Degree Requirements

For the Bachelor of Science degree in BioRenewable Systems, a minimum of 121 credits is required for the BioProducts Option and the Agricultural Systems Management Option:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>106-109</td>
</tr>
</tbody>
</table>

30 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GS courses; 9 credits of GWS courses.

Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>BRS 350</td>
<td>Introduction to Life Cycle Assessment</td>
<td>3</td>
</tr>
<tr>
<td>BRS 422</td>
<td>Energy Analysis in Biorenewable Systems</td>
<td>3</td>
</tr>
<tr>
<td>BRS 426</td>
<td>Safety and Health in Agriculture and Biorenewable Industries</td>
<td>3</td>
</tr>
<tr>
<td>BRS 428</td>
<td>Electric Power and Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>BRS 429W</td>
<td>Biorenewable Systems Analysis and Management</td>
<td>3</td>
</tr>
<tr>
<td>BRS 430W</td>
<td>Biorenewable Systems Capstone 1</td>
<td>1</td>
</tr>
<tr>
<td>BRS 431W</td>
<td>BioRenewable Sys Capstone 2</td>
<td>2</td>
</tr>
<tr>
<td>BRS 490</td>
<td>BioRenewable Systems Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 106</td>
<td>Agribusiness Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>BRS 221</td>
<td>Engineering Principles of Biorenewable Systems</td>
<td>3</td>
</tr>
<tr>
<td>BRS 391</td>
<td>Communication Skills for BE and BRS Students</td>
<td>2</td>
</tr>
<tr>
<td>BRS 392</td>
<td>Leadership Skills for BE and BRS Students</td>
<td>2</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Cornerstone Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBM 101</td>
<td>Economic Principles of Agribusiness Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td></td>
</tr>
<tr>
<td>BA 303</td>
<td>Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>

or AGBM 302 | Food Product Marketing                     |
| BIOL 11 & BIOL 12 | Introductory Biology I and Introductory Biology II |
| or BIOL 110 | Biology Basic Concepts and Biodiversity     |
| EBF 200 | Introduction to Energy and Earth Sciences Economics | 3 |
| or ECON 104 | Introductory Macroeconomic Analysis and Policy | |
| PHYS 211 | General Physics: Mechanics                  | 4       |
| or PHYS 250| Introductory Physics I                      |         |

Select one of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 241</td>
<td>Legal Environment of Business</td>
<td></td>
</tr>
<tr>
<td>&amp; BA 242</td>
<td>Social and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>BA 243</td>
<td>Social, Legal, and Ethical Environment of Business</td>
<td></td>
</tr>
<tr>
<td>BLAW 243</td>
<td>Legal Environment of Business</td>
<td></td>
</tr>
</tbody>
</table>

Additional Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or CAS 100B</td>
<td>Effective Speech</td>
<td></td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>3-4</td>
</tr>
<tr>
<td>or STAT 240</td>
<td>Introduction to Biometry</td>
<td></td>
</tr>
<tr>
<td>or STAT 250</td>
<td>Introduction to Biostatistics</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for the Option

Select an option 33-34

Agricultural Systems Management Option (33-34 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM 310</td>
<td>Power Transmission in Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>ASM 327</td>
<td>Soil and Water Resource Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 28</td>
<td>Principles of Crop Management</td>
<td>3</td>
</tr>
<tr>
<td>or HORT 101</td>
<td>Horticultural Science</td>
<td></td>
</tr>
</tbody>
</table>

Select 3-4 credits of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 100</td>
<td>Introduction to Animal Industries</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 201</td>
<td>Animal Science</td>
<td></td>
</tr>
<tr>
<td>ANSC 207/FDSC 207 and ANSC 208/FDSC 208</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

Select 18 credits of specialization courses in consultation with an adviser. At least 12 credits must be at 200-400 level.

Bioproducts Option (33 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRS 300</td>
<td>Introduction to Biorenewable Products</td>
<td>3</td>
</tr>
<tr>
<td>BRS 411</td>
<td>Bioproducts Science and Technology</td>
<td>3</td>
</tr>
<tr>
<td>BRS 417</td>
<td>Processing and Manufacturing Systems for Bioproducts</td>
<td>3</td>
</tr>
<tr>
<td>BRS 423</td>
<td>Deterioration and Protection of Bioproducts</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRS 402</td>
<td>Foundations of Sustainable Business</td>
<td>3</td>
</tr>
</tbody>
</table>
Supporting Courses and Related Areas

Select 3 credits in leadership/entrepreneurship

Select 15 credits of specialization courses in consultation with an adviser. At least 9 credits must be at 200-400 level.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)

- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains

- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)

- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.