

# COMPUTER ENGINEERING MAJOR (B.S.)

<https://ceps.unh.edu/ece/computer-engineering-bs>

## 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   |
| <b>Capstone</b> <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> |  | 8   |
| Select two courses from the following:        |  | 8   |
| CS 619  | Introduction to Object-Oriented Design and Development |     |
| CS 620  | Operating System Fundamentals                          |     |
| CS 659  | Introduction to the Theory of Computation              |     |
| CS 671  | Programming Language Concepts and Features             |     |
| CS 700:799                                    |  |     |
| CS 730W                                       | Introduction to Artificial Intelligence                |     |
| CS 760W                                       | Introduction to Human-Computer Interaction             |     |
| CS 767W                                       | Interactive Data Visualization                         |     |
| CS 770W                                       |  |     |
| DS 773  | Database Management and Systems Analysis               |     |
| or DS 774                                     | E-Business   |     |
| ECE 651                                       | Electronic Design II                                   |     |
| ECE 795                                       | Electrical and Computer Engineering Projects           |     |
| ECE 796                                       | Special Topics   |     |
| Total Credits                                 |  | 109 |

<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 |         |
| Credits           |  | 16      |
| <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   |
|                                  | Credits  | 16  |
| <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   |
|                                  | Credits  | 16  |
| <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   |
|                                  | Credits  | 16  |
| <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   |
|                                  | Credits  | 19  |
| <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   |
|                                  | Credits  | 18  |
| <b>Fourth Year</b>               |  |     |
| <b>Fall</b>                      |  |     |
| Two Professional Electives       |  | 8   |
| Two Discovery Program Categories |  | 8   |
| ECE 791                          | Senior Project I                                       | 2   |
|                                  | Credits  | 18  |
| <b>Spring</b>                    |  |     |
| Two Professional Electives       |  | 8   |
| Discovery Program Category       |  | 4   |
| ECE 792                          | Senior Project II                                      | 2   |
|                                  | Credits  | 14  |
|                                  | Total Credits  | 133 |