

# COMPUTER ENGINEERING MAJOR (B.S.)

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

## Description

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.

For a detailed semester by semester list of requirements for the four years of study, please refer to the Degree Plan tab.

## 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 computer science 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 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 adviser's assistance, should plan their programs based on the distribution of courses found in the Degree Plan tab.

## Required Courses

Code	Title	Credits
CS 415	Introduction to Computer Science I	4
CS 416	Introduction to Computer Science II	4
CS 515	Data Structures and Introduction to Algorithms	4
CS 520	Assembly Language Programming and Machine Organization	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	4
ECE 602	Engineering Analysis	4
ECE 603	Electromagnetic Fields and Waves I	4
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	4
ECON 402	Principles of Economics (Micro)	4
or EREC 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 <sup>2</sup>		
ECE 791	Senior Project I	2
ECE 792	Senior Project II	2
<b>Professional Electives</b>		
Choose two ECE 700-level courses <sup>1</sup>		
Select two courses from the following:		
CS 619	Introduction to Object-Oriented Design and Development	
CS 620	Operating System Fundamentals	
CS 659	Introduction to the Theory of Computation	
DS 673	Database Management	
or DS 774	E-Business	
ECE 651	Electronic Design II	
ECE 795	Electrical and Computer Engineering Projects	
ECE 796	Special Topics	
<b>Other Courses</b>		
Discovery requirements not already covered by required courses		
		24
<b>Total Credits</b>		<b>133</b>

- <sup>1</sup> Choose two 700-level courses not including ECE 795 or ECE 796.
- <sup>2</sup> Honors students who complete ECE 791H Senior Honors Project I and ECE 792H Senior Honors Project II satisfy one professional elective requirement as well as the requirements for ECE 791 Senior Project I and ECE 792 Senior Project II.

## Degree Plan

Course	Title	Credits
<b>First Year</b>		
<b>Fall</b>		
ECE 401	Perspectives in Electrical and Computer Engineering	4
MATH 425	Calculus I	4
CS 415	Introduction to Computer Science I	4
ECON 402	Principles of Economics (Micro)	4
or EREC 411	or Environmental and Resource Economics Perspectives	
		<b>Credits</b>
		<b>16</b>
<b>Spring</b>		
ECE 543	Introduction to Digital Systems	4
MATH 426	Calculus II	4
CS 416	Introduction to Computer Science II	4
ENGL 401	First-Year Writing	4
		<b>Credits</b>
		<b>16</b>
<b>Second Year</b>		
<b>Fall</b>		
ECE 562	Computer Organization	4
PHYS 407	General Physics I	4
MATH 527	Differential Equations with Linear Algebra	4
CS 515	Data Structures and Introduction to Algorithms	4
		<b>Credits</b>
		<b>16</b>
<b>Spring</b>		
ECE 583	Designing with Programmable Logic	4
PHYS 408	General Physics II	4
CS 520	Assembly Language Programming and Machine Organization	4

MATH 645	Linear Algebra for Applications	4
<b>Credits</b>		<b>16</b>
<b>Third Year</b>		
<b>Fall</b>		
ECE 541	Electric Circuits	4
ECE 602	Engineering Analysis	4
ECE 633	Signals and Systems I	3
ECE 649	Embedded Microcomputer Based Design	4
Discovery Program Category		4
<b>Credits</b>		<b>19</b>
<b>Spring</b>		
ECE 548	Electronic Design I	4
ECE 603	Electromagnetic Fields and Waves I	4
ECE 634	Signals and Systems II	3
ECE 647	Random Processes and Signals in Engineering	3
Discovery Program Category		4
<b>Credits</b>		<b>18</b>
<b>Fourth Year</b>		
<b>Fall</b>		
Two Professional Electives		8
Two Discovery Program Categories		8
ECE 791	Senior Project I	2
<b>Credits</b>		<b>18</b>
<b>Spring</b>		
Two Professional Electives		8
Discovery Program Category		4
ECE 792	Senior Project II	2
<b>Credits</b>		<b>14</b>
<b>Total Credits</b>		<b>133</b>

- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## Student Learning Outcomes

The Program Educational Objectives for the Computer Engineering Program are as follows:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- An ability to function on multidisciplinary teams an ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- A recognition of the need for, and an ability to engage in life-long learning a knowledge of contemporary issues.