COMPUTER ENGINEERING MAJOR (B.S.)

https://ceps.unh.edu/electrical-computer-engineering/program/bs/computer-engineering

Description

This program is tailored to students who want to understand and participate in the engineering discipline that merges electronics systems with software. Students learn the fundamental concepts of electrical circuits and how those circuits can be controlled by software, gaining skills and technological expertise needed to succeed in graduate studies or a variety of career fields.

In addition to the university's mandatory Discovery Program requirements, degree candidates must complete our core program (freshman through junior years). In the senior year, students select professional technical electives in the areas of their interest. They also carry out a student-designed project to acquire both breadth and depth of study and to integrate knowledge across course boundaries.

The Computer Engineering (B Sci in Computer Engineering) program is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the General Criteria and the Program Criteria for Electrical, Computer, Communications, Telecommunication(s) and Similarly Named Engineering Programs.

Requirements

Degree Requirements

Minimum Credit Requirement: 129 credits

Minimum Residency Requirement: 32 credits must be taken at UNH

Minimum GPA: 2.0 required for conferral*

Core Curriculum Required: Discovery & Writing Program Requirements

Foreign Language Requirement: No

All Major, Option and Elective Requirements as indicated.
**Major GPA requirements as indicated.*

Major Requirements

In addition to Discovery Program requirements, the department has a number of grade-point average and course requirements:

1. Any computer engineering major whose cumulative grade-point average in ECE and CS courses is less than 2.0 during any three semesters will not be allowed to continue as a computer engineering major.
2. Computer engineering majors must achieve a 2.0 grade-point average in all ECE and CS courses as a requirement for graduation.

To make an exception to any of these departmental requirements based on extenuating circumstances, students must petition the department's undergraduate committee. Mindful of these rules, students, with their advisor's assistance, should plan their programs based on the distribution of courses found in the Degree Plan tab.

Code	Title	Credits
Required Courses		
CS 410C	Introduction to Scientific Programming/C	4
CS 419	Computer Science for Engineers and Scientists	4
ECE 401	Perspectives in Electrical and Computer Engineering	4
ECE 541	Electric Circuits	4
ECE 543	Introduction to Digital Systems	4
ECE 548	Electronic Design I	4
ECE 562	Computer Organization	4
ECE 583	Designing with Programmable Logic	6
ECE 602	Engineering Analysis	3
ECE 603	Electromagnetic Fields and Waves I	3
ECE 633	Signals and Systems I	3
ECE 634	Signals and Systems II	3
ECE 647	Random Processes and Signals in Engineering	3
ECE 649	Embedded Microcomputer Based Design	6
ECON 402	Principles of Economics (Micro)	4
or NR 411	Environmental and Resource Economics Perspectives	
MATH 425	Calculus I	4
MATH 426	Calculus II	4
MATH 527	Differential Equations with Linear Algebra	4
MATH 645	Linear Algebra for Applications	4
PHYS 407	General Physics I	4
PHYS 408	General Physics II	4
Capstone [2]		
ECE 791	Senior Project I	3
ECE 792	Senior Project II	3
Professional Electives		
Choose four professional elective courses [1]		16
Other Courses		
Discovery requirements not already covered by required courses [2]		24
Total Credits		**129**

[1] Four professional electives must be selected as follows:
- Choose two ECE 700-level courses, one course could be ECE 652 Electronic Design II.
- Students are allowed to take only one as ECE 795 Electrical and Computer Engineering Projects or ECE 796 Special Topics.
- Remaining professional electives can include: CS 619 Introduction to Object-Oriented Design and Development CS 620 Operating System Fundamentals, CS 659 Introduction to the Theory of Computation, or any CS 700-level course.

[2] Fulfilling the CE Program curriculum taking ECE 401 Perspectives in Electrical and Computer Engineering, ECE 791 Senior Project I, and ECE 792 Senior Project II curriculum will automatically meet Discovery Category, "Environment, Technology and Society."

Degree Plan

Sample Degree Plan

This sample degree plan serves as a general guide; students collaborate with their academic advisor to develop a personalized degree plan to meet their academic goals and program requirements.

First Year		
Fall		**Credits**
ECE 401	Perspectives in Electrical and Computer Engineering	4

CS 410C	Introduction to Scientific Programming/C	4
MATH 425	Calculus I	4
ECON 402 or NR 411	Principles of Economics (Micro) [1] or Environmental and Resource Economics Perspectives	4
	Credits	**16**
Spring		
PHYS 407	General Physics I	4
CS 419	Computer Science for Engineers and Scientists	4
MATH 426	Calculus II	4
ENGL 401	First-Year Writing	4
	Credits	**16**
Second Year		
Fall		
ECE 541	Electric Circuits	4
ECE 543	Introduction to Digital Systems	4
MATH 527	Differential Equations with Linear Algebra	4
PHYS 408	General Physics II	4
	Credits	**16**
Spring		
ECE 548	Electronic Design I	4
ECE 562	Computer Organization	4
MATH 645	Linear Algebra for Applications	4
Discovery Program Category		4
	Credits	**16**
Third Year		
Fall		
ECE 602	Engineering Analysis	3
ECE 633	Signals and Systems I	3
ECE 583	Designing with Programmable Logic	6
Discovery Program Category		4
	Credits	**16**
Spring		
ECE 603	Electromagnetic Fields and Waves I	3
ECE 647	Random Processes and Signals in Engineering	3
ECE 634	Signals and Systems II	3
ECE 649	Embedded Microcomputer Based Design	6
Discovery Program Category		4
	Credits	**19**
Fourth Year		
Fall		
ECE 791	Senior Project I	3
Two Professional Electives [2]		8
Discovery Program Category		4
	Credits	**15**
Spring		
ECE 792	Senior Project II	3
Two Professional Electives [2]		8
Discovery Program Category		4
	Credits	**15**
	Total Credits	**129**

1. Students are required to take either ECON 402 Principles of Economics (Micro) or NR 411 Environmental and Resource Economics Perspectives to fulfill the Social Science Category of the Discovery Program.
2. Four professional electives must be selected as follows:
   - Choose two ECE 7XX courses, one course could be ECE 652 Electronic Design II.
   - Students are allowed to take only one as ECE 795 Electrical and Computer Engineering Projects or ECE 796 Special Topics.
   - Remaining professional electives can include: CS 619 Introduction to Object-Oriented Design and Development , CS 620 Operating System Fundamentals, CS 659 Introduction to the Theory of Computation, or any CS 7XX course.

ECE 791 Senior Project I and ECE 792 Senior Project II fulfill Discovery Program Capstone Experience.

Fulfilling the CE program curriculum taking ECE 401 Perspectives in Electrical and Computer Engineering, ECE 791 Senior Project I, and ECE 792 Senior Project II will automatically meet Discovery Category, "Environment, Technology and Society."

Student Learning Outcomes

The Department of Electrical and Computer Engineering has adopted a set of student outcomes that consists of statements describing what students are expected to know and be able to do by the time of graduation, the achievement of which indicates that the student is equipped to achieve the program objectives.

The current student outcomes are:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental and economic factors.
- An ability to communicate effectively with a range of audiences.
- An ability to 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.
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.