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 soil conservation and water quality, food and biological process engineering, structures and their environments, power and machinery, or microbiological engineering.

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

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE 300</td>
<td>Heat and Mass Transfer in Biological Systems</td>
<td></td>
</tr>
<tr>
<td>BE 303</td>
<td>Structural Systems in Agriculture</td>
<td></td>
</tr>
<tr>
<td>BE 304</td>
<td>Engineering Properties of Food and Biological Materials</td>
<td></td>
</tr>
<tr>
<td>BE 305</td>
<td>Agricultural Measurements and Control Systems</td>
<td></td>
</tr>
<tr>
<td>BE 306</td>
<td>Machines for Agricultural and Biological Processing</td>
<td></td>
</tr>
<tr>
<td>BE 307</td>
<td>Principles of Soil and Water Engineering</td>
<td></td>
</tr>
<tr>
<td>BE 308</td>
<td>Engineering Elements of Biochemistry and Microbiology</td>
<td></td>
</tr>
</tbody>
</table>

Select 9-10 credits from one of the following areas:

<table>
<thead>
<tr>
<th>Power and Machinery Systems</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM 420</td>
<td></td>
</tr>
<tr>
<td>ASM 424</td>
<td></td>
</tr>
<tr>
<td>BE 461</td>
<td></td>
</tr>
<tr>
<td>ME 431</td>
<td></td>
</tr>
<tr>
<td>ME 480</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Biological Systems</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE 468</td>
<td></td>
</tr>
<tr>
<td>CHE 340</td>
<td></td>
</tr>
<tr>
<td>CHE 438</td>
<td></td>
</tr>
<tr>
<td>CHE 449</td>
<td></td>
</tr>
<tr>
<td>ESC 484</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Natural Resource Systems</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM 309</td>
<td></td>
</tr>
<tr>
<td>BE 467</td>
<td></td>
</tr>
<tr>
<td>BE 477</td>
<td></td>
</tr>
<tr>
<td>BE 487</td>
<td></td>
</tr>
<tr>
<td>CE 370</td>
<td></td>
</tr>
<tr>
<td>CE 371</td>
<td></td>
</tr>
<tr>
<td>CE 461</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Food Process Systems</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE 465</td>
<td></td>
</tr>
<tr>
<td>BE 468</td>
<td></td>
</tr>
<tr>
<td>CHE 410</td>
<td></td>
</tr>
<tr>
<td>FDSC 430</td>
<td></td>
</tr>
<tr>
<td>IE 312</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structural Systems</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 308</td>
<td></td>
</tr>
<tr>
<td>BE 462</td>
<td></td>
</tr>
<tr>
<td>CE 340</td>
<td></td>
</tr>
<tr>
<td>CE 341</td>
<td></td>
</tr>
<tr>
<td>CE 342</td>
<td></td>
</tr>
</tbody>
</table>

1 One of these five courses must be selected.

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 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park
Megan Marshall
Associate Teaching Professor
305 Agricultural Engineering Building
University Park, PA 16802
814-865-3392
mnm11@psu.edu

Contact
University Park
DEPARTMENT OF AGRICULTURAL AND BIOLOGICAL ENGINEERING
105 Agricultural Engineering Building
University Park, PA 16802
814-863-1524
wjt11@psu.edu

http://abe.psu.edu