

BIOLOGICAL ENGINEERING, MINOR

Requirements for a minor may be completed at any campus location offering the specified courses for the minor. Students may not change from a campus that offers their major to a campus that does not offer their major for the purpose of completing a minor.

Program Description

This minor provides students with an opportunity to apply engineering principles to agricultural and biological production and processing systems and to the management of our natural resources. Courses may be selected by students to gain a better understanding of power and machinery, microbiological engineering, soil conservation and water quality, food process engineering, or structures and their environments.

The minor is particularly suitable for students pursuing an undergraduate degree in a different engineering major. Additional prerequisites for courses in the minor may be required including calculus through differential equations, engineering mechanics, fluid dynamics, or thermodynamics. Students interested in pursuing this minor should follow up with the contact provided under Academic Advising to discuss how the minor might integrate with their major and any other questions.

What is Biological Engineering?

Biological Engineering involves the study of engineering fundamentals, very similar to traditional engineering disciplines like chemical, civil, or mechanical engineering. What makes Biological Engineering unique is the integration of these engineering fundamentals with biological, agricultural, and environmental sciences and the holistic approach taken to studying agricultural production, processing of food and other bio-based materials, and natural resource protection. Problem-solving skills are developed and then applied to grand engineering challenges such as sustainably providing safe food and clean water.

You Might Like This Program If...

- You are pursuing an engineering major and want to complement it with an engineering minor that offers a different perspective on the connections between agriculture, food, and environment.
- You want to take application-focused classes with interactive labs and hands-on learning opportunities.
- You are interested in solving problems related to fundamental societal needs, like food, water, fiber, and renewable energy.
- You are passionate about sustainability.

Program Requirements

Requirement	Credits
Requirements for the Minor	18-20

Requirements for the Minor

The minor requires a minimum of 18 credits, at least 6 of which must be at the 400 level.

A grade of C or better is required for all courses in the minor, as specified by Senate Policy 59-10 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/59-00-minors-and-certificates/#59-10>).

In addition, at least six credits of the minor must be unique from the prescribed courses required by a student's major(s).

Code	Title	Credits
Additional Courses		
<i>Additional Courses: Require a grade of C or better</i>		
Select 3-4 credits from the following related science electives:		3-4
AGRO 28	Principles of Crop Management	
ANSC 201	Animal Science	
ASM/ERM 309	Measurement & Monitoring of Hydrologic Systems	
BIOL 110	Biology: Basic Concepts and Biodiversity	
BIOL 127	Introduction to Plant Biology	
BMB 211	Elementary Biochemistry	
BMB/MICRB 251	Molecular and Cell Biology I	
CHEM 202	Fundamentals of Organic Chemistry I	
CHEM 210	Organic Chemistry I	
FDSC 200	Introductory Food Science	
HORT 101	Horticultural Science	
MICRB 201	Introductory Microbiology	
SOILS 101	Introductory Soil Science	
Select 6-7 credits from the following 300-level BE courses:		6-7
BE 301	Mathematical Modeling of Biological and Physical Systems	
BE 302	Heat and Mass Transfer in Biological Systems	
BE 303	Structural Systems in Agriculture	
BE 304		
BE 305	Agricultural Measurements and Control Systems	
BE 306	Machines for Agricultural and Biological Processing	
BE 307	Principles of Soil and Water Engineering	
BE 308	Engineering Elements of Biochemistry and Microbiology	
Select 6 credits from the following 400-level BE courses:		6
BE 461	Design of Fluid Power Systems	
BE 462	Design of Wood Structures	
BE 464	Bioenergy Systems Engineering	
BE 465	Food and Biological Process Engineering	
BE 467	Design of Stormwater and Erosion Control Facilities	
BE 468	Microbiological Engineering	
BE 477	Land-Based Waste Disposal	
BE 487	Simulation Modeling for Water Resources Management	

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of 400-level coursework or independent study in a related science or engineering field in consultation with the minor adviser 3

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of

both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy/>)

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