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.

### Major Requirements

**Code** | **Title** | **Credits**
--- | --- | ---
BENG 763 | Bioengineering Design I | 2
BENG 764 | Bioengineering Design II | 4
BENG 766 | Biomaterials | 4
BMBC 659 | General Biochemistry and General Biochemistry Lab | 5
BMS 503 | General Microbiology | 3
BMS 504 | General Microbiology Laboratory | 2
BIO 410 | Principles of Molecular and Cellular Biology | 3
CHE 400 | Chemical Engineering Lectures | 1
CHE 501 | Introduction to Chemical Engineering I | 3
CHE 502 | Introduction to Chemical Engineering II | 3
CHE 601 | Fluid Mechanics and Unit Operations | 3
CHE 604 | Chemical Engineering Thermodynamics | 3
CHE 614 | Separation Processes | 3
CHE 761 | Biochemical Engineering | 4
CHE 762 | Biomedical Engineering | 4
CHEM 405 | Chemical Principles for Engineers | 4
CHEM 545 | Organic Chemistry and Organic Chemistry Laboratory | 5
& CHEM 546 | Organic Chemistry | 5
GEN 604 | Principles of Genetics | 4
MATH 425 | Calculus I | 4
MATH 426 | Calculus II | 4
MATH 527 | Differential Equations with Linear Algebra | 4
MATH 644 | Statistics for Engineers and Scientists | 4

**Select five courses from the following:**

- BENG 755 Computational Molecular Bioengineering
- BMS 508 Human Anatomy and Physiology I
- CHE 500 Cellular and Molecular Biology Laboratory
- CHE 502 Introduction to Chemical Engineering II
- CHE 601 Introduction to Chemical Engineering I
- CHE 602 Heat Transfer and Unit Operations
- CHE 603 Applied Mathematics for Chemical Engineers
- CHE 604 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
- GEN 717 Molecular Microbiology
- GEN 771 Molecular Genetics
- GEN 774 Techniques in Plant Genetic Engineering and Biotechnology

### Degree Plan

**First Year**

**Fall**

- CHE 400 Chemical Engineering Lectures | 1
- MATH 425 Calculus I | 4
- CHEM 405 Chemical Principles for Engineers | 4
- BIOL 410 Principles of Molecular and Cellular Biology | 3

**Credits** | 16

**Spring**

- MATH 426 Calculus II | 4
- GEN 604 Principles of Genetics | 4
- PHYS 407 General Physics I | 4
- ENGL 401 First-Year Writing | 4

**Credits** | 16

**Second Year**

**Fall**

- CHE 501 Introduction to Chemical Engineering I | 3
- MATH 527 Differential Equations with Linear Algebra | 4
- CHEM 545 Organic Chemistry | 3
- CHEM 546 Organic Chemistry Laboratory | 2

**Credits** | 16

**Spring**

- CHE 502 Introduction to Chemical Engineering II | 3
- MATH 644 Statistics for Engineers and Scientists | 4

**Credits** | 4

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1 At least four of the elective courses must be engineering.
Bioengineering Major (B.S.)

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<tr>
<td>BMS 503</td>
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**Third Year**

**Fall**

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<td>BMCB 658</td>
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<td>BMCB 659</td>
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**Credits**

16

**Spring**

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<td>CHE 761</td>
<td>Biochemical Engineering</td>
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<td>BMS 508</td>
<td>Human Anatomy and Physiology II</td>
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**Credits**

15

**Fourth Year**

**Fall**

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<td>BENG 762</td>
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**Credits**

18

**Spring**

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**Credits**

15

**Total Credits**

128

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.

34 credits engineering, 16 credits math, 14 credits chemistry, 16 credits life science

Five electives: 15 to 16 credits engineering, 4 credits science, math, or engineering