BS IN ELECTRICAL AND ELECTRONIC ENGINEERING

Units required for Major: 92
Total units required for BS: 122

Program Description
The field of Electrical and Electronic Engineering continues to expand in scope, driven by advances in technology and new challenges faced by society. To prepare our graduates for careers in this demanding field, we equip them with a strong background in the fundamental principles of the discipline, and subsequent advanced courses in specific areas. Our curriculum provides practical, hands-on experience through laboratory courses.

The Electrical and Electronic Engineering program provides breadth (core courses), depth (elective sequence), and a culminating design project to apply the knowledge gained through the curriculum. The curriculum allows flexibility by offering a number of elective courses providing our graduates with depth in their respective areas of interest. The electives offered provide depth in one or more of the following areas: Analog/Digital Electronics, Control Systems, Communication Engineering, and Power Engineering. Students select a senior project either in power engineering or in the general area of electronics. Each of these options includes a sequence of two courses for the completion of the project, and has its own prerequisite requirements.

Note: Students graduating with a BS in Electrical and Electronic Engineering will not be subject to the University's Foreign Language Graduation Requirement. Students who change major may be subject to the University's Foreign Language Graduation Requirement.

Minimum Grade Requirement
A grade of "C-" or better is required in all courses applied to an Electrical and Electronic Engineering major.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td><strong>REQUIRED LOWER DIVISION COURSES (38 Units)</strong></td>
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<tr>
<td>CHEM 1E</td>
<td>General Chemistry for Engineering</td>
<td>4</td>
</tr>
<tr>
<td>ENGR 1</td>
<td>Introduction to Engineering</td>
<td>1</td>
</tr>
<tr>
<td>MATH 30</td>
<td>Calculus I</td>
<td>4</td>
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<tr>
<td><strong>Second Semester Freshman Year</strong></td>
<td></td>
<td></td>
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<tr>
<td>ENGR 50</td>
<td>Computational Methods and Applications</td>
<td>3</td>
</tr>
<tr>
<td>MATH 31</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 11A</td>
<td>General Physics: Mechanics</td>
<td>3</td>
</tr>
<tr>
<td><strong>First Semester Sophomore Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EEE/CPE 64</td>
<td>Introduction to Logic Design</td>
<td>4</td>
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<tr>
<td>MATH 32</td>
<td>Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 11C</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td><strong>Second Semester Sophomore Year</strong></td>
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<td></td>
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<tr>
<td>ENGR 17</td>
<td>Introductory Circuit Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 45</td>
<td>Differential Equations for Science and Engineering</td>
<td>3</td>
</tr>
<tr>
<td><strong>REQUIRED UPPER DIVISION COURSES (33 Units)</strong></td>
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First Semester Junior Year
EEE 117 & 117L Network Analysis & Networks Analysis Laboratory 4
EEE 161 Applied Electromagnetics 4
EEE 180 Signals & Systems 3
ENGR 140 Engineering Economics 2

Second Semester Junior Year
EEE 108 & 108L Electronics I & Electronics I Laboratory 4
EEE 141 Power System Analysis I 3
EEE 174 Introduction to Microprocessors 4
EEE 184 Introduction to Feedback Systems 3
ENGR 120 Probability and Random Signals 3

First semester senior year
EEE 185 Modern Communication Systems 3

REQUIRED DESIGN PROJECT SERIES
Select one of the following two series:

**POWER DESIGN PROJECT SERIES (8 Units)**
EEE 142 Power System Analysis II 4
& EEE 143 Power System Laboratory 4
EEE 192A Electrical Power Design Project I 2
or
EEE 192B Electrical Power Design Project II 2

**PRODUCT DESIGN PROJECT SERIES (8 Units)**
EEE 109 Electronics II 4
EEE 193A Product Design Project I 2
EEE 193B Product Design Project II 2

ADDITIONAL ELECTIVE REQUIREMENTS FOR BOTH POWER/PRODUCT DESIGN PROJECT SERIES
Select 6 units of lecture and 1 unit of laboratory from one of the four areas listed below.
Select 6 additional units from any of the four areas listed below.

TOTAL UNITS 92

1. Course also satisfies General Education (GE)/Graduation Requirement. The designation "General Education course" denotes a course which meets GE requirements other than those which also serve as prerequisites to courses in the major. Students are expected to satisfy the University's GE requirements. Consult the Department Chair for specific GE requirements. Students should take ENGL 5 as early as possible since it is required for admission to the upper division.

2. CPE 64W, EEE 64W or ENGR 17W may be available to augment understanding of material; however, these courses cannot be used to satisfy graduation requirements.

3. It is imperative that students take the University's Writing Placement for Juniors (WPJ) during the first semester of the junior year, as it is a prerequisite to some laboratory courses after EEE 117L.

Depth Requirement Areas and List of Electives
Depth Area Requirement for both Power Design and Product Design Series:

- Select 6 units of lecture and 1 unit of laboratory from one of the four areas below:
  - Select 6 additional units from any of the four areas listed below.
### Analog/Digital Electronics (34 Units)

- **CPE/CSC 138**: Computer Networking Fundamentals (3 Units)
- **CPE 151**: CMOS and Digital VLSI Design (3 Units)
- **CPE 153**: VLSI Design (3 Units)
- **CPE 166**: Advanced Logic Design (3 Units)
- **CPE 186**: Computer Hardware System Design (3 Units)
- **CPE 187**: Embedded Systems Design (3 Units)
- **EEE 109**: Electronics II (4 Units)
- **EEE 110**: Advanced Analog Integrated Circuits (1 Unit)
- **EEE 111**: Advanced Analog Integrated Circuits Laboratory (1 Unit)
- **EEE 120**: Electronic Instrumentation (4 Units)
- **EEE 166**: Physical Electronics (3 Units)

### Control Systems (11 Units)

- **EEE 178**: Introduction to Machine Vision (3 Units)
- **EEE 187**: Robotics (4 Units)
- **EEE 188**: Digital Control System (3 Units)
- **EEE 189**: Controls Laboratory (1 Unit)

### Communication Engineering (19 Units)

- **EEE 122**: Applied Digital Signal Processing (3 Units)
- **EEE 162**: Applied Wave Propagation (3 Units)
- **EEE 163**: Traveling Waves Laboratory (1 Unit)
- **EEE 165**: Introduction to Optical Engineering (3 Units)
- **EEE 167**: Electro-Optical Engineering Lab (1 Unit)
- **EEE 181**: Introduction to Digital Signal Processing (3 Units)
- **EEE 182**: Digital Signal Processing Lab (1 Unit)
- **EEE 183**: Digital and Wireless Communication System Design (3 Units)
- **EEE 186**: Communication Systems Laboratory (1 Unit)

### Power Engineering (29 Units)

- **EEE 130**: Electromechanical Conversion (3 Units)
- **EEE 131**: Electromechanics Laboratory (1 Unit)
- **EEE 135**: Renewable Electrical Energy Sources and Grid Integration (3 Units)
- **EEE 136**: Smart Electric Power Grid (3 Units)
- **EEE 137**: Applications of Power Electronics in Power Systems (3 Units)
- **EEE 142**: Power System Analysis II (3 Units)
- **EEE 143**: Power System Laboratory (1 Unit)
- **EEE 144**: Electric Power Distribution (3 Units)
- **EEE 145**: Power System Relay Protection and Laboratory (4 Units)
- **EEE 146**: Power Electronics (3 Units)
- **EEE 147**: Power System Operation and Control Laboratory (1 Unit)
- **EEE 148**: Power Electronics Laboratory (1 Unit)

### General Education Requirements

#### Area A: Basic Subjects (6 Units)

- **A1**: Oral Communication (3 Units)
- **A2**: Written Communication (3 Units)
- **A3**: Critical Thinking (Exempt) (0 Units)

#### Area B: Physical Universe and Its Life Forms (3 Units)

- **B1**: Physical Science - Met by major courses.
- **B2**: Life Forms (3 Units)
- **B3**: Lab - Met by major courses.
- **B4**: Math Concepts - Met by major courses.
- **B5**: Additional Course - Met by upper-division major courses.

#### Area C: Arts and Humanities (12 Units)

- **C1**: Arts (3 Units)
- **C2**: Humanities (3 Units)

#### Area D: The Individual and Society (6 Units)

- **D1**: Arts and Humanities (3 Units)
- **D2**: Understanding Personal Development (3 Units)

#### Area E: Understanding Personal Development

- **E1**: Arts Course - Met by major courses.
- **E2**: Course - Met by major courses.

#### Area F: Ethnic Studies (3 units) (3 Units)

- **F1**: Ethnic Studies (3 Units)

### Graduation Requirements

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<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td><strong>Graduation Requirements (required by CSU) (9 Units)</strong></td>
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<tr>
<td><strong>American Institutions: U.S. History</strong></td>
<td></td>
<td>3</td>
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<tr>
<td><strong>American Institutions: U.S. Constitution &amp; CA Government</strong></td>
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<td>3</td>
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<tr>
<td><strong>Writing Intensive (WI)</strong></td>
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<td>3</td>
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<tr>
<td><strong>Graduation Requirements (required by Sacramento State) (6 Units)</strong></td>
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<tr>
<td><strong>English Composition II</strong></td>
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<td>3</td>
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<tr>
<td><strong>Race and Ethnicity in American Society (RE)</strong></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Foreign Language Proficiency Requirement (Exempt)</strong></td>
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Note:

- Other upper division courses in Engineering and Computer Science may be selected as elective lectures with prior approval of the student’s advisor.
- Other upper division and graduate courses in Engineering and Computer Science may be selected as elective lectures with prior approval of the student’s advisor. Graduate courses counted towards a BS degree may not be used for a MS degree.

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1. To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (http://catalog.csus.edu/colleges/academic-affairs/general-education/).

   Note: There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (http://www.csus.edu/acad/), by phone (916) 278-1000, or email (advising@csus.edu).

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1. You may not use a course to count for both a required course and an elective course.
To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (http://catalog.csus.edu/colleges/academic-affairs/general-education/).

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