# BIOENGINEERING MINOR

**Banner Code:** BIOE  
**Website:** https://bioengineering.gmu.edu/

The minor in Bioengineering is available to both engineering and non-engineering majors. It provides considerable opportunities in a highly cross-disciplinary field involving the application of engineering concepts and tools to solve problems in biomedicine. The minor in Bioengineering prepares students to gain and reinforce their knowledge of biology and engineering fundamentals, and develop and apply skills to clinically-relevant challenges.

## Admissions & Policies

### Admissions

Students must have completed MATH 114 Analytic Geometry and Calculus II with a grade of B- or better to be admitted to the minor.

### Policies

For policies governing all minors, see AP.5.3.4 Minors.

## Requirements

**Total credits: 19-21**

### Minor Requirements

#### Required Courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BENG 101</td>
<td>Introduction to Bioengineering</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 213</td>
<td>Cell Structure and Function (Mason Core)</td>
<td>4</td>
</tr>
<tr>
<td>BENG 214</td>
<td>Physiology for Engineers</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
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<td><strong>10</strong></td>
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1. All students in the Bioengineering minor program are recommended to register for the specific section of BIOL 213 Cell Structure and Function (Mason Core).

#### Technical Electives:

Select at least nine credits from the following list: 9-11

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BENG 420</td>
<td>Biomedical Data Analytics</td>
<td></td>
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<tr>
<td>BENG 430</td>
<td>Continuum Biomechanics and Biotransport II</td>
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<tr>
<td>BENG 435</td>
<td>Multi-scale Modeling and Simulation in Biomedicine</td>
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<td>BENG 487</td>
<td>Molecular Engineering Laboratory</td>
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<td>BENG 488</td>
<td>Neuronal Engineering</td>
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<td>BENG 492</td>
<td>Computational Modelling of Neurons and Networks</td>
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<td>BENG 489</td>
<td>Neuroinformatics</td>
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<td>BENG 490</td>
<td>Mason-Inova Applied Technologies</td>
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<td>BENG 491</td>
<td>Bioengineering World Health</td>
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<tr>
<td>BENG 395</td>
<td>RS: Mentored Research in Bioengineering (Research Experience)</td>
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Students may choose to substitute two of the technical electives (up to 6 credits) from the following:

**ECE courses**
- ECE 370: Robot Design
- ECE 410: Applications of Discrete-Time Signal Processing
- ECE 422: Digital Control Systems
- ECE 431: Digital Circuit Design
- ECE 470: Introduction to Humanoid Robotics

**ME courses**
- ME 221: Thermodynamics
- ME 322: Fluid Mechanics
- ME 313: Material Science
- ME 432: Control Engineering

**SYST courses**
- OR 442: Stochastic Operations Research
- SYST 468: Applied Predictive Analytics
- SYST 470: Human Factors Engineering

**NEUR courses**
- NEUR 327: Cellular, Neurophysiological, and Pharmacological Neuroscience
- NEUR 461: Special Topics in Neuroscience

**BIOL courses**
- BIOL 311: General Genetics
- BIOL 385: Biotechnology and Genetic Engineering
- BIOL 484: Cell Signaling and Disease
- BIOL 486: Molecular Biology and Biotechnology Laboratory

**CHEM courses**
- CHEM 313: Organic Chemistry I
- CHEM 314: Organic Chemistry II
- CHEM 463: General Biochemistry I

**Total Credits** 9-11