be taken concurrently with Ed Elm 430B, C and 433. Must be taken Credit/No Credit. A "B" or better is required to receive a grade of credit.

430B Curriculum and Instruction in Elementary School Teaching (Math, Science, Social Studies) (1-6)

Prerequisite: admission to Multiple Subject Credential Program. An emphasis on instructional materials, learning styles, inquiry, concept learning, problem solving, direct instruction applied to the teaching of math, science, and social studies. Must be taken Credit/ No Credit. A "B" or better is required to receive a grade of credit.

430C Supervised Fieldwork in Elementary Teacher Education (1-2)

Prerequisite: admission to Multiple Subject Credential Program. Co-requisites: other credential courses such as Ed El 429, 430A,B, and 433. Students will serve as teacher participants in an assigned elementary school classroom. Must be taken Credit/No Credit. A "B" or better is required to receive a grade of credit.

431 Curriculum and Instruction for Diverse Populations in Elementary Schools I (1)

Prerequisite: earned Multiple Subject Credential. Effective integration of curriculum and instruction relating to linguistic and cultural diversity in elementary school students. CLAD certificate requirement.

432 Curriculum and Instruction for Diverse Populations in Elementary Schools II (2)

Prerequisites: Ed El 431 and earned Multiple Subject Credential. Effective integration of curriculum and instruction relating to linguistic and cultural diversity in elementary school students. CLAD certificate requirement.

433 Language Arts and Reading Instruction in the Public Schools (3)

Prerequisite: admission to Multiple Subject Credential Program. An overview of principles of reading instruction, elements of the language arts program including literature-based reading, content area reading, the role of phonics, emergent literacy, and diagnosis of reading problems. Must be taken Credit/No Credit. A "B" or better is required to receive a grade of credit.

434 Methods and Inquiry for Teaching English Learners (2)

Prerequisite: admission to Multiple Subject Credential Program. Theoretical foundations, legal issues, and school programs for the education of English learners. Assessment, materials, methods and strategies for English language development and learning across the curriculum for elementary school English learners. Must be taken Credit/No Credit. A "B" or better is required to receive a grade of Credit.

439A Student Teaching in the Elementary School (5-14)

Pre- or co-requisites: Ed El 430A,B,C, 433 and admission to student teaching. Co-requisite: Ed Elm 439B. Participation in a regular elementary school teaching program for the full school day. Must be taken Credit/ No Credit. A "B" or better is required to receive a grade of credit.

439B Seminar in Elementary Student Teaching (4)

Prerequisites: Ed El 430A,B,C, 433 and admission to student teaching. Co-requisite: Ed Elm 439A. Seminar in problems and procedures of elementary school teaching. Must be taken Credit/No Credit. A "B" or better is required to receive a grade of credit.

439C Intern Teaching in the Elementary School (3)

Prerequisites: Ed El 430A,B,C, 433, and completion of the first two semesters of intern teaching program. Admission only with consent of instructor. Participation in a regular elementary school teaching program for the full school day, as an intern teacher. Must be taken credit/no credit. A "B" or better is required to receive a grade of credit.

446 Methods and Inquiry for BCLAD Candidates (3)

Prerequisite: admission to Multiple Subject Program with BCLAD Emphasis. This course prepares Multiple Subject candidates for teaching Spanish-speaking elementary students. Emphasis includes reading instruction methods, materials and assessment, equity issues, and elements and considerations of culture that promote effective instruction for Spanish-speaking elementary students.

448 Methods and Inquiry for Vietnamese BCLAD Candidates (3)

Prerequisite: Admission to Multiple Subject Credential Program with BCLAD emphasis (Vietnamese). Course focuses on equity issues, curriculum and instruction for Vietnamese speaking elementary students.

492A Gender Issues in Math and Science Teaching and Learning (2)

Prerequisites: Ed El 315A,B and senior or graduate standing. Explores educational and cultural barriers and avenues to the success of girls in science and mathematics, development of curricula and instructional methods to address these issues.

492B Gender Issues in Math and Science Education: Practicum (1)

Prerequisite: Ed El 315A,B. Co-requisite: Ed El 492A. Educational and cultural barriers/avenues to girls' success in science and mathematics; implementation of curricula and instructional methods. 20 hours teaching required. If taken Credit/No Credit, a "B" or better is required for credit.

499 Independent Study (1-3)

Prerequisites: senior or graduate standing, consent of instructor prior to registration. Individual investigation under supervision of a faculty member. Only students of demonstrated capability and maturity will be approved. May be repeated for credit.

500 Bilingual Multicultural Curriculum (3)

Prerequisite: teaching credential or consent of instructor. Seminar: the multicultural school curriculum including forces operating on the curriculum and the participants involved in curriculum building. Modification of the curriculum to reflect multicultural contexts.

511 Survey of Educational Research (3)

Prerequisite: teaching credential or consent of instructor. Descriptive statistics and statistical inferences in educational research. Representative research papers. Principles of research design. Prepare papers using research findings.

515 Problem Solving Strategies Including Logo (3)

Prerequisites: Ed El 419 and teaching credential. Strategies for using logo graphics, words and lists, and other microcomputer problem-solving applications with elementary school children. Design and use of micro-worlds to facilitate children's development of problem-solving skills.

518A Issues in Instructional Design of School Software (3)

Prerequisite: Ed Elm 419. This course focuses on issues related to the instructional design of courseware designed specifically for classroom students. Topics include learning principles, learner characteristics, instructional strategies, screen design, response analysis, feedback, and interactivity.

518B Multimedia Development and Instruction in the Classroom (3)

Prerequisite: Ed Elm 518A. This course focuses the application and instruction of computer-based instructional design principles in the development for classroom software and multimedia projects. Topics include planning and assessment, design principles, and development of tools.

521 The Study of Teaching (3)

Prerequisite: Ed El 511 and teaching credential or permission of instructor. A systematic study of the teaching process. Examination of the research methodology used to analyze teaching, the current knowledge of the association between teaching processes and student learning, and the implications of the research for the classroom.

522 Web Design and Instruction (3)

Prerequisite: Ed Elm 419. Design, development, ad implementation of Web pages and sites for instructional purposes. Emphasis placed in the issues surrounding using the World Wide Web for instruction.

527 Graduate Seminar in Developmental Psychology: The Human from Conception Through Eight Years (3)

Prerequisites: teaching credential or consent of instructor. The physical, social, cognitive-intellectual, and emotional development of individuals from conception to middle childhood. Current problems, theories and research.

528 Reading/Language Arts in the Early Childhood Curriculum (3)

Prerequisite: teaching credential or consent of instructor. Seminar: significant research, curriculum developments and materials, and current instructional strategies for promoting emergent literacy in children.

529 Graduate Studies: Learning Theory for Classroom Use (3)

Prerequisite: teaching credential or consent of instructor. Major theoretical positions in planning and interpreting classroom practices. Educational research findings, implications for curriculum development and teaching practices.

530 Graduate Studies in Elementary Education: Second Languages (3)

Prerequisites: Ed El 431 and 432 and teaching credential, or consent of instructor. Seminar: significant research, curriculum developments and materials, and criteria for planning and improving second language programs including those for English as a second language.

531 Graduate Studies in Elementary Education: Integrated Language Arts (3)

Prerequisite: teaching credential or consent of instructor. Seminar: significant research, trends and problems in teaching the fundamental skills of communication; curriculum development and materials, and criteria for planning and improving integrated language arts programs.

532 Graduate Studies in Elementary Education: Mathematics (3)

Prerequisite: teaching credential or consent of instructor. Seminar: significant research, curricular developments and materials, criteria for planning and improving mathematics programs and instruction.

533 Graduate Studies in Elementary Education: Science (3)

Prerequisite: teaching credential or consent of instructor. Seminar: research in elementary school science. The development of materials.

534 Graduate Studies in Elementary Education: Social Studies (3)

Prerequisite: teaching credential or consent of instructor. Seminar: research developments and materials, criteria for planning and improving social studies programs, and current techniques of teaching.

535 Graduate Studies in Elementary Education: Reading in the Language Arts Program (3)

Prerequisite: teaching credential or consent of instructor. Seminar: research developments and materials, criteria for planning and improving reading instruction in the integrated language arts programs, current instructional strategies, and the role of children's literature.

536 Curriculum Theory and Development (3)

Prerequisite: teaching credential or consent of instructor. Seminar: the school curriculum including the forces operating on the curriculum and the participants involved in curriculum building. The process of curriculum building.

537 Graduate Studies: Current Issues and Problems (3)

Prerequisite: teaching credential or consent of instructor. Problems and issues in elementary education, their causes and possible solutions.

538 Graduate Studies: Early Childhood Education (3)

Prerequisite: teaching credential or consent of instructor. Seminar: application of significant research in the education of young children. Current instructional strategies and criteria for planning and improving programs in early childhood education.

539 Clinical Supervision: Analyzing Effective Teaching (3)

Prerequisite: teaching credential or consent of instructor. A systematic, research-based approach. Identifies basic components needed by teachers, staff developers, and administrators to improve their instructional skills. Includes principles of learning applied to supervision and applied practice in analyzing the instructional process.

541 Psychological and Sociological Foundations of Bilingual-Bicultural Education (3)

Prerequisite: teaching credential or consent of instructor. Application of psychological and sociological theory related to teaching English learners; application of these disciplines for the development of emotionally and socially supportive learning environments.

542 Current Issues and Problems in Bilingual-Bicultural Education (3)

Prerequisite: teaching credential or consent of instructor. Problems and issues in the development and implementation of bilingual-bicultural education.

548 Social Studies, Science, and Math in Early Childhood Education (3)

Prerequisite: teaching credential or equivalent experience. This seminar investigates current curriculum standards and instructional options in social studies, science, and mathematics in early childhood education. Focus on content, process skills and literature connections.

551 Assessment Across the Curriculum (3)

Prerequisite: teaching credential or consent of instructor. Improving student performance through assessment, self-assessment, and student goals setting; establishing congruence between purposes, audiences, and instruments used. Goals of the course include: design and selection of instruments including performance assessment, portfolio, observation, and personal communication forms for standards based assessment.

552 Family, Community and Professional Partnership (3)

Prerequisite: teaching credential or consent of instructor. Overview of community collaboration with service providers, business leaders, policy makers, and parents. Addresses diversity across families and importance of family interface with agencies and community. Stresses importance of partnerships with professional agencies concerned with education, youth, and children.

553 Models of Teaching (3)

Prerequisite: teaching credential or consent of instructor. Explores varied strategies of instruction, culminating in the identification and study of sixteen unique models. Examines relationships among theories of learning and instruction. Investigates various instructional alternatives.

571 Graduate Studies in Elementary Education: Science Education Practicum (3)

Prerequisite: Ed El 533 or consent of instructor. Strategies for effectively teaching and assessing science content knowledge, science process skills, and scientific attitudes in the elementary school; includes field assignments in elementary schools (1 unit - 4 hours per week); seminars (2 units - 2 hours per week). Principles of effective staff development in elementary science education.

590 Practicum: Elementary School Teachers and Computers (3)
(Formerly 517)

Prerequisite: completion of all technology-related courses in the degree program or consent of instructor. Strategies for effectively using computers with elementary school children to improve learning; course includes field work assignments in elementary schools, and on-campus seminars.

594 Research Seminar (3)

Prerequisite: consent of instructor. The preparation, evaluation, development, and presentation of curriculum research proposals culminating in a graduate project. Individuals and groups will participate in critiquing proposals, curriculum projects, and research results.

597 Project (1-3)

Prerequisite: consent of instructor. Individual research on an empirical project, with conferences with the instructor, culminating in a project.

598 Thesis (1-3)

Prerequisite: consent of instructor. Individual research with conferences with the instructor, culminating in a thesis.

599 Independent Graduate Research (1-3)

Prerequisite: a teaching credential, one year of teaching experience, and consent of instructor. Independent inquiry.



DIVISION OF ENGINEERING

The Division of Engineering consists of the Departments of Civil and Environmental Engineering, Electrical Engineering, and Mechanical Engineering. Programs offered by the Division lead to the degrees of Bachelor of Science and Master of Science in the above disciplines; the three Bachelor of Science degree programs are nationally accredited by ABET, the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. Also offered are programs leading to the degrees of Bachelor of Science and Master of Science in Engineering with an Emphasis in Pharmaceutical Engineering or Option in Engineering Science, for which the student, working with an adviser, designs an appropriate interdisciplinary program.

CSUF is located in an industrial and highly technological region of Southern California. Drawing upon its professional expertise in many areas of engineering, the Division of Engineering serves as a distinctive resource and catalyst for partnership with public and private organizations in our region. Our nationally accredited undergraduate engineering programs offer a broad education in basic sciences, mathematics, and fundamental principles and practice of engineering. These are coupled with studies in social sciences, arts, humanities, and behavioral sciences due to their importance for an engineer's professional career.

DIVISION MISSION AND OBJECTIVES

Division Mission Statement

Consistent with the university's mission, learning is the first priority in the Division of Engineering.

To implement its mission, the engineering programs at CSUF provide the best qualities of teaching, scholarship and professional practice. The Division's programs are committed to facilitate the education of both engineering undergraduate and graduate students for their entrance in, and significant contribution to the engineering profession. Our students are actively engaged and work in collaboration with faculty and staff to acquire and expand knowledge. The objectives for our mission are further elaborated under "Division Educational Objectives."

Division Educational Objectives

The goals of the Division are as follows:

1. To provide the best of current practice, theory, research and intellectual study in the humanities to prepare students for challenging careers in engineering, strengthen relationships to their communities and contribute ethically and productively to society;
2. To educate students who, actively engage with faculty and staff, work in collaboration to acquire and expand knowledge;
3. To provide service to the profession, the state of California, the country and to the world-wide development of engineering.

A critical focus of the education, research, and service programs within the Division of Engineering is to afford undergraduates of varying backgrounds and abilities every opportunity for achieving success in the engineering professions.

To achieve these goals, the faculty and students of the Division of Engineering, with input from other constituents, have established the following program educational objectives:

1. To prepare students for successful careers and lifelong learning;
2. To make students thoroughly proficient in methods of analysis, including the mathematical and computational skills appropriate for engineers to use when solving problems; and

DIVISION CHAIR

Jesa Kreiner

PROGRAMS OFFERED

- Bachelor of Science in Civil Engineering
 - Emphasis in Architectural Engineering
- Bachelor of Science in Electrical Engineering
- Bachelor of Science in Engineering
 - Option in Engineering Science
 - Emphasis in Pharmaceutical Engineering
- Bachelor of Science in Mechanical Engineering
 - Emphasis in Manufacturing Engineering
- Master of Science in Civil Engineering
 - Concentration in Environmental Engineering
- Master of Science in Electrical Engineering
 - Option in Systems Engineering
- Master of Science in Engineering
 - Option in Engineering Science
- Master of Science in Mechanical Engineering

3. To develop the skills pertinent to the design process, including the students' ability to formulate problems, to think creatively, to communicate effectively, to synthesize information, and to work collaboratively;
4. To teach students to use current experimental and data analysis techniques for engineering application; and
5. To instill in our students an understanding of their professional and ethical responsibilities.

Actual program education objectives for various disciplines such as Civil and Environmental Engineering, Electrical Engineering and Mechanical Engineering are decided by the respective departments to match their program outcomes.

2 + 2 Articulated Programs with Community Colleges

The Division of Engineering has developed 2+2 years articulation agreements with community colleges to provide students seamless transfer to the CSUF engineering program of their choice. This allows the full-time students, taking the courses specified by the engineering department each semester, to graduate in two years following transfer to CSUF.

INTRODUCTION

The undergraduate engineering programs have a broad base of science, mathematics, social sciences, humanities and engineering topics (which include engineering science and engineering design courses). Students are thus prepared to enter directly into engineering practice or to continue further education at the graduate level. The Bachelor of Science degrees in Civil, Electrical, and Mechanical Engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

High School Preparation

The entering high school student should have a preparation which includes two years of algebra, geometry, trigonometry, and one year of physics or chemistry. Students deficient in mathematics or chemistry must take special preparatory courses, i.e., Mathematics 125 and Chemistry 115, which will not carry credit for the major. (See Mathematics Section for Entry Level Mathematics test and Math-Science Qualifying Examination requirements.)

Transfer Students

A transfer student shall complete a minimum of 30 units in residence of which at least 15 units shall be taken in upper-division engineering courses. Work taken at another college or university on which a grade of "D" was earned may not be substituted for upper-division courses.

BACHELOR'S DEGREES IN ENGINEERING

The undergraduate program requirements in engineering are comprised of four major segments. The first three segments are common to all four engineering programs, i.e., Civil Engineering, Electrical Engineering, Mechanical Engineering and the Engineering Science Option as well as the Architectural Engineering Emphasis within the Civil Engineering degree and the Manufacturing Engineering Emphasis within the Mechanical Engineering degree.

The first segment consists of foundation courses in mathematics and the physical sciences (33 units for Electrical Engineering, 32 units for Civil Engineering, and 30 units for Mechanical Engineering, 35 for Pharmaceutical Engineering). The second segment consists of 24 units of engineering core courses. The third segment contains 33 units of

general education courses in the arts, humanities, social sciences, biological sciences and other related areas.

The fourth segment contains a sequence of courses in one of the four programs which includes a combination of required courses and adviser-approved technical elective courses. The number of units in this segment is not the same for each of the four engineering programs but varies from 45 to 50 units. Students must meet with their academic adviser to prepare an approved study plan of technical elective courses prior to taking such courses. Undergraduate students are required to meet with their academic adviser every semester during the first year and at least once a year thereafter. Students are strongly encouraged to see their academic advisers frequently.

All courses taken in fulfillment of the requirements for the bachelor's degrees in Engineering must be taken for a letter grade, i.e., under grade Option 1. All mathematics and physical science courses required for the degree must be completed with at least a "C" grade to count as prerequisite courses or as credit towards the degree. Graduate courses are not open to undergraduate students without approval of the department head.

Mathematics and Science Courses

Mathematics 150A Calculus (4)

Mathematics 150B Calculus (4)

Mathematics 250A Multivariate Calculus (4)

Mathematics 250B Introduction to Linear Algebra and Differential Equations (4)

Chemistry 120A General Chemistry (5)

Physics 225, 225L Fundamental Physics: Mechanics and Lab (4)

Physics 226, 226L Fundamental Physics: Electricity and Magnetism and Lab (4)

Physics 227, 227L Fundamental Physics: Waves, Optics, and Modern Physics and Lab (4) (required in Electrical, and Engineering Science)

OR either Chemistry 125 (3) or Geological Sciences 376 (3) (required in Civil Engineering)

OR Physics 227 (1) (Required in Mechanical Engineering)

OR Biology 101 (3) and Chemistry 301A (3) (Pharmaceutical Engineering)

Engineering Core Courses

All undergraduate engineering students are required to complete the following 24 units of engineering core courses regardless of the particular program selected by the student.

EGME 102 Graphical Communications (3)

EGCE 201 Statics (3)

EGEE 203 Electric Circuits (3)

EGGN 205 Digital Computation (3)

EGCE 302 Dynamics (3)

EGME 304 Thermodynamics (3)

EGME 306A Unified Laboratory (1)

EGGN 308 Engineering Analysis (3)

EGGN 314 Engineering Economy (2)

General Education Courses

I. Core competencies (9 units)

- A. Oral Communication (3 units) HONR 101B, SPCOM 100 or SPCOM 102
- B. Written Communication (3 units) (ENGL 101)
- C. Critical Thinking (3 units)
HONR 101A, PHIL 105, 106, PSYCH 110, READ 290 or SPCOM 235

II. Historical and Cultural Foundations (9 units)

- A. Development of Civilization (3 units HIST 110A or HIST 110B)
- B. American History, Institutions and Values
 - 1. American History (3 units) AFRO 190, AMST 201, CHIC 190, HIST 180, 190 or HONR 201A
 - 2. Government (3 units) POLSC 100



Note: In order to meet the ABET accreditation requirement for depth in either Humanities or Social Sciences, at least two courses must be selected from the same department (one preferably a prerequisite to the other) from

the selection of courses in sections I.C, II.B.2, III.B.1, III.B.2, III.B.3. or III.C.2

INTERNSHIPS IN ENGINEERING

Internships for Engineering provide practical work experiences which integrate with and supplement the student's academic studies. Internship jobs are coordinated through the Center for Internships and Cooperative Education. In order to participate in this program, a student must register for EGGN 495 Professional Practice (1) foreach semester of internship participation.

ENGINEERING SCIENCE OPTION

The Engineering Science Option program is an interdisciplinary program designed for those students who are interested in a broad education in the basic concepts and principles of engineering, rather than an in-depth study in one particular engineering discipline such as civil, electrical or mechanical engineering. The Option provides a flexible interdisciplinary program in engineering with ample opportunity to develop a study plan which meets specific career goals. Courses can be selected from engineering, computer science, the physical sciences, mathematics and business to meet a special and specific engineering science objective.

Students who wish to be considered for an undergraduate or graduate engineering science program should meet with the Chair of the Division of Engineering. The Division Chair may serve as the academic adviser to the student or one or more advisers from the engineering, computer science, physical sciences, mathematics or the business faculties may be selected if appropriate.

Bachelor of Science in Engineering

Option in Engineering Science

The degree consists of 33 units of mathematics and physical science courses, 24 units of engineering core courses, 33 units of general

education courses and 45 units of adviser-approved elective courses for a total of 135 units. The adviser-approved electives must include a component of engineering design courses and engineering laboratory courses.

Master of Science in Engineering

Option in Engineering Science

The degree consists of 30 units of adviser-approved 400- and 500-level courses. At least half the units required for the degree must be graduate (500-level) courses. A segment of the 30 units must include a math-oriented course as well as EGGN 403 Computer Methods in Numerical Analysis (3).

PHARMACEUTICAL ENGINEERING EMPHASIS

Pharmaceutical Engineering is a new and an emerging field that incorporates multiple areas of science and engineering as well as innovative technological advances in pharmaceutical manufacturing. Students in this program will be introduced to the broad fundamentals of pharmaceutical engineering and manufacturing. They will learn about the manufacturing technologies for different drug dosage forms, industrial fermentation, sterilization and aseptic technology, validation and quality control, good manufacturing practice, and FDA regulations. Students choosing this program will learn about the emerging technologies in pharmaceutical manufacturing in order to meet the growing demand of the industry for pharmaceutical engineers.

Math and Science Courses (35 units)

Engineering Core Courses (24 units)

Required Courses (37 units)

- EGEE 203L Electric Circuits Lab (1)
- EGEE 245 Computer Logic and Architecture (3)
- EGEE 303 Electronics (3)
- EGEE 303L Electronics Lab (1)
- EGEE 409 Introduction to Linear Systems (3)
- EGME 306B Fluids and Thermal Lab (1)
- EGME 333 Fluid Mechanics and Aerodynamics (3)
- EGME 407 Heat Transfer (3)
- EGME 426 Design of Thermal and Fluid Systems (3)
- EGPH 201 Introduction to Pharmaceutical Engineering (3)
- EGPH 320 Pharmaceutical Dosage Forms and Drug Delivery Systems (3)
- EGPH 420 Pharmaceutical Utilities, Safety and Environment (3)
- EGPH 484 Pharmaceutical Engineering Lab (2)
- EGGN 495 Professional Practice (1 unit each semester)
- EGPH 497 Design Project (3)

Elective Courses (6 units)

Students choose six units from the following list of courses. Additional elective courses may be available. Please contact the Division of Engineering.

- EGPH 401 Project Management for Pharmaceutical and General Engineering (3)
- EGME 452 Fluid Machinery (3)
- EGME 457L Intelligent Systems Lab (2)

GENERAL ENGINEERING COURSES

Courses are designated as EGGN in the class schedule.

General engineering courses are courses whose academic content is not specific for any of the engineering disciplines. The courses are not administered by any one particular department. General engineering courses are taught by faculty from all three of the engineering departments.

Although there is no degree program in general engineering, new students who do not select a specific engineering degree will be classified as a general engineering major. The Chair of the Division of Engineering serves as the academic adviser to all general engineering students. General engineering students should make every effort to declare a major in one of the four engineering programs after one or two semesters of coursework.

205 Digital Computation (3)

Prerequisite: college algebra or three years of high school mathematics including a second course in algebra. Computers and their numerical applications. Elementary FORTRAN programming language, digital computation methods in statistics and solving algebraic equations.

308 Engineering Analysis (3)

Prerequisites: Physics 226, Math 250B or equivalent. Fundamentals and engineering applications of Fourier series, Fourier transforms, Laplace transforms, complex analysis, vector analysis; engineering applications.

314 Engineering Economy (2)

Prerequisite: junior or senior standing in engineering. Development, evaluation and presentation of alternatives for engineering systems and projects using principles of engineering economy and cost benefit analysis.

350 Living and Working in Space (3)

Prerequisite: junior standing. History of space flight. Space travel in literature and films. Space pioneers. The Moon Race. Space tourism and space hotels. Colonization of Moon and Mars. Space art. Economic, social, psychological, technological and global issues in space habitats.

403 Computer Methods in Numerical Analysis (3)

Prerequisites: Math 250B and EGGN 205 or equivalent. The use of numerical methods and digital computers in the solution of algebraic, transcendental, simultaneous, ordinary and partial differential equations.

495 Professional Practice (1)

Prerequisite: junior or senior standing in engineering. Professional engineering work in industry or government. Written report required. May be repeated for credit. Applicable towards bachelor's degree programs. Not for credit in the graduate program.

PHARMACEUTICAL ENGINEERING COURSES

These courses are designated as EGPH in the class schedule.

201 Introduction to Pharmaceutical Engineering (3) (Formerly EG-GN 201)

Prerequisites: Biology 101, Chemistry 120A, Math 250A. Survey of major areas of pharmaceutical engineering. Overview of pharmaceutical engineering technologies in drug manufacturing and delivery systems, high purity water systems, sterilization, medical devices, process engineering and packaging and industrial fermentation. Process validation, FDA requirements and good manufacturing practices.

320 Pharmaceutical Dosage Forms and Drug Delivery Systems (3) (Formerly EG-GN 320)

Prerequisites: Biology 101, Chemistry 120A, and EG-PH 201. Dosage form design. Peroral solids, injections and transdermal drug designs. Products of biotechnology. New drug delivery systems. Implantable vascular access devices. Closed-loop insulin delivery systems. Computerized drug delivery systems in cardiology and oncology. Validation of dosage process and equipment. GMP guidelines.

401 Project Management for Pharmaceutical and General Engineering (3) (Formerly EG-GN 401)

Prerequisite: EG-GN 314 Pharmaceutical and general engineering applications of project management. Engineering projects life cycle. Product and facility development process. Needs identification and proposal preparation. Planning and scheduling. Resource Considerations. Project implementation. Teamwork in a multi-cultural environment. International engineering codes and government regulations. Software applications. Case studies and term project.

420 Pharmaceutical Utilities, Safety and Environment (3) (Formerly EG-GN 420)

Prerequisites; EG-ME 333, EG-PH 201 and Chemistry 301A. Reaction kinetics and reactor design. Industrial fermentation and bioreactor systems. Sterilization techniques. Cleaning and passivation. Design of HVAC systems. Clean room design. WFI systems; filtration, reverse osmosis and distillation. Pharmaceutical facilities, piping, maintenance, process safety, environmental impact and protection.

484 Pharmaceutical Engineering Lab (2) (Formerly EG-GN 484)

Prerequisites: EG-PH 320 and Chemistry 301A. Exploring current techniques in pharmaceutical manufacturing and monitoring. Including water purification methods and WFI systems, steam sterilization, calibration of pharmaceutical devices, validation of pharmaceutical devices and procedures.

497 Design Project (3)

Prerequisite: consent of adviser and instructor. Directed independent design project.



INTRODUCTION

The civil engineering program at CSUF includes the fields of engineering mechanics and structural, geotechnical, hydraulic, environmental, construction, transportation, and architectural engineering. Modern civil engineering practices rely heavily upon computer-aided analysis and design. Students at CSUF use both microcomputers and the mainframe computer.

“Structural” engineers are designers of buildings, bridges, dams, power plants, offshore structures and many other kinds of systems. These engineers determine, usually by computer analysis, the forces that a structure must resist, the appropriate materials, and the possible structural types. Structural engineers usually work with a team that includes architects, mechanical and electrical engineers, contractors, and the owner of the project.

“Engineering Mechanics” courses offered in this department provide strong support for research, consulting and teaching in many fields of civil engineering.

“Geotechnical” engineers analyze the properties of soils and rocks that affect the behavior of structures. They evaluate the potential settlements of buildings, the stability of slopes and fills, and the effects of earthquakes. They take part in the design and construction of foundations, including those of offshore platforms, tunnels and dams.

“Hydraulic” engineers deal with all aspects of the physical control of water. They work to prevent floods, develop irrigation projects, design hydroelectric power systems, manage water resources, and predict water runoff.

“Architectural” engineering is a combination of the art of architecture and the science of engineering. The architect conceives of structures as an art form, and relies upon the structural engineer to translate his concepts of beauty into structural reality. The architectural engineer has the training to interact with both architects and engineers or to work on his own in designing structures that combine both strength and beauty.

“Construction engineering and management” is a wide ranging specialization that uses both technical and management skills to plan and build public and private projects and commercial developments.

“Environmental” engineers apply science and engineering principles to minimize the adverse effects of human activity on the environment. They typically deal with water and waste water treatment, air pollution control, solid and hazardous waste management, and groundwater/soil remediation. They also help draft regulations and enforce many federal and state laws to control damage to the environment.

“Transportation” engineers are concerned with the planning, design, and control of projects related to transportation of people and goods. They also help draft regulations and enforce many federal and state laws related to transportation.

The undergraduate engineering program is designed to impart knowledge of mathematics and natural sciences to students so that they learn to use the forces of nature and materials economically while maintaining engineering ethics and high professional standards.

One of the major objectives of this program is to provide design experience to the students gradually from the very beginning years until they graduate, through a variety of courses. During this time, they also learn about safety, reliability, ethics and socially sensitive problems.

The graduate engineering program is designed for specialization in the areas of structures, engineering mechanics, geotechnology, hydraulics, construction management, and environmental engineering.

DEPARTMENT HEAD

George Lin (Acting)

DEPARTMENT OFFICE

Engineering 100

DEPARTMENT WEBSITE

<http://www.fullerton.edu/ecs>

PROGRAMS OFFERED

Bachelor of Science in Civil Engineering

Emphasis in Architectural
Engineering

Master of Science in Civil Engineering

Concentration in Environmental
Engineering

FACULTY

Pinaki Chakrabarti, Jeff Kuo, George Lin,
Mallela Prasada Rao, Chandrasekhar Putcha,
Dindial Ramsamooj, Mufid Samara,
Mahadeva Venkatesan

ADVISERS

Undergraduate adviser:

Pinaki R. Chakrabarti

Graduate adviser:

Jeff Kuo

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Mathematics and Science Foundation Courses (32 units)

See information under "Division of Engineering" section.

Engineering Core Courses (24 units)

See information under "Division of Engineering" section.

Upper-Division Writing Requirement

In addition to the Examination in Writing Proficiency which is to be taken as soon as 60 units are completed, six units from the following courses are required and must be passed with a grade of C or better. The laboratory reports are graded on English composition as well as content.

- EGME 306A Unified Laboratory (1)
- EGCE 324L Soil Mechanics Laboratory (1)
- EGCE 325L Structural Analysis Laboratory (1)
- EGCE 377 Civil Engineering Materials Lab (1)
- EGCE 428L Engineering Hydraulics Lab (1)
- EGCE 431L Advanced Structural Lab (1)
- EGCE 463L Precast and Prestressed Concrete Design Lab (1)
- EGCE 465 Planning and Control of Engineering Construction Projects (3)
- EGCE 468 Engineering Construction (3)
- EGCE 490 Civil Engineering Professional Practice (1)

Required Courses in Civil Engineering (38 units)

- EGEE 203L Electric Circuits Laboratory (1)
 - OR EGCE 206 Computer-Aided Architectural and Civil Engineering Drafting (1)
- EGCE 214 Engineering Surveying (2)
- EGCE 214L Engineering Surveying Laboratory (1)
- EGCE 301 Mechanics of Materials (3)
- EGCE 324 Soil Mechanics (3)
- EGCE 324L Soil Mechanics Laboratory (3)
- EGCE 325 Structural Analysis (3)
- EGCE 325L Structural Analysis Laboratory (3)
- EGCE 330 Computer Applications in Civil Engineering (3)
- EGCE 377 Civil Engineering Materials Lab (1)
- EGCE 408 Reinforced Concrete Design (3)
- EGCE 418 Foundation Design (3)
- EGCE 428 Engineering Hydraulics (3)
- EGCE 428L Engineering Hydraulics Lab (1)
- EGCE 430 Structural Steel Design (3)
- EGCE 431L Advanced Structural Laboratory (1)
 - OR EGCE 463L Precast & Prestressed Concrete Design Lab (1)
- EGCE 494 Design of Civil Engineering Structures (3)*
- EGCE 494L Civil Engineering Structural Laboratory (1)*
- EGCE 495 Civil Engineering Professional Practice (1)

*EGCE 494 and 494L must be taken together.

Technical Electives in Civil Engineering (8 units minimum)

Before enrolling in any elective course, approval of the adviser must be obtained. Technical electives must include EGCE 441 or 465 or 466 or 468.

- EGCE 411 Structural Dynamics (3)
- EGCE 431L Advanced Structural Laboratory (1)
 - OR EGCE 463L Precast and Prestressed Concrete Design Lab (1)
- EGCE 432 Computer-Aided Design in Structural Engineering (3)
- EGCE 435 Design of Hydraulic Structures (3)
- EGCE 436 Engineering Hydrology (3)
- EGCE 441 Environmental Engineering (3)
- EGCE 463 Precast and Prestressed Concrete Design (3)
- EGCE 465 Planning and Control of Engineering Construction Projects (3)
- EGCE 466 Public Transit Systems Planning and Operations (3)
- EGCE 468 Engineering Construction (3)
- EGCE 493 Structural Systems for Buildings (3)
- EGCE 497 Senior Projects (1-3)
- EGCE 499 Independent Study (1-3)

ARCHITECTURAL ENGINEERING EMPHASIS

Mathematics and Science Courses (32 units)

Engineering Core Courses (24 units)

Required Civil Engineering Core (30 units)

- EGEE 203L Electric Circuits Laboratory (1)
 - OR EGCE 206 Computer-Aided Architectural and Civil Engineering Drafting (1)
- EGCE 214 Engineering Surveying (2)
- EGCE 214L Engineering Surveying Laboratory (1)
- EGCE 301 Mechanics of Materials (3)
- EGCE 324 Soil Mechanics (3)
- EGCE 324L Soil Mechanics Laboratory (1)
- EGCE 325 Structural Analysis (3)
- EGCE 325L Structural Analysis Laboratory (1)
- EGCE 377 Civil Engineering Materials Laboratory (1)
- EGCE 408 Reinforced Concrete Design (3)
- EGCE 418 Foundation Design (3)
- EGCE 430 Structural Steel Design (3)
- EGCE 494 Design of Civil Engineering Structures (3)*
- EGCE 494L Civil Engineering Structural Laboratory (1)*
- EGCE 495 Civil Engineering Professional Practice (1)

*EGCE 494 and 494L must be taken together.

Core Courses for the Emphasis in Architectural Engineering (13 units)

- EGCE 431L Advanced Structural Laboratory (1)
 - OR EGCE 463L Precast and Prestressed Concrete Design Lab (1)
- EGCE 432 Computer-Aided Design in Structural Engineering (3)

EGCE 441 Environmental Engineering (3)

EGCE 493 Structural Systems for Buildings (3)

OR EGCE 463 Precast and Prestressed Concrete Design (3)

EGCE 496 Architectural Design (3)

Technical Electives for the Emphasis in Architectural Engineering (3 units)

EGCE 465 Planning and Control of Engineering Construction Projects (3)

EGCE 466 Public Transit Systems Planning and Operations (3)

EGCE 468 Engineering Construction (3)

MASTER OF SCIENCE IN CIVIL ENGINEERING

The Master of Science degree in Civil Engineering is intended to meet the needs of students who wish to prepare for careers in areas such as construction and project management, design and analysis of complex systems (including structures such as tall buildings and bridges), environmental engineering, consulting, and research. This program also provides excellent preparation for doctoral studies.

The program provides advanced study within the area of civil engineering and allows students to elect coursework, with adviser approval, in the areas of structural engineering, hydraulics/

hydrology, geotechnical engineering, engineering mechanics, engineering management or environmental engineering.

Graduates from the M.S. program have obtained employment in various fields including manufacturing, construction, business, education, and government.

Admission Requirements

To qualify for admission to conditionally classified standing, applicants must meet the following university and departmental requirements:

1. Bachelor's degree from a regionally accredited institution.
2. Bachelor's degree in Civil Engineering from an institution accredited by the Accreditation Board for Engineering and Technology (ABET).
3. Minimum grade-point-average of 2.5 in the last 60 semester units.
4. Good standing at the last institution attended.

Students meeting the above requirements will be admitted to the graduate program in Civil Engineering and will be advanced to classified standing immediately after filing an adviser-approved study plan in the Civil and Environmental Engineering Department office.

Students not meeting the above requirements may be admitted at the discretion of the department head and will be required to take an additional six or more units of adviser-approved prerequisite coursework. The student must demonstrate potential for graduate study by earning a GPA of 3.0 or higher in these prerequisite courses.

Any student entering the Master of Science degree program without a B.S. in Civil Engineering will also be required to complete deficiency courses prior to beginning coursework for the master's degree.

Graduate and postbaccalaureate students who do not possess a bachelor's degree from a postsecondary institution where English is the principal language of instruction must receive a minimum score of 550 on the Test of English as a Foreign Language (TOEFL).

The Civil and Environmental Engineering Department does not require the Graduate Record Exam (GRE).

Application Deadlines

Applications need to be postmarked no later than March 1st for the fall semester and October 1st for the spring semester. However, deadlines may be changed based upon enrollment projections. Check the university graduate studies website for current information at <http://www.fullerton.edu/graduate>.

Classified Standing

Students meeting the following additional requirements will be advanced to classified standing and are eligible to take graduate courses for which they are qualified.

1. Completion of all deficiency work specified by the graduate adviser with a grade of B or better.
2. Development of an approved study plan. Before completing nine units at CSUF toward the M.S. degree, the student must meet with an adviser for preparation of a study plan which must be approved by the department head and Office of Graduate Studies.
3. Fulfillment of the university writing requirement prior to completing nine units at CSUF toward the M.S. degree. Students must demonstrate writing ability commensurate with the baccalaureate degree by successfully completing one of the following:
 - A. An upper-division writing requirement at any CSU campus.
 - B. An upper-division writing course from another university which is equivalent to a course satisfying the CSUF Upper-Division Writing Requirement. Equivalency must be certified by the department head.
 - C. Cal State Fullerton Examination in Writing Proficiency (EWP).
 - D. A CSUF upper-division or graduate-level course that is certified as meeting the writing requirement and is approved by the department head. The grade received must be a C or better.

Study Plan

The study plan consists of a minimum of 30 units of adviser-approved upper-division or graduate-level coursework which must be completed with an overall grade-point average of at least 3.0. At least half the units required for the degree must be in approved graduate (500-level) courses.

Required Courses (6 units)

EGGN 403 Computer Methods in Numerical Analysis (3) and an additional adviser-approved math-oriented course (3) OR six units adviser-approved electives (for those focusing on environmental and construction areas).



Concentration Courses (15 units)

A student is required to select a minimum of 15 units in Civil Engineering. These units may be 400-level (subject to approval by the department head) and 500-level courses and are selected according to the student's areas of interest. Coursework may focus on the following areas: Engineering Mechanics, Geo-technical Engineering, Hydraulics/Hydrology, Structural Engineering, and Construction Engineering and Management. Students interested in Environmental Engineering should refer to the text following this section.

Other Courses (9 units)

Elective units should be taken in Civil Engineering or a related engineering field and are subject to adviser approval.

Exam/Thesis/Project Option

Subject to approval by the department head, students may select one of the following three options for final review by a department committee:

1. Oral comprehensive examination OR
2. EGCE 598 Thesis OR
3. EGCE 597 Project

Students enrolling in less than six units of Independent Study/Thesis/Project will be required to take an oral comprehensive exam. Students enrolling in six units of thesis or project may defend their thesis or project instead of taking an oral comprehensive exam.

Advancement to Candidacy

Advancement to candidacy and completion of requirements for the degree include:

1. Filing a graduation check prior to the beginning of the final semester (deadlines are listed in the class schedule).
2. Completion of study plan coursework with a minimum overall GPA of 3.0.
3. Successful completion of a comprehensive examination or oral defense of a thesis or project.
4. Recommendation by the Civil and Environmental Engineering Department faculty and Office of Graduate Studies.

CONCENTRATION IN ENVIRONMENTAL ENGINEERING

Required Concentration Courses (15 units)

EGCE 481 Solid Waste Technology & Management (3)

EGCE 482 Liquid Waste Technology & Management (3)

Adviser-approved Environmental Engineering courses which may include Thesis, Project or Independent Study (9)

Electives (15 units)

Adviser-approved electives must include a minimum of six units in non-Environmental Engineering courses.

Students enrolling in less than six units of Independent Study/Thesis/Project will be required to take an oral comprehensive exam. Students enrolling in six units of thesis or project may defend their thesis or project instead of taking an oral comprehensive exam.

CIVIL AND ENVIRONMENTAL ENGINEERING COURSES

Courses are designated as EGCE in the class schedule

201 Statics (3)

Prerequisites: Math 150B and Physics 225. Vectorial treatment of statics of particles and rigid bodies. Freebody diagrams. Applications to problems of equilibrium (two and three dimensions) of structural and mechanical force systems. Trusses, frames and machines. Friction problems. Centroids and moments of inertia. (CAN ENGR 8)

206 Computer-Aided Architectural and Civil Engineering Drafting (1)

Prerequisite: EGME 102. Architectural and civil engineering drawing with the aid of computer-aided drafting techniques; grading plans, engineering drawings (including standard structural, electrical and hydraulic details) of buildings, bridges, dams and civil engineering structures. Bill of Materials. (3 hours laboratory)

214 Engineering Surveying (2)

Co-requisite: EGCE 214L. Basis of plane surveying. Distance measurement using tapes and EDM. Levelling. Measurement of angles and directions. Traverse and topographic survey and computations. Applications in highway curves, construction surveys and land surveys. Principles of stadia.

214L Engineering Surveying Laboratory (1)

Co-requisite: EGCE 214. Field practice of measurement of distance, difference of elevation, and horizontal and vertical angles using tapes, EDM, automatic levels, theodolites and total stations. (3 hours laboratory)

301 Mechanics of Materials (3)

Prerequisites: Math 250A and EGCE 201. Stress and deformation analysis for axial load, torsion, flexure, and combined forces. Analysis of simple statically indeterminate structures. Deflection and stress analysis of beams. Stability of columns. Strain energy and ultimate resistance. Interactive relationships between analysis and design.

302 Dynamics (3)

Prerequisites: Math 250A and EGCE 201. Kinematics and kinetics of particles and rigid bodies, kinetics of rigid bodies in three dimension, Newton's laws, work and energy, impulse and momentum. Solution of problems using vector approach.

305 Failure of Building and Structure due to Earthquakes and After Effects (3)

Prerequisites: Students must have completed one course from General Education category III.A.1 Math, or III.A.2 Natural Science. Geological aspects of earthquakes as they apply to building safety, introduction to earthquake-related problems and building damages cause by historic earthquakes. Discussion on destruction aspects of earthquakes, preparedness for large earthquakes and how to protect structural and non-structural parts of buildings. (Same as GEOL 305)

324 Soil Mechanics (3)

Prerequisite: EGCE 301. Soil properties and soil action as related to problems encountered in engineering structures; consolidation, shear strength, stability and lateral earth pressures.

324L Soil Mechanics Laboratory (1)

Prerequisites: English 101 and EGCE 324. Behavior and properties of soils. Application to foundation design, liquefaction and seepage.

325 Structural Analysis (3)

Prerequisite: EGCE 301. Analysis of forces and displacements in statically determinate and indeterminate elastic structures by force and displacement methods. Approximate methods of analysis. Matrix formulation of structural analysis and computer applications. Introduction to structural design.

325L Structural Analysis Laboratory (1)

Prerequisites: English 101 and EGCE 325. Principles of model analysis and similitude. Influence lines for reactive and internal forces; generalized displacements of statically indeterminate structures. Nonprismatic members. (3 hours laboratory)

330 Computer Applications in Civil Engineering (3)

Prerequisites: EGGN 205, EGCE 324 and 325. Application of computer programming to the solution of analytical and design problems in various branches of Civil Engineering.

377 Civil Engineering Materials Laboratory (1)

Prerequisites: EGCE 324 and 325. Behavior and properties of most common materials, e.g. steel, concrete, wood, masonry and asphalt. Mix design of asphalt and concrete. Determination of strain and stress using strain gages. Specimen testing according to ASTM. Material properties determination. Safety, reliability, and design considerations. (3 hours laboratory)

408 Reinforced Concrete Design (3)

Prerequisite: EGCE 325. Co-requisite: EGCE 377 or equivalent. Design for bending, shear, axial force, torsion and combined loading. Beam, columns, slab and foundation design for ultimate strength and serviceability requirements. Prestressed concrete design. Safety, reliability and cost considerations. Design project conforming to latest ACI code. Professional computer program. (2 hours lecture, 3 hours lab)

411 Structural Dynamics (3)

Prerequisites: EGCE 325 and EGGN 308 or equivalent. Free and forced vibrations of discrete and continuous systems. Matrix formulation and normal coordinates analysis. Response of structures to impulse and earthquake loads. Application to structural design problems and comparison with code prescribed forces.

418 Foundation Design (3)

Prerequisites: EGCE 324 and 408. Design of footings and retaining walls. Mat and piled foundations for structures. Design project to standards of professional practice using latest codes and standards. Consideration for safety, reliability and cost.

428 Engineering Hydraulics (3)

Prerequisite: EGCE 302. Incompressible fluid flow in closed conduits and open channels. Hydrostatics, energy, and hydraulic grade lines. Momentum, friction formulas, pipelines, uniform flow, and water surface profiles. Design of pipes and open channels. Computer solutions.

428L Engineering Hydraulics Laboratory (1)

Prerequisites: English 101 and EGCE 428. Introduction to experimental hydraulics in open channel and pipe flows including measurements of discharge, depth, velocity, force and friction coefficients. Hydraulic model laws and report writing. (3 hours laboratory)

430 Structural Steel Design (3)

Prerequisite: EGCE 325. Co-requisite: EGCE 377 or equivalent. Design for bending, torsion, shear, axial forces, combined loadings. Design of built-up girders, composite construction. Design of shear and moment connections. Design project using professional practice standards. LRFD method. Safety, reliability and cost considerations. Professional computer program. (2 hours lecture and 3 hours lab)

431L Advanced Structural Laboratory (1)

Prerequisites: EGCE 325L and either EGCE 408 or EGCE 430. Fundamentals of earthquake engineering and soil structure interaction; design of lateral bracing for model buildings. (3 hours laboratory)

432 Computer-Aided Design in Structural Engineering (3)

Prerequisites: EGGN 205, EGCE 325 and 408. Application of computer-aided design techniques with automated graphics to the design of civil engineering structures. Design project to the standards of professional practice. (2 hours lecture, 3 hours laboratory)

435 Design of Hydraulic Structures (3)

Prerequisite: EGCE 428. Applications of hydraulic principles to design of various structures including spillways, energy dissipators, outlet works, storm drains, culverts and water distribution systems. Use of computers in design process.

436 Engineering Hydrology (3)

Co-requisite: EGCE 428. Hydrologic cycle with applications to hydrologic design of engineering structures. Rainfall, stream flow, ground water, surface runoff, hydrographs, flood routing, frequency distributions and design hydrographs.

441 Environmental Engineering (3)

Prerequisites: Biology 101 or Chem 120A and EGGN 308. Planning and control of the environment; wastewater treatment and disposal; solid waste management; air pollution; radiation protection; housing and residential environment.

463 Precast and Prestressed Concrete Design (3)

Prerequisite: ECCE 408. Prestressed concrete design and analysis for conventional and lateral loading. Design of reinforced and pre-stressed structural and architectural elements. Safety and economy. Connection design for earthquake and wind loadings. Design projects using professional practice standards including latest codes.

463L Precast and Prestressed Concrete Design Lab (1)

Prerequisites: EGCE 408 and EGCE 463 or equivalent. Behavior of prestressed and reinforced concrete beams subjected to the different types of loadings. Observation of elastic and ultimate strength behavior, deflection crack propagation and collapse. Observation of prestressing operation and camber. (3 hours laboratory)

465 Planning and Control of Engineering Construction Projects (3)

Prerequisite: Senior standing. Overview of construction project management; construction scheduling fundamentals: bar charts, CPM, PERT; schedule control: manual vs. computer systems, reports, schedule maintenance; cost control: code of accounts, control base, budgets, forecasting, reports, computer systems; applications in construction projects.

466 Public Transit Systems Planning and Operations (3)

Prerequisite: Senior standing in Civil Engineering. Urban passenger transportation modes, paratransit, special modes, vehicles characteristics and motion, highway transit mode, rail transit mode new concepts, transit system performance (capacity, productivity, efficiency and utilization, organization and financing).

468 Engineering Construction (3)

Prerequisite: EGCE 408 or equivalent. Co-requisite: EGCE 418. Engineering construction planning equipment and methods. Construction management. Critical path method. Construction of buildings, bridges, highways, foundations and dams. Consideration for safety and reliability.

481 Solid Waste Technology and Management (3)

Prerequisite: EGCE 441 or equivalent. Process dynamics and kinetics; thermal, physical, chemical and biological treatment operations; immobilization process; residual management and treatment process train selection.

482 Liquid Waste Technology and Management (3)

Prerequisite: EGCE 441 or equivalent. Process dynamics; reactions and kinetics; reactor engineering and process design; pretreatment operations and physical, chemical and biological treatment operations; residual management and treatment process train selection.

490 Civil Engineering Professional Practice (1) (Formerly 495)

Prerequisite: Senior standing. Discussion of civil engineering as a profession and the civil engineer as a professional. Career opportunities in private sectors and government. Office and field practice. Professional growth and development. Project management. Business management and opportunities. Ethics and aesthetics. Case studies.

493 Structural Systems for Buildings (3)

Prerequisite: EGCE 408 or 430. Co-requisite: EGCE 418. Building structural concepts and systems and their behavior under loads. Foundation systems. Roof, floor, wall systems. Construction safety and cost considerations. Design project to standards of professional practice. Use of latest building codes and standards and computer application. (2 hours lecture and 3 hours laboratory)

494 Design of Civil Engineering Structures (3)

Prerequisites: EGCE 408 and 430. Co-requisites: EGCE 418 and 494L. Timber, reinforced masonry, reinforced concrete and steel design. Use of Uniform Building Code and standards. Design of buildings and bridges. Design projects to standards of professional practice. Reliability, safety and cost consideration. Computer application. (2 hours lecture; 3 hours laboratory)

494L Civil Engineering Structural Laboratory (1)

Co-requisite: EGCE 494. Design of bridges according to AASHTO code. Design project to the standards of professional practice. (3 hours laboratory)

496 Architectural Design (3)

Prerequisite: EGCE 408 or 430 or senior standing or consent of instructor and department head. History of architectural design. Systems based design process: aesthetic, functional, environmental, and behavioral aspects. Urban planning and design. Case studies. Architectural design project to the standards of professional practice.

497 Senior Projects (1-3)

Prerequisites: Senior standing in engineering and formal approval by adviser and department head. Independent design projects. Formal report to be submitted after completion of project work.

499 Independent Study (1-3)

Prerequisites: Senior standing in engineering and formal approval by adviser and department head. Special topics in civil engineering. Formal report to be submitted after completion of independent study.

501 Analytical Methods for the Design of Civil Engineering Systems (3)

Prerequisite: graduate standing or equivalent. Application of linear and dynamic programming principles to the design of pipelines, irrigation systems, water-resources and traffic-flow control problems. Probabilistic network analysis. First order and advanced first order second moment reliability methods. Probabilistic design.

509 Theory of Plates and Shells (3)

Prerequisite: EGME 438 or equivalent. Theory of thin plates subjected to transverse loads. Analysis of plates of circular, rectangular and other shapes. Theory of thin shells. Shells of revolution. Shells of translation.

510 The Finite Element Method (3)

Prerequisites: EGCE 517 and 533 or equivalent. Formulation of finite elements for analysis of plane stress and strain problems, axisymmetric bodies, plates and shells. Conforming and non-conforming shape functions. Computer applications to complex structural systems under static and dynamic loads.

515 Geo-Environmental Engineering (3)

Prerequisite: EGCE 436 or equivalent. Geo-environmental properties and soil action related to problems encountered in waste management engineering; physico-chemical soil properties, shear strength as applied to landfill design and lateral earth pressures on braced excavation; contaminant migration and partitioning in unsaturated soils.

517 Theory of Elasticity (3)

Prerequisite: EGME 438 or equivalent. Analysis of stress and strain. Equations of elasticity. Extension, torsion and flexure of beams. Two-dimensional elastostatic problems. Variational methods and energy theorems. Elementary three-dimensional elastostatic problems. Introduction to thermoelasticity and wave propagation.

532 Earthquake Engineering (3)

Prerequisites: EGCE 411 and 533 or equivalent. Earthquake motions; response spectra; computational methods and computer applications for response of structural systems. Energy absorption capacity of materials and structural components. Soil structure interaction. Seismic design and evaluation of current building codes.

533 Matrix Methods of Structural Analysis (3)

Prerequisites: EGCE 325 and EGGN 403. Matrix formulation of structural analysis using the direct stiffness approach. Comparison of flexibility and stiffness approaches. Computer aided analysis of complex structural systems under static and dynamic loads. Stability analysis. Introduction to the finite element method.

534 Construction Methods and Equipment for Buildings (3)

Prerequisites: EGCE 408 and 430. Methods and equipment for construction of high-rise buildings, space structures, folded plates, shells, and suspension systems. Modularization. Quality control and construction failures.

537 Groundwater and Seepage (3)

Prerequisite: EGCE 436 or equivalent. Equations governing flow of liquid in porous media. Seepage through dams and under structures, flow in confined and unconfined aquifers, steady and unsteady flow, well fields, flow nets, computer solutions, sea water intrusion, recharge, groundwater pollution.

538 Construction Methods and Equipment for Heavy Construction Engineering (3)

Prerequisites: EGCE 408 and 418. Methods and equipment for construction of foundations, highways, airfields, bridges, ports, harbors, dams, nuclear power plants and industrial facilities. Quality control and construction failures.

539 Preconstruction Design Evaluation (3)

Prerequisites: EGCE 534 or equivalent. Cost benefit, preconstruction scheduling, and constructibility modifications in design, specifications and construction methods. Value Engineering.

540 New Technology & Innovations in Construction Engineering (3)

Prerequisite: EGCE 534 or 538 or equivalent. Automation and robotics in construction. New materials, construction equipment and methods for construction of dams, highways, and buildings. Latest computer applications in construction.

546 Coastal Engineering (3)

Prerequisites: EGCE 418 and 436 or equivalent. To introduce theories and applications in coastal engineering, coastal hydrodynamics, coastal development, planning of ports, and conceptual engineering design, tide, wave, wind, currents, littoral drift, beach erosion and sedimentation, coastal geomorphology. Port planning, location, design factors and engineering features. Preparation of construction, dredging, anchoring and dewatering. Effect of coastal engineering on environment.

549 Theory of Elastic Stability (3)

Prerequisites: EGCE 509 and 517 or equivalent. Critical buckling loads of columns, beam-columns, frames, plates, and shells. Lateral stability of beams. Torsional buckling of open wall sections.

550 Major Commercial Project Development and Management (3)

Prerequisite: Any 400-level Management course approved by the department head. Process of major commercial project development; macroeconomics aspects; project initiation and implementation, construction management systems, schedule, cost and quality control, control of long-lead equipment and materials, construction disputes and claims, case studies.

556 Construction Cost Control, Scheduling and Planning (3)

Prerequisite: EGCE 465 or 468 or equivalent. Systems approach for estimating, scheduling, cost comparison, risk analysis and cost control. Project feasibility studies and alternative approaches. Project control, baseline establishment, cost and claim management.

557 Total Cost Management of Capital Projects (3)

Prerequisite: EGCE 465 or equivalent. Management and cost control of large capital projects. Capital cost estimation, value prediction and control, cost and schedule control and management of mega projects.

559 Environmental and Public Transportation Regulations (3)

Prerequisite: EGCE 441 or equivalent. Environmental regulations, clean air act, intermodal surface transportation efficiency act of 1991, Federal Transit Administration project planning guidelines, planning for public transit and environmental requirement, development of required environmental documents; procedure for major investment studies; future of public transportation. Project.

563 Advanced Prestressed and Reinforced Concrete Design (3)

Prerequisite: EGCE 408 or 463. Prestressed concrete theory. Continuous prestressed concrete members, flat plate systems, virendeel systems, application of unbonded posttensioning-Theory and design. Yield line theory, limit analysis and cracking of concrete. Design of prestressed dome roof, barrel shell and hyperbolic paraboloid shell. Design project to standards of professional practice. Computer application. (2 hours lecture and 3 hours lab).

566 Design of Tall Buildings (4)

Prerequisite: EGCE 408 or 430; EGCE 533 or equivalent. Characteristics, design criteria and safety provisions of tall buildings. Selection, optimization and analysis of framing systems. Design standards, constructability, wind and seismic considerations. Design project to the standards of professional practice. Computer application.

575 Expert Systems in Construction Engineering (3)

Prerequisite: any 400-level Management course approved by the department head. Expert systems and artificial intelligence techniques in construction engineering; expert systems for: safety evaluation of structures during construction, site selection, construction decision making, and construction schedule analysis; project monitoring; claims and disputes.

597 Project (1-6)

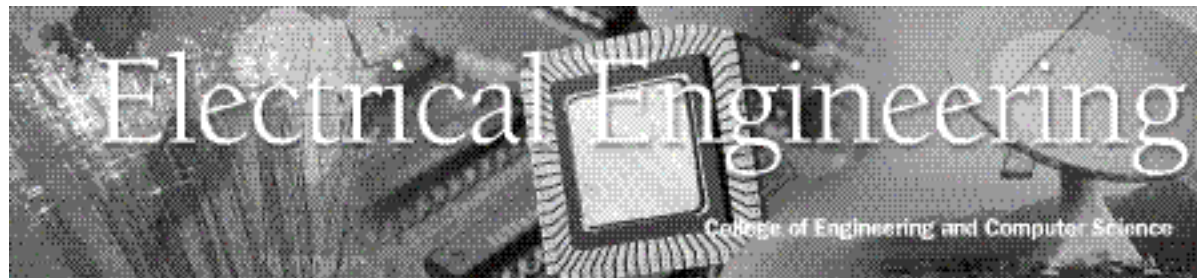
Prerequisites: Classified graduate status and formal approval of Civil Engineering Graduate Committee, graduate adviser and department head.

598 Thesis (1-6)

Prerequisites: Classified graduate status and formal approval of Civil Engineering Graduate Committee, graduate adviser, and department head. (Maximum of 3 units per semester)

599 Independent Graduate Research (1-3)

Prerequisites: Classified graduate status and formal approval of Civil Engineering Graduate Committee, graduate adviser, and department head.

**DEPARTMENT HEAD**

Mostafa Shiva

DEPARTMENT OFFICE

Engineering 100A

DEPARTMENT WEBSITE

<http://www.fullerton.edu/ecs>

PROGRAMS OFFERED

Bachelor of Science in Electrical
Engineering
Master of Science in Electrical
Engineering
Option in Systems Engineering

FACULTY

Maqsood Ahmed Chaudhry, David Cheng,
John Clymer, George Cohn, Shahin
Ghazanshahi, Mohinder Grewal, Karim
Hamidian, Hassan Hamidi-Hashemi, Young
Kwon, Chennareddy Reddy, Mostafa Shiva,
Fleur Tehrani, Jesus Tuazon, Raman
Unnikrishnan

ADVISERS

Undergraduate program adviser:
Jesus Tuazon

Graduate program coordinator:
Mostafa Shiva

Graduate admissions:
Jesus Tuazon

All department full-time faculty serve as advisers; see electrical engineering bulletin board for names, office hours and room numbers.

INTRODUCTION

The Bachelor of Science degree in Electrical Engineering is accredited by the Accreditation Board for Engineering and Technology (ABET). The electrical engineering program provides the students with the knowledge of basic and advanced topics in the areas of design and analysis of VLSI and electronic circuits, design and analysis of computer architecture, microprocessors, communication systems, signal processing, and control systems. This program develops an ability to apply design and analysis knowledge to the practice of electrical engineering in an effective and professional manner. This knowledge can be applied to various engineering practices in aerospace, computer, electrical, electronics and other applied fields.

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

See "Division of Engineering" section of this catalog for requirements in mathematics and science foundation courses (33 units), engineering core courses (24 units) and general education course work.

In addition, EGEE 203 and 303 must be completed.

Upper-Division Writing Requirement

In addition to the Examination in Writing Proficiency (EWP), all of the following courses are required to fulfill the upper-division English writing requirement:

EGEE 303L Electronics Laboratory (1)

EGME 306A Unified Laboratory (1)

EGEE 310L Electronic Circuits Laboratory (2)

EGEE 485 Electrical Engineering Design Projects Laboratory (3)

OR EGEE 407L Digital Computer Design Lab (3)

Written work for these courses must meet professional standards. All these courses must be passed with at least a "C" grade.

Required Courses in Electrical Engineering (34 units)

Enrollment in these courses is limited to students who meet the prerequisites.

EGEE 203L Electric Circuits Lab (1)

EGEE 245 Computer Logic & Architecture (3)

EGEE 245L Computer Logic and Architecture Lab (2)

EGEE 303 Electronics (3)

EGEE 303L Electronics Lab (1)

EGEE 309 Network Analysis (3)

EGEE 310 Electronic Circuits (3)

EGEE 310L Electronic Circuits Lab (2)

EGEE 311 Field Theory and Transmission Lines (3)

EGEE 313 Introduction to Electromechanics (3)

EGEE 323 Engineering Probability and Statistics (3)

EGEE 407L Digital Computer Design Lab (3)

OR EGEE 485 Electrical Engineering Design Projects Lab (3)

EGEE 409 Introduction to Linear Systems (3)

EGEE 490 Seminar in Electrical Engineering (1)

Note: EGEE 203, 303, 303L, and 310L must be passed with at least a C grade.

Technical Electives in Electrical Engineering (11 units)

Before enrolling in any elective course, approval of the adviser must be obtained. At least 3-5 units of design content must be included. Senior project, EGEE 497 (1-3), and Independent Study, EGEE 499 (1-3), are elective courses; the student must complete a study application form and submit it for approval to the supervising faculty member and the department head prior to the semester in which the course work is to begin.

VLSI and Electronic Circuits

EGEE 404 Intro to Microprocessors and Microcomputers (3)

EGEE 404L Microprocessor Laboratory (1)

EGEE 410 Electro-Optical Systems (3)

EGEE 442 Electronic Circuits (3)

EGEE 445 Digital Electronics (3)

EGEE 448 Digital Systems Design and VHDL (3)

EGEE 455 Solid State Electronics (3)

EGEE 465 Introduction to VLSI Design (3)

Communication Systems and Signal Processing

EGEE 404 Introduction to Microprocessors and Microcomputers (3)

EGEE 410 Electro-Optical Systems (3)

EGEE 420 Introduction to Digital Filtering (3)

EGEE 442 Electronic Circuits (3)

EGEE 443 Electronic Communication Systems (3)

EGEE 448 Digital Systems Design and VHDL (3)

EGEE 480 Engineering Optics (3)

EGEE 483 Introduction to Global Positioning Systems (GPS) (3)

EGEE 483L Global Positioning Systems Lab (2)

Control Systems

EGEE 313L Power Laboratory (1)

EGEE 404 Introduction to Microprocessors and Microcomputers (3)

EGEE 416 Feedback Control Systems (3)

EGEE 420 Introduction to Digital Filtering (3)

EGEE 424 Computer Simulation of Continuous Systems (3)

EGEE 425 Introduction to Systems Engineering (3)

EGEE 483 Introduction to Global Positioning Systems (GPS) (3)

Computer Engineering

EG-GN 403 Computer Methods in Numerical Analysis (3)

EGEE 404 Introduction to Microprocessors and Microcomputers (3)

EGEE 404L Microprocessor Lab (1)

EGEE 407 Digital Computer Architecture & Design I (3)

EGEE 407L Digital Computer Design Lab (3)

EGEE 412 Digital Computer Architecture and Design II (3)

EGEE 425 Introduction to Systems Engineering (3)

EGEE 445 Digital Electronics (3)

EGEE 448 Digital Systems Design with VHDL (3)

EGEE 455 Solid State Electronics (3)

EGEE 465 Introduction to VLSI Design (3)

MASTER OF SCIENCE IN ELECTRICAL ENGINEERING

To qualify for admission in conditionally classified standing, applicants must meet the following university and departmental requirements:

1. Bachelor's degree from a regionally accredited institution.
2. Bachelor's degree in an engineering program which is accredited by the Accreditation Board for Engineering and Technology (ABET).
3. Good standing at the last institution attended.
4. Minimum GPA of 2.75 in the last 60 semester units and 3.0 in the last 15 units of electrical engineering courses attempted.

Students with grade deficiencies, degrees from non-ABET accredited universities, or undergraduate majors other than Electrical Engineering may be considered for conditional admission. However, any deficiencies must be made up prior to advancing to classified standing and prior to beginning course work for the master's degree. Requirements for fulfilling deficiencies include a minimum of six units of adviser-approved course work. Deficiencies must be completed with minimum 2.5 GPA and with at least 2.75 GPA in the last nine deficiency units.

Each applicant file will be reviewed by the department graduate admissions adviser. Upon admission, the applicant is required to make an appointment with the graduate program coordinator. The program coordinator will assign a faculty adviser based on the student's areas of interest and career objectives.

Application Deadlines

Applications need to be postmarked no later than March 1st for the fall semester and October 1st for the spring semester. However, deadlines may be changed based upon enrollment projections. Check the university graduate studies website for current information at <http://www.fullerton.edu/graduate>.

Classified Standing

A student who meets the above requirements for admission to conditionally classified standing may be granted classified standing contingent upon:

1. Completion of all required deficiency course work.
2. Fulfillment of the university writing requirement. Students with degrees from American universities must show proof of meeting an upper-division writing requirement, pass the EWP, or complete English 301 or 360. Students who have degrees from foreign universities must pass the Examination in Writing Proficiency (EWP) or complete English 301 or 360 with a grade of "C" or better.
3. Development and approval of a study plan prior to completing nine units toward the 30-unit degree requirement.

Students must meet with a faculty adviser to set up a study plan. Classification is not granted until the study plan is approved by the faculty adviser, the department head, and the Office of Graduate Studies. Any subsequent changes to the study plan must have prior written approval by the faculty adviser and department head.

Study Plan

The study plan consists of a minimum of 30 units adviser-approved upper-division and graduate-level course work which must be completed with an overall grade-point average of at least 3.0. At least half the units must be in graduate-level courses.

Required Courses (6 units)

EGGN 403 Computer Methods in Numerical Analysis (3)

Additional adviser-approved math-oriented course (3)



Concentration Courses (15 units)

A student is required to select a minimum of 15 units in Electrical Engineering. These units may be 400- and 500-level courses and are selected according to the student's area of interest. Course work may focus on the following areas: Communications Systems/Signal Processing, Computer Engineering, Control Systems, Microelec-

tronics and Circuit Theory, Electromagnetic Field Theory and Optics and Systems Engineering. Graduate Project, EGEE 597 (1-3), and Thesis, EGEE 598 (6), are considered concentration courses.

Other Courses (9 units)

Elective units should be taken in Electrical Engineering or a related engineering field and are subject to adviser approval.

Exam/Thesis/Project Option

Subject to approval by the faculty adviser, students may select one of the following options for final review by the department graduate committee:

1. Satisfactory completion of a final oral comprehensive examination on coursework OR
2. Satisfactory completion of a formal project EGEE 597 (3 units) and a final oral comprehensive examination on coursework OR
3. Satisfactory completion and oral defense of a thesis EGEE 598 (6 units).

A typed draft of the thesis or project report must be submitted to the student's thesis or project committee no later than four weeks prior to the last day of the semester in which the oral defense of the thesis or project report is scheduled.

The thesis or project committee consists of a minimum of three members of the Electrical Engineering faculty. The thesis should cover original research and be prepared according to the university guidelines. Committee questions will be directed toward defense of the project report and include questions related to course work.

Guidelines for the preparation of theses and formal reports are available in the Electrical Engineering Department office and the university Graduate Studies office.

Students requesting Graduate Project (EGEE 597), Thesis (EGEE 598) or Independent Study (EGEE 599) must complete a study application form and submit it for approval to the supervising faculty member and department head prior to the semester in which the course work is to begin.

Advancement to Candidacy

Advancement to candidacy requires that the student file a graduation check prior to the beginning of the final semester (see class schedule for deadlines). Completion of requirements for the degree include a minimum GPA of 3.0 on all study plan course work, successful completion of a comprehensive examination or oral defense of a thesis or project, and recommendation by the Electrical Engineering faculty and Office of Graduate Studies.

MASTER OF SCIENCE IN ELECTRICAL ENGINEERING OPTION IN SYSTEMS ENGINEERING

Students seeking this option must meet the same requirements as the program in Electrical Engineering. In addition students selecting the systems engineering option will be required to include the following five courses in their study plans:

EGEE 580 Analysis of Random Signals (3)

EGEE 581 Theory of Linear Systems (3)

EGEE 582 Linear Estimation Theory (3)

EGEE 585 Optimization Techniques in Systems Engineering (3)

EGEE 587 Operational Analysis Techniques in Systems Engineering (3)

The remainder of the systems engineering study plan will include other engineering courses with an emphasis in a particular field such as information systems, control theory, computer systems, civil or mechanical engineering applications. Students possessing a Bachelor of Science in Engineering may elect to include up to nine units from approved subjects offered by the College of Business Administration and Economics as a part of their study plan.

ENGINEERING COURSES

Courses are designated as EGEE in the class schedule.

203 Electric Circuits (3)

Prerequisites: Physics 226; Math 250A; Prerequisite or co-requisite: EGGN 205. Units; Ohm's and Kirchhoff's laws; mesh and nodal analysis; superposition; Thevenin and Norton theorems; RL and RC transients; phasors and steady state sinusoidal analysis; response as a function of frequency; current, voltage, and power relationships; polyphase circuits. (203=CAN ENGR 12; 203+203L=CAN ENGR 6)

203L Electric Circuits Laboratory (1)

Prerequisite or co-requisite: EGEE 203. Simple resistive RL and RC circuits, electrical measurement techniques, verification of basic circuit laws through hard-wired breadboarding and CAD circuit simulation. (3 hours laboratory) (203+203L=CAN ENGR 6)

241 Low-Level Language Systems (3)

(Same as Computer Science 241)

245 Computer Logic and Architecture (3)

Prerequisite: EGGN 205 or equivalent. Logic design and organization of the major components of a computer, analysis and synthesis of combinational and sequential logics, analysis of the arithmetic, memory control and I/O units, concepts in computer control.

245L Computer Logic and Architecture Lab (2)

Prerequisite or co-requisite: EGEE 245. Digital logic circuits; decoders, counters, serial and parallel adders, control circuits (1 hour lecture, 3 hours laboratory)

303 Electronics (3)

Prerequisites: Physics 227 and EGEE 203. Co-requisite: EGEE 203L. Characteristics and elementary applications of semiconductor diodes, field-effect transistors and bipolar-junction transistors, and operational amplifiers; mid-frequency small-signal analysis and design of transistors.

303L Electronics Laboratory (1)

Prerequisites: EGEE 203L, 323 and English 101. Co-requisite: EGEE 303. Study of semiconductor diodes, transistors and elementary electronic circuits through hard-wired breadboarding, CAD electronic simulation and analysis. (3 hours laboratory)

309 Network Analysis (3)

Prerequisites: EGEE 203 and EGGN 308. Prerequisite or co-requisite: EGEE 203L. Performance of RLC circuits; complex frequency and the s-plane; frequency response and resonance; network topology; two-port network characterization; classical filter theory.

310 Electronic Circuits (3)

Prerequisites: EGEE 303 and 309. Continuation of 303, analysis and design of multistage and feedback amplifiers; frequency characteristics of amplifiers, frequency characteristics and stability of feedback amplifiers, differential amplifiers, design of IC circuit biasing, operational amplifiers and their applications.

310L Electronic Circuits Lab (2)

Prerequisite: EGEE 303L. Prerequisite or co-requisite: EGEE 310. Single, multistage and feedback amplifiers; linear and digital integrated circuits, ADC and DAC design project. (3 hours laboratory, 1 hour lecture)

311 Field Theory and Transmission Lines (3)

Prerequisites: EGEE 203, Physics 226 and Math 250B. Electrostatics and magnetostatics; boundary value problems; magnetic materials and the magnetic circuit; magnetic induction; Maxwell's equations and the formulation of circuit concepts; transmission lines.

313 Introduction to Electromechanics (3)

Prerequisites: EGEE 309 and 311. Electromagnetic fields and circuits; transformers, saturation effects. Simple electro-mechanical systems. Circuit models, terminal characteristics and applications of DC and AC machines.

313L Power Laboratory (1)

Prerequisite: EGEE 303L. Prerequisite or co-requisite: EGEE 313. Experiments in electromagnetic fields and circuits, transformers, and electromechanical systems such as AC and DC machines (3 hours laboratory)

323 Engineering Probability and Statistics (3)

Prerequisite: Math 250A. Set theory: axiomatic foundation of probability; random variables; probability distribution and density functions; joint, conditional, and marginal distributions; expected values; distribution of functions of random variables; central limit theorem; estimation.

404 Introduction to Microprocessors and Microcomputers (3)

Prerequisite: EGEE 245L. Hardware and software concepts in microprocessors, processor family chips, system architecture, CPU, input/output devices, interrupts and DMA, memory (ROM, RAM), electrical and timing characteristics, assembly language programming.

404L Microprocessor Laboratory (1)

Prerequisite: EGEE 245L. Prerequisite or co-requisite: EGEE 404. I/O interfacing with a microprocessor system; familiarization with the operating system, assembler, debugger and emulator; design of keyboard, LCO display, RS 232, D/A converter, A/D converter and floppy disk interfaces. (3 hours laboratory)

406 Design Applications with Microcontroller and FPGA (3)

Prerequisites: EGEE 245 and 245L. Digital system application design using microcontrollers, FPGAs and CPLDs including programming hardware interfacing, A/D conversion, CLB, logic arrays, interconnections, testing and simulations

407 Digital Computer Architecture and Design I (3) (Formerly 307)

Prerequisite: EGEE 245L. Organization and design of major components of a digital computer including arithmetic, memory, input, output and control units. Integration of units into a system and simulation by a computer design language.

407L Digital Computer Design Laboratory (3) (Formerly 307L)

Prerequisites: EGEE 245, 303L, and 407. Design and implementation of a small digital computer; adders, arithmetic unit, control unit, memory control unit, memory unit and program unit. May be taken in lieu of EGEE 485. (1 hour lecture, 6 hours laboratory).

409 Introduction to Linear Systems (3)

Prerequisite: EGEE 309. Development of time and frequency domain models for physical systems. The linearization process and representation with block diagrams and signal flow graphs; discrete-time systems and digital signals including use of Z-transforms; stability theory of continuous and discrete time systems.

410 Electro-Optical Systems (3)

Prerequisite: EGEE 311. Introduction to electro-optics; optical radiation characteristics and sources; geometrical and physical optics; lasers and electro-optical modulation; quantum and thermal optical radiation detectors; detector performance analysis; electro-optical systems modeling and analysis; application examples.

412 Digital Computer Architecture and Design II (3)

Prerequisite: EGEE 307. Modern architectures of computer systems, their CPU structure, memory hierarchies and I/O processors; conventional and microprogrammed control; high-speed and pipelined ALU; cache, virtual and interleaved memories, DMA, interrupts and priority.

416 Feedback Control Systems (3)

Prerequisite: EGEE 409. Feedback control system characteristics; stability in the frequency domain; analysis and design of continuous-time systems using root-locus, Bode and Nyquist plots and Nichols chart.

420 Introduction to Digital Filtering (3)

Prerequisite: EGEE 409. Discrete-time signals and systems; solution of difference equations; Fourier transform for a sequence; Z-transform; discrete Fourier transform; FIR and IIR realizations; design of digital filters.

424 Computer Simulation of Continuous Systems (3)

Prerequisites: EGGN 205 and 308. Use of the digital computer for simulation of physical systems modeled by ordinary differential equations; problem formulation, in-depth analysis of two integration methods, and the use of a general purpose system simulation program such as CSSL.

425 Introduction to Systems Engineering (3)

Prerequisites: EGEE 245, EGEE 323 or Computer Science 240 and Math 338 for Computer Science majors. Introduction to systems engineering analysis and the systems approach; introduction to modeling, optimization, design and control; systems requirements analysis; analytical and computational solution methods; information processing; integrated systems.

430 Fuzzy Logic and Control (3)

Prerequisite: EGEE 409. Fuzzy logic and systems; comparison of classical sets, relations, and operators with fuzzy sets, relations and operators; fuzzy arithmetic and transformations; classical predicate logic and reasoning versus fuzzy logic and approximate reasoning. Applications to rule-based systems and control systems.

442 Electronic Circuits (3)

Prerequisite: EGEE 310. Power amplifiers and tuned amplifiers; RF amplifiers; modulation and detection circuits; oscillators; and operational amplifier applications.

443 Electronic Communication Systems (3)

Prerequisites: EGEE 310 and 323 or equivalent. Principles of amplitude, angular and pulse modulation, representative communication systems, the effects of noise on system performance.

445 Digital Electronics (3)

Prerequisites: EGEE 245 and 303. RC circuits, attenuators, compensation and scope probe. Logic circuits: DTL, TTL, STTL, LSTTL and ECL. Fanout, noise-immunity, switching speed, power consumption, input-output characteristics. Design and analysis of MOS logic circuits; PMOS, NMOS and CMOS gates, flip-flops, shift registers and memory circuits.

448 Digital Systems Design and VHDL (3)

Prerequisites: EGEE 245 and 303. Basic concepts and characteristics of digital systems, traditional logic design, LSI/VLSI logic design, combinational and sequential logic, and their applications; timing and control, race conditions and noise, microcomputers, computer-aided programming, development systems, microcomputer system hardware design, input/output devices.

455 Solid State Electronics (3)

Prerequisites: EGEE 303 and 311. Quantum mechanical principles, atomic structure, crystal structure, crystal defect and diffusion, lattice vibration and phonons, energy band theory, charge transport phenomena, free electron theory of metal, intrinsic and extrinsic semiconductors, p-n junction theory, transistor theory.

460 Introduction to Cellular Mobile Communications Systems (3)

Prerequisite: EGEE 443. Introduction to wireless mobile telecommunications, description and analysis of cellular radio systems, co-channel interference reduction, channel capacity and digital cellular systems.

465 Introduction to VLSI Design (3)

Prerequisites: EGEE 245 and 303. Computer-aided design of VLSI circuits. MOS device structure, design rules, layout examples, CMOS standard cells. Speed power trade off, scaling, device and circuit simulation. VLSI design software tools. Routing method system design, Design Project. Chip fabrication through MOSIS service, testing.

480 Engineering Optics (3)

Prerequisite: EGEE 311 or Physics 227. Engineering aspects of the optics of planar interfaces; geometrical optics of devices; interference of beams at parallel interfaces; linear system transforms; diffraction, polarization, coherence; practical optical elements; laboratory demonstrations and significant coverage of engineering applications.

483 Introduction to Global Positioning Systems (GPS) (3)

Prerequisites: EGEE 232, 308, 409. Description of Global Positioning Systems (GPS) and Differential Global Positioning Systems (DGPS), GPS navigation, errors. Satellite signals and co-ordinate transform math. Modeling for position and velocity. Application to navigation.

483L Global Positioning System Lab (2)

Prerequisite: EGEE 483. Use and description of Novatel, Magelonn, Ahstek, Collins and Tribel receivers. Computation of GPS and GEO stationary satellite positions from ephemeris data available on almanac. Errors such as selective availability, ionospheric, tropospheric, satellite ad receiver will be calculated and compensated in the data. (1 hour lecture, 3 hours laboratory)

485 Electrical Engineering Design Projects Laboratory (3)
(Formerly 385)

Prerequisite: EGEE 310L. Learn the practical aspects of design and project construction. Select an instructor approved design project in electrical engineering. Use CAD program for schematic capture and simulation. Construct the final hardware according to the design specification. Complete a performance evaluation and demonstrate the final product. (1 hour lecture, 6 hours laboratory).

490 Seminar in Electrical Engineering (1) (Formerly 370)

Prerequisite: Senior standing in engineering. The engineering profession, professional ethics, and related topics.

497 Senior Project (1-3)

Prerequisite: Consent of adviser and instructor. Directed independent design project.

499 Independent Study (1-3)

Prerequisite: approval of study plan by adviser. Specialized topics in engineering selected in consultation with and completed under the supervision of the instructor. May be repeated for credit.

503 Information Theory and Coding (3)

Prerequisite: EGEE 323. Information measures, probabilistic studies of the transmission and encoding of information, Shannon's fundamental theorems, coding for noisy channels.

504A Linear Network Synthesis (3)

Prerequisite: EGEE 310. Synthesis of passive element driving-point and transfer-functions with emphasis on RC networks. Basic operational amplifier RC circuits and their performance limitations, introduction to second-order RC active filters. Parameter sensitivity analysis.

507 Detection Theory (3)

Prerequisite: EGEE 580. Formulation of decision rules for the detection of signals in a noisy environment, optimum receivers. Estimation of parameters of detected signals. Estimation theory.

510 Optics & Electromagnetics in Communications (3)

Prerequisite: EGEE 480. Plane-wave propagation and reflection from multiple layers; two- and three-dimensional boundary value problems; waveguides and resonant cavities; radiation from apertures and antennas; electromagnetic properties of materials, gases, and plasmas; significant coverage of engineering applications.

518 Digital Signal Processing I (3)

Prerequisite: EGEE 420. Discrete Fourier transform; fast Fourier transform; Chirp Z-transform; discrete time random signals; floating-point arithmetic; quantization; finite word length effect in digital filters; spectral analysis and power spectrum estimation.

519A Hypercube Multiprocessing and Applications (3)

Prerequisite: EGEE 412. The system architecture and application of hypercubes; the node processor, floating point accelerator, communication circuits, synchronization, routing and message-passing algorithms, process decomposition and load balancing, a hands-on parallel programming experience on Hypercube Parallel Processing System.

519B Multiprocessing and Computer Networks (3)

Prerequisite: EGEE 519A. Advanced topics in computer architecture design to increase computing through-put and efficiency through multiprocessing, distributed processing, array and pipeline processors, and computer networks.

522 Spread Spectrum Communications (3)

Prerequisites: EGEE 443 and 580. Introduction to Spread Spectrum (SS) Systems. Performance analysis of coherent digital signaling schemes. Synchronization. Direct sequence, frequency hopping, time hopping, and Hybrid Spread Spectrum Modulations. Binary shift register sequences. Code tracking loops. Performance of SS systems in a jamming environment, with forward error correction.

523A VLSI Technology and Integrated Circuits (3)

Prerequisite: EGEE 465 or equivalent. Solid-state physics of silicon crystal, oxide and interface physics. Wafer fabrication technologies: oxidation, diffusion, ion implantation, epitaxy, thin film process, photolithography, layout design principles for integrated circuits. Bipolar technology and design rules.

523B Very Large-Scale Integrated Circuits (3)

Prerequisites: EGEE 465 or equivalent and EGEE 445. Design and analysis of VLSI circuits. MOS device physics. Short channel effect, LDD device. PMOS, NMOS, and CMOS circuits. Fabrication process and design rules. Latch-up problem. CMOS static and dynamic circuit. CAD design.

526 Digital Control Systems (3)

Prerequisite: EGEE 416. Analysis, design and implementation of digital control systems; Z-transform methods; frequency domain and state-space approach for discrete-time systems.

527 Fault Diagnosis and Fault-Tolerant Design (3)

Prerequisite: EGEE 307. Fault diagnosis and fault-tolerant design of digital systems; fault diagnosis test for combinational and sequential circuits, reliability calculations, multiple hardware redundancy, error detection and correcting codes, software redundancy and fault-tolerant computing.

529 Principles of Neural Systems (3)

Prerequisites: EGEE 310 and 409. Principles of neural systems and their hardware implementation. Basic properties, discrete and continuous bidirectional associative memories. Temporal associative memories. Neural nets classifiers, perceptrons, supervised and unsupervised learning. Forward and backward propagation. Electrical models of neural networks using op-amp., analog VLSI.

531 Phase-Locked and Frequency Feedback Systems (3)

Prerequisite: EGEE 580 or consent of instructor. Theory of noise and linear systems, FM feedback principles. Theory and design of phase-locked loops and their applications in communication and control.

537 Satellite Communications (3)

Prerequisite: EGEE 443. Satellite systems, link analysis, propagation effects, SNR/CNR calculations, modulation schemes, TDMA, FDMA, CDMA techniques.

557 Microprogramming and Emulation (3)

Prerequisite: EGEE 407. An introduction to microprogramming concepts and applications to the control unit of a computer, digital control systems, interpretations, translation and emulations. (Same as Computer Science 557)

558A Microprocessors and System Applications I (3)

Prerequisites: EGEE 404 and 404L. Microprocessors and micro-computers, their related software systems, system design with microprocessors, applications in peripheral controllers, communication devices and multiprocessing systems.

558B Microprocessors and Systems Applications II (3)

Prerequisite: EGEE 558A. Advanced microprocessor architecture and their applications to microcomputer networking; RISC VS CISC architectures, communication protocol, distributed-operating system, and local area networks.

559 Introduction to Robotics (3)

Prerequisite: EGEE 416 or consent of instructor. The science of robotics from an electrical engineering standpoint, including modeling, task planning, control, sensing and robot intelligence.

580 Analysis of Random Signals (3)

Prerequisites: EGEE 323 and 409 or equivalent. Random processes pertinent to communications, controls and other physical applications, Markov sequences and processes, the orthogonality principle.

581 Theory of Linear Systems (3)

Prerequisites: EGEE 416 and EGGN 403. State space analysis, linear spaces, stability of systems; numerical methods of linear systems analysis and design.

582 Linear Estimation Theory (3)

Prerequisites: EGEE 580 and 581. Mathematical models of continuous-time and discrete-time stochastic processes; the Kalman filter, smoothing and suboptimal filtering computational studies.

585 Optimization Techniques in Systems Engineering (3)

Prerequisite: EGGN 403 or Math 340 for Computer Science majors. Calculus of variations, optimization of functions of several variables, Lagrange multipliers, gradient techniques, linear programming, and the simplex method, nonlinear and dynamic programming.

587 Operational Analysis Techniques in Systems Engineering (3)

Prerequisite: EGEE 323 or Math 338 for Computer Science majors. Operational research models; applications of probability theory to reliability, quality control, waiting line theory, Markov chains; Monte Carlo methods.

597 Project (1-3)

Prerequisite: consent of adviser. Classified graduate students only.

598 Thesis (1-6)

Prerequisite: consent of adviser. Classified graduate students only.

599 Independent Graduate Research (1-3)

Prerequisite: consent of adviser. May be repeated for credit.



DEPARTMENT HEAD

Hossein Moini

DEPARTMENT OFFICE

Engineering 100

PROGRAMS OFFERED

Bachelor of Science in Mechanical Engineering

Manufacturing Engineering Emphasis

Master of Science in Mechanical Engineering

DEPARTMENT WEBSITE

<http://www.fullerton.edu/ecs>

FACULTY

Andy Bazar, Jesa Kreiner, Sundaram Krishnamurthy, Timothy Lancey, Hossein Moini, Peter Othmer, James Rizza, Hasan Sehitoglu

ADVISER

Undergraduate/Graduate Program
Adviser: Hossein Moini

INTRODUCTION

The mechanical engineering program at CSUF provides a foundation for professional engineering careers in private industry and government. Mechanical engineers are employed in a wide range of industries such as manufacturing, transportation, energy, food, and biomedical application. In general, mechanical engineers are involved with the design, research, development, manufacture, testing, distribution, support, maintenance, and recycling of devices and products. Automobiles, airplanes, home appliances (refrigerators, washing machines, dryers, vacuum cleaners, etc.), robots, printers, and computer hard disk drives are some of the various products that have been customarily designed and developed by mechanical engineers. Mechanical engineers possess a firm understanding of science, mathematics and engineering needed to carry out these complex tasks which are so important to a modern technological society.

The graduate curriculum is designed to provide a specialized education for career advancement or further work towards a doctoral degree program.

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

See "Division of Engineering" for requirements in mathematics and science foundation courses (30 units), engineering core courses (24 units) and general education coursework.

Upper-Division Writing Requirement

In addition to a passing score on the Examination in Writing Proficiency (EWP), the following courses are required by all mechanical engineering majors: EGME 306A, 306B, 376A and 376B. Written work for these courses must meet professional standards and requires completion with a grade of "C" or better.

Required Courses in Mechanical Engineering (39 units)

- EGEE 303 Electronics (3)
- EGEE 303L Electronics Laboratory (1)
- EGME 306B Fluids and Thermal Laboratory (1)
- EGME 322L Introduction to Computer-Aided Design (3)
- EGME 331 Mechanical Behavior of Materials (3)
- EGME 333 Fluid Mechanics & Aerodynamics (3)
- EGME 335 Introduction to Mechanical Design (3)
- EGME 376A Dynamic Systems and Controls Lab (2)
- EGME 376B Energy and Power Lab (2)
- EGME 407 Heat Transfer (3)
- EGME 414 Design Project I (3)
- EGME 419 Design Project II (2)
- EGME 421 Mechanical Design (3)
- EGME 426 Design of Thermal and Fluid Systems (3)
- EGME 431 Mechanical Vibrations (3)
- EGME 490 Seminar in Engineering (1)

Technical Electives in Mechanical Engineering (11 units)

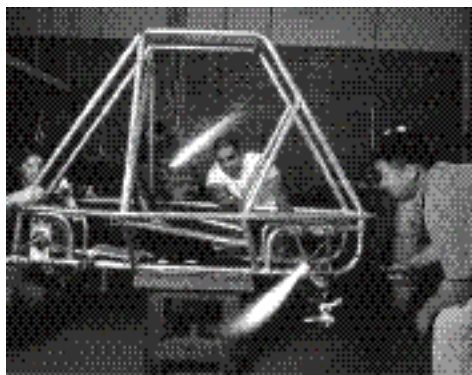
Before enrolling in any elective course, approval of the adviser must be obtained.

Power and Energy

- EGGN 403 Computer Methods in Numerical Analysis (3)
- EGME 417 Computational Heat Transfer (3)
- EGME 424 Data Acquisition and Instrumentation Using LabVIEW (3)
- EGME 447 Piping Selection and Piping Network Design (3)
- EGME 451 Heating, Ventilating and Air Conditioning Systems (3)
- EGME 452 Fluid Machinery (3)
- EGME 454 Optimization of Engineering Design (3)

Design and Materials for Manufacturing

- EGME 301L Advanced Auto CAD for Design Documentation (2)
- EGGN 403 Computer Methods in Numerical Analysis (3)
- EGME 410 Introduction to the Finite Element Method and Applications (3)
- EGME 411 Mechanical Control Systems (3)
- EGME 438 Analytical Methods in Engineering (3)
- EGME 454 Optimization of Engineering Design (3)
- EGME 456 Introduction to Mechatronics for Engineers (3)
- EGME 459 Plastics and Other Non-Metallics (3)



- EGME 460 Failure of Engineering Materials (3)
- EGME 461 Fabrication Methods (3)
- EGME 462 Composite Materials (3)
- EGME 463 Introduction to Robotics (3)

- EGME 475 Acoustics and Noise Control (3)
- EGME 480 Human Factors in Engineering (3)
- EGME 483 Computer-Aided Manufacturing (3)
- EGME 486 Introduction to Electronics Packaging (3)
- EGME 487 Thermal Control of Electronic Packaging (3)

Thermal and Fluids Engineering

- EGME 410 Introduction to the Finite Element Method and Applications (3)
- EGME 417 Computational Heat Transfer (3)
- EGME 424 Data Acquisition and Instrumentation Using LabVIEW (3)

- EGME 447 Piping Selection and Piping Network Design (3)
- EGME 451 Heating, Ventilating and Air Conditioning Systems (3)
- EGME 452 Fluid Machinery (3)
- EGME 454 Optimization of Engineering Design (3)
- EGME 486 Introduction to Electronics Packaging (3)
- EGME 487 Thermal Control of Electronic Packaging (3)

Robotics, Controls, and Automated Manufacturing

- EGGN 403 Computer Methods in Numerical Analysis (3)
- EGME 410 Introduction to the Finite Element Method and Applications (3)
- EGME 411 Mechanical Control Systems (3)
- EGME 424 Data Acquisition and Instrumentation Using LabVIEW (3)
- EGME 454 Optimization of Engineering Design (3)
- EGME 456 Introduction to Mechatronics for Engineers (3)
- EGME 457L Intelligent Systems Lab (2)
- EGME 461 Fabrication Methods (3)
- EGME 463 Introduction to Robotics (3)
- EGME 483 Computer-Aided Manufacturing (3)
- EGME 486 Introduction to Electronics Packaging (3)

MANUFACTURING ENGINEERING EMPHASIS

See "Division of Engineering" section of this catalog for requirements in mathematics and science foundation courses (30 units), engineering core courses (24 units) and general education course work.

Required Courses (43 units)

- EGEE 303 Electronic Instrumentation (3)
- EGEE 303L Electronic Instrumentation Lab (1)
- EGME 306B Fluids and Thermal Laboratory (1)
- EGME 322L Introduction to Computer-Aided Design (3)
- EGME 331 Mechanical Behavior of Materials (3)
- EGME 333 Fluid Mechanics and Aerodynamics (3)
- EGME 335 Introduction to Mechanical Design (3)
- EGME 376A Dynamic Systems and Controls Lab (2)
- EGME 407 Heat Transfer (3)
- EGME 414 Design Project I (3)
- EGME 419 Design Project II (2)
- EGME 421 Mechanical Design (3)
- EGME 426 Design of Thermal and Fluid Systems (3)
- EGME 461 Fabrication Methods (3)
- EGME 463 Introduction to Robotics (3)
- EGME 483 Computer-Aided Manufacturing (3)
- EGME 490 Seminar in Engineering (1)

Technical Electives (9 units)

Approval of the adviser must be obtained before enrolling in any elective course.

- EGME 410 Introduction to the Finite Element Method and Applications (3)
- EGME 411 Mechanical Control Systems (3)
- EGME 454 Optimization of Engineering Design (3)
- EGME 459 Plastics and Other Non-Metallics (3)
- EGME 460 Failure of Engineering Materials (3)
- EGME 462 Composite Materials (3)
- EGME 480 Human Factors in Engineering (3)
- EGCE 408 Reinforced Concrete Design (3)
- EGEE 323 Engineering Probability and Statistics (3)
- EGEE 404 Introduction to Microprocessors and Microcomputers (3)
- EGEE 404L Microprocessor Lab (1)
- EGEE 445 Digital Electronics (3)
- EGEE 465 Introduction to VLSI Design (3)

MASTER OF SCIENCE IN MECHANICAL ENGINEERING

To qualify for admission to a conditionally classified standing, applicants must meet the following university and departmental requirements:

1. Bachelor's degree from a regionally accredited institution, e.g., Western Association of Schools and Colleges (WASC).
2. Bachelor's degree in mechanical engineering from an institution accredited by the Accreditation Board for Engineering and Technology (ABET).
3. Minimum GPA of 2.5 in the last 60 semester units.
4. Good standing at the last institution attended.

Students not meeting the above requirements may be admitted at the discretion of the department head and will be required to take an additional six or more units of adviser-approved prerequisite coursework. The student must demonstrate potential for graduate study by earning a grade point average of 3.0 or higher in these courses.

Any student entering the Master of Science degree program without a B.S. in Mechanical Engineering will also be required to complete one or more courses in the areas where the student is deemed to be deficient, prior to beginning course work for the Master's degree.

Application Deadlines

Applications need to be postmarked no later than March 1st for the fall semester and October 1st for the spring semester. However, deadlines may be changed based upon enrollment projections. Check the university graduate studies website for current information at <http://www.fullerton.edu/graduate>.

Classified Standing

Students meeting the following additional requirements will be advanced to classified standing and are eligible to take graduate courses for which they are qualified.

1. Completion of all deficiency work specified by the graduate adviser with a grade of B or better.

2. Development of an approved study plan. Before completing nine units at CSUF toward the M.S. degree, the student must meet with an adviser for preparation of a study plan which must be approved by the department head and Office of Graduate Studies.
3. Fulfillment of the university writing requirement prior to completing nine units at CSUF toward the M.S. degree. Students must demonstrate writing ability commensurate with the baccalaureate degree. Please refer to the "Graduate Regulations" section of this catalog for further information on how this requirement can be met.

Study Plan

The study plan consists of a minimum of 30 units of adviser-approved upper-division or graduate-level course work which must be completed with an overall grade-point average of at least 3.0. At least half the units required for the degree must be in approved graduate (500-level) courses.

Required Courses (6 units)

- EGGN 403 Computer Methods in Numerical Analysis (3)
- Additional adviser-approved math-oriented course (3)

Concentration Courses (15 units)

A student is required to select a minimum of 15 units in mechanical engineering.

These units may be 400-level and 500-level courses and are selected according to the student's area of interest. Course work is designed to meet the student's professional career goals and may focus on the following areas: Power and Energy, Design and Materials for Manufacturing, Thermal and Fluids Engineering, Robotics, Controls, and Automated Manufacturing.

Other Courses (9 units)

Elective units should be taken in mechanical engineering or a related engineering field and are subject to adviser approval.

Exam/Thesis/Project Option (3-6 units)

Subject to approval by the adviser, students may select one of the following three options for final review by a department committee:

1. Oral comprehensive examination
2. EGME 597 Project (3-6 units)
3. EGME 598 Thesis (3-6 units)

Students enrolling in less than six units of Thesis/Project will be required to take an oral comprehensive exam. Students enrolling in six units of thesis or project may defend their thesis or project instead of taking an oral comprehensive exam.

MECHANICAL ENGINEERING COURSES

Courses are designated as EGME in the class schedule.

102 Graphical Communications (3)

Graphics as a fundamental means of communication in design. Development of spatial visualization. Freehand sketching and use of instruments, orthographic projection, pictorials. Dimensioning, tolerances, descriptive geometry, CAD principles and applications, AutoCAD, design procedure, cost analysis and freshman design project. (1 hour lecture, 6 hours laboratory) (CAN ENGR 2)

214 Basic Machine Shop Practice and Safety (2)

Prerequisites: Mathematics 115, 125 or equivalents. Introduction to machine shop practices and drill press, grinding wheel, lathe, vertical mill and band saw. Thorough safety procedures instruction on each machine. Student demonstrates safe practices on each machine. Introduction to measurement and tolerancing. Discussion and laboratory practice. (1 hour lecture, 3 hours laboratory.) Does not count toward fulfilling degree requirements. Credit/No Credit only.

286 Technology-Based Graphical Communication (3)

Prerequisite: Mathematics 130 or Mathematics 150A. Introduction to the techniques used in three-dimensional graphics, design and visualization to conceptualize, apply, analyze, synthesize, evaluate and communicate information concepts using available technology. No credit for Engineering/Computer Science majors. (2 hours lecture, 2 hours laboratory)

304 Thermodynamics (3)

Prerequisites: Chem 120A, Math 150B and Physics 225; Co-requisite: EGGN 205 or consent of instructor. Energy and its transformation; heat and work; conservation of mass and energy, system properties, irreversibility and availability. Ideal gases, heat engines and refrigeration (both ideal and actual), equipment selection and sizing.

306A Unified Laboratory (1)

Prerequisites: Physics 225 and EGME 102. Co-requisite: EGGN 205. Observations and measurements as an introduction to the experimental method. Static and dynamic measurements on engineering systems (beams, columns, pendulums, gyroscopes) using mechanical and electrical transducers. Principles of probability and statistics and their applications to experimental measurements. Report writing. (3 hours laboratory)

306B Fluids and Thermal Laboratory (1)

Prerequisites: EGME 306A and 333. Co-requisite: EGME 407. Continuation of EGME 306A. Flow measurement techniques using orifice plates, venturimeters. Pitot probes and nozzles. Temperature and pressure measurement. Experimental studies of fluid friction and heat exchanger performance. Use of microcomputers in data acquisition, reduction and analysis. Technical report writing. (3 hours laboratory)

322L Introduction to Computer-Aided Design (3)

Prerequisite: EGME 331, EGCE 302, or consent of instructor. Introduction to modeling, assembly, design documentation and analysis using typical commercial CAD/CAE software such as Mechanical Desktop, Pro/ENGINEER and ANSYS. Use of online resources in the collaborative design process. Design file transfer protocols. Design project using a technology based team environment. CAD/CAE system selection criteria. (1 hour discussion, 6 hours laboratory). (Same as Computer Science 322L)

331 Mechanical Behavior of Materials (3)

Prerequisites: Chem 120A, Math 250A, EGCE 201; Co-requisite: EGME 306A. Engineering properties of materials. Toughness and fatigue. Creep phenomena. Corrosion. Energy concepts. Beams and columns. Torsion. Combined stresses. Pressure vessels. Failure theories. Design of machine elements.

333 Fluid Mechanics and Aerodynamics (3)

Prerequisite: EGCE 201. Co-requisites: EGGN 205 and EGME 304. Principles of fluid mechanics and their applications; fluid properties; fluid statics; one-dimensional incompressible flow; concepts of multi-dimensional flows including conservation principles; similitude and dimensional analysis; internal and external viscous flow; elements of compressible flow; design considerations in fluid mechanics.

335 Introduction to Mechanical Design (3)

Prerequisites: EGGN 205, EGCE 302 and EGME 102. Kinematics and dynamics of mechanisms; design and analysis of linkages, gears, and cams through the use of analytical, graphical and computer-aided techniques.

376A Dynamic Systems and Controls Laboratory (2)

Prerequisites: EGGN 308, EGCE 302, and EGME 306A. Co-requisite: EGEE 303. Dynamic systems, vibration, acoustics and other mechanical components; computer simulation of dynamic systems; robotics, computer controlled machining and automatic data acquisition. (6 hours laboratory)

376B Energy and Power Laboratory (2)

Prerequisites: EGME 304 and 306B. Mass transfer, heat transfer, and thermodynamic phenomena and their interaction with mechanical systems. Team projects, engineering reports. (6 hours laboratory)

407 Heat Transfer (3)

Prerequisites: Mathematics 250B and EGME 333. Principles of heat transfer and their applications: introduction to conductive, convective and radiation heat transfer; one-dimensional heat conduction; concepts of multi-dimensional conduction; convective heat transfer in conduits and external surfaces; heat exchangers and thermal system design.

410 Introduction to the Finite Element Method and Applications (3)

Prerequisite: approved study plan. Basic concepts of integral and matrix formulation of boundary value problems. One dimensional finite element formulation of heat transfer, truss beam and vibration problems. Applications of commercial finite element programs. Selection criteria for code, element and hardware. CAD system interfaces.

411 Mechanical Control Systems (3)

Prerequisites: EGGN 205 and 308, and EGCE 302. Mechanical control system design and analysis. Pneumatic, hydraulic, electro-mechanical actuators and devices. Stability criteria, root locus plots, transfer functions, introduction to feedback control and micro-processor applications.

414 Design Project I (3)

Prerequisites: EGME 322L and 421. Co-requisite: EGME 426. Design methodology, CAD/CAE philosophy, optimization, product liability, probability/statistical principles, ASME codes, safety, human factors, material selection, legal aspects of design, professional ethics. Design project to be completed in EGME 419, feasibility study, preliminary design, assembly drawings, interim project report. Oral presentation. (1 hour lecture and 6 hours laboratory)

417 Computational Heat Transfer (3)

Prerequisites: EGGN 205 and 308, and EGME 407. Computer visualization of 2-D/3-D temperature fields. Steady and unsteady conduction heat transfer. Incompressible free and forced convective boundary layer flows. Multiple surface radiation analysis. Boiling and condensation. Emphasis on design aspects of computational heat transfer and use of CFD codes.

418 Space and Rocket Engineering (3)

Prerequisites: EGCE 201, EGME 304, 331, and 333. Principles of rocket propulsion systems. Single and multi-stage rockets. Theory and application of orbital mechanics. Space flight maneuvers. Boosting a satellite into orbit. Spacecraft guidance and control. Trajectories to Moon and Mars.

419 Design Project II (2)

Prerequisite: EGME 414. Completion of the design project initiated in EGME 414. Construction of prototype, model or components. Testing of the proposed design, and preparation of a final design report. Teamwork and communications skills are emphasized. Oral presentation is required. (6 hours laboratory)

421 Mechanical Design (3)

Prerequisites: EGCE 301 or EGME 331, and 335. Design and application of machine components such as brakes, clutches, gears, springs, fasteners, lubrication of machine elements, bearings, gaskets, seals, "O" rings, methods for study of impact, dynamic loading and fatigue; comprehensive treatment of failure, safety and reliability.

422 Mechanical Design Using Pro/ENGINEER (3)

Prerequisite: EGME 322L or equivalent. Modeling, assembly and design documentation using Pro/ENGINEER. Design of mechanical components and assemblies using Advanced Pro/ENGINEER features such as blends, drafts, user defined features, relations, family tables and assembly management. Collaborative design project, utilizing online resources. May be repeated for one credit.

424 Data Acquisition and Instrumentation Using LabVIEW (3)

Prerequisite: EGME 306A or equivalent. Graphical programming; design and development of virtual instruments using LabVIEW programming environment; building applications for data acquisition, measurement, testing, and control of engineering systems; collaborative term project. (2 hours discussion, 3 hours laboratory)

426 Design of Thermal and Fluid Systems (3)

Prerequisite: EGME 407. Integration of fundamental principles of thermodynamics, fluid mechanics, heat transfer and related subjects in the design of thermal and fluid systems. The design process is applied to pumps, fans, turbines, boilers, and heat exchangers using economics and optimization with case studies.

431 Mechanical Vibrations (3)

Prerequisites: EGGN 205 and 308, and EGCE 302. Modeling and analysis of single and multiple degrees of freedom systems. Response to forcing functions. Vibrations of machine elements. Design of vibration isolation systems. Balancing of rotating machinery. Random excitation and response of mechanical structures.

438 Analytical Methods in Engineering (3)

Prerequisite: EGGN 308. Ordinary and partial differential equations with constant and variable coefficients; orthogonal functions; conformal mapping; potential theory; engineering applications.

447 Piping Selection and Piping Network Design (3)

Prerequisites: EGME 333 and EGCE 301 or EGME 331. Pressure losses in piping networks; selection of piping based upon fluid, temperature, pressure and economic considerations; piping connections, fittings and components; stress analysis; review of national piping codes.

451 Heating, Ventilating and Air Conditioning Systems (3)

Prerequisites: EGME 304 and 407. The fundamentals of controlling heating, ventilating, and air conditioning systems. Theory and analysis of fundamental thermodynamics relating to these systems. Laboratory demonstrations of actual systems.

452 Fluid Machinery (3)

Prerequisites: EGME 304 and 333. Thermal and hydraulic design and analysis of pumps, fans, turbines and compressors. Component selection, system design and performance evaluations.

454 Optimization of Engineering Design (3)

Prerequisite: EGGN 308. Application of analytical and computer optimization techniques to engineering design problems. Presentation of design as an optimization task. One dimensional minimization. Unconstrained and constrained nonlinear programming. Approximation concepts. Duality. Computer applications to design problems using a general purpose optimization program.

456 Introduction to Mechatronics for Engineers (3)

Prerequisites: EGGN 308, EGEE 303L, and EGME 306A. Introduction to mechatronics. Design issues. Sensors, actuators, programmable controllers. Hardware components for control systems. System performance. Data acquisition and control. Mechatronic control in automated manufacturing. Advanced applications and case studies. Design project.

457L Intelligent Systems Laboratory (2)

Prerequisite: EGEE 303L. Design and assembly of microprocessor-based mechanisms. Lab experiments encompass machine/high level programming, and interfacing of microcontrollers with sensors and actuators. Design project. (1 hour lecture, 3 hours laboratory)

459 Plastics and Other Non-Metallics (3)

Prerequisite: EGME 331. Simplified chemistry of plastics. Applications. Manufacturing processes. Methods for preventing deterioration of non-metallic materials. Composites. Ceramics. Refractories. Wood. Destructive and nondestructive testing of nonmetallic materials.

460 Failure of Engineering Materials (3)

Prerequisite: EGME 331. Imperfections in solids; fracture initiation and crack propagation; dislocations; yield point phenomenon; fatigue; creep; ultrasonic effects; radiation damage; stress corrosion; hydrogen embrittlement; composite materials.

461 Fabrication Methods (3)

Prerequisite: EGME 331. Manufacturing processes. Metal joining processes. Casting, forging, powder metallurgy, machining and machining tools, finishing, coating, plating, non-metallic materials inspection and gaging, and tolerances.

462 Composite Materials (3)

Prerequisites: EGCE 301 or EGME 331. Application, mechanical properties and fabrication studies of fiber reinforced composite materials, stress analysis of laminated anisotropic composite structures. Studies of special problems unique to composites.

463 Introduction to Robotics (3)

Prerequisites: EGME 335. Co-requisite: EGME 376A. Kinematic, dynamic, control and programming fundamentals associated with industrial robots and programmable manipulators. Trajectory planning, application of robotics in manufacturing and integration of robots into flexible manufacturing systems.

475 Acoustics and Noise Control (3)

Prerequisite: Physics 227. Basic phenomena on the propagation, absorption and generation of acoustic waves, specification and measurement of noise, effects of noise on speech and behavior, legal aspects of industrial and building noise, principles and application of noise control.

480 Human Factors in Engineering (3)

Prerequisite: Approved study plan. Principles of design for making products and systems faster, easier, and more effective to use. Design project using these principles that consider human capabilities and limitation of senses and responses to sensory stimuli. Physiological, psychological and work factors are evaluated for design of equipment, work methods, environments and standards.

483 Computer-Aided Manufacturing (3)

Prerequisite: EGME 376A or equivalent. Introduction to computer-aided manufacturing processes. CNC machines, robot and PLC programming. Design for CIM. Fixed and flexible manufacturing systems. Process planning and scheduling. Simulation software for manufacturing systems. Laboratory experiments. (1 hour discussion, 4 hours laboratory)

486 Introduction to Electronics Packaging (3)

Prerequisites: EGEE 303 and EGME 306A. Electronic components and devices. The chip carrier, packaging and production of printed circuit boards. First, second and third level packaging. Introduction to thermal analysis and vibration of electronic equipment.

487 Thermal Control of Electronic Packaging (3)

Prerequisites: EGGN 308, EGME 304 and 486 or equivalent. Fluid mechanics and heat transfer as related to the thermal control of electronic packages of varying sizes. Analysis of individual components, complete, boards, and complete systems is considered. Both liquid and gas cooling mediums are covered.

490 Seminar in Engineering (1) (Formerly 370)

Prerequisite: senior standing in engineering. The engineering profession, professional ethics, and related topics. May be repeated once for credit with the approval of the department.

497 Senior Project (1-3)

Prerequisite: Consent of instructor, adviser and department head. Directed independent design project.

499 Independent Study (1-3)

Prerequisite: Approval of study plan by adviser and department head. Specialized topics in engineering, selected in consultation with and completed under the supervision of the instructor. May be repeated for credit.

508 Advanced Inviscid Fluid Flow (3)

Prerequisites: EGGN 205 and 308, and EGME 333. Study of two- and three-dimensional potential flow theory. Sources, sinks, vortices, Rankine bodies, free jets, channel flow, air foils. Introduction to computational fluid dynamics. Complex potential and various transformation techniques are used.

511 Advanced Mechanical Vibrations (3)

Prerequisite: EGME 431. Vibrations in rotating and reciprocating machines; noise and vibration in fluid machinery; continuous systems; random vibrations; transient and nonlinear vibration, computer applications.

512 Advanced Mechanical Design and Management (3)

Prerequisite: EGME 421 or equivalent. Advanced modern mechanisms. Analysis and synthesis of mechanisms. Advanced topics in computer-aided design of mechanical, thermal and fluid systems. Methodology of modern design. Optimization in design.

516 Advanced Radiation Heat Transfer (3)

Prerequisite: EGME 407. Radiation heat transfer including the study of the geometric factor, black and real systems, and energy transfer in absorbing, scattering and emitting media, and radiation combined with other modes of energy transfer.

520 Advanced Viscous Fluid Flow (3)

Prerequisite: EGME 333. The fundamental equations of viscous fluid flow. Viscous drag estimation. Drag reduction methods. Introduction to instability and transition.

524 Advanced Thermodynamics (3)

Prerequisite: EGME 304. Equilibrium and stability criteria, third law of thermodynamics, multiple component systems, ionization, equilibrium reaction, lower core "ideal" gases, thermodynamic cycles.

526 Advanced Convective Heat Transfer (3)

Prerequisite: EGME 407. Convective heat transfer; heat transfer in external and internal flow fields for both laminar and turbulent fluid flow, applications.

530 Advanced Strength of Materials (3)

Prerequisite: EGME 421. Energy methods. Castigliano's theorem. Curved beams, beams on elastic supports, thickwall cylinders, shrink fits, localized stress, column instability, failure theories, bearings.

536 Advanced Conduction Heat Transfer (3)

Prerequisite: EGME 407. Conduction heat transfer; Bessel and Legendre functions, Fourier series solutions, heat sources and sinks, multidimensional problems, transient systems and numerical methods (finite difference and finite element methods).

538 Advanced Engineering Analysis (3)

Prerequisites: EGGN 403 and EGME 438. Partial differential equations in engineering, numerical techniques, integral equations, engineering applications.

540 Computer Applications In Engineering Design (3)

Prerequisite: EGGN 403. Computers and microprocessors in engineering design. Design methodology, modeling and simulation. Geometric modeling. Design optimization. Expert systems in engineering design. Generalized programs and simulation languages are emphasized.

541 Finite Element Method for Mechanical Engineers (3)

Prerequisites: EGGN 403 and EGME 410. Matrix formulation of basic equations in steady state and transient heat conduction. Elements and interpolation functions. Non-linear problem formulation. Finite element computer programs in heat transfer, fluid dynamics and design.

554 Applied Optimal Mechanical Design (3)

Prerequisite: EGME 454 or equivalent. Formulation of design optimization problems in mechanical engineering. Review of mathematical programming methods. Practical aspects of optimization. Design of complex mechanical systems. Individual projects will be assigned to apply optimization techniques to an engineering system or component.

576 Advanced Dynamics & Control of Mechanical Systems (3)

Prerequisite: EGME 411. Advanced study of the dynamics and control of mechanical systems including: state space modeling, Lyapunov stability, modern design techniques and case studies.

597 Project (1-6)

Prerequisite: Consent of Graduate Program Adviser.

598 Thesis (1-6)

Prerequisite: Consent of Graduate Program Adviser.

599 Independent Graduate Research (1-3)

Prerequisite: Classified graduate status. Open to graduate students only by consent of Mechanical Engineering Graduate Program Adviser. May be repeated for credit only upon approval by the Graduate Program Adviser.



DEPARTMENT CHAIR

Joseph Sawicki

VICE CHAIR

Joanne Gass

DEPARTMENT OFFICE

University Hall 323

DEPARTMENT WEBSITE

<http://hss.fullerton.edu/english/index.htm>

PROGRAMS OFFERED

Bachelor of Arts in Comparative
Literature

Master of Arts in Comparative Literature

Bachelor of Arts in English

Minor in English

Master of Arts in English

Minor in Linguistics

Bachelor of Arts in Linguistics

Master of Arts in Linguistics

FACULTY

Marlin Blaine, Cornel Bonca, Ellen
Coldwell, Mary Kay Crouch, Angela Della
Volpe, Sheryl Fontaine, Joanne Gass, Jane
Hipolito, Susan Jacobsen, Joanne Jasin, Helen
Jaskoski, Alan Kaye, Thomas Klammer,
Deborah Lawrence, Mohsen Mirshafiei, Helen
Mugambi, Franz Müller-Gotama, Keith
Neilson, Irena Praitis, Sally Romotsky, Chris
Ruiz-Velasco, Joseph Sawicki, Amy-Scott-
Douglass, Yichin Shen, Kay Stanton, Atara
Stein, John White, Heping Zhao

INTRODUCTION

The discipline of English includes the study of British and American literature, the various kinds of writing, and the history, structure and dialects of the English language.

The major in English is a flexible program emphasizing skill(s) in writing, familiarity with and appreciation of the literatures of England and America, and knowledge of the nature and development of the English language.

Comparative literature is the study of world literature without specific regard for national or linguistic boundaries. It is comparative in that it deals with the relationships among different literatures. The comparatist studies not only the international literary masterpieces and historical periods of world literature, but also examines critical theories from a cross-cultural perspective. The major in comparative literature promotes the understanding of world literatures and cultures in various historical periods, including the present, for students with a special concern for the relationships among the languages and literatures of various civilizations. Comparative literature courses are conducted in English, and required reading is available in English.

The study of literature and language helps students to achieve a mature understanding of themselves and the world and to learn to read critically and analytically, write clearly and persuasively, and reason soundly. For these reasons such study is ideal preparation for professional training in fields such as law, medicine, and religion, or for responsible positions in business and industry. The major in English may be combined with preparation for elementary and secondary school teaching. In addition, the majors in English, Comparative Literature and Linguistics provide a foundation for students who intend to work for advanced degrees in preparation for college teaching.

Advisers

English/Comparative Literature, Undergraduate:

All full-time faculty members serve as advisers.

English/Comparative Literature, Graduate:

Susan Jacobsen

Teaching Credential:

John White

Linguistics, Undergraduate:

Franz Muller-Gotama

Linguistics, Graduate:

Alan Kaye

An annual conference with a faculty adviser is required. New students must confer with an adviser in each of the first two semesters.

Credential Information

The bachelor's degree in English may be effectively combined with subject matter studies necessary for either the multiple subject teaching credential (K-8) or single subject credential (7-12) in English. Undergraduates are encouraged to work with the Center for Careers in Teaching (714-278-7130) as early as possible in their academic careers to plan efficient course selections for general education, the major and electives. With careful planning, it may be possible to enter the credential program in the senior year of the bachelor's degree. Postgraduate students should contact the Admission to Teacher Education office in the School of Education (714-278-3411) to obtain information on attending an overview presentation.

BACHELOR OF ARTS IN COMPARATIVE LITERATURE

The Bachelor of Arts in Comparative Literature requires a minimum of 120 units which includes courses for the major, General Education, all University requirements, and free electives. For the major, students must complete a total of 42 units of upper-division courses. In selecting courses, students are urged to consult a faculty adviser.

Required courses (English 300 and 18 units in comparative literature, including Comparative Literature 324, 325, and either English/Comparative Literature 450 or Comparative Literature 451)

British and American Literature (6 upper-division units listed under English)

Breadth Requirement (6 adviser-approved units in other fields such as anthropology, history, art history, music history or philosophy)

Electives (9 upper-division units in comparative literature, or literature courses in English or an adviser-approved foreign language)

Reading Competence in a Foreign Language

This requirement can be met by examination or by successful completion of an adviser-approved 400-level course offered by the Department of Modern Languages and Literatures, provided it is not taught in translation. Information on the examination is available in the Department of English, Comparative Literature, and Linguistics office.

MASTER OF ARTS IN COMPARATIVE LITERATURE

The master's degree program in comparative literature promotes the understanding of other literatures, peoples, and cultures in various historical periods, including the present, provides background for more advanced degrees, prepares teachers of world literature in the high schools and community colleges, and provides a liberal arts background for library studies.

Application Deadlines

Applications need to be postmarked no later than March 1st for the fall semester and October 1st for the spring semester. However, deadlines may be changed based upon enrollment projections. Check the university graduate studies website for current information <http://www.fullerton.edu/graduate/>.

Admission to Graduate Standing: Conditionally Classified

University requirements include a bachelor's degree from an accredited institution and a minimum GPA of 2.5 in the last 60 semester units attempted.

A writing sample will also be required of all applicants. The writing sample should demonstrate advanced skill in literary analysis and expository writing. A paper written for a course and analyzing one or more elements in one or more literary works is preferred; the submitted copy should include the instructor's name and institution, and the grade received. Applicants who do not have course papers available should contact the department graduate adviser for advice. The writing sample should be approximately five to ten pages long, and it need not include secondary research.

Graduate Standing: Classified

Classified standing requires:

1. An undergraduate major in comparative literature, English or foreign language with a GPA of 3.0 or better in the upper-division major courses and a GPA of 2.5 in all other college and/or university work. If the student's degree is in another field, a total of 24

units of upper-division work in comparative literature, English or foreign language with a GPA of 3.0 will be required.

If the student lacks the prerequisite number of courses, they must be taken before beginning work in the master's degree program, with at least a 3.0 in such makeup course work. If the student's GPA in these probationary courses is 3.0 or better, classified standing may be granted. Courses taken to remove qualitative and quantitative deficiencies may not be applied to the M.A. program.

2. Satisfactory completion of a written examination in an adviser-approved foreign language, or satisfactory completion of an upper-division course taught in an adviser-approved foreign language.
3. Development of an approved study plan.

Study Plan

A minimum of 30 units of course work must be completed with a minimum GPA of 3.0 to be distributed as follows:

500-Level Courses (18 units)

This requirement is met by 15 units at the 500-level in comparative literature or courses cross-listed in English (one adviser-approved 500-level course in English may help satisfy this requirement) and one 3-unit course at the 500-level in a related area.

Upper-Division Courses (12 units)

Adviser-approved courses in comparative literature (6 units)

Adviser-approved courses in a related area (6 units)

(At least 3 units of related course work must be in foreign literature, read in the original language.)

Comprehensive Exam

At the conclusion of all course work, the student will take a comprehensive examination for the master's degree. Each section of the four-part comprehensive examination must be passed before the degree will be awarded. Any section(s) failed may be repeated once only. Notice of intention to take the examination must be on file with the graduate secretary within six weeks of the first class of the semester.

Project Option

The candidate may elect to write a project. For information, consult the graduate adviser.

For further information, consult the Department of English, Comparative Literature, and Linguistics.

BACHELOR OF ARTS IN ENGLISH

The Bachelor of Arts in English requires a minimum of 120 units which includes courses for the major, General Education, all University requirements, and free electives. The English major consists of 42 units. At least 30 units must be upper-division courses. In selecting courses, students are urged to consult a faculty member of the Department of English, Comparative Literature and Linguistics. English 101, a graduation requirement for all students, is not part of the English major but is a prerequisite to further work in English.

Required Courses (9 units)

English 300 Analysis of Literary Forms (3)

English 301 Advanced College Writing (3)

English 316 Shakespeare (3)

Survey Courses (at least 6 units)

- English 211 British Literature to 1760 (3)
English 212 British Literature from 1760 (3)
English 221 American Literature to Whitman (3)
English 222 American Literature from Twain to the Moderns (3)
Comp Lit 324 World Literature to 1650 (3)
Comp Lit 325 American Ballad and Folksong (3)

Period, Genre and Criticism Courses

(at least 9 units, including at least 3 units from courses prior to 1800, i.e., 423, 450, 451, 452, 453, 454, 455, 456)

- English 423 Early American Literature (3)
English 450 Medieval Literature (3)
English 451 Elizabethan and Jacobean Drama (3)



- English 452 Elizabethan Poetry and Prose (3)
English 453 17th-Century Poetry and Prose (3)
English 454 The Drama of the Restoration and the 18th Century (3)
English 455 Restoration and 18th Century Poetry and Prose (3)
English 456 The Development of the English Novel Through Jane Austen (3)

- English 457 The Romantic Movement in English Literature (3)
English 458 Victorian Literature (3)
English 459 The Development of the 19th Century English Novel (3)
English 462 Modern British and American Novels (3)
English 463 Contemporary Novels in English (3)
English 464 Modern British and American Drama (3)
English 465 Contemporary Drama in English (3)
English 466 Modern British and American Poetry (3)
English 467 Contemporary Poetry in English (3)
English 491 Traditions of English Literary Criticism (3)
English 492 Modern Critical Theory (3)

Major Author Courses (at least 3 units)

- English 315 Chaucer (3)
English 317 Milton (3)

Language Courses (at least 3 units)

- English 303 Structure of Modern English (3)
English 305 The English Language in America (3)

Electives (at least 12 units)

Chosen from English, Comparative Literature and Linguistics courses numbered 201 and above.

MINOR IN ENGLISH

Students must complete a total of 21 units, including 15 units as described below and 6 units of electives. No more than six units of lower-division course work can be applied to the minor. In selecting courses, students seeking a minor in English should consult a faculty member of the Department of English, Comparative Literature, and Linguistics.

Required Courses (9 units)

- English 300 Analysis of Literary Forms (3)
English 301 Advanced College Writing (3)
English 316 Shakespeare (3)

Survey Courses (at least 6 units)

- English 211 British Literature to 1760 (3)
English 212 British Literature from 1760 (3)
English 221 American Literature to Whitman (3)
English 222 American Literature from Twain to the Moderns (3)
Comp Lit 324 World Literature to 1650 (3)
Comp Lit 325 World Literature from 1650 (3)

Electives (at least 6 units)

Chosen from additional English, Comparative Literature and Linguistics courses, with the exception of English 101 and 200.

Students may take the approved upper-division writing course(s) in their majors instead of English 301. They must, however, complete 21 units in English, Comparative Literature and Linguistics.

MASTER OF ARTS IN ENGLISH

The master's degree program in English offers students the opportunity to achieve a multifaceted understanding of literature and language. The degree is useful to those already teaching in high schools or interested in community college teaching, to those seeking careers in writing and publishing, and to those intending to take further graduate work.

Admission to Graduate Standing

Applicants are encouraged to make an appointment with the department graduate adviser. The adviser will review transcripts, advise applicants regarding prerequisites, and determine if any courses apply to the degree program.

Admission requirements for conditionally classified standing are outlined below.

Admission to the master's degree program is a prerequisite to enrollment in all graduate courses.

1. University requirements include a bachelor's degree from an accredited institution and a minimum GPA of 2.5 in the last 60 semester units attempted.

- The Department requires a bachelor's degree in English or Comparative Literature from an accredited institution with at least a 3.0 grade-point average in the upper-division major courses, provided that a minimum of 24 units of upper-division course work is included.

If the applicant holds a bachelor's degree in another major, 24 units of upper-division course work in English must be completed with at least a 3.0 grade-point average before beginning work in the master's degree program. In the event that the applicant's GPA in prerequisite English courses is less than 3.0, six to nine units of probationary, adviser-approved course work may be assigned. If the GPA in these probationary courses is 3.0 or better, the student may be classified.

Some courses taken to make up qualitative deficiencies may be credited toward the M.A., if completed with a grade of B or better, and if applicable to the student's particular study plan. Courses taken to remove quantitative deficiencies may not be applied to the M.A. program.

- A writing sample will also be required of all applicants. The writing sample should demonstrate advanced skill in literary analysis and expository writing. A paper written for an upper-division literature course and analyzing one or more elements in one or more literary works is preferred; the submitted copy should include the instructor's name and institution, the instructor's comments, and the grade received. The writing sample should be approximately five to ten pages long, and it need not include secondary research. Applicants who do not have course papers available should contact the department graduate adviser for advice.
- Applicants must submit three letter(s) of recommendation from individuals best qualified to judge their potential for graduate study in English.

Application Deadlines

Applications need to be postmarked no later than March 1st for the fall semester and October 1st for the spring semester. However, deadlines may be changed based upon enrollment projections. Check the university graduate studies website for current information <http://www.fullerton.edu/graduate/>.

Foreign Language Requirement

Students must satisfy a foreign language requirement with one of the following options:

(1) two years of one foreign language at the college or university level, (2) one 400-level course in a foreign language or in literature taught in a foreign language, (3) Linguistics 406 Descriptive Linguistics or Linguistics 412 Sociolinguistics OR (4) another 400-level linguistics course approved by the graduate adviser. This requirement may be satisfied prior to or after admission to the M.A. program.

Study Plan

The graduate program in English comprises 30 units of course credit. All courses must be approved by the graduate adviser.

A study plan must be developed and approved for admission to classified graduate standing within the student's first nine units of graduate coursework. Courses taken by a student admitted to the program with conditionally classified status do not necessarily apply toward the degree. No more than nine units of postgraduate course

work may be applied to the master's degree program. See the graduate adviser for further information.

The study plan allows three units of adviser-approved course work outside the department and/or three units of graduate independent study. No more than six units are allowed at the 400-level. In addition, at least one proseminar or seminar must be in Comparative Literature or cross-listed in Comparative Literature. A project and comprehensive exam are required of all students. Students are encouraged to take English 500 in their first semester.

Core courses (6 units)

English 500 Introduction to Graduate Studies in Literature (3)

Analysis of Discourse (3 units from English 491, 492, 579T)

Proseminars (12 units)

Students are encouraged to satisfy the proseminar requirements prior to taking seminars.

Seminars (9 units)

Students choose from adviser-approved seminar courses (English or Comparative Literature 509, 571T, 572T, 573T, 574T, 575T, or 591T).

Project (3 units)

In addition to the written exam described below, students are required to complete a project in the project writing course (for the course number, title and description, please consult the English department office). Students who plan to do a creative writing project may take a maximum of six units of creative writing workshops, one of which must be at the 500-level.

Project proposals are due before the end of the eighth week of the semester preceding enrollment in the project writing course and are reviewed by the department Graduate Studies Committee. Please consult the graduate adviser or department office for further details.

Written Exam

In order to complete degree requirements, students must pass a two-part written exam involving analysis and synthesis. Failed parts of the exam may be retaken only once. The deadline to file a notice of intention to take the examination is the end of the third week of the semester in which the student plans to take the exam.

BACHELOR OF ARTS IN LINGUISTICS

MINOR IN LINGUISTICS

MASTER OF ARTS IN LINGUISTICS

For information on these programs and a listing of linguistics courses, please consult the "Linguistics" section of this catalog.

COMPARATIVE LITERATURE COURSES

Courses are designated as CPLT in the class schedule.

110 Literature of the Western World from Ancient through Medieval Times (3)

(Same as English 110)

111 Literature of the Western World from the Renaissance through the 19th Century (3)

(Same as English 111)

257 Writing Haiku (1)

(Same as English 257)

312 The Bible as Literature (3)

Prerequisite: completion of General Education category III.B.2. Literary qualities of biblical literature and the influence of major themes upon Western literary traditions. (Same as Comparative Religion 312)

315 Classical Mythology in World Literature (3)

Prerequisite: completion of General Education category III.B.2. Greek and Roman myths which have been of continuing significance in Western world literature.

324 World Literature to 1650 (3)

Prerequisites: junior or senior standing and completion of any literature course from General Education category III.B.2. Asian and Western literature from the beginning to 1650.

325 World Literature from 1650 (3)

Prerequisites: junior or senior standing and completion of any literature course from General Education category III.B.2. Asian and Western literature from 1650 to the present.

347 The Fairy Tale (3)

(Same as English 347)

355T Images of Women in Literature (3)

(Same as English 355T)

373 Nineteenth Century Russian Literature (3)

Prerequisites: junior or senior standing and completion of any literature course from General Education category III.B.2. Major writers such as Pushkin, Gogol, Dostoyevsky, Tolstoy, Chekhov, and their relationship to Western literature.

374 Twentieth Century Russian Literature (3)

Prerequisite: completion of any literature course from General Education category III.B.2. Soviet peoples' literature from 1918 to the present. Basic trends in literary criticism. Major writers such as Gorky, Blok, Mayakovsky, Zamyatin, Zoshchenko, Akhmatova and Pasternak.

380 Introduction to Asian Literature (3)

Prerequisite: completion of any literature course from General Education category III.B.2. Selected translations of Arabic, Persian, Indian, Chinese and Japanese literature.

381 African Literature (3)

(Same as English 381 and Afro-Ethnic Studies 381)

382T Topics in Asian Literature (3) (Formerly 423T)

Prerequisite: completion of any literature course from General Education category III.B.2. Specific topics will vary from semester to semester. May be repeated with different content for additional credit.

450 Medieval Literature (3)

(Same as English 450)

451 Literature of the Renaissance (3)

Prerequisites: survey of English, American, or world literature; an upper-division literature course; or equivalent. The Renaissance as a literary movement, from Erasmus to Montaigne and Cervantes.

499 Independent Study (1-3)

Prerequisite: junior or senior standing.

525T Proseminar in Literature, Rhetoric, or Writing (3)

(Same as English 525T)

571T Graduate Seminar: Major Writers (3)

(Same as English 571T)

572T Graduate Seminar: Literary Genres (3)

(Same as English 572T)

574T Graduate Seminar: Special Problems in Literature (3)

(Same as English 574T)

575T Graduate Seminar: Topics in Teaching (3)

(Same as English 575T)

579T Graduate Seminar: Problems in Criticism (3)

(Same as English 579T)

597 Project (3)

(Same as English 597)

599 Independent Study (1-3)**ENGLISH COURSES**

Courses are designated as ENGL in catalog.

For world literature in English translation, see courses under Comparative Literature (CPLT)

099 Developmental Writing (3)

An intensive course in basic writing skills. Designed to prepare students for English 101. Required of, and open only to, students who score below minimum standard on the English Placement Test (EPT). Degree credit is not awarded for this course. Instructional fee. (Same as Foreign Language Education 099)

101 Beginning College Writing (3)

Prerequisite: English 099, a satisfactory score on the English Placement Test, or exemption from the EPT. An introductory course in the fundamentals of expository prose. Emphasizes grammatical and basic rhetorical concepts and practices necessary for successful college writing. Instructional fee. (CAN ENGL 2)

105 Introduction to Creative Writing (3)

Exploratory creative writing with the opportunity to write in various genres. No credit toward the major.

110 Literature of the Western World from Ancient through Medieval Times (3)

Representative writers and works from the ancient through the medieval world. (Same as Comp Lit 110)

111 Literature of the Western World from the Renaissance through the 19th Century (3)

Representative writers and works from the Renaissance through the 19th century. (Same as Comp Lit 111)

199 Intensive Writing Review (3)

Prerequisite: consent of instructor. Restricted to students who have failed the EWP at least twice. Intensive review of the fundamentals of writing expository prose. Meets examination portion of baccalaureate writing requirement. Carries no credit toward graduation.

200 Introduction to Literature (3)

An introduction to the study of fiction, drama and poetry. Concentration on the critical understanding of literary types rather than on their historical development. Carries no credit toward the major.

204 Intermediate Creative Writing (3)

Prerequisite: Completion of General Education Category III.B.2. A course providing experience in creative writing beyond the introductory level. Emphasis on poetry, the short story, and/or the one-act play.

211 British Literature to 1760 (3) (Formerly 311)

Major periods and movements, major authors, and major forms through 1760.

212 British Literature from 1760 (3) (Formerly 312)

Major periods and movements, major authors and major forms from 1760 through modern times.

221 American Literature to Whitman (3) (Formerly 321)

Major writers such as Hawthorn, Poe, Melville, Emerson, Thoreau, Whitman, and Dickinson.

222 American Literature from Twain to the Moderns (3) (Formerly 322)

Major writers such as Twain, James, Crane, Hemingway, Faulkner, O'Neill, Frost, and Elliot.

257 Writing Haiku (1)

After a brief study of the development of haiku in Japan, students will write and revise haiku in English and share them with the class. With consent of instructor, may be repeated for no more than three units of credit. (Same as Comp Lit 257)

300 Analysis of Literary Forms (3)

The main literary forms-prose fiction, poetry and drama-are studied and analyzed. English majors should schedule this basic course as early as possible.

301 Advanced College Writing (3)

Prerequisite: English 101. An advanced course in writing expository prose. Emphasizes precision in rhetoric and development of individual style by concentration on matters of diction, audience, emphasis and persuasion. Required of English majors seeking a secondary credential. Instructional fee.

303 The Structure of Modern English (3)

Prerequisite: junior standing. The grammar of contemporary English. Modern English usage. Required of English majors seeking a secondary credential. Must be taken before student teaching.

305 The English Language in America (3)

American English, its origins, its regional and social dialects, and its role in American history and in such institutions as schools, corporations, government, and the media. (Same as Linguistics 305)

315 Chaucer (3)

Prerequisite: English 101 or equivalent. The Canterbury Tales and Chaucer's language. The vocabulary, pronunciation, grammar and syntax of the East Midland dialect of Middle English.

316 Shakespeare (3)

Prerequisite: English 101 or equivalent. A study of the major plays.

317 Milton (3)

Prerequisite: English 101 or equivalent. The poetry and prose in the light of Milton's intellectual development.

323T Cultural Pluralism in American Literature (3)

Prerequisite: junior or senior standing. The role of varied cultural groups in the USA as exemplified in American literature. Topics may include Jewish writers, images of immigrants, Asian-American writers, American Indian literatures, and others.

324 Introduction to Afro-American Literature (3) (Formerly 424)

(Same as Afro-Ethnic 324)

325 American Ballad and Folksong (3)

Anglo-American balladry and folksong; their historical development, ethnic background and poetical values.

326 The American Frontier in Literature (3)

Prerequisite: any courses in American literature, American studies or American history. Thematic study of American literature as it reflects the changing frontier experience and establishes national myths and symbols.

327 Asian American Literature (3)

(Same as Asian American Studies 327)

328 Literature of the American Indians (3) (Formerly 420)

Prerequisite: completion of any literature courses from General Education category III.B.2. The prose and poetry of the North American Indian tribes.

341 Children's Literature (3) (Formerly English 433)

Prerequisite: completion of any literature course in General Education category III.B.2. World literature written primarily for children, including material from the oral tradition, realistic fiction, fantasy, and poetry. Not applicable for graduate degree credit.

347 The Fairy Tale (3)

Prerequisite: English 101. The development of the fairy tale in English. Includes early continental influences and covers such authors as the Brothers Grimm, H.C. Anderson, C. Rosetti, MacDonald, Barris, and Sendak. (Same as Comp Lit 347)

355T Images of Women in Literature (3)

Prerequisite: junior or senior standing. Images of women in genres such as autobiography, poetry, drama, novel. Individual sections may treat conventional literary periods or specific cultures. May be repeated with different content for additional credit. (Same as Comp Lit 355T)

360 Scientific and Technical Writing (3)

Open to science and non-science students. Scientific and professional writing and editing, with attention to outlines and abstracts, description, process explanation, instructions, and fundamentals of reports, feasibility studies, proposals, internal memos, and letters.

365 Legal Writing (3)

Advanced compositions stressing logic, reasoning, and legal analysis.

370 Horror Fiction (3)

Prerequisite: English 101 or equivalent. Horror/occult fiction (or "dark fantasy") from Mary Shelley to the present, including such writers as E. A. Poe, J. S. LeFanu, Bram Stoker, H. P. Lovecraft, Fritz Leiber, and Stephen King.

371 Fantasy Fiction (3)

Prerequisite: English 101 or equivalent. Fantasy in literature from Ariosto to Brautigan.

372 Detective Fiction (3)

Prerequisite: English 101 or equivalent. Detective fiction from Edgar Allan Poe to the present, including writers such as Sayers, Christie, Chandler, Hammett, and Ross MacDonald.

373 Science Fiction (3)

Prerequisite: English 101 or equivalent. Science fiction as a literary genre, including future-scene fiction, the utopian novel, the superman/woman novel and short stories.

374 The Gothic Novel (3)

Prerequisite: English 101. The development of the Gothic Novel in England from 1750-1850, including such authors as Walpole, Smith, Radcliffe, Lewis, Mary Shelley, Austen, Maturin, and Emily Brontë.

381 African Literature (3)

Prerequisite: completion of any literature course from General Education category III.B.2 African literature written in the English language; the fiction, poetry and drama of the new nations. (Same as Comparative Literature 381 and Afro-Ethnic Studies 381)

402 Theories of Response to Written Composition (2)

Prerequisite: English 301 and 303 or equivalents. Corequisite: English 402S. The course does not lend itself to a multi-level differentiation in student performance that serves as the basis for the letter grade option. Offered credit/no credit only.

402S Tutor Supervision (1)

Prerequisites: English 301 and English 303. Corequisite: English 402. Supervision of Writing Center tutors. Offered credit/no credit only.

404T Advanced Creative Writing (3)

Prerequisite: English 204 or its equivalent. Instruction and practice in a workshop setting for the student with some experience in creative writing; emphasis on writing for professional markets. Consult the class schedule to determine section's emphasis. May be repeated for credit.

416 Studies in Shakespeare (3)

Prerequisite: English 316 or consent of instructor. Problems of dramatic structure and artistic meanings.

423 Early American Literature (3)

Prerequisite: English 321. Literature of colonial and revolutionary America, including the Puritans, 18th century deism and rationalism, and the literary antecedents of American democratic thought.

429 American Landscape in Literature (3)

The American landscape in literature. Literary perception of our environment, with special attention to what perceptions of the landscape reveal about human nature.

434 Literature for Junior and Senior High School (3)

Prerequisite: junior or senior standing. The evaluation, selection, and interpretation of fiction, non-fiction, drama, and poetry reflecting the broad range of interest of young people from 12 to 17 years of age.

442 Changing Words: History, Semantics, and Translation (3)

(Same as Linguistics 442)

450 Medieval Literature (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. Readings in modern English translation from the medieval literature of England and the continent from St. Augustine to Sir Thomas Malory. (Same as Comparative Literature 450)

451 Elizabethan and Jacobean Drama (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. The dramatic tradition in plays by such dramatists as Marlowe, Jonson, Webster, Beaumont and Fletcher.

452 Elizabethan Poetry and Prose (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. The non-dramatic literature of the English Renaissance.

453 17th-Century Poetry and Prose (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. Non-dramatic literature of the period from 1603 to 1660 excluding Milton.

454 The Drama of the Restoration & the 18th Century (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. Representative plays of the Restoration and the 18th century. The development of such dramatic movements as the heroic play, Restoration comedy, and sentimental drama.

455 Restoration and 18th Century Poetry and Prose (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. Major writers such as Butler, Rochester, Dryden, Pepys, Swift, Addison and Steele, Pope, Boswell, Johnson, and selected minor writers.

456 The Development of the English Novel through Jane Austen (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. The English novel from its beginnings to the 19th century including such novelists as Defoe, Richardson, Fielding, Sterne, and Austen.

457 The Romantic Movement in English Literature (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. Major writers such as Burns, Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats.

458 Victorian Literature (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. Major writers such as Carlyle, Tennyson, Browning, Arnold, Ruskin, and Pater.

459 The Development of the 19th Century English Novel (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. Major novelists such as the Brontes, Thackeray, Dickens, Eliot, and Hardy.

462 Modern British and American Novels (3)

Prerequisite: survey of English, American or world literature; an upper-division literature course; or equivalent. Modern British and American novels from 1900 to 1950.

463 Contemporary Novels in English (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. The novel in English since World War II.

464 Modern British and American Drama (3)

Prerequisite: survey of English, American or world literature; an upper-division literature course; or equivalent. British and American drama from 1900 to 1950.

465 Contemporary Drama in English (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. Drama in English from 1950 to the present.

466 Modern British and American Poetry (3)

Prerequisite: survey of English, American or world literature; an upper-division literature course; or equivalent. British and American poetry from 1900 to 1950.

467 Contemporary Poetry In English (3)

Prerequisites: survey of English, American or world literature; an upper-division literature course; or equivalent. Poetry in English from 1950 to the present.

491 Traditions of English Literary Criticism (3)

Prerequisite: English 300 or equivalent. The major English critics, from the Renaissance to the beginning of the 20th century, in relationship to the classical theories of criticism.

492 Modern Critical Theory (3)

Prerequisite: English 300 or equivalent. The major movements in 20th-century British and American criticism.

498 English Internship (3)

Prerequisites: junior or senior status and consent of faculty supervisor. Experience in the practical application of studies in literature and language to work outside the university. Hours to be specified; enrollment limited; C/NC; no credit toward major.

499 Independent Study (1-3)

Prerequisite: junior or senior standing. Open to advanced students in English with consent of department chair. May be repeated for credit.

500 Introduction to Graduate Studies in Literature (3)

Research techniques, analytical approaches and theories of literature. A course providing basic orientation in graduate literary studies.

509 Creative Writing Workshop (3)

An intensive graduate-level workshop in creative writing. Students will produce their own work, write critiques of others' works, and discuss opportunities for publication. Recommended for students with an interest in creative writing. Workshops may focus on the writing of poetry or fiction or of a mix of fiction and drama, depending on expertise of instructor. May be repeated for credit with different topic.

510 Rhetorical Criticism and Disclosure Analysis (3)

This course will cover theories of disclosure and rhetorical analysis ranging from an overview of historically foundational/classical readings and approaches to contemporary rhetorical theories and their applications to textual criticism.

525T Proseminar in Literature, Rhetoric, or Writing (3)

Comprehensive readings course focusing on a key area in literature, rhetoric or writing. Examines major primary works and where they exist, major critical texts representing the area. Students are strongly advised to take proseminars before enrolling in seminars. May be repeated for credit with a different topic. (Same as Comp Lit 525T)

571T Graduate Seminar: Major Writers (3)

As appropriate to the specialized research and publication of instructor; major figures such as Shakespeare, Dante, Shakespeare, Cervantes, Goethe, Bronte, Twain, Joyce, Woolf, and Morrison. May be repeated with different content for additional credit. (Same as Comp Lit 571T)

572T Graduate Seminar: Literary Genres (3)

As appropriate to the specialized research and publication of instructor, major literary types such as the epic, the novel, the short story, lyric poetry, tragedy, comedy, and historical drama. May be repeated with different content for additional credit. (Same as Comp Lit 572T)

573T Graduate Seminar: Cultural Periods (3)

As appropriate to the specialized research and publication of instructor, the literature of a cultural period from Anglo-Saxon to modern times. May be repeated with different content for additional credit.

574T Graduate Seminar: Special Problems in Literature (3)

As appropriate to the specialized research and publication of the instructor, special problems such as influences on literature, including philosophical, religious, scientific, geographic, and other ecological viewpoints. May be repeated with different content for additional credit. (Same as Comp Lit 574T)

575T Graduate Seminar: Topics in Teaching (3)

Specific topics will vary from semester to semester. May be repeated with different content for additional credit. (Same as Comp Lit 575T)

579T Graduate Seminar: Problems in Criticism (3)

Historical development and schools of criticism. Individual offerings within this course number may deal with only one aspect of critical problems. May be repeated with different content for additional credit. (Same as Comparative Literature 579T)

590 Writing Theory and Practice for Teaching Associates (3)

Prerequisite: English 402 and admission to the English Department Teaching Associate Program. Theory and practice of the composing process for the beginning college teacher of expository writing. Required of all English Department Teaching Associates during their first semester of teaching.

590S Teaching Associate Supervision (1)

Prerequisite: English 590. Supervised teaching of developmental writing and freshman composition. No credit toward the M.A. in English. This course may be repeated for credit.

591T Seminar: Topics in Rhetoric and Composition (3)

As appropriate to the specialized research of instructor, special topics on rhetoric and composition, including historical and theoretical approaches. May be repeated with different content for additional credit.

595 M.A. Project Writing (3)

This course will guide students through the process of writing an M.A. project in literature, rhetoric and composition, or creative writing. To enroll in the course, students must receive prior departmental approval of their M.A. project proposal.

597 Project (3)

Prerequisite: classified graduate standing. A research paper, a critical study, a portfolio of creative writing, or the results of fieldwork or experiment. Supervising professor and English department graduate studies committee must approve the proposal in advance of registration. (Same as Comparative Literature 597)

599 Independent Graduate Research (3)

Research projects in areas of specialization beyond regularly offered course work. Oral and written reports. May be repeated with different content for additional credit.

ENGLISH EDUCATION COURSES

Courses are designated as ENED in catalog.

442 Teaching English in the Secondary School (3)

Prerequisite: admission to teacher education. Principles, methods and materials of teaching English in the secondary school.

449E Externship in Secondary Teaching (3)

Student teaching in the secondary school during the first semester of the teacher preparation program. The candidate plans and teaches assigned lessons during the last third of the semester.

449I Internship in Secondary Teaching (10)

Student teaching in the secondary school during the second semester of the teacher preparation program. The candidate has the same instructional hours of responsibility as the master teacher.

449S Seminar in Secondary Teaching (3)

Taken concurrently with Ed Sec 449I. Seminar in teaching a single subject in secondary schools. Videotape analysis of teaching based on Teaching Performance Assessments. Taken Credit/No Credit. A "B" or better is required to receive a grade of credit.

**PROGRAM COORDINATOR**

Robert Voeks

ASSISTANT COORDINATOR

Tracy Briggs

PROGRAM OFFICE

Humanities 407

DEPARTMENT WEBSITE

<http://hss.fullerton.edu/envstud/index.html>

PROGRAM OFFERED

Master of Science in Environmental
Studies

PROGRAM COUNCIL AND ADVISERS

Michael Steiner (American Studies),
Gordon Bakken (History), Dennis Berg
(Sociology), Vincent Buck (Political Science),
John Foster (Geological Science), Andrea
Guillaume (Elementary Education), Morteza
Rahmatian (Economics), Prem Saint (Geological
Sciences), Coleen Delaney-Rivera (Anthropology),
Jonathan S. Taylor (Geography) C. Eugene
Jones (Biological Science), Harold Rogers
(Chemistry) Chad Briggs (Political Science),
Theodore Hromadka (Mathematics), Jeff Kuo
(Civil Engineering).

INTRODUCTION

The masters program in Environmental Studies is a broadly-based interdisciplinary program that focuses on human interaction with the environment. The program is geared for students entering the rapidly expanding environmental field, especially in science, planning and regulation, and education. Because the scale and scope of environmental issues vary from local and practical to international and theoretical, the program seeks to integrate knowledge and approaches from a range of related disciplines in the sciences, social sciences, and humanities. Topics include environmental policy, management, pollution, law, philosophy, economics, planning, regulation, and education. Given the range of their academic backgrounds, students are encouraged to craft a study plan that meets their own particular career or avocational goals. Students demonstrate their expertise in one of the environmental concentrations by preparing a thesis or project.

Students select a course of study consistent with one of the following three concentrations:

Environmental Sciences

This area deals with the application of physical and biological science principles to environmental issues. Topical concerns include environmental ecology, water and air resources, and environmental geology. Students in this emphasis typically have a strong background in biology, chemistry, earth science, engineering, geography, geology or mathematics.

Environmental Policy and Planning

This area deals with the concepts and methods of the social and behavioral sciences as applied to environmental policy and planning. Topical concerns include urban and regional planning, environmental aspects of administration, design, ethics, perception, law and economics. Students in this area come from many backgrounds, including the natural, social or behavioral sciences, or the humanities.

Environmental Education and Communication

This emphasis seeks to develop a body of knowledge that is consistent with the needs of the classroom teacher, the outdoor naturalist or the communication specialist. Students in this emphasis area should have a background in natural science, education or communications.

International Learning Opportunities in Environmental Studies

Because many environmental problems are trans-boundary in nature, our curriculum necessarily addresses issues that are international in scope. From topical courses, such as Environmental Ethics and Global Environmental Issues, to region-specific courses, such as Endangered Primates and Tropical Rainforests, students tackle an array of internationally significant environmental problems. This experience is enhanced further through interaction with the significant number of international students enrolled in the program.

MASTER OF SCIENCE IN ENVIRONMENTAL STUDIES**Application Deadlines**

Applications need to be postmarked no later than March 1st for the fall semester and October 1st for the spring semester. However, deadlines may be changed based upon enrollment projections. Check the university graduate studies website for current information <http://www.fullerton.edu/graduate/>.

Admission to Graduate Standing: Conditionally Classified

University requirements include a baccalaureate from an accredited institution and a grade-point average of 3.0 in the last 60 units of course work attempted. In addition, two letters of recommendation are required, at least one of which must come from a college or university.

An undergraduate course in ecology and one in statistics are prerequisites for admission. Students without these prerequisites will be admitted provisionally but must take these courses during their first year in the program.

Graduate Standing: Classified

After completion of no more than nine semester units of adviser-approved course work and the development of an approved study plan, the student should apply for classified standing.

STUDY PLAN

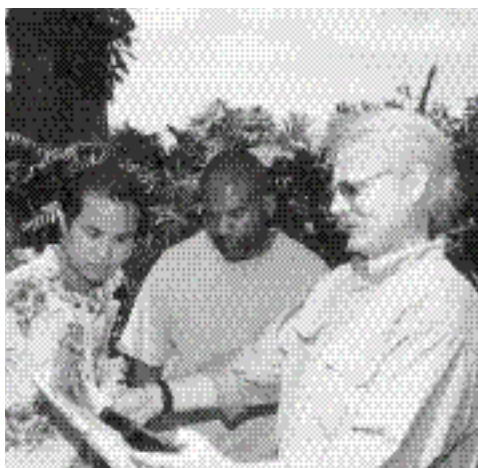
The M.S. in Environmental Studies requires the completion of 36 units of adviser-approved course work with a GPA of 3.0 or better and a thesis or project. The student's thesis committee should be comprised of three members, representing at least two different fields, with one being a member of the Environmental Studies Council. A student's project is supervised by a single faculty member.

Environmental Studies Core (9 units)

ENST 500 Environmental Issues and Approaches (3)

ENST 510 Environmental Evaluation and Protection (3)

ENST 520 Environmental Research and Analysis (3)



Environmental Studies Electives (9-15 units)

Choose from:

ENST 595T Selected Topics in Environmental Problems (3)

ENST 596 Internship in Environmental Studies (3)

ENST 599 Independent Graduate Research (3)

Cross-Disciplinary Electives Work (9-15 units)

Courses outside Environmental Studies are chosen with prior approval of the faculty adviser and consistent with the student's area of concentration.

No more than 12 units can be taken from the undergraduate major department. A three- unit planning course must be included.

Thesis 598 or Project 597 (3 units)

All Environmental Studies students are required to register in ENST 597 Project or ENST 598 Thesis exit research option. Students may only register for this course once. If they do not complete their project or thesis within this semester, they will be assigned a grade of RP for the course until a letter grade can be assigned. Since students are required to maintain continuous enrollment, they must register in GS 700 either through University Extension or CSUF. Students may only enroll in GS 700 through University Extension for one semester if they are working on a project and for two semesters if they are working on a thesis.

The deadline for project completion is the last day of the final exam period each semester. The deadline for thesis completion is set by the

university (usually three weeks before the end of exam week). By the thesis/project deadline, a notification of completion form must be submitted with the faculty supervisor's signature and (if applicable) with change of grade card(s) from the faculty supervisor. In addition, all students must submit a completed copy of the project or, for a thesis, a receipt from the thesis-binding department of the bookstore indicating that a bound and title-embossed copy of the thesis has been ordered for the Environmental Studies program office.

For further information, consult the graduate program adviser.

ENVIRONMENTAL STUDIES COURSES

500 Environmental Issues and Approaches (3)

Prerequisite: graduate standing in Environmental Studies or consent of instructor. Discussions of interdisciplinary approaches to environmental problems and research methods. Students prepare seminars and papers on research design for potential thesis topics. Meets graduate writing requirement.

510 Environmental Evaluation and Protection (3)

Prerequisite: graduate standing in Environmental Studies or consent of instructor. Environmental parameters (water, air, solid wastes, noise, radiation, etc.). Techniques in monitoring and measurement; effect on human health; environmental quality standards and controls. Demonstrations and field trips.

520 Environmental Research and Analysis (3)

Prerequisite: graduate standing in Environmental Studies or consent of instructor. Research methods and statistics used in the field of environmental studies. Research tools used in such areas as environmental field studies, environmental experiments, social environmental impacts, environmental attitudes and behavior and environmental trend analysis. Use of secondary data sources and computer required.

595T Selected Topics in Environmental Problems (3)

Prerequisite: graduate standing in Environmental Studies or consent of instructor. Various environmental topics, contemporary or historic, that focus on problems (e.g., law, endangered habitats, planning, global environmental issues, etc.) Topic chosen and outline will be circulated prior to registration. May be repeated four times (with different topics) for credit.

596 Internship in Environmental Studies (3)

Prerequisite: graduate standing in Environmental Studies or consent of instructor. Field experience with a governmental or private agency.

597 Project (3)

Prerequisites: classified status in Environmental Studies program and consent of instructor and program coordinator. Planning, preparation and completion of an acceptable, interdisciplinary project. Credit on submission of project.

598 Thesis (3)

Prerequisites: classified status in Environmental Studies program and consent of instructor and program coordinator. Planning, preparation and completion of an acceptable, interdisciplinary thesis. Credit on submission of thesis.

599 Independent Graduate Research (1-3)

Prerequisite: graduate standing in Environmental Studies and consent of instructor and program coordinator. May be repeated for credit for a maximum of three units.



DEPARTMENT CHAIR

John Erickson

DEPARTMENT OFFICE

College Park 1060-2

DEPARTMENT WEBSITE

<http://business.fullerton.edu/finance>

PROGRAMS OFFERED

Bachelor of Arts in Business Administration

Concentration in Finance

Master of Business Administration

Concentration in Finance

FACULTY

Su Chan, Carolyn Chang, Donald Crane, John Erickson, Joseph Greco, Tsong-Yue Lai, Yuming Li, Weili Lu, Yun Park, Catherine Richert, Zekiye Selvili, Mark Stohs, Charles Tu, Donald Valachi, Blaine Walgren, Ko Wang

ADVISERS

The Business Advising Center, Langsdorf Hall 731, provides information on admissions, curriculum and graduation requirements, registration and grading procedures, residence and similar academic matters. In addition, advising on curriculum content and career opportunities may be obtained from the chair of the Finance Department or from:

Financial Management

Yun Park, Mark Stohs

Personal Financial Planning

Donald Crane

Real Estate

Ko Wang, Donald Valachi

Securities and Investments

Tony Lai, Yuming Li

Insurance and Financial Services

Weili Lu

International Finance

Joseph Greco

INTRODUCTION

In choosing their coursework, students are advised (but not required) to choose one of the five areas (advisory tracks) of study within the finance concentration. The corporate/international financial management track is designed to provide entry-level skills for students interested in the financial management of a non-financial firm. The international component of this track is designed for students who are interested in international corporate financial management. The financial institutions track may lead to employment in banks or savings and loan associations. The investment/financial planning track is designed for students interested in positions with brokerage firms or financial planning firms. The insurance and financial services track is designed for students interested in positions with life insurance firms. The real estate track is designed for students interested in careers in commercial brokerage, property management, property development and real estate finance. Students may also combine courses from different advisory tracks to meet a specialized educational objective.

Awards in Finance

Finance Outstanding Service Award

Finance Outstanding Student Award

Financial Executives Award

Peter M. Mlynaryk Outstanding Real Estate Student Award

John Nichols Investment Trust Award

9 ERZ/STARZ Target of Management Scholarships

Edward D'Cunha

Mercury Insurance Group

Pacific Life

Golden Eagle

AAA

Rims

ISO

Chen-da Su Insurance Award

Prudential

BACHELOR OF ARTS IN BUSINESS ADMINISTRATION

See "Business Administration, Finance Concentration."

MASTER OF BUSINESS ADMINISTRATION

See "Business Administration, MBA Specialist Plan"

FINANCE COURSES

Courses are designated as FIN in the class schedule.

310 Personal Financial Management (3)

Financial problems of the household in allocating resources and planning expenditures. Housing, insurance, installment buying, medical care, savings and investments. Also examines the special financial planning problems faced by minorities and women. (May not be used to fulfill the concentration requirement in finance.)

320 Business Finance (3)

Prerequisite: Accounting 201A. Corequisites: Info Systems/Dec Sci 361A and Business Admin 301. Financing business enterprises; financial planning and control; analysis of alternative sources and uses of combinations of short-, intermediate- and long-term debt and equity. Cost of capital and capital investment decisions; capital budgeting analysis and valuation; working capital and capital structure management; corporate financial decisions in an international environment.

331 Working Capital Management and Computer Applications (3)

Prerequisite: Finance 320. Analysis of working capital management and policy. Use of available software programs and financial models in the management of cash and short-term securities; the management of accounts receivable and inventories; financial forecasting; and short-term financing.

332 Theory of Corporate Finance (3)

Prerequisite: Finance 320. Risk and return analysis. An introduction to the capital asset and arbitrage pricing models. Analysis of capital budgeting, real options, use of capital structure, dividend policy, leasing, mergers and divestitures.



335 Financial Analysis for Investors and Lenders (3)

Prerequisite: Finance 320. Interpretation of financial statements from the perspective of both the financial analyst and the creditor. Emphasis on the economic meaning of financial statement data for the purpose of valuing the firm's securities.

340 Introduction to Investments (3)

Prerequisite: Finance 320. Institutional characteristics of securities markets, security valuation and trading methods, fundamental and technical analysis, selection and management of securities, role of the capital asset pricing model in investing, options and futures markets, portfolio analysis and mutual funds.

342 Capital and Money Markets (3)

Prerequisite: Finance 320. Capital and money markets in the American and international economies; markets for new corporate and government issues; secondary markets; use of derivative securities for hedging; factors influencing yields and security prices.

351 Introduction to Real Estate (3)

Prerequisite: Finance 320. Real estate principles, practices and investment decisions. Equity investment, finance, legal aspects, practices, principles, property development, real estate administration in the public sector, real estate market analysis, and valuation.

352 Real Estate Finance (3)

Prerequisite: Finance 351. Financial institutions and real estate credit. Sources and uses of capital (funds) in financing real estate transactions. Money and capital markets and their effect on credit availability. Emphasis on secondary mortgage markets, securitization and derivative securities.

353 Real Estate Valuation (3)

Prerequisite: Finance 351. A comprehensive coverage of the basic concepts and principles of real estate valuation. Emphasis is placed on the use of the three approaches to valuation for the appraisal of both residential and income-producing properties. The role of valuation in real estate investment. Government regulation of appraisers.

355 Real Estate Investment Analysis (3)

Prerequisite: Finance 320. Alternative analytical techniques in evaluating real estate investments. Tax aspects, measurement of investment returns, application of computer models to investment decisions. Lecture, discussion and case analysis of major investment types – raw land, apartment houses, commercial and industrial uses.

360 Principles of Insurance (3)

Prerequisite: Finance 320. Analysis of the risk management process, introduction to property and liability insurance, employee benefits and financial planning. Overview of the insurance industry and insurance problems.

370 International Business Finance (3)

Prerequisite: Finance 320. Financing problems of the multinational business. The international financial environment, taxation of foreign income, the cost of capital in international capital and money markets, problems of risk in foreign investments, and financial techniques for the operation of the multinational firm.

371 Export-Import Financing (3)

Prerequisite: Finance 320. Institutional arrangements, methods and techniques used to finance international trade. Government and financial institution services. Risk-return aspects of international sales, insurance needs, the use of letters of credit, international factoring, accounts receivable insurance and other financing techniques. Review of required export-import documentation.

373 Asia-Pacific Financial and Security Markets (3)

Prerequisite: Finance 320. Overview of financial markets in Japan, Korea, Taiwan, China, Hong Kong, Singapore and Southeast Asia. Historical perspectives, regulations, more recent liberalization and internationalization and institutional technical aspects of the stock, bond, and other financial markets.

410 Theory & Practice of Personal Financial Planning (3)

Prerequisite: Finance 320. Developing, implementing and monitoring comprehensive personal financial plans. Includes risk management, investments, taxation, retirement and estate planning, as well as professional practices.

411 Retirement and Estate Planning (3)

Prerequisite: Finance 320. Development of retirement objectives, needs and financial condition. Forecasting retirement income from employer based retirement plans, IRAs, insurance policies, social security, and investment programs. Medicare, medical, group life and health benefits after retirement. Property titling, wills and transfers in contemplation of death.

425 Commercial Bank and Financial Institution Management (3)

Prerequisite: Finance 320. The solution of financial institution problems. Major financial intermediaries and the decision-making problems they face. Regulation and its effect on management operations. Group problems and case studies.

432 Financial Forecasting and Budgeting (3)

Prerequisite: Finance 320. Forecasting in financial management; profit planning and control process; goals, technical procedures, and effects of budgeting; mechanics of forecasting and budgeting, follow up and control.

433 Problems in Business Finance (3)

Prerequisite: Finance 332. Case studies. Group problems and case studies relating to estimation of funds requirements, long-term financial planning, evaluation of cash flows, financing acquisitions and mergers, capital budgeting and cost of capital. Team-building, leadership and computer-assisted presentation skills. Not applicable for graduate degree credit.

442 Advanced Investment Analysis (3)

Prerequisites: Finance 340 and Info Sys/Decision Sci 361A. Securities markets and company analysis, security valuation models, the CAPM and the APT, option pricing, and portfolio models. Practical application of investment theory and recent literature will be emphasized. Students may not receive credit for both Finance 442 and 541.

444 Options and Futures (3)

Prerequisite: Finance 340. Put and call options, option pricing theory and models. Financial futures pricing, hedging strategies and models. Institutional characteristics of futures trading. Options and futures on stock indices. Options on futures, theoretical relationship between options and futures.

454 Real Estate Market Analysis (3)

Prerequisite: Finance 351. Factors and influences of urban growth and development. Economic factors and real estate supply and demand. Location theory and urban growth patterns. Public policy as a factor in real estate development. Analysis of real estate markets.

456 Property Development and Management (3)

Prerequisite: Finance 351. Decision making in the property development process – from raw land to marketing and management of the completed product. Policy formulation and implementation, project feasibility analysis, financial analysis, computer assisted analysis; case studies.

461 Business Property and Liability Risk Management (3)

Prerequisite: Finance 360. Course covers the duties and functions of a corporate risk manager, the major commercial property liability lines including business income, general liability, commercial auto workers compensation, business owner insurance, and operation of property liability insurers.

462 Life and Health Insurance (3)

Prerequisite: Finance 360. Course covers the analysis of various types of life annuity and health insurance contracts, major employee benefit plans adopted by corporations and the organization and management of life and health insurance companies.

495 Internship (1-3)

Prerequisites: Finance 332, a concentration in finance, consent of department internship adviser, junior standing, 2.5 GPA and one semester in residence at the university. Also open to international business majors. Planned and supervised work experience. May be repeated for credit up to a total of six units. Credit/No Credit only.

499 Independent Study (1-3)

Prerequisites: Finance 320 and consent of the instructor and department chair. Open to undergraduate students desiring to pursue directed independent inquiry. May be repeated for credit. Not open to students on academic probation.

517 Managerial Finance (3)

Prerequisites: Accounting 510 and classified CBE status. The methodology of financial management. The primary tools for financial analysis, long-term investment decisions, evaluation and working capital management. International applications.

523 Seminar in Corporate Financial Management (3)

Prerequisites: Finance 517 or equivalent and classified CBE status. The analysis of the financial decision-making process through case studies and seminar presentations. Current financial theory and models. International applications.

533 Seminar in Financial Administration (3)

Prerequisites: Finance 523 and classified CBE status. Optimal financing and asset administration; advanced techniques of capital budgeting; application of analytical methods to the administration of the finance function of the business firm.

540 Seminar in Financial Markets (3)

Prerequisites: Finance 517 or equivalent and classified CBE status. Structure and operation of major financial institutions; portfolio composition, price-cost problems, and market behavior; analysis of financial intermediation and interrelation of financial institutions and markets.

541 Seminar in Investment Management (3)

Prerequisites: Finance 517 or equivalent and classified CBE status. Problems of investment and portfolio management; concepts of risk evaluation and investment criteria; analysis of interest rate movements; investment valuation and timing; regulation and administrative problems of the industry. Students may not receive credit for both Finance 442 and 541.

543 Entrepreneurial Finance (3)

Prerequisites: Finance 517, Accounting 510 and Accounting 511.

This course deals with financing a new/small firm including forecasting the firm's investment needs, raising short-term funding and banking relationships, managing working capital, making fixed asset investment and managing risk.

551 Seminar in Real Estate Investment (3)

Prerequisites: Finance 517 or equivalent and classified CBE status. Problems of real estate investment; concepts of evaluation and investment criteria; analysis of real property values; real estate development and financing. Case studies.

570 Seminar in International Financial Management (3)

Prerequisites: Finance 517 or equivalent and classified CBE status. The financial problems of the multinational firm. International financing instruments, capital investment decisions, and constraints on the profitability of multinational businesses.

597 Project (3)

Prerequisites: Finance 517 or equivalent and classified CBE status, consent of instructor and approval by Department Chair. Directed independent inquiry. Not open to students on academic probation.

599 Independent Graduate Research (1-3)

Prerequisites: Finance 517 or equivalent and classified CBE status, consent of instructor and approval by Department Chair and Associate Dean. May be repeated for credit. Not open to students on academic probation.