Computer Engineering, Bachelor of Science

College of Engineering

Faculty (https://ece.ucdavis.edu/directory/)

The Electrical & Computer Engineering Undergraduate Programs

The department administers two undergraduate curricula in the College of Engineering: (1) the Electrical Engineering curriculum and (2) the Computer Engineering curriculum.

Integrated Degree Programs (IDP)

The IDP leads to both the Bachelor of Science and the Master of Science degrees. The program provides a student the opportunity to obtain superior breadth and depth of technical material. The IDP program in the Department of Electrical & Computer Engineering is available only to UC Davis undergraduates with strong academic records enrolled in the Electrical Engineering, Computer Engineering or Applied Physics curricula. Applicants in their junior year must apply for the IDP by March 31. For more information on IDP, see B.S./M.S. Integrated Degree Programs.

Mission

Under its land grant status, the University of California has a mission to provide the state with the trained workforce it needs and to advance knowledge and research in directions that contribute to the general welfare of the state and the nation. The Department of Electrical & Computer Engineering contributes to the mission of the University in three ways. First, its undergraduate and graduate education programs seek to provide students with an understanding of the fundamental principles of electrical and computer engineering, the skills needed to solve the complex technological problems of modern society and the ability to continue to learn and develop throughout their careers. Second, through its research programs, the department contributes to the development and progress of electronics, communications, and computer technology. Finally, the department helps to transfer research results to industry through publication, public service and professional activities.

Objectives

Teaching—To provide undergraduate students with sufficient breadth to allow them to participate in teams, continue their own education after graduation and select a focus area intelligently; to provide undergraduate students with sufficient depth in a narrower discipline to allow them to develop the ability to solve complex engineering problems; to educate the students in the graduate program to be leaders in industry or to do meaningful research in industry, government or academia.

Research—To develop and maintain research programs that produce useful technological advances while simultaneously training the next generation of researchers and leaders; to update and/or shift the foci of these programs frequently in response to the needs of our constituency and the nation; to provide a stimulating environment that encourages our graduate students to develop their abilities as far as possible.

Computer Engineering Undergraduate Program

The Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org).

Objectives

The Electrical & Computer Engineering program educational objectives have been developed to address the needs of our constituencies. The objectives of the Electrical & Computer Engineering programs are as follow:

- Graduates will create value for their employers, demonstrating knowledge and initiative and making beneficial contributions beyond the workplace. This can also result in patents, awards, publications and presentations.
- Graduates will grow their capabilities through advanced education and professional development.
- Graduates will provide leadership and be proactive in their profession and/or communities.

Exclusive of General Education units, the minimum number of units required for the Computer Engineering undergraduate major is 138.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMN 001</td>
<td>Introduction to Public Speaking</td>
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<tr>
<td>or ENG 003</td>
<td>Introduction to Engineering Design</td>
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<tr>
<td>Mathematics</td>
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<tr>
<td>MAT 021A</td>
<td>Calculus</td>
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<td>MAT 021C</td>
<td>Calculus</td>
<td>4</td>
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<tr>
<td>MAT 021D</td>
<td>Vector Analysis</td>
<td>4</td>
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<tr>
<td>MAT 022A</td>
<td>Linear Algebra</td>
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<td>Linear Algebra Computer Laboratory</td>
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<td>MAT 022B</td>
<td>Differential Equations</td>
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<td>Physics</td>
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<tr>
<td>PHY 009A</td>
<td>Classical Physics</td>
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<tr>
<td>PHY 009B</td>
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<td>PHY 009C</td>
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<td>Computer Engineering</td>
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<tr>
<td>ECS 020</td>
<td>Discrete Mathematics For Computer Science</td>
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<tr>
<td>ECS 036A</td>
<td>Programming &amp; Problem Solving</td>
<td>4</td>
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<tr>
<td>ECS 036B</td>
<td>Software Development &amp; Object-Oriented Programming in C++</td>
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<tr>
<td>ECS 036C</td>
<td>Data Structures, Algorithms, &amp; Programming</td>
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</table>

Electrical & Computer Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>EEC 001</td>
<td>Introduction to Electrical &amp; Computer Engineering</td>
<td>1</td>
</tr>
<tr>
<td>EEC 010</td>
<td>Introduction to Digital &amp; Analog Systems</td>
<td>4</td>
</tr>
<tr>
<td>EEC 018</td>
<td>Digital Systems I</td>
<td>5</td>
</tr>
</tbody>
</table>
**Engineering**

- **ENG 017** Circuits I 4

Choose one; a grade of C- or better is required: 4

- **ENL 003** Introduction to Literature
- **UWP 001** Introduction to Academic Literacies
- **UWP 001Y** Introduction to Academic Literacies
- **UWP 001V** Introduction to Academic Literacies: Online
- **COM 001** Major Works of the Ancient World
- **COM 002** Major Works of the Medieval & Early Modern World
- **COM 003** Major Works of the Modern World
- **NAS 005** Introduction to Native American Literature

**Lower Division Required Course Subtotal** 76

**Upper Division Required Courses**

**Electrical & Computer Engineering**

- **EEC 100** Circuits II 5
- **EEC 111** Digital Electronic Circuits 4
- **EEC 161** Probabilistic Analysis of Electrical & Computer Systems 4
- **EEC 170** Introduction to Computer Architecture 4
- **EEC 172** Embedded Systems 4
- **EEC 173A/ECS 152A** Computer Networks 4
- **EEC 180** Digital Systems II 5
- **EEC 196** Issues in Engineering Design 1

**Computer Engineering**

- **ECS 122A** Algorithm Design & Analysis 4
- **ECS 150** Operating Systems & System Programming 4

Choose one: 3-4

- **ENG/PHY 160** Environmental Physics & Society
- **ENG 190** Professional Responsibilities of Engineers
- **ECS 188** Ethics in an Age of Technology

**Upper Division Electives**

All Design Project courses are also considered Design Laboratory electives and may be counted in both categories simultaneously. Both A and B need to be taken to receive credit for the Design Project.

- **EEC 119A** Integrated Circuit Design Project
- **EEC 119B** Integrated Circuit Design Project
- **EEC 134A** RF/Microwave Systems Design
- **EEC 134B** RF/Microwave Systems Design
- **EEC 136A** Electronic Design Project
- **EEC 136B** Electronic Design Project
- **EEC 181A** Digital Systems Design Project
- **EEC 181B** Digital Systems Design Project
- **EEC 193A** Senior Design Project
- **EEC 193B** Senior Design Project
- **EEC 195A** Autonomous Vehicle Design Project
- **EEC 195B** Autonomous Vehicle Design Project

Choose four letter graded upper division EEC or ECS courses 2 12-16

**Technical Electives**

Choose 8 units: 8

- Chemistry

**Computer Engineering**

- **ECS 122A** Algorithm Design & Analysis 4
- **ECS 150** Operating Systems & System Programming 4

Choose one: 3-4

- **ENG/PHY 160** Environmental Physics & Society
- **ENG 190** Professional Responsibilities of Engineers
- **ECS 188** Ethics in an Age of Technology

**Upper Division Electives**

- **CHE 002A** General Chemistry
- **CHE 002B** General Chemistry
- **CHE 002C** General Chemistry
- Any upper division course 3

**Lower Division Required Course Subtotal** 76

**Upper Division Required Courses**

**Electrical & Computer Engineering**

- **EEC 100** Circuits II 5
- **EEC 111** Digital Electronic Circuits 4
- **EEC 161** Probabilistic Analysis of Electrical & Computer Systems 4
- **EEC 170** Introduction to Computer Architecture 4
- **EEC 172** Embedded Systems 4
- **EEC 173A/ECS 152A** Computer Networks 4
- **EEC 180** Digital Systems II 5
- **EEC 196** Issues in Engineering Design 1

**Computer Engineering**

- **ECS 122A** Algorithm Design & Analysis 4
- **ECS 150** Operating Systems & System Programming 4

Choose one: 3-4

- **ENG/PHY 160** Environmental Physics & Society
- **ENG 190** Professional Responsibilities of Engineers
- **ECS 188** Ethics in an Age of Technology

**Upper Division Electives**

- **CHE 002A** General Chemistry
- **CHE 002B** General Chemistry
- **CHE 002C** General Chemistry
- Any upper division course 3

**Engineering**

- **ENG 035** Statics
- **ENG 045** Properties of Materials

Any upper division engineering course not used in satisfaction of core degree requirements 4

A maximum of 6 units for any combination of engineering courses numbered 190C, 192, 198, and 199 may be used.

**Mathematics**

- Any upper division course 5

**Statistics**

- Any upper division course 6

**Biological Sciences**

- **BIS 101** Genes & Gene Expression
- **BIS 101D** Genes & Gene Expression Discussion
- **BIS 102** Structure & Function of Biomolecules
- **BIS 103** Bioenergetics & Metabolism
- **BIS 104** Cell Biology
- **BIS 122** Population Biology & Ecology
- **BIS 122P** Population Biology & Ecology/Advanced Laboratory Topics

**Economics**

- **ECN 100A** Intermediate Micro Theory: Consumer & Producer Theory
- **ECN 100B** Intermediate Micro Theory: Imperfect Competition & Market Failure
- **ECN 101** Intermediate Macro Theory
- **ECN 102** Analysis of Economic Data
- **ECN 103** Economics of Uncertainty & Information
- **ECN 122** Theory of Games & Strategic Behavior
- **ECN 140** Econometrics

**Management**

- **MGT 011A** Elementary Accounting
- **MGT 011B** Elementary Accounting
- **MGT 100** Introduction to Financial Accounting
- **MGT 120** Managing & Using Information Technology
- **MGT 140** Marketing for the Technology-Based Enterprise
- **MGT 150** Technology Management
- **MGT 160** Financing New Business Ventures
- **MGT 170** Management Accounting & Control
- **MGT 180** Supply Chain Planning & Management

**Upper Division Composition Requirement**

Choose one; a grade of a C- or better is required: 0-4

- **UWP 101** Advanced Composition
- **UWP 102A** Writing in the Disciplines: Special Topics
- **UWP 102B** Writing in the Disciplines: Biology
- **UWP 102C** Writing in the Disciplines: History
### Upper Division Required Course Subtotal

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>UWP 102D</td>
<td>Writing in the Disciplines: International Relations</td>
</tr>
<tr>
<td>UWP 102E</td>
<td>Writing in the Disciplines: Engineering</td>
</tr>
<tr>
<td>UWP 102F</td>
<td>Writing in the Disciplines: Food Science &amp; Technology</td>
</tr>
<tr>
<td>UWP 102G</td>
<td>Writing in the Disciplines: Environmental Writing</td>
</tr>
<tr>
<td>UWP 102H</td>
<td>Writing in the Disciplines: Human Development &amp; Psychology</td>
</tr>
<tr>
<td>UWP 102I</td>
<td>Writing in the Disciplines: Ethnic Studies</td>
</tr>
<tr>
<td>UWP 102J</td>
<td>Writing in the Disciplines: Fine Arts</td>
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<tr>
<td>UWP 102K</td>
<td>Writing in the Disciplines: Sociology</td>
</tr>
<tr>
<td>UWP 102L</td>
<td>Writing in the Disciplines: Film Studies</td>
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<tr>
<td>UWP 104A</td>
<td>Writing in the Professions: Business Writing</td>
</tr>
<tr>
<td>UWP 104B</td>
<td>Writing in the Professions: Law</td>
</tr>
<tr>
<td>UWP 104C</td>
<td>Writing in the Professions: Journalism</td>
</tr>
<tr>
<td>UWP 104D</td>
<td>Writing in the Professions: Elementary &amp; Secondary Education</td>
</tr>
<tr>
<td>UWP 104E</td>
<td>Writing in the Professions: Science</td>
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<tr>
<td>UWP 104F</td>
<td>Writing in the Professions: Health</td>
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<tr>
<td>UWP 104I</td>
<td>Writing in the Professions: Internships</td>
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<tr>
<td>UWP 104J</td>
<td>Writing in the Professions: Writing for Social Justice</td>
</tr>
<tr>
<td>UWP 104T</td>
<td>Writing in the Professions: Technical Writing</td>
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</table>

Passing the Upper Division Composition Exam.

Upper Division Required Course Subtotal: 68-77

**Total Units:** 138-147

1. Transfer and change of major students who do not take EEC 010 will substitute 4 additional units of upper division electives.
2. Excluding ECS 132, ECS 155, ECS 157, ECS 188, ECS 154A, ECS 154B.
3. Except CHE 195, CHE 197.
4. Excluding ENG 100, ENG 160, ENG 190 (each restricted to 1 unit of technical elective), ENG 198, ECS 132, ECS 154A, ECS 154B, ECS 188.
5. Except MAT 135A, MAT 197TC.
6. Except PHY 116, PHY 137, PHY 160 (restricted to 1 unit of technical elective), PHY 195, PHY 197T.
7. Except STA 100, STA 102, STA 103, STA 104, STA 106, STA 108, STA 120, STA 130A.