COMPUTER ENGINEERING
MAJOR: BIOMEDICAL ENGINEERING OPTION (B.S.)

https://ceps.unh.edu/electrical-computer-engineering/program/bsceng/computer-engineering-biomedical-engineering-option

Description

The Biomedical Engineering (BME) Option is intended to provide the core of knowledge expected of a computer and/or electrical engineer to provide engineering services in the biomedical field. Electrical and/or computer engineers with this option in biomedical engineering combine engineering principles with medical and biological sciences to design and create equipment, devices, computer systems, and software used in healthcare. The BME option is embedded in both the Electrical Engineering (EE) program and the Computer Engineering (CE) program. The Computer Engineering (BSci 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: 128 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 adviser's assistance, should plan their programs based on the distribution of courses found in the Degree Plan tab.

Required Courses

Degree Plan

First Year

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 401</td>
<td>Perspectives in Electrical and Computer Engineering</td>
<td>4</td>
</tr>
<tr>
<td>MATH 425</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>CS 410C</td>
<td>Introduction to Scientific Programming/C</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 401</td>
<td>First-Year Writing</td>
<td>4</td>
</tr>
</tbody>
</table>

Credits: 16

Spring

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 407</td>
<td>General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 426</td>
<td>Calculus II</td>
<td>4</td>
</tr>
</tbody>
</table>

Credits: 20

1 Professional electives must be selected as follows:
   • Choose any one ECE 700-level course.
   • Students are allowed to take only one as ECE 795 Electrical and Computer Engineering Projects or ECE 796 Special Topics

2 Fulfiling 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."
CS 419  Computer Science for Engineers and Scientists  4
BMS 508  Human Anatomy and Physiology II  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
ECON 402  Principles of Economics  (Micro)  4
or EREC 411  Environmental and Resource Economics Perspectives  4
Credits  16

Third Year
Fall
ECE 583  Designing with Programmable Logic  6
ECE 602  Engineering Analysis  3
ECE 633  Signals and Systems I  3
Discovery Program Category  4
Credits  16

Spring
ECE 603  Electromagnetic Fields and Waves 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
Discovery Program Category  4
Credits  19

Fourth Year
Fall
ECE 791  Senior Project I  3
CHBE 762  Biomedical Engineering  4
or CHBE 766  Biomedical Engineering  4
or Biomaterials  4
One Professional Elective Course  2
Discovery Program Category  4
Credits  15

Spring
ECE 717  Introduction to Digital Image Processing  4
ECE 784  Biomedical Instrumentation  4
ECE 792  Senior Project II  3
Discovery Program Category  4
Credits  15

Total Credits  129

1 Students are required to take either ECON 402 Principles of Economics (Micro)  or EREC 411 Environmental and Resource Economics Perspectives to fulfill the Social Science Category of the Discovery Program.

2 One professional elective must be selected as follows:
• Choose any one ECE 7XX course

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

Fulfilling the EE 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."

Student Learning Outcomes

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

• 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.