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, microbial 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

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for the Minor</td>
<td>18-20</td>
</tr>
</tbody>
</table>

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** | **Additional Courses** | **Credits**
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**Additional Courses: Require a grade of C or better** | |
Select 3-4 credits from the following related science electives: | 3-4 |
AGRO 28 | Principles of Crop Management |
ANSC 201 | Animal Science |
ASLM/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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