

Electrical Engineering, B.S.

Program Educational Objectives: Graduates of the Electrical Engineering program will (1) engage in professional practice in academia, industry, or government; (2) promote innovation in the design, research and implementation of products and services in the field of electrical engineering through strong communication, leadership and entrepreneurial skills; (3) engage in life-long learning in the field of electrical engineering. (Program educational objectives are those aspects of engineering that help shape the curriculum; achievement of these objectives is a shared responsibility between the student and UCI.)

The undergraduate Electrical Engineering curriculum is built around a basic core of humanities, mathematics, and natural and engineering science courses. It is arranged to provide the fundamentals of synthesis and design that will enable graduates to begin careers in industry or to go on to graduate study. UCI Electrical Engineering students take courses in network analysis, electronics, electronic system design, signal processing, electromagnetics, and computer engineering. They learn to design circuits and systems to meet specific needs and to use modern computers in problem analysis and solution.

Electrical Engineering majors have the opportunity to select a specialization in Electro-optics and Solid-State Devices; and Systems and Signal Processing. In addition to the courses offered by the Department, the major program includes selected courses from the Donald Bren School of Information and Computer Sciences.

High School Students: See School Admissions (<http://catalogue.uci.edu/thehenrysamuelischoolofengineering/#undergraduatestudytext>) information.

Transfer Students: Preference will be given to junior-level applicants with the highest grades overall, and who have satisfactorily completed the following **required** courses: two years of approved calculus, one year of calculus-based physics with laboratories (mechanics, electricity and magnetism), completion of lower-division writing, and one course in computational methods (e.g., C, C++). For course equivalency specific to each college, visit <https://assist.org>.

Students are encouraged to complete as many of the lower-division degree requirements as possible prior to transfer. Students who enroll at UCI in need of completing lower-division coursework may find that it will take longer than two years to complete their degrees. For further information, contact The Henry Samueli School of Engineering at 949-824-4334.

All students must meet the University Requirements (<http://catalogue.uci.edu/informationforadmittedstudents/requirementsforabachelorsdegree/>).

All students must meet the School Requirements (<http://catalogue.uci.edu/thehenrysamuelischoolofengineering/#schoolrequirementstext>).

Major Requirements:

Mathematics and Basic Science Courses:

ENGR 1A or CHEM 1A	General Chemistry for Engineers General Chemistry
EECS 55	Engineering Probability
EECS 70LA	Network Analysis I Laboratory
EECS 145	Electrical Engineering Analysis
MATH 2A- 2B	Single-Variable Calculus and Single-Variable Calculus
MATH 2D	Multivariable Calculus
MATH 2E	Multivariable Calculus
MATH 3A	Introduction to Linear Algebra
MATH 3D	Elementary Differential Equations
PHYSICS 7C	Classical Physics
PHYSICS 7LC	Classical Physics Laboratory
PHYSICS 7D- 7E	Classical Physics and Classical Physics
PHYSICS 7LD	Classical Physics Laboratory
PHYSICS 51A	Modern Physics

Engineering Topics Courses:

Students must complete each of the following courses and accumulate a minimum of 28 units of engineering design:

EECS 1	Introduction to Electrical Engineering and Computer Engineering
EECS 10	Computational Methods in Electrical and Computer Engineering
EECS 31	Introduction to Digital Systems

EECS 31L	Introduction to Digital Logic Laboratory
EECS 50	Discrete-Time Signals and Systems
EECS 70A	Network Analysis I
EECS 70B	Network Analysis II
EECS 70LB	Network Analysis II Laboratory
EECS 150	Continuous-Time Signals and Systems
EECS 159A- 159B	Senior Design Project I and Senior Design Project II
EECS 160A	Introduction to Control Systems
EECS 160LA	Control Systems I Laboratory
EECS 170A	Electronics I
EECS 170LA	Electronics I Laboratory
EECS 170B	Electronics II
EECS 170LB	Electronics II Laboratory
EECS 170C	Electronics III
EECS 170LC	Electronics III Laboratory
EECS 180A	Engineering Electromagnetics I

Electrical Engineering Specialization:

Students must satisfy the requirements for one of the five specializations listed below.

Technical Elective Courses:

In addition to a specialization, and with approval of a faculty advisor, students must select a minimum of three other technical elective courses, comprising of at least 10 units. At least one of these courses must be from outside the student's specialization. All EECS courses not required for the major are approved as technical electives. Four (4) units of 199 course work count as one technical elective. ENGR 7A and ENGR 7B can be counted as 4 units of Technical Electives. ENGR 7A and ENGR 7B are available only to lower-division students. Both ENGR 7A and ENGR 7B must be taken to be counted as a Technical Elective.

Engineering Professional Topics Courses

ENGR 190W	Communications in the Professional World
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At most an aggregate total of 6 units of EECS 199 may be used to satisfy degree requirements; EECS 199 is open to students with a 3.0 GPA or higher.

(The nominal Electrical Engineering program will require 188-191 units of courses to satisfy all university and major requirements. Because each student comes to UCI with a different level of preparation, the actual number of units will vary.)

Specialization in Electronic Circuit Design:**Requires:**

EECS 170D	Integrated Electronic Circuit Design
EECS 170E	Analog and Communications IC Design
and select four of the following:	
EECS 166A	Industrial and Power Electronics
EECS 174	Semiconductor Devices
EECS 176	Fundamentals of Solid-State Electronics and Materials
EECS 179	Microelectromechanical Systems (MEMS)
EECS 182	Monolithic Microwave Integrated Circuit (MMIC) Analysis and Design
EECS 188	Optical Electronics

Specialization in Semiconductors and Optoelectronics:**Requires:**

EECS 174	Semiconductor Devices
EECS 188	Optical Electronics
PHYSICS 52A	Fundamentals of Experimental Physics
and select three of the following:	
EECS 170D	Integrated Electronic Circuit Design
EECS 176	Fundamentals of Solid-State Electronics and Materials
EECS 179	Microelectromechanical Systems (MEMS)
EECS 180B	Engineering Electromagnetics II
EECS 180C	Engineering Electromagnetics III

ENGR 54

Principles of Materials Science and Engineering

Specialization in RF, Antennas and Microwaves:

Requires:

EECS 144	Antenna Design for Wireless Communication Links
EECS 180B	Engineering Electromagnetics II
EECS 182	Monolithic Microwave Integrated Circuit (MMIC) Analysis and Design
and select three of the following:	
EECS 170D	Integrated Electronic Circuit Design
EECS 170E	Analog and Communications IC Design
EECS 180C	Engineering Electromagnetics III
EECS 188	Optical Electronics
PHYSICS 52A	Fundamentals of Experimental Physics

Specialization in Digital Signal Processing:

Requires:

EECS 22	Advanced C Programming
EECS 152A	Digital Signal Processing
EECS 152B	Digital Signal Processing Design and Laboratory
and select three of the following:	
EECS 20	Computer Systems and C Programming
EECS 101	Introduction to Machine Vision
EECS 112	Organization of Digital Computers
EECS 141A	Communication Systems I
EECS 141B	Communication Systems II

Specialization in Communications:

Requires:

EECS 141A	Communication Systems I
EECS 141B	Communication Systems II
and select four of the following:	
EECS 20	Computer Systems and C Programming
EECS 22	Advanced C Programming
EECS 144	Antenna Design for Wireless Communication Links
EECS 148	Computer Networks
EECS 152A	Digital Signal Processing
EECS 152B	Digital Signal Processing Design and Laboratory
EECS 170E	Analog and Communications IC Design
EECS 188	Optical Electronics

Listed below are sample programs for each of the five specializations within Electrical Engineering. These sample programs are typical for the accredited major in Electrical Engineering. Students should keep in mind that this program is based upon a rigid set of prerequisites, beginning with adequate preparation in high school mathematics, physics, and chemistry. Therefore, the course sequence should not be changed except for the most compelling reasons. Students who are not adequately prepared, or who wish to make changes in the sequence for other reasons, must have their programs approved by their advisor. Electrical Engineering majors are encouraged to consult with academic counselors as needed, and students who are academically at risk are mandated to see a counselor as frequently as deemed necessary by the advising staff.

Sample Program of Study — Electrical Engineering (Electronic Circuit Design Specialization)

Freshman		
Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
EECS 10	PHYSICS 7C	PHYSICS 7D
General Education	PHYSICS 7LC	PHYSICS 7LD
General Education	ENGR 1A or CHEM 1A	EECS 1
	General Education	EECS 31
Sophomore		
Fall	Winter	Spring
MATH 3A	MATH 3D	MATH 2E

PHYSICS 7E	EECS 55	PHYSICS 51A
EECS 31L	EECS 70A	EECS 50
General Education	EECS 70LA	EECS 70B
	General Education	EECS 70LB
Junior		
Fall	Winter	Spring
EECS 145	EECS 150	EECS 170C
EECS 170A	EECS 170B	EECS 170LC
EECS 170LA	EECS 170LB	ENGR 190W
Spec. Elective	EECS 180A	Spec. Elective
General Education	Spec. Elective	General Education
Senior		
Fall	Winter	Spring
EECS 159A	EECS 159B	Technical Elective
EECS 160A	EECS 170E	General Education
EECS 160LA	Technical Elective	General Education
EECS 170D	Technical Elective	
Spec. Elective		

Students must obtain approval for their program of study and must see their faculty advisor at least once each year.

Sample Program of Study — Electrical Engineering (Semiconductors and Optoelectronics)

Freshman		
Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
EECS 10	PHYSICS 7C	PHYSICS 7D
General Education	PHYSICS 7LC	PHYSICS 7LD
General Education	ENGR 1A or CHEM 1A	EECS 1
	General Education	EECS 31
Sophomore		
Fall	Winter	Spring
MATH 3A	MATH 3D	MATH 2E
PHYSICS 7E	EECS 55	PHYSICS 51A
PHYSICS 52A	EECS 70A	EECS 50
EECS 31L	EECS 70LA	EECS 70B
	General Education	EECS 70LB
Junior		
Fall	Winter	Spring
EECS 145	EECS 150	EECS 170C
EECS 170A	EECS 170B	EECS 170LC
EECS 170LA	EECS 170LB	Spec. Elective
ENGR 190W	EECS 174	Technical Elective
General Education	EECS 180A	General Education
Senior		
Fall	Winter	Spring
EECS 159A	EECS 159B	Technical Elective
EECS 160A	EECS 188	General Education
EECS 160LA	Spec. Elective	General Education
General Education	Technical Elective	
Spec. Elective		

Students must obtain approval for their program of study and must see their faculty advisor at least once each year.

Sample Program of Study — Electrical Engineering (RF, Antennas and Microwaves)

Freshman		
Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
EECS 10	PHYSICS 7C	PHYSICS 7D
General Education	PHYSICS 7LC	PHYSICS 7LD
General Education	ENGR 1A or CHEM 1A	EECS 1
	General Education	EECS 31

Sophomore		
Fall	Winter	Spring
MATH 3A	MATH 3D	MATH 2E
PHYSICS 7E	EECS 55	PHYSICS 51A
EECS 31L	EECS 70A	EECS 50
General Education	EECS 70LA	EECS 70B
	General Education	EECS 70LB
Junior		
Fall	Winter	Spring
EECS 145	EECS 150	EECS 170C
EECS 170A	EECS 170B	EECS 170LC
EECS 170LA	EECS 170LB	EECS 180B
ENGR 190W	EECS 180A	Spec. Elective
General Education	Spec. Elective	Spec. Elective
Senior		
Fall	Winter	Spring
EECS 144	EECS 159B	General Education
EECS 159A	General Education	General Education
EECS 160A	Technical Elective	Technical Elective
EECS 160LA	Technical Elective	
EECS 182		

Students must obtain approval for their program of study and must see their faculty advisor at least once each year.

Sample Program of Study — Electrical Engineering (Digital Signal Processing Specialization)

Freshman		
Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
EECS 10	PHYSICS 7C	PHYSICS 7D
General Education	PHYSICS 7LC	PHYSICS 7LD
General Education	CHEM 1A or ENGR 1A	EECS 1
	General Education	EECS 31
Sophomore		
Fall	Winter	Spring
MATH 3A	MATH 3D	MATH 2E
PHYSICS 7E	EECS 55	PHYSICS 51A
EECS 22	EECS 70A	EECS 50
EECS 31L	EECS 70LA	EECS 70B
	General Education	EECS 70LB
Junior		
Fall	Winter	Spring
EECS 145	EECS 150	EECS 170C
EECS 152A	EECS 152B	EECS 170LC
EECS 170A	EECS 170B	Spec. Elective
EECS 170LA	EECS 170LB	General Education
Spec. Elective	Spec. Elective	
Senior		
Fall	Winter	Spring
EECS 159A	EECS 159B	ENGR 190W
EECS 160A	EECS 180A	Technical Elective
EECS 160LA	Technical Elective	General Education
Technical Elective	General Education	General Education
General Education		

Students must obtain approval for their program of study and must see their faculty advisor at least once each year.

Sample Program of Study — Electrical Engineering (Communication Specialization)

Freshman		
Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
EECS 10	PHYSICS 7C	PHYSICS 7D
General Education	PHYSICS 7LC	PHYSICS 7LD

General Education	ENGR 1A or CHEM 1A General Education	EECS 1 EECS 31
Sophomore		
Fall	Winter	Spring
MATH 3A	MATH 3D	MATH 2E
PHYSICS 7E	EECS 55	PHYSICS 51A
EECS 31L	EECS 70A	EECS 50
General Education	EECS 70LA General Education	EECS 70B EECS 70LB
Junior		
Fall	Winter	Spring
EECS 145	EECS 150	EECS 170C
EECS 170A	EECS 170B	EECS 170LC
EECS 170LA	EECS 170LB	Spec. Elective
ENGR 190W	EECS 180A	Spec. Elective
Spec. Elective	Spec. Elective	General Education
Senior		
Fall	Winter	Spring
EECS 159A	EECS 159B	Technical Elective
EECS 141A	EECS 141B	General Education
EECS 160A	Technical Elective	General Education
EECS 160LA	General Education	
Technical Elective		

Students must obtain approval for their program of study and must see their faculty advisor at least once each year.