

BIOENGINEERING MINOR

Banner Code: BIOE

Website: 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

Eight credits of coursework must be unique to the minor and students must complete all coursework with a minimum GPA of 2.00. For policies governing all minors, see AP.5.3.4 Minors (<http://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-4>).

Requirements

Minor Requirements

Total credits: 19-21

Required Courses

Code	Title	Credits
BENG 101	Introduction to Bioengineering	3
BIOL 213	Cell Structure and Function ¹	4
BENG 214	Physiology for Engineers	3
Total Credits		10

¹ All students in the Bioengineering minor program are recommended to register for the specific section of BIOL 213 Cell Structure and Function.

Technical Electives

Code	Title	Credits
Select at least nine credits from the following list: 9-11		
Computational Biomedicine		
BENG 230	Continuum Biomechanics and Transport I	
BENG 420	Biomedical Data Analytics	
BENG 430	Continuum Biomechanics and Biotransport II	
BENG 435	Multi-scale Modeling and Simulation in Biomedicine	
Biomedical Imaging & Devices		
BENG 437	Medical Image Processing	

BENG 438 Advanced Biomedical Imaging

BENG 470 Bioinstrumentation and Devices II

Biomaterials & Nanomedicine

BENG 240 Biomaterials

BENG 413 Molecular Engineering Laboratory

BENG 421 Cell and Tissue Engineering

BENG 440 Advanced Biomaterials and Biomimetic Devices for Nanomedicine

Neurotechnology & Computational Neuroscience

BENG 327 Cellular, Neurophysiological, and Pharmacological Neuroscience

BENG 426 Neural Engineering

BENG 434 Computational Modelling of Neurons and Networks

BENG 487 Neuroinformatics

Study Abroad

BENG 417 Bioengineering World Health

Research Experience

BENG 395 RS: Mentored Research in Bioengineering (Research Experience)

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 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 Systems Dynamics and Controls

SYST courses

OR 442 Stochastic Operations Research

SYST 468 Applied Predictive Analytics

SYST 470 Human Factors Engineering

NEUR courses

NEUR 327 Cellular 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

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CHEM 463	General Biochemistry I	
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Total Credits		9-11