

Electrical and Computer Engineering

Program: B.S., Computer Engineering

Program Description

"Nowadays the world is lit by lightning," playwright Tennessee Williams wrote. But electrical and computer engineers prove him wrong every day.

From city lights to satellites, semiconductors, telephone switching systems and audio equipment, their work depends on electricity and the engineers who design and develop ways to harness its power.

The Computer Engineering (CompE) program bridges the curriculum gap between Computer Science and Electrical Engineering. Computer Engineers deal with the hardware and software aspects of computer system design and development. The CompE curriculum contains components of both the Computer Science and Electrical Engineering programs.

Computer Engineering majors receive a broad knowledge in the basic curriculum. Among the many covered topics are mathematics, physics, chemistry, biology, electrical circuits, engineering economics, algorithms, programming and computer organization. Computer Engineering students will take coursework in a number of areas (i.e., computer architecture, digital design) from both the software and hardware points of view, allowing a broader, more complete exposure to the subject. Additionally, these curricula will be unified in the one year senior design project course bringing together the existing Electrical and Computer Engineering and Computer Science programs.

The ECE department has 17 labs associated with its ECE classes. In the labs, students work alongside professors who may be designing medical instrumentation for healthcare, designing microcontroller-based applications, developing pager and satellite communications systems, or working on innovations in electrical power systems.

All students in the EE or CompE programs take part in the department's senior design program, modeled on industry work groups that students will encounter on the job. Like professional engineers, students design and develop a project from conception through manufacture. In the process, they gain valuable experience in working as a team and dealing with personalities, as well as technical areas.

Senior design projects have included national intercollegiate competitions. Students compete in designing a micromouse and training it to run through a 10-square-foot maze. Students also work on interdisciplinary teams to design, build, program and test an unmanned autonomous helicopter. Other projects include developing a sophisticated stereo system, a control system for a satellite tracking antenna, a television tuner, fabrication of a hybrid circuit, software-defined radio, etc.

Program Requirements

The Computer Engineering program is based on an expectation of adequate high school preparation in science, mathematics and English. High school courses should include algebra, plane geometry, trigonometry, chemistry or physics (all desirable), and four years of English.

CSUN provides the opportunity for students who have not had a complete background of pre-engineering work in high school to take courses to prepare for the major. These additional courses will not count toward the major and may increase the time to graduate. CSUN provides testing as outlined below to ensure that students start their engineering coursework at an appropriate level.

Placement Exam Requirements

1. The Mathematics Placement Test (MPT) is required prior to enrollment in MATH 150A. Students should take this exam before enrolling in their classes so they may be placed in the appropriate mathematics course. Students with scores of 4 or 5 on the AP Calculus AB or BC tests are exempt from the MPT.
2. If Computer Engineering majors elect to take CHEM 101 to satisfy their science elective requirement, the Chemistry Placement Test (CPT) is required with a score of 40 or higher prior to enrolling in CHEM 101. Students who have had high school chemistry and expect to enroll in CHEM 101 must take this test regardless of their score on the AP Chemistry exam. Students who do not receive this CPT score must receive a grade of "C" or better in CHEM 100 before taking CHEM 101.

Special Grade Requirements

1. All students must complete the lower division writing requirement before enrolling in 300-level engineering courses.
2. All students must attempt the Upper Division Writing Proficiency Exam before enrolling in 400-level engineering courses.
3. A grade of "C-" or better is required in all courses in the major. A grade of "C" or better is required in all undergraduate transfer courses.
4. Senior-level courses cannot be taken unless the student previously completed or is concurrently completing all freshman-, sophomore- and junior-level core requirements.
5. A grade of "C" or higher is necessary in MATH 150B to meet the prerequisite requirements for the next-level math courses.

Course Requirements

The Computer Engineering program requires a minimum of 123 units total, including General Education requirements of 27 units, a Computer Engineering core of 90 units and a minimum of 6 units of an approved elective. Computer Engineering majors must complete a minimum of 30 semester units of upper division Computer Engineering courses in residency, including Senior Design Project I and II.

Additional information about this program and its facilities, faculty and students can be found on the [Department of Electrical and Computer Engineering](#) website.

1. Lower Division Required Courses (39 units)

Freshman Year

[COMP 110/L Introduction to Algorithms and Programming and Lab \(3/1\)](#)

[COMP 182/L Data Structures and Program Design and Lab \(3/1\)](#)

[MATH 150A Calculus I \(5\)](#)

[MATH 150B Calculus II \(5\)](#)

[PHYS 220A Mechanics \(3\)](#)

[PHYS 220AL Mechanics Lab \(1\)](#)

Sophomore Year

[COMP 282 Advanced Data Structures \(3\)](#)

[ECE 240 Electrical Engineering Fundamentals \(3\)](#)

[ECE 240L Electrical Engineering Fundamentals Lab \(1\)](#)

[MATH 250 Calculus III \(3\)](#)

[MATH 280 Applied Differential Equations \(3\)](#)

or [ECE 280 Applied Differential Equations \(3\)](#)

[PHYS 220B Electricity and Magnetism \(3\)](#)

[PHYS 220BL Electricity and Magnetism Lab \(1\)](#)

2. Math and Science Electives (6 units)

Select a minimum of 6 units from the following list with corresponding lab if one exists:

[BIOL 106 Biological Principles I \(3\)](#)

[BIOL 106L Biological Principles I Lab \(1\)](#)

[BIOL 107 Biological Principles II \(3\)](#)

[BIOL 107L Biological Principles II Lab \(1\)](#)

[CHEM 101 General Chemistry I \(4\)](#)

[CHEM 101L General Chemistry I Lab \(1\)](#)

[CHEM 102 General Chemistry II \(4\)](#)

[CHEM 102L General Chemistry II Lab \(1\)](#)

[MATH 262 Introduction to Linear Algebra \(3\)](#)

[MATH 326 Discrete Mathematics \(3\)](#)

[PHYS 227 Physics III \(4\)](#)

[PHYS 227L Physics III Lab \(1\)](#)

[PHYS 375 Quantum Physics I \(3\)](#)

3. Upper Division Required Courses (39 units)

Note: All students must complete the lower division writing requirements before enrolling in any 300-level course in the major and must attempt the [Upper Division Writing Proficiency Exam](#) before the completion of 75 units or enrolling in any 400-level course in the major. If students fail to do so, a hold is placed on their subsequent class registration and this may delay their graduation.

Junior Year

[ECE 309 Numerical Methods in Electrical Engineering \(2\)](#)

[ECE 320/L Theory of Digital Systems and Lab \(3/1\)](#)

[ECE 340/L Electronics I and Lab \(3/1\)](#)

[ECE 350 Linear Systems I \(3\)](#)
[ECE 351 Linear Systems II \(3\)](#)
[MSE 304 Engineering Economy \(3\)](#)

Senior Year

The senior year must include a capstone design experience and additional courses with design content so that the student's total engineering program contains at least one semester of engineering design. This engineering design requirement must be taken in residency. An advisor and the department chair must approve all senior year electives.

[ECE 420 Digital Systems Design with Programmable Logic \(3\)](#)
[ECE 422 Design of Digital Computers \(3\)](#)
[ECE 425/L Microprocessor Systems and Lab \(3/1\)](#)
[ECE 442/L Digital Electronics and Lab \(3/1\)](#)
[ECE 450 Probabilistic Systems in Electrical Engineering Design and Analysis \(3\)](#)
[ECE 492/ECE 493 Senior Design Project I and II \(2/1\)](#)

4. Upper Division Electives (12 units)

Select a minimum of 12 units from the following:

[COMP 322/L Introduction to Operating Systems and System Architecture and Lab \(3/1\)](#)
[COMP 380/L Introduction to Software Engineering \(2/1\)](#)
[COMP 424 Computer System Security \(3\)](#)
[COMP 429 Computer Network Software \(3\)](#)
[COMP 529/L Advanced Network Topics and Lab \(2/1\)](#)
[COMP 581 Open Source Software \(3\)](#)
[COMP 598EA Embedded Applications](#)
[COMP 598NSP Network and Systems Deployment \(3\)](#)
[ECE 422L Design of Digital Computers Lab \(1\)](#)
[ECE 443/L Pulse and Wave Shaping Circuit Design and Lab \(3/1\)](#)
[ECE 520/ECE 520L System on Chip Design and Lab \(3/1\)](#)
[ECE 524/ECE 524L FPGA/ASIC Design and Optimization Using VHDL and Lab \(3/1\)](#)
[ECE 526/L Digital Design with Verilog and System Verilog and Lab \(3/1\)](#)
[ECE 527/ECE 527L Application Specific Integrated Circuit Development and Lab \(3/1\)](#)
[ECE 546 Very Large Scale Integrated Circuit Design \(3\)](#)
[ECE 562 Data Communication Network \(3\)](#)

Note: Some elective courses have prerequisites that are not part of the required program. All courses must include the lab, if one exists. Other courses may be selected with the approval of the ECE department chair. The total number of units in the major is 96.

5. General Education (48 units)

Undergraduate students must complete 48 units of [General Education](#) as described in this Catalog.

21 units are satisfied by coursework in the major. Completion of the Computer Engineering major satisfies A3 Critical Thinking. 6 units of Physical Science may be used to satisfy sections B1-3. [MATH 150A](#) satisfies Basic Skills B4 Mathematics/Quantitative Reasoning; [ECE 340](#) satisfies B5 Scientific Inquiry and Quantitative Reasoning; [MSE 304](#) satisfies 3 units of upper division D1 Social Science; and [COMP 110/L](#) satisfies E Lifelong Learning.

Total Units in the Major: 96

General Education Units: 27

Total Units Required for the Degree: 123

Contact

[Department of Electrical and Computer Engineering](#)
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Student Learning Outcomes

Educational Objectives

The computer engineering program at California State University, Northridge, prepares a diverse group of graduates for lifelong careers in a field that will allow them to make productive contributions to society and to find personal satisfaction in their work. To accomplish this, graduates of the computer engineering programs will meet the following educational objectives:

1. Have professional careers in computer engineering or related technical fields, or continue their studies at the graduate level.
2. Continue their professional development throughout their careers.

Student Outcomes

Graduates will have an ability to:

1. Identify, formulate and solve complex engineering problems by applying principles of knowledge of engineering, science and mathematics.
2. Apply the engineering design process to produce solutions that meet specified needs with consideration for public health and safety, and global, cultural, social, environmental, economic and other factors as appropriate to the discipline.
3. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
4. Communicate effectively with a range of audiences.
5. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts.
6. Recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge.
7. Function effectively as a member or leader of a team that establishes goals, plan tasks, meets deadlines, and creates a collaborative and inclusive environment.

Degree Road Maps

[Computer Engineering - 2019](#)

[Previous Years](#)

Transfer Road Maps

[Computer Engineering - 2019](#)

[Previous Years](#)