

# Engineering - Electrical Engineering Option, M.S.

## DEPARTMENT

### Department of Electrical and Computer Engineering

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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**

### **Master of Science in Engineering Requirements**

#### **Master of Science Programs**

The Lyles College of Engineering offers a Master of Science in Civil Engineering and a Master of Science in Engineering (with options in Computer, Electrical, and Mechanical Engineering).

M.S. in Civil Engineering

M.S. in Engineering (Options in Computer, Electrical, and Mechanical Engineering)

The Master of Science in Engineering program has the following goals: (1) to develop the students' advanced analytical skills by developing an in-depth understanding of major theoretical and practical engineering concepts; (2) to develop students' written and oral communication skills applied to technical areas; (3) to achieve an appropriate level of competence by the students in solving practical electrical or mechanical engineering problems; (4) to develop students' critical and creative thinking skills in mastering new topics required to understand and solve complex engineering problems; and (5) to allow the students to demonstrate a sufficient depth of knowledge in a substantive area of electrical or mechanical engineering to pursue advanced academic or industrial work.

#### **Program Objectives**

The program has the following objectives: (1) to complete a minimum of 30 units of graduate coursework, including appropriate core courses, (2) to successfully demonstrate knowledge base in culminating experience, and (3) to enhance the students' career goals by increasing their theoretical, research, and problem-solving skills in applied engineering.

## Program Requirements

The program consists of the following:

### A. Main Core (1 unit)

ENGR 200

### B. Option Core (9 units)

EE Option: ENGR 201, ECE 224; choose one from ECE 230, ECE 241, ENGR 206

CompE Option: ECE 278; choose two from ECE 240, 243, 274

ME Option (choose 3 courses): ENGR 201, 202, 205, 206

### C. Electives (14 units)

CompE and EE Options: Choose from remaining upper-division and graduate courses. Minimum of 6 units from corresponding program electives. Maximum of 9 upper-division units. See advising notes.

ME Option: Choose from remaining upper-division and program courses. Maximum of 9 upper-division units. See courses in Mechanical Engineering.

### D. Culminating Experience (6 units)

For either option, choose

1. 6 units of electives plus comprehensive exam, minimum of 3 units from corresponding program electives, or
2. ECE 298 or ME 298 Project (3 units) plus 3 units of program electives, or
3. ECE 299 or ME 299 Thesis (6 units)

### Total (30 units)

## Advising Notes

1. CompE Program electives: ECE 224, 240, 242, 243, 255, 274, 291T, 290 (3 units max)
2. EE Program electives: ENGR 206, ECE 230, 231, 232, 241, 245, 247, 249, 251, 253, 255, 257, 259, 274, 291T, 290 (3 units max)
3. Approved graduate courses may be taken with the permission of the department of the program of study.

Up to nine semester hours of satisfactory graduate credit may be transferred into the program from other institutions if not used in completing another graduate degree program. Undergraduate courses may be transferred if the courses were not used in completing another degree program. The total undergraduate upper-division semester hours applied to this degree program cannot exceed nine hours.

The Graduate Record Examination (GRE) Aptitude Test is required of all students prior to advancement to candidacy status.

The program requires extensive use of a computer; therefore, students are expected to have their own computer or access to one 24 hours a day.

## Admission to the University

Requirements for admission to California State University, Fresno are in accordance with Title 5, Chapter 1, Subchapter 3 of the California Code of Regulations.

## Admission to the Program

Students who apply to the program are placed in one of the following categories:

1. **Graduate Standing, Classified.** Students with (a) an undergraduate degree in an appropriate engineering discipline from an ABET accredited program, (b) an undergraduate grade point average of 3.0, (c) a minimum GRE quantitative score of 550 are eligible for classified (degree status) graduate standing, and (d) a letter of recommendation from an academic or an industrial source.
2. **Graduate Standing, Conditionally Classified.** Students from non-ABET accredited engineering programs, or with a degree in physical science or mathematics or a different engineering discipline, and who have not met the requirements of category 1, will be given conditionally classified graduate standing. These students may be required to take prerequisite courses as determined by the graduate program at the time of admission. Upon satisfactorily meeting any specified requirements, students will then be advanced to classified standing.

### **Degree Candidacy**

The following requirements must be met prior to advancement to candidacy:

1. Classified graduate standing.
2. Completion at California State University, Fresno of at least 9 units of the proposed program with a 3.0 average on all completed work appearing on the program.
3. A minimum grade point average of 3.0 in all required graduate coursework from the date of commencing the first course of the proposed master's degree program.
4. Departmental recommendation for advancement to candidacy.
5. Satisfactory completion of the Graduate Writing Skills Requirement.

### **Nondegree students**

Students with a bachelor's degree may take graduate courses (concurrent with regular students) for credit or audit. Prior approval is required.

## **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.