Electrical and Computer Engineering, M.S.

The Department offers M.S. and Ph.D. degrees in Electrical and Computer Engineering with a concentration in Electrical Engineering and in Computer Engineering. Because most graduate courses are not repeated every quarter, students should make every effort to begin their graduate program in the fall.

Detailed descriptions of the two concentrations are as follows.

Electrical Engineering Concentration (EE)

The Electrical Engineering faculty study the following areas: optical and solid-state devices, including quantum electronics and optics, integrated electro-optics, design of semiconductor devices and materials, analog and mixed-signal IC design, microwave circuits antenna and devices, and nano imaging; systems engineering and signal processing, including communication theory, signal processing, power electronics, neural networks, communications networks, systems engineering, and control systems. Related communication networks topics are also addressed by the Networked Systems M.S. (http://catalogue.uci.edu/interdisciplinarystudies/networkedsystems_ms/) and Ph.D. (http://catalogue.uci.edu/interdisciplinarystudies/networkedsystems_phd/) degrees.

Computer Engineering Concentration (CPE)

The concentration in Computer Engineering provides students with a solid base in the design, development, and evaluation of computer systems and software. Thrust areas include computer architecture, software design, and embedded systems, but the program is highly customizable to the specific interests of the student. The research activities of the faculty in this concentration include parallel and networked computer systems, distributed software architectures and databases, real-time and embedded computer systems, VLSI architectures, computer design automation, low-power design, computer communication protocols and networks, security, programming languages for parallel/distributed processing, knowledge management, service-oriented architectures, and software engineering.

Two plans are offered for the M.S.: a thesis option and a comprehensive examination option. For either option, students are required to develop a complete program of study with advice from their faculty advisor. The graduate advisor must approve the study plan. Part-time study toward the M.S. is available. The program of study must be completed within four calendar years from first enrollment.

Plan I: Thesis Option

The thesis option requires completion of 12 courses of study; an original research investigation; the completion of an M.S. thesis; and approval of the thesis by a thesis committee. The thesis committee is composed of three full-time faculty members with the faculty advisor of the student serving as the chair. Required undergraduate core courses and graduate seminar courses, such as EECS 292, EECS 293, EECS 294, and EECS 295, may not be counted toward the 12 courses. No more than one course of EECS 299 and one undergraduate elective course may be counted toward the 12 courses. Up to four of the required 12 courses may be from EECS 296 (M.S. Thesis Research) with the approval of the student's thesis advisor. Additional concentration-specific requirements are as follows; a list of core and concentration courses is given at the end of this section.

Electrical Engineering Concentration:	
At least seven concentration courses in the Electrical Engineering Concentration (EE) must be completed. All courses must be completed with a grade of B (3.0) or better.	
Computer Engineering Concentration:	
Three core courses in the Computer Engineering Concentration (CPE) must be completed: EECS 211, EECS 213, and EECS 215. At least four additional concentration or approved courses must also be completed. All courses must be completed with a grade of B (3.0) or better.	

Plan II: Comprehensive Examination Option

The comprehensive examination option requires the completion of 12 courses and a comprehensive examination. Only one EECS 299 course can be counted if the EECS 299 course is four or more units. Undergraduate core courses and graduate seminar courses, such as EECS 292, EECS 293, EECS 294, and EECS 295, may not be counted toward the 12 courses requirement. No more than two of undergraduate elective courses may be counted. Only 1 unit of EECS 294 Electrical Engineering and Computer Science Colloquium completed with a satisfactory grade is needed to fulfill the comprehensive exam requirements. Additional concentration-specific requirements are as follows; a list of core and concentration courses is given at the end of this section.

Electrical Engineering Concentration:	
Students enrolled in the Electrical Engineering (EE) concentration who choose the Comprehensive Examination option must select one of the following plans of study.	
Circuits and Devices Plan of Study:	
Select four of the following:	
EECS 270A	Advanced Analog Integrated Circuit Design I
EECS 270B	Advanced Analog Integrated Circuit Design II
EECS 270D	Radio-Frequency Integrated Circuits and Systems

EECS 277A	Advanced Semiconductor Devices I
EECS 277B	Advanced Semiconductor Devices II
EECS 280A	Advanced Engineering Electromagnetics I
EECS 285A	Optical Communications
At least five additional courses from the list of EE concentration courses must be completed. All must be completed with a grade of B (3.0) or better.	
Systems Plan of Study:	
Select four of the following: [1]	
EECS 232	Data Privacy
EECS 240	Random Processes
EECS 241A	Digital Communications I
EECS 250	Digital Signal Processing I
EECS 251A	Detection, Estimation, and Demodulation Theory
or ENGRMAE 278	Parameter and State Estimation
EECS 260A	Linear Systems I
EECS 267A	Industrial and Power Electronics
At least five additional courses from the list of EE concentration courses must be completed. All must be completed with a grade of B (3.0) or better.	

[1] If all six courses are not offered in an academic year, students who graduate in that year can petition to replace the courses that are not offered by EECS 242 and/or EECS 244.

Electrical Engineering Concentration Courses

Electrical Engineering Concentration:	
EECS 203A	Digital Image Processing
EECS 213	Computer Architecture
EECS 215	Design and Analysis of Algorithms
EECS 217	VLSI System Design
EECS 240	Random Processes
EECS 241A- 241B	Digital Communications I and Digital Communications II
EECS 242	Information Theory
EECS 244	Wireless Communications
EECS 247	Information Storage
EECS 248A	Computer and Communication Networks
EECS 250	Digital Signal Processing I
EECS 251A	Detection, Estimation, and Demodulation Theory
or ENGRMAE 278	Parameter and State Estimation
EECS 251B	Detection, Estimation, and Demodulation Theory
EECS 260A	Linear Systems I
EECS 261A	Linear Optimization Methods
EECS 267A- 267B	Industrial and Power Electronics and Topics in Industrial and Power Electronics
EECS 270A- 270B	Advanced Analog Integrated Circuit Design I and Advanced Analog Integrated Circuit Design II (and Advanced Analog Integrated Circuit Design II)
EECS 270C	Design of Integrated Circuits for Broadband Applications
EECS 270D	Radio-Frequency Integrated Circuits and Systems
EECS 277A	Advanced Semiconductor Devices I
EECS 277B	Advanced Semiconductor Devices II
EECS 277C	Nanotechnology
EECS 278	Micro-System Design

EECS 279	Micro-Sensors and Actuators
EECS 280A	Advanced Engineering Electromagnetics I
EECS 280B	Advanced Engineering Electromagnetics II
EECS 282	Monolithic Microwave Integrated Circuit (MMIC) Analysis and Design II
EECS 284	Wireless Communication Links and Antenna Design
EECS 285A	Optical Communications
EECS 285B	Lasers and Photonics
EECS 285C	Nano Imaging
EECS 286	Fabrication of Biomedical and Wearable Microdevices
EECS 287	Micro/Nano Biotechnology and Biosensing: Fundamentals, Designs, and Applications
EECS 289	Bioinstrumentation
EECS 298	Topics in Electrical Engineering and Computer Science

Computer Engineering Concentration Courses

Computer Engineering Concentration:	
Three core courses in the Computer Engineering Concentration (CPE) must be completed: EECS 211, EECS 213, and EECS 215. At least five additional concentration or approved courses must also be completed. All courses must be completed with a grade of B (3.0) or better.	
Computer Engineering Concentration:	
EECS 211	Advanced System Software [1]
EECS 213	Computer Architecture [1]
EECS 215	Design and Analysis of Algorithms [1]
EECS 217	VLSI System Design
EECS 221	Topics in Computer Engineering
EECS 222	Embedded System Modeling
EECS 223	Real-Time Computer Systems
EECS 224	High-Performance Computing
EECS 226	Embedded System Software
EECS 227	Cyber-Physical System Design
EECS 230	Energy Efficiency
EECS 231	Advanced System Security
EECS 232	Data Privacy
EECS 247	Information Storage
EECS 248A	Computer and Communication Networks
EECS 284	Wireless Communication Links and Antenna Design
EECS 298	Topics in Electrical Engineering and Computer Science
COMPSCI 233	Networking Laboratory
COMPSCI 234	Advanced Networks
COMPSCI 236	Wireless and Mobile Networking

[1] This course is also a core course.

In addition to fulfilling the course requirements outlined above, it is a University requirement for the Master of Science degree that students fulfill a minimum of 36 units of study.

Program in Law and Graduate Studies (J.D./M.S.-ECE; J.D./Ph.D.-ECE)

Highly qualified students interested in combining the study of law with graduate qualifications in the ECE program are invited to undertake concurrent degree study under the auspices of UC Irvine's Program in Law and Graduate Studies (PLGS). Students in this program pursue a coordinated curriculum leading to a J.D. degree from the School of Law in conjunction with a Master's or Ph.D. degree in the ECE program. Additional information is available from the PLGS Program Director's Office, 949-824-4158, or by email to plgs@uci.edu. A full description of the program, with links to all relevant application information can be found at the School of Law Concurrent Degree Programs website (http://www.law.uci.edu/academics/interdisciplinary-studies/concurrent-degrees.html) and in the Law School section (http://catalogue.uci.edu/schooloflaw/#lawandgraduatestudiestext) of the *Catalogue*.