

BIORENEWABLE SYSTEMS, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

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:

Requirement	Credits
General Education	45
Requirements for the Major	106-109

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.

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.

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)

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

Prescribed Courses: Require a grade of C or better

AGBM 106	Agribusiness Problem Solving	3
BRS 221	Engineering Principles of Biorenewable Systems	3
BRS 391	Communication Skills for BE and BRS Students	2
BRS 392	Leadership Skills for BE and BRS Students	2
EDSGN 100	Cornerstone Engineering Design	3
ENGL 15	Rhetoric and Composition	3

Additional Courses

AGBM 101	Economic Principles of Agribusiness Decision Making	3
or ECON 102	Introductory Microeconomic Analysis and Policy	
BA 303	Marketing	3
or AGBM 302	Food Product Marketing	
BIOL 11	Introductory Biology I	4
& BIOL 12	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

BA 241	Legal Environment of Business	
& BA 242	and Social and Ethical Environment of Business	
BA 243	Social, Legal, and Ethical Environment of Business	
BLAW 243	Legal Environment of Business	

Additional Courses: Require a grade of C or better

CAS 100A	Effective Speech	3
or CAS 100B	Effective Speech	
MATH 110	Techniques of Calculus I	4
or MATH 140	Calculus With Analytic Geometry I	
STAT 200	Elementary Statistics	3-4
or STAT 240	Introduction to Biometry	
or STAT 250	Introduction to Biostatistics	

Requirements for the Option

Select an option 33-34

Requirements for the Options**Agricultural Systems Management Option (33-34 credits)**

Code	Title	Credits
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Prescribed Courses

SOILS 101	Introductory Soil Science	3
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Prescribed Courses: Require a grade of C or better

ASM 310	Power Transmission in Agriculture	3
ASM 327	Soil and Water Resource Management	3

Additional Courses

AGRO 28	Principles of Crop Management	3
or HORT 101	Horticultural Science	

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

ANSC 100	Introduction to Animal Industries	
ANSC 201	Animal Science	
ANSC 207/FDSC 207 and ANSC 208/FDSC 208		

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. 18

Bioproducts Option (32 credits)

Code	Title	Credits
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Prescribed Courses

BRS 300	Introduction to Biorenewable Products	3
BRS 411	Bioproducts Science and Technology	3
BRS 417	Processing and Manufacturing Systems for Bioproducts	3
BRS 423	Deterioration and Protection of Bioproducts	3

Prescribed Courses: Require a grade of C or better

BRS 402	Foundations of Sustainable Business	3
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Supporting Courses and Related Areas

Select 3 credits in leadership/entrepreneurship 3

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