

BIORENEWABLE SYSTEMS, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

The BioRenewable Systems Major is an applied major that intertwines the study of engineering technology, natural resources, and agriculture with fundamentals of business, entrepreneurship, and management. Administered through the Department of Agricultural and Biological Engineering, the BioRenewable Systems (BRS) program uniquely prepares students to solve 21st century problems and attain careers in both traditional sectors and those relating to the emerging bioeconomy. Students in this program will secure:

1. knowledge of fundamental sciences related to resources, processes, and products in biorenewable systems;
2. communication and managerial skills relevant to careers in product development, technology, sales, marketing and management; and
3. the ability to apply systems analysis skills, positioning them for effective problem solving and leadership in the agricultural and bioproducts industries.

Graduates are typically employed as sales and field representatives, financial and technical consultants, and technical service or quality assurance personnel in renewable bioproducts or related agricultural sectors such as:

- power and machinery systems,
- forest products,
- food production,
- bioprocessing,
- environmental systems,
- wood structures,
- bioenergy,
- co-product development, and
- agrochemicals.

Graduates may continue their education in a graduate program with a science, engineering, or business orientation.

The BRS major has two options: Agricultural Systems Management (ASM) and BioProducts (BP).

Agricultural Systems Management Option

This option applies a technological approach to understanding and managing agricultural production systems to meet economical and sustainable needs. Basic study is emphasized in the agricultural and business management sciences, along with the application of the technical results of engineering research, design, and manufacturing. Graduates of this option apply their technology and management training to the diverse areas of food and fiber production; bioprocessing; and land, water, and air resources.

BioProducts Option

The scientific nature of biobased resources—their unique design, sustainability, and renewability—constitutes the core of this option.

Building upon that foundation, students will learn techniques for converting and efficiently utilizing these materials to maximize product life cycles, while simultaneously exploring relevant marketing and management strategies. Technical electives for this option emphasize material sciences, engineering, and/or business. Career tracks are broad, ranging from traditional forest products companies to emerging sectors, including bioenergy co-products.

You Might Like this Program If...

- You want to make a difference in the world by developing more efficient and sustainable technologies and systems
- You want to work with engineers in the testing, development, and improvement of equipment, processes, or products
- You enjoy supervising and interacting with other professionals, employees, suppliers, and customers
- You want to demonstrate features, advantages, and benefits of new technologies or products and train service personnel
- You are interested in business, marketing and sales, with a focus on biorenewable and agricultural industries.

Entrance to Major

In order to be eligible for entrance to this major, a student must:

1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (<http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major>)

Degree Requirements

For the Bachelor of Science degree in BioRenewable Systems, a minimum of 120 credits is required for the BioProducts Option and minimum of 121 credits is required for the Agricultural Systems Management Option:

Requirement	Credits
General Education	45
Requirements for the Major	105-109

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 (<http://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 391	Contextual Integration of Communication Skills for the Technical Workplace	2
BRS 392	Contextual Integration of Leadership Skills for the Technical Workplace	2
BRS 393	Industry Tour	1
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 490	BioRenewable Systems Colloquium	1
CHEM 110	Chemical Principles I	3
CHEM 111	Experimental Chemistry I	1
ENGL 15	Rhetoric and Composition	3
<i>Prescribed Courses: Require a grade of C or better</i>		
AGBM 106	Agribusiness Problem Solving	3
BRS 221	Engineering Principles of Biorenewable Systems	3
BRS 300	Introduction to Biorenewable Products	3
BRS 437	Bioproduct Marketing and Sales	4
EDSGN 100	Introduction to Engineering Design	3
Additional Courses		
Select 1 credit of First-Year Seminar		1
AGBM 101	Economic Principles of Agribusiness Decision Making	3
or ECON 102	Introductory Microeconomic Analysis and Policy	
BIOL 11	Introductory Biology I	4
& BIOL 12	and Introductory Biology II	
or BIOL 110	Biology: Basic Concepts and Biodiversity	
CAS 100A	Effective Speech	3
or CAS 100B	Effective Speech	
EBF 200	Introduction to Energy and Earth Sciences Economics	3
or ECON 104	Introductory Macroeconomic Analysis and Policy	
MATH 110	Techniques of Calculus I	4
or MATH 140	Calculus With Analytic Geometry I	
PHYS 211	General Physics: Mechanics	4
or PHYS 250	Introductory Physics I	
STAT 200	Elementary Statistics	3-4
or STAT 240	Introduction to Biometry	
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	
Requirements for the Option		
Select an option		32-34

Requirements for the Options

Agricultural Systems Management Option (33-34 credits)

Code	Title	Credits
Prescribed Courses		
SOILS 101	Introductory Soil Science	3
<i>Prescribed Courses: Require a grade of C or better</i>		
ASM 310	Power Transmission in Agriculture	3
ASM 327	Soil and Water Resource Management	3
Additional Courses		
Select 6-7 credits of the following:		
AGRO 28	Principles of Crop Management	3
or HORT 101	Horticultural Science	
ANSC 100	Introduction to Animal Industries	3
ANSC 201	Animal Science	4
ANSC/FDSC 207	Animal Products Technology	2
ANSC/FDSC 208	Animal Products Technology Laboratory	1
Supporting Courses and Related Areas		
Select 18 credits of specialization courses in consultation with an adviser ¹		18

¹ At least 12 credits must be at 200-400 level.

Bioproducts Option (32 credits)

Code	Title	Credits
Prescribed Courses		
BRS 411	Biobased Fiber Science	4
BRS 417	Processing and Manufacturing Systems for Bioproducts	4
BRS 423	Deterioration and Protection of Bioproducts	3
<i>Prescribed Courses: Require a grade of C or better</i>		
BRS 402	Foundations of Sustainable Business	3
Supporting Courses and Related Areas		
Select 3 credits in leadership/entrepreneurship		3
Select 15 credits of specialization courses in consultation with an adviser ¹		15

¹ At least 9 credits must be at 200-400 level.

Program Learning Objectives

1. Graduates will demonstrate knowledge of engineering technologies, materials sciences, and safety as they pertain to biorenewable systems.
2. Graduates will demonstrate knowledge of sales, marketing, management, and/or entrepreneurship principles relating to biorenewable systems and industries.
3. Graduates will be able to analyze and interpret data using relevant software, and demonstrate an ability to draw sound conclusions from data.
4. Graduates will be able to communicate, both orally and in writing, business and technical concepts within the context of biorenewable industries.

5. Graduates will be able to identify solutions to problems relevant to biorenewable systems.
6. Graduates will be able to apply systems analysis skills for effective decision making in the operations and management of biorenewable resource industries.

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

Serap Gorucu

Assistant BRS Program Coordinator
201 Agricultural Engineering Building
University Park, PA 16802
814-863-8124
sgk16@psu.edu

Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2019-20 academic year. To access previous years' suggested academic plans, please visit the archive (<http://bulletins.psu.edu/undergraduate/archive>) to view the appropriate Undergraduate Bulletin edition (*Note: the archive only contain suggested academic plans beginning with the 2018-19 edition of the Undergraduate Bulletin*).

Agricultural Systems Management Option, University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year		
Fall	Credits Spring	Credits
BE 1	1 CHEM 111 [†]	1
CHEM 110 [†]	3 ACCTG 211	4
EDSGN 100 [*]	3 ENGL 15, 30, or ESL 15 ^{††}	3
MATH 110 or 140 ^{††}	4 PHYS 250 or 211 [†]	4
General Education Course (GHW)	1.5 General Education Course	3

ECON 104 or EBF 200 [†]	3 General Education Course (GHW)	1.5
		15.5
		16.5

Second Year

Fall	Credits Spring	Credits
AGBM 101 or ECON 102 [†]	3 BLAW 243, BA 243, or BA 241 and BA 242	3-4
BIOL 110 or 11 and 12 [†]	4 SOILS 101	3
CAS 100A or 100B ^{††}	3 AGRO 28 or HORT 101	3
STAT 200 or 240 ^{††}	3-4 General Education Course	3
General Education Course	3 General Education Course	3
		16-17
		15-16

Third Year

Fall	Credits Spring	Credits
AGBM 106 [*]	3 BRS 392 ^{††}	2
BRS 221 [*]	3 BRS 437 [*]	4
BRS 300 [*]	3 ANSC 201 or 100	3-4
ASM 310 [*]	3 Selection	3
ASM 327 [*]	3 Selection	3
BRS 391 ^{††}	2	
		17
		15-16

Fourth Year

Fall	Credits Spring	Credits
BRS 428	3 BRS 426	3
BRS 393	1 BRS 429W	3
BRS 422	3 BRS 490	1
Selection	3 Selection	3
Selection	3 Selection	3
		13
		13

Total Credits 121-124

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

A list of 'selection' courses can be found in the BRS Advising Manual: abe.psu.edu/documents/brs-advising-manual.pdf (<https://abe.psu.edu/documents/brs-advising-manual.pdf>). Students should consult with an academic adviser to discuss appropriate course selection.

BioProducts Option, University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
BE 1	1 CHEM 111 [†]	1
CHEM 110 [†]	3 ACCTG 211	4
EDSGN 100 [*]	3 ENGL 15, 30, or ESL 15 ^{††}	3
MATH 110 or 140 ^{††}	4 PHYS 250 or 211 [†]	4
General Education Course (GHW)	1.5 General Education Course	3
ECON 104 or EBF 200 [†]	3 General Education Course (GHW)	1.5
		15.5
		16.5

Second Year

Fall	Credits Spring	Credits
AGBM 101 or ECON 102 [†]	3 BLAW 243, BA 243, or BA 241 and BA 242	3-4
BIOL 110 or 11 and 12 [†]	4 Selection	3
CAS 100A or 100B ^{††}	3 Selection	3
STAT 200 or 240 ^{††}	3-4 General Education Course	3
General Education Course	3 General Education Course	3
		16-17
		15-16

Third Year

Fall	Credits Spring	Credits
AGBM 106 [*]	3 BRS 392 ^{††}	2
BRS 221 [*]	3 BRS 437 [*]	4
BRS 300 [*]	3 BRS 417	4
Selection - BRS Leadership/Entrepreneurship (ENGR 310, AEE 360, MGMT 215, or SUST 200)	3 BRS 411	4
Selection	3	
BRS 391 ^{††}	2	
		17
		14

Fourth Year

Fall	Credits Spring	Credits
BRS 402 [*]	3 BRS 426	3
BRS 428	3 BRS 429W	3

BRS 393	1 BRS 490	1
BRS 422	3 BRS 423	3
Selection	3 Selection	3
13		13

Total Credits 120-122

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138 in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Note:

A list of 'selection' courses can be found in the BRS Advising Manual: abe.psu.edu/documents/brs-advising-manual.pdf (<https://abe.psu.edu/documents/brs-advising-manual.pdf>). Students should consult with an academic adviser to discuss appropriate course selection.

Agricultural Systems Management Option, Commonwealth Campuses

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
First Year Seminar	1-3 CHEM 111 [†]	1
CHEM 110 [†]	3 ACCTG 211	4
EDSGN 100 [*]	3 ENGL 15, 30, or ESL 15 ^{††}	3
MATH 110 or 140 ^{††}	4 PHYS 250 or 211 [†]	4
General Education Course (GHW)	1.5 General Education Course	3

ECON 104 or EBF 200 [†]	3 General Education Course (GHW)	1.5
15.5-17.5		16.5

Second Year

Fall	Credits Spring	Credits
AGBM 101 or ECON 102 [†]	3 BLAW 243, BA 243, or BA 241 and BA 242	3-4
BIOL 110 or 111 and 12 [†]	4 SOILS 101	3
CAS 100A or 100B ^{††}	3 AGRO 28 or HORT 101	3
STAT 200 or 240 ^{††}	3-4 General Education Course	3
General Education Course	3 General Education Course	3
16-17		15-16

Third Year

Fall	Credits Spring	Credits
AGBM 106 [*]	3 BRS 392 ^{††}	2
BRS 221 [*]	3 BRS 437 [*]	4
BRS 300 [*]	3 ANSC 201 or 100	3-4
ASM 310 [*]	3 Selection	3
ASM 327 [*]	3 Selection	3
BRS 391 ^{††}	2	
17		15-16

Fourth Year

Fall	Credits Spring	Credits
BRS 428	3 BRS 426	3
BRS 393	1 BRS 429W	3
BRS 422	3 BRS 490	1
Selection	3 Selection	3
Selection	3 Selection	3
13		13

Total Credits 121-126

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Note:

A list of 'selection' courses can be found in the BRS Advising Manual: abe.psu.edu/documents/brs-advising-manual.pdf (<https://abe.psu.edu/documents/brs-advising-manual.pdf>). Students should consult with an academic adviser to discuss appropriate course selection.

BioProducts Option, Commonwealth Campuses

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
First Year Seminar	1-3 CHEM 111 [†]	1
CHEM 110 [†]	3 ACCTG 211	4
EDSGN 100 [*]	3 ENGL 15, 30, or ESL 15 ^{††}	3
MATH 110 or 140 ^{††}	4 PHYS 250 or 211 [†]	4
General Education Course (GHW)	1.5 General Education Course	3
ECON 104 or EBF 200 [†]	3 General Education Course (GHW)	1.5
	15.5-17.5	16.5

Second Year

Fall	Credits Spring	Credits
AGBM 101 or ECON 102 [†]	3 BLAW 243, BA 243, or BA 241 and BA 242	3-4
BIOL 110 or 11 and 12 [†]	4 Selection	3
CAS 100A or 100B ^{††}	3 Selection	3
STAT 200 or 240 ^{††}	3-4 General Education Course	3
General Education Course	3 General Education Course	3
	16-17	15-16

Third Year

Fall	Credits Spring	Credits
AGBM 106 [*]	3 BRS 392 ^{††}	2
BRS 221 [*]	3 BRS 437 [*]	4
BRS 300 [*]	3 BRS 417	4
Selection - BRS Leadership/Entrepreneurship (ENGR 310, AEE 360, MGMT 215, or SUST 200)	3 BRS 411	4
Selection	3	
BRS 391 ^{††}	2	
	17	14

Fourth Year

Fall	Credits Spring	Credits
BRS 402 [*]	3 BRS 426	3
BRS 428	3 BRS 429W	3
BRS 393	1 BRS 490	1
BRS 422	3 BRS 423	3

Selection	3 Selection	3
	13	13

Total Credits 120-124

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of 'C' or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Note:

A list of 'selection' courses can be found in the BRS Advising Manual: abe.psu.edu/documents/brs-advising-manual.pdf (<https://abe.psu.edu/documents/brs-advising-manual.pdf>). Students should consult with an academic adviser to discuss appropriate course selection.

Career Paths

The BioRenewable Systems major provides a broad background in science, technology, and business that can help you succeed in industry or a graduate degree program. Career opportunities for students are diverse, and the demand for graduates is expected to be very strong. According to the USDA, scientists, engineers, managers, sales representatives, and marketing specialists will account for 73 percent of the total annual U.S. employment openings for new college graduates with expertise in agricultural and food sciences in the early twenty-first century. Specific career paths vary by option.

Careers

Graduates may find jobs as market analysts, policy advocates, quality assurance managers, materials brokers, production-line supervisors, sales associates, educators, or technical service specialists within bioproducts or agricultural industries. These opportunities may be entrepreneurial, within small businesses, or with large food, agricultural, forest products, or industrial machinery firms. We expect our graduates to advance quickly in their fields. The success of our past graduates in related fields has created a continuing demand for future graduates. Recent annual starting salaries in these fields ranged from \$35,000 to \$60,000.

Opportunities for Graduate Studies

As a BioRenewable Systems graduate, you may pursue an advanced degree in agricultural and biological engineering departments or related science, sustainability, or business disciplines.

Professional Resources

- American Society of Agricultural and Biological Engineers (<http://www.asabe.org>)
- Society for Wood Science and Technology (<http://www.swst.org/wp>)

Contact

University Park

DEPARTMENT OF AGRICULTURAL AND BIOLOGICAL ENGINEERING

105 Agricultural Engineering Building

University Park, PA 16802

814-865-1524

wjt11@psu.edu

<http://abe.psu.edu>