

# Electrical Engineering, B.S.

## DEPARTMENT

### Department of Electrical and Computer Engineering

Reza Raeisi, Chair  
East Engineering Building, Room 254A  
559.278.6038  
[www.fresnostate.edu/engineering/elec-computer/](http://www.fresnostate.edu/engineering/elec-computer/)

MS in Engineering - Electrical Engineering Option, M.S.  
MS in Engineering - Computer Engineering Option, M.S.  
BS in Electrical Engineering, B.S.  
MN in Electrical Engineering, Minor  
BS in Computer Engineering, B.S.  
MN in Computer Engineering, Minor  
Courses Offered

### Electrical Engineering

The Electrical Engineering Program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Electrical engineers design and develop electronic circuits, equipment and systems in the areas of electromagnetics (antennas; radar, radio, and television systems), communications (telephone systems, satellite communications; laser and optical fiber communications; aircraft and missile guidance systems), computers and digital systems (computers, microprocessors, and microcomputers; artificial intelligence), physical electronics and optics (transistors; integrated circuits; optical display devices; lasers; optical fibers), power systems and energy conversion (electric power generation; analysis and synthesis of power transmission and distribution protection systems design; on-line power control protection systems design), and control systems (computer control, robotics, automated manufacturing, intelligent sensors). Hands-on experiences are emphasized and gained through laboratory work and design projects.

### Computer Engineering

The Computer Engineering Program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). Computer engineering is a discipline which allows the student to obtain expertise in the design, programming, and applications of computers. It prepares the graduate for professional practice or graduate studies.

The program combines the following:

- a. A strong emphasis on electrical engineering (primarily electronic circuits and systems)
- b. A broad basis in mathematics, physical science, and general engineering
- c. Fundamentals of computer science including programming methodology, software engineering, and operating systems
- d. Introductory and advanced concepts in the design of computers and computer systems

A rich set of technical area courses is available to allow students to broaden their knowledge within any of several computer engineering areas.

### Mission and Program Educational Objectives

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

The Electrical Engineering Program and the Computer Engineering Program award degrees to students who within three to five years of graduation, through work experience and/or graduate education in the engineering field, will be expected to

1. have grown technically to the level sufficient to be productive in their respective industry workplaces.

2. be capable of addressing technical problems of increasing complexity.
3. communicate and function effectively in an interdisciplinary team environment at a level commensurate with their career development.
4. demonstrate an ability for independent learning and continued professional as well as ethical development.

The mission of the department complements and is enhanced by a graduate program leading to the M.S. in Engineering. For more information, see Master of Science in Engineering Program.

The faculty members possess depth and breadth in their specialty areas and are active in bringing these experiences and skills to the classroom. The identifiable strengths of the academic program are the laboratory and hands-on experience for students, the proper attention given to the scientific and mathematical foundation of electrical engineering and computer engineering, and the rigor of upper-division courses coupled with design and culminating senior projects. The technical and liberal arts components of the curriculum provide the students with the opportunity for gaining self-development, technical competence, and awareness of economic and ethical responsibilities. The technical curriculum includes (1) basic engineering science, (2) core electrical and computer engineering subjects, and (3) a junior-/senior-level choice for more depth in communications and analog systems, power systems and controls, or digital systems and computers.

The department requires mandatory advising to help students make sound academic decisions.

### Organizations

Student chapters of the Institute of Electrical and Electronic Engineers (IEEE) and Eta Kappa Nu (the national honor society for electrical engineers) are active in the department. The Lyles College of Engineering, in addition, has chapters of Tau Beta Pi, the Society of Women Engineers, the Society of Hispanic Engineers, and the National Society of Black Engineers.

### Co-op Program

The department participates in the Valley Industry Partnership Program which allows students to integrate planned industrial experiences into their academic programs. Students interested in this program should contact the chair of the Department of Electrical and Computer Engineering and the college's co-op coordinator.

### Mandatory Advising

Students must complete mandatory advising with a faculty member at least once during each academic year. Students who fail to do so by the established deadline (usually around the end of April) will be prevented from participating in the STAR registration process prior to the start of classes.

## REQUIREMENTS

### Bachelor of Science Degree Requirements

#### Electrical Engineering Major

(See note 1)

#### 1. Major requirements (65 units) and additional requirements (27-28 units)

*Major requirements (65 units)*

ECE 1, 71, 72, 85, 85L, 90, 90L, 102, 103, 118, 118L, 121, 124, 125, 126, 128, 128L, 134, 138, 138L, 155, 186A (51 units)

Select one from CE 29, ME 29, or ME 136 (3 units)

Technical Area Courses (11 units)

Select from the following

ECE 106, 107, 114, 115, 132, 135, 136, 140, 146, 148, 151, 152, 153, 162, 166, 168, 171, 176, 172, 173, 174, 178

Select at least two from the following: ECE 119L, 121L, 134L, 136L, 155L

*Additional requirements (27-28)*

MATH 76, 77, 81

PHYS 4A; PHYS 4B, 4BL; PHYS 4C; choose one from MATH 121, 123, 128, 152, 171, 181, 182

#### 2. General Education requirements (49 units)\*

Select one course from each of the G.E. areas: Area A1, A2, D1, D2. (See G.E. listings.)

The following courses are required to satisfy both G.E. and additional requirements: MATH 75 [B4], CHEM 3A [B1], PHIL 1 or 10 [C2], ECE 186B [IB], ECON 40 or 50 [D3], BIOL 10 [B2]

### 3. Other requirements (6 units)

Upper-division writing and Multicultural and International (MI)

4. Sufficient elective units to meet required total units (if needed) (See Degree Requirements.)

5. Total (124 units)

**Note:** Engineering majors are exempt from G.E. Area A3, third course Area C, Area E, and Area ID.

### Advising Notes

1. Courses in mathematics, the physical sciences, or engineering taken CR/NC are not counted toward fulfillment of degree requirements in electrical engineering.
2. Electrical engineering majors might consider a math minor (see faculty advisor for details).
3. All electrical engineering students must consult with their academic advisor at least once each year.
4. The Upper-Division Writing Skills requirements can be met by passing the university examination or completing an upper-division writing course with a letter grade of C or better no sooner than the term in which 60 units of coursework are completed. The writing course units are not counted toward the required 130 program units.
5. ENGR 101 may be taken instead of MATH 81.
6. The prerequisites for ECE 186A are ECE 85, 85L, 90, 90L, 102, 118, 124, 128, 128L; one lab from ECE 119L, 118L, 121L, 134L, 138L, 155L; and two courses from ECE 121, 134, 138, 155.
7. Students must enroll in and complete ECE 1 during the first two semesters of attendance at Fresno State.
8. The following prerequisite courses must be completed with a letter grade of C or better: ECE 71, 72, 85, 85L, 90, 90L.

### Prerequisites

Students violating any course prerequisites may be required to take an additional course (if they earned a C) or repeat a course (if they earned a D or less.) Repeated violations of prerequisites may trigger disciplinary action.

## FACULTY

The faculty members possess depth and breadth in their specialty areas and are active in bringing these experiences and skills to the classroom. The identifiable strengths of the academic program are the laboratory and hands-on experience for students, the proper attention given to the scientific and mathematical foundation of electrical engineering and computer engineering, and the rigor of upper-division courses coupled with design and culminating senior projects. The technical and liberal arts components of the curriculum provide the students with the opportunity for gaining self-development, technical competence, and awareness of economic and ethical responsibilities. The technical curriculum includes (1) basic engineering science, (2) core electrical and computer engineering subjects, and (3) a junior-/senior-level choice for more depth in communications and analog systems, power systems and controls, or digital systems and computers.

The department requires mandatory advising to help students make sound academic decisions.

For faculty phone numbers and e-mail, see the campus directory.

For more on the faculty, see the faculty pages.

The faculty pages are updated by the department or program.