

a California teaching credential. Interested students should consult the credential advisor in the Graduate School of Education.

Under the direction of the Associate Dean for Undergraduate Studies, academic advising services are jointly provided by advisors in the College of Engineering, as well as advisors in the department. Students who plan to change to a major in the department should consult the ECE student office. Departmental faculty advisors are assigned to students to assist them in choosing senior elective courses.

Counseling is provided to graduate students through the ECE graduate advisor. Individual faculty members are also available for help in academic planning.

### Mission Statement

The Department of Electrical and Computer Engineering seeks to provide a comprehensive, rigorous and accredited educational program for the graduates of California's high schools and for postgraduate students, both domestic and international. The department has a dual mission:

- *Education:* We will develop and produce excellent electrical and computer engineers who will support the high-tech economy of California and the nation. This mission requires that we offer a balanced and timely education that includes not only strength in the fundamental principles but also experience with the practical skills that are needed to contribute to the complex technological infrastructure of our society. This approach will enable each of our graduates to continue learning throughout an extended career.
- *Research:* We will develop relevant and innovative science and technology through our research that addresses the needs of industry, government and the scientific community. This technology can be transferred through our graduates, through industrial affiliations, and through publications and presentations.

We provide a faculty that is committed to education and research, is accessible to students, and is highly qualified in their areas of expertise.

### Educational Objectives

The educational objectives of the Electrical Engineering Program identify what we hope that our graduates will accomplish within a few years after graduation.

1. We expect our graduates to make positive contributions to society in fields including, but not limited to, engineering.
2. We expect our graduates to have acquired the ability to be flexible and adaptable, showing that their educational background has given them the foundation needed to remain effective, take on new responsibilities and assume leadership roles.
3. We expect some of our graduates to pursue their formal education further, including graduate study for master's and doctoral degrees.

### Program Outcomes

The EE program expects our students upon graduation to have:

1. Acquired strong basic knowledge and skills in those fundamental areas of mathematics, science, and electrical engineering that are required to support specialized professional training at the advanced level and to provide necessary breadth to the student's overall program of studies. This provides the basis for lifelong learning.
2. Experienced in-depth training in state-of-the-art specialty areas in electrical engineering. This is implemented through our senior electives. Students are required to take two sequences of at least two courses each at the senior level.
3. Benefited from imaginative and highly supportive laboratory experiences where appropriate throughout the program. The laboratory experience will be closely integrated with coursework and will make use of up-to-date instrumentation and computing facilities. Students should experience both hardware-oriented and simulation-oriented exercises.
4. Experienced design-oriented challenges that exercise and integrate skills and knowledge acquired in several courses. These may include design of components or subsystems with performance specifications. Graduates should be able to demonstrate an ability to design and conduct experiments as well as analyze the results.
5. Learned to function well in teams. Also, students must develop communication skills, written and oral, both through team and classroom experiences. Skills including written reports, webpage preparation, and public presentations are required.
6. Completed a well-rounded and balanced education through required studies in selected areas of fine arts, humanities, and social sciences. This provides for the ability to understand the impact of engineering solutions in a global and societal context. A course in engineering ethics is also required of all undergraduates.

## Undergraduate Program

### Bachelor of Science—Electrical Engineering

A minimum of 194 units is required for graduation. A complete list of requirements for the major can be found on page 48. Schedules should be planned to meet both General Education and major requirements.

The department academic advisor can suggest a recommended study plan for electrical engineering freshmen and sophomores. Each student is assigned a departmental faculty advisor who must be

consulted in planning the junior and senior year programs.

The required 32 units (8 courses) of departmental electives are taken primarily in the senior year, and they permit students to develop depth in specialty areas of their choice. A student's elective course program must be approved by a departmental faculty advisor. The advisor will check the program to ensure satisfaction of the departmental requirements. A wide variety of elective programs will be considered acceptable.

Three matters should be noted: (1) students who fail to attain a grade-point average of at least 2.0 in the major may be denied the privilege of continuing in the major, (2) a large majority of electrical and computer engineering courses have prerequisites which must be completed successfully. Successful completion of prerequisite courses means receiving a grade of C- or better in prerequisite courses except for Mathematics 3A-B-C and Mathematics 5A and 5B which require a grade of C or better to apply these courses as prerequisites, (3) courses required for the pre-major or major, inside or outside of the Department of Electrical Engineering, cannot be taken for the passed/not passed grading option. They must be taken for letter grades.

### Bachelor of Science—Computer Engineering

This major is offered jointly by the Department of Computer Science and the Department of Electrical and Computer Engineering. For information about this major, see page 22.

## Electrical & Computer Engineering Courses

*Many of the ECE courses are restricted to ECE majors only. Instructor and quarter offered are subject to change.*

### LOWER DIVISION

#### 1. Ten Puzzling Problems in Computer Engineering

(1) PARHAMI

*Prerequisite: open to pre-computer engineering only. Seminar, 1 hour.*

Gaining familiarity with, and motivation to study, the field of computer engineering, through puzzle-like problems that represent a range of challenges facing computer engineers in their daily problem-solving efforts and at the frontiers of research.

#### 2A. Circuits, Devices, and Systems

(5) YORK

*Prerequisites: Mathematics 3A-B-C with a minimum grade of C; and, Mathematics 5A with a minimum grade of C (may be taken concurrently); Physics 3 or 23 (may be taken concurrently); open to electrical engineering, computer engineering, and pre-computer engineering majors only. Lecture, 3 hours; laboratory, 4 hours.*

Introduction to basic circuit analysis. KCL, KVL, nodal analysis, superposition, independent and dependent sources; diodes and I-V characteristics; basic op-amp circuits; first-order transient analysis; AC analysis and phasors. Introduction to the use of test instruments.