

# Electrical Engineering

## The Field of Electrical Engineering

The field of electrical engineering is a high-tech dynamic field that is in the middle of almost every technology that affects our daily life. From computer chips that process millions of instructions every second to radar systems that detect weather patterns days in advance, electrical and electronic engineers are responsible for a wide range of technologies. Electrical and electronics engineers design, develop, test, and supervise the manufacture of electrical and electronic equipment. Some of this equipment includes power generating, controlling, and automation devices used by electric utilities, electric motors, machinery controls, lighting and wiring in buildings, automobiles, medical equipment, robotics, transportation, and aircraft; and in radar and navigation systems, computer and office equipment, and broadcast and communications systems.

Electrical and electronics engineers specialize in different areas such as power generation, transmission, and distribution; renewable energy systems; automated systems; communications, computer electronics, and electrical equipment manufacturing – or a subdivision of these areas – industrial robot control systems, or aviation electronics, for example. Electrical and electronics engineers

design new products and high-tech systems. They also test equipment, solve operating problems, manage projects, and estimate the time and cost of engineering projects.

## The Department

The Department of Electrical and Computer Engineering offers the B.S. in Computer Engineering and the B.S. in Electrical Engineering. It also offers the M.S. in Engineering, Electrical and Computer Options. The B.S. programs are accredited by the Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology (ABET). The EE Program prepares the graduate for professional practice or graduate studies in the broad area of electrical engineering. By the appropriate choice of technical area courses, the student may emphasize one of the following areas:

- Electronics
- Control Systems, Robotics, and System Automation
- Digital Systems
- Communications
- Digital Signal Processing
- Electromagnetics
- Microwaves
- Optoelectronics
- Power Systems and Renewable Energy Sources

The faculty members of the Department of Electrical and Computer Engineering are well qualified engineers with a wide range of experience. Their

backgrounds include significant research accomplishments, engineering teaching experience, consulting work, and other related engineering experiences.

## Mission

The mission of the Department of Electrical and Computer Engineering is to fulfill the needs of the region and state by providing an undergraduate technical education in computer engineering and electrical engineering to a diverse group of students. The department strives to continually update its strong programs of study in order to qualify graduates for positions in industry, while providing sufficient breadth and depth in the programs to assure graduates of a successful practice in the profession. At the same time, students are grounded in the rigorous scientific and theoretical foundations of the discipline. This grounding will not only enable graduates to enter and be successful in any advanced level educational program of their choosing, but also to build upon this strong foundation and extend it to new depths.

The Electrical Engineering program awards degrees to students, who, within three to five years of graduation — through work experience and/or graduate education

Some information taken from the *U.S. Occupational Outlook* handbook.

California State  
University, Fresno

Department  
of Electrical  
and Computer  
Engineering

559.278.2726

[http://fresnostate.edu/engineering/electrical\\_computer/](http://fresnostate.edu/engineering/electrical_computer/)

B.S. in Computer  
Engineering

B.S. in Electrical  
Engineering

M.S. in Engineering

Options:

- *Electrical*
- *Computer*

Minor in Electrical  
Engineering

Minor in Computer  
Engineering

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in the engineering field — will be expected to have grown technically and be productive in their respective workplaces. Graduates should be capable of addressing technical problems of increasing complexity and of communicating and functioning effectively in a team environment. They also should be able to demonstrate ability for independent learning and continued professional as well as ethical development.

## Facilities

The department makes available to students excellent laboratory facilities housed in the Engineering East Building. The laboratories support the curriculum in digital systems, microprocessors, power systems, electronics and communications, optoelectronics, VLSI, instrumentation and controls, and microwaves. Students can work on both Unix based Sun Workstations available via the College of Engineering's CAD laboratories, and PCs available in all department laboratories.

The electrical engineering program emphasizes quality education through engineering design and hands-on experiences. Numerous laboratories are available to students for regular exercises, independent work, and projects. Availability of current engineering tools prepares students for practice and enhances their awareness of industry standards.

The fast pace of advances in technology and the increasing dependence of modern society on electricity and electronic products drives the continuing demand for electrical engineers for new products in communication, aerospace, automobile, defense, manufacturing, electric utility, automation, transportation, computers, entertainment, and related fields and industries.

According to the U.S. Department of Labor, the average yearly wages of electrical and electronic engineers were \$93,380 (National) and \$112,100 (California) in 2013. Job opportunities should continue to grow during this decade. The average starting salary for Electrical/Electronics Engineers is \$61,420.

## Future Education

The bachelor's degree in electrical engineering should prepare a student for graduate work in computer or electrical engineering leading to an M.S. or a Ph.D. at any university. Students can also choose to pursue education leading to an MBA.

## General Preparation

To be successful in the profession of electrical engineering, some basic skills are important: the proper background in mathematics, science, written and oral communications; an analytical, creative mind to meet the challenge of open-ended technical problems; and the ability to grasp fundamentals well in order to cope with the constant technological changes and the ability to work in a team environment.

## High School Preparation

Students should meet California State University's admission requirements in terms of college preparatory course requirements, grade point average, and test scores. Additional recommended courses are advanced mathematics (1/2 year), chemistry and physics (1 year), and computer programming (1/2 year).

## College Program

Students should consult the university's *General Catalog* for specific major and university requirements, for General Education requirements, and for approved technical area courses.

## General Education

Students should follow the program of the electrical engineering major. For specific requirements, see the program outline in the electrical engineering curriculum in the university's *General Catalog*.

## Course Requirements

The B.S. in Electrical Engineering requires a total of 124 units including 65 units in the major and 59 units in other areas such as mathematics, physics, and General Education. The major includes a core of 54 units and 11 units of technical area courses. Elective senior students must complete a year-long culmination design project.

**For additional information, write**

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Department of Electrical and Computer Engineering**

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93740-8030

**Visit or call**

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[http://fresnostate.edu/engineering/elec\\_computer/](http://fresnostate.edu/engineering/elec_computer/)

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**PLEASE NOTE:** This document is for general informational purposes only. The information is subject to change; consult the appropriate department or an academic adviser. Entering freshmen must follow the revised General Education program effective fall 1999 and thereafter. The university catalog and schedule of courses are available online at [www.fresnostate.edu/ClassSchedule](http://www.fresnostate.edu/ClassSchedule) and [www.fresnostate.edu/catalog](http://www.fresnostate.edu/catalog).

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