BIOENGINEERING MAJOR
(B.S.)

https://ceps.unh.edu/chemical-engineering/bioengineering-bs

Description

Bioengineering, as defined by the NIH, is "the application of life sciences, mathematics, and engineering principles to define and solve problems in biology, medicine, health care, and other fields."

The bioengineering program will train graduates in biology and physiology as well as engineering. The program will provide graduates with capabilities in advanced mathematics (including differential equations and statics), science, and engineering. Graduates will be conversant with solving problems at the interface of biology and engineering that may arise in the fields of biotechnology and pharmaceuticals, as well as medicine and biofuels. By graduation, students will have experience measuring and interpreting data from living systems and addressing the interactions between living and non-living materials.

Students are required to obtain a minimum 2.0 grade-point average in CHE 501 Introduction to Chemical Engineering I/ CHE 502 Introduction to Chemical Engineering II and in overall standing at the end of the sophomore year in order to continue in the major. Study abroad (Exchange) students are required to have a cumulative GPA of 3.0 or better in math, physics, chemistry, and other required courses at the end of the semester prior to their exchange semester.

For more information on the bioengineering program, please contact Russell Carr, professor and chair, Russell.Carr@unh.edu.

Requirements

Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BENG 763</td>
<td>Bioengineering Design I</td>
<td>2</td>
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<tr>
<td>BENG 764</td>
<td>Bioengineering Design II</td>
<td>4</td>
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<tr>
<td>BENG 766</td>
<td>Biomaterials</td>
<td>4</td>
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<tr>
<td>BMCB 658</td>
<td>General Biochemistry</td>
<td>5</td>
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<tr>
<td>&amp; BMCB 659</td>
<td>and General Biochemistry Lab</td>
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<tr>
<td>BMS 503</td>
<td>General Microbiology</td>
<td>3</td>
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<td>BMS 504</td>
<td>General Microbiology Laboratory</td>
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<td>BIOL 410</td>
<td>Principles of Molecular and Cellular Biology</td>
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<tr>
<td>CHE 400</td>
<td>Chemical Engineering Lectures</td>
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<td>CHE 501</td>
<td>Introduction to Chemical Engineering I</td>
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<td>CHE 502</td>
<td>Introduction to Chemical Engineering II</td>
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<td>CHE 601</td>
<td>Fluid Mechanics and Unit Operations</td>
<td>3</td>
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<tr>
<td>CHE 604</td>
<td>Chemical Engineering Thermodynamics</td>
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<td>CHE 614</td>
<td>Separation Processes</td>
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<tr>
<td>CHE 761</td>
<td>Biochemical Engineering</td>
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<td>CHE 762</td>
<td>Biomedical Engineering</td>
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<tr>
<td>CHEM 405</td>
<td>Chemical Principles for Engineers</td>
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<tr>
<td>CHEM 545&amp; CHEM 546</td>
<td>Organic Chemistry and Organic Chemistry Laboratory</td>
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<tr>
<td>GEN 604</td>
<td>Principles of Genetics</td>
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<td>MATH 425</td>
<td>Calculus I</td>
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<td>MATH 426</td>
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<td>MATH 527</td>
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<td>General Physics I</td>
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<tr>
<td>BMS 508</td>
<td>Human Anatomy and Physiology II</td>
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Electives

Select five courses from the following:

- BENG 755 Computational Molecular Bioengineering
- BMCB 753 Cell Culture
- BMS 702 Endocrinology
- BMS 704 Pathologic Basis of Disease
- BMS 706 Virology
- & BMS 708 and Virology Laboratory
- CEE 502 Project Engineering
- CEE 724 Environmental Engineering Microbiology
- CHE 602 Heat Transfer and Unit Operations
- CHE 603 Applied Mathematics for Chemical Engineers
- CHE 651 Biotech Experience/Biomanufacturing
- CHE 703 Mass Transfer and Stagewise Operations
- CHE 722 Introduction to Microfluidics
- CHE 752 Process Dynamics and Control
- ECE 537 Introduction to Electrical Engineering
- ECE 784 Biomedical Instrumentation
- GEN 711 Genomics and Bioinformatics
- or GEN 711W Genomics and Bioinformatics
- GEN 712 Programming for Bioinformatics
- GEN 717 Molecular Microbiology
- GEN 771 Molecular Genetics
- GEN 774 Techniques in Plant Genetic Engineering and Biotechnology

Total Credits 84

At least four of the elective courses must be engineering.

Degree Plan

First Year

<table>
<thead>
<tr>
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<tbody>
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Spring

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<td>ENGL 401</td>
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**Second Year**

**Fall**

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<td>Organic Chemistry</td>
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<td>Organic Chemistry Laboratory</td>
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<td>Discovery Program Elective (1)</td>
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**Credits**

| Credits | 16 |

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**Credits**

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**Credits**

| Credits | 15 |

**Fourth Year**

**Fall**

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**Credits**

| Credits | 18 |

**Spring**

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**Credits**

| Credits | 15 |

**Total Credits**

| Total Credits | 128 |

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1. MATH 425 Calculus I satisfies the Discovery Foundation Quantitative Reasoning category.
2. CHEM 405 Chemical Principles for Engineers satisfies the Discovery Physical Science (with lab) category.
3. ENGL 401 First-Year Writing satisfies the Discovery Foundation Writing Skills category.