BIOLOGICAL ENGINEERING, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

This major helps prepare students for careers involving the application of engineering principles to agricultural and biological production systems, processing systems, and conservation of land and water resources. Education in mathematics, physics, and engineering sciences common to all engineering disciplines is provided along with specialized training in biological and agricultural sciences. The curriculum covers all areas of biological engineering, including development of machines for biological processing and agriculture, postharvest handling and processing, natural resource management and utilization, biological processes, food engineering, and structures and their environmental modifications. A student must select the Agricultural Engineering option, Food and Biological Processing Engineering option, or the Natural Resources Engineering option.

Principles of engineering design experiences are integrated throughout the third-year curriculum by having students solve problems typical of those encountered in the agricultural and biological engineering profession. A year-long major design experience in the fourth year emphasizes that biological engineers must learn not only how to develop engineering solutions to unique, practical problems using the newest technology, but also to assess and integrate the social and ethical implications of their solutions.

Careers for graduates include design, development, and research engineering positions involving biological processes, machinery development, natural resources management, materials handling, biological product development, and structural systems for animals, plants, and crop storage. Biological engineers are employed in industry, consulting firms, and governmental agencies in the United States and abroad. Graduates deal with the various engineering aspects associated with production and processing of food, fiber, and other biological materials, within the constraints of environmental protection and natural resource conservation.

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 applied to grand engineering challenges such as sustainably providing safe food and clean water.

You Might Like This Program If...

- You enjoy quantitative problem solving and real-life application and/or working outdoors.
- You are interested in a career where you address challenges related to fundamental societal needs, like food, water, fiber, and renewable energy.
- You are passionate about sustainability.
- You want to take application-focused classes with interactive labs and hands-on learning opportunities.

Entrance to Major

In order to be eligible for entrance to this major, students must satisfy the following requirements:

- 29-55 cumulative credits (excludes transfer and AP credits)
- completed with a grade of C or better: EDSGN 100, CHEM 110, MATH 140, MATH 141, PHYS 211
- earned a minimum cumulative grade-point average (GPA) of 2.60

* In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

Degree Requirements

For the Bachelor of Science degree in Biological Engineering, a minimum of 128 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	107-108

24 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; 9 credits of GWS courses. The remaining 21 General Education credits must be distinct from the Requirements for the Major.

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 (https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/).

Common Requirements for the Major (All Options)

Code	Title	Credits
Prescribed Courses		
BE 404	Engineering Properties of Food and Biological Materials	3
BE 460W	Biological Engineering Design I	2
BE 466W	Biological Engineering Design II	2
CHEM 111	Experimental Chemistry I	1
MATH 231	Calculus of Several Variables	2
PHYS 212	General Physics: Electricity and Magnetism	4
Prescribed Courses: Require a grade of C or better		
BE 301	Mathematical Modeling of Biological and Physical Systems	3
BE 302	Heat and Mass Transfer in Biological Systems	4
BE 305	Agricultural Measurements and Control Systems	3
BE 308	Engineering Elements of Biochemistry and Microbiology	3
BE 391	Communication Skills for BE and ABSM Students	2

BE 392	Leadership and Ethics for BE and ABSM Students	2
CHEM 110	Chemical Principles I	3
EDSGN 100	Cornerstone Engineering Design	3
EMCH 211	Statics	3
EMCH 212	Dynamics	3
EMCH 213	Strength of Materials	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
ME 300	Engineering Thermodynamics I	3
PHYS 211	General Physics: Mechanics	4
Additional Courses		
Select one of the following:		3
IE 424	Process Quality Engineering	
STAT 240	Introduction to Biometry	
STAT 250	Introduction to Biostatistics	
STAT/MATH 318	Elementary Probability	
STAT 401	Experimental Methods	
STAT/MATH 418	Introduction to Probability and Stochastic Processes for Engineering	
Additional Courses: Require a grade of C or better		
Select one of the following:		3
CAS 100A	Effective Speech	
CAS 100B	Effective Speech	
CAS 100C	Effective Speech	
CAS/ENGL 138T	Rhetoric and Civic Life II	
Select one of the following:		3
ENGL 15	Rhetoric and Composition	
ENGL 30H	Honors Rhetoric and Composition	
ENGL/CAS 137H	Rhetoric and Civic Life I	
Select one of the following:		4
MATH 251	Ordinary and Partial Differential Equations	
MATH 250 & MATH 252	Ordinary Differential Equations and Partial Differential Equations	
Requirements for the Option		
Select an option		33-34

Requirements for the Option

Agricultural Engineering Option (33 credits)

Code	Title	Credits
Additional Courses		
Additional Courses: Require a grade of C or better		
CE 360	Fluid Mechanics	3
or ME 320	Fluid Flow	
Supporting Courses and Related Areas		
Select 3 credits in math/basic science [1]		3
Select 6 credits in engineering science/design [1]		6
Select 3 credits in agricultural/biological science [1]		3
Select 6 credits in biological engineering [1]		6
Select 6 credits in technical elective [1,2]		6
Supporting Courses and Related Area: Require a grade of C or better		
Select 6 credits from the following:		6
BE 303	Structural Systems in Agriculture	
BE 306	Machine Design for Agricultural and Biological Engineering	
BE 307	Principles of Soil and Water Engineering	

1. Courses to be selected from a list approved by the Agricultural and Biological Engineering faculty. These courses must be chosen so that the engineering design and engineering science requirements for the major are met.
2. Students may apply 3 credits of ROTC to the technical selection category and 3 credits to the GHW category upon completion of the ROTC program.

Food and Biological Processing Engineering Option (33-34 credits)

Code	Title	Credits
Prescribed Courses		
BE 465	Food and Biological Process Engineering	3
BE 468	Microbiological Engineering	3
Additional Courses		
CHEM 202	Fundamentals of Organic Chemistry I	3
or CHEM 210	Organic Chemistry I	
Select one of the following:		3-4
BIOL 230W	Biology: Molecules and Cells	
BMB 211	Elementary Biochemistry	
BMB/MICRB 251	Molecular and Cell Biology I	
BME 201	Fundamentals of Cells and Molecules	
Additional Courses: Require a grade of C or better		
CE 360	Fluid Mechanics	3
or ME 320	Fluid Flow	
Supporting Courses and Related Areas		
Select 6 credits in biological/food science [1]		6
Select 6 credits in engineering science/design [1]		6
Select 6 credits in technical elective [1,2]		6

1. Courses to be selected from a list approved by the Agricultural and Biological Engineering faculty. These courses must be chosen so that the engineering design and engineering science requirements for the major are met.
2. Students may apply 3 credits of ROTC to the technical selection category and 3 credits to the GHW category upon completion of the ROTC program.

Natural Resources Engineering Option (33 credits)

Code	Title	Credits
Prescribed Courses		
BE 467	Design of Stormwater and Erosion Control Facilities	3
BE 477	Land-Based Waste Disposal	3
BE 487	Simulation Modeling for Water Resources Management	3
SOILS 101	Introductory Soil Science	3
Prescribed Courses: Require a grade of C or better		
ABSM 309	Measurement & Monitoring of Hydrologic Systems	3

BE 307	Principles of Soil and Water Engineering	3
CE 360	Fluid Mechanics	3
Supporting Courses and Related Areas		
Select 6 credits in engineering science/design [1]		6
Select 3 credits in biological/environmental science [1]		3
Select 3 credits in technical elective [1,2]		3

1 Courses to be selected from a list approved by the Agricultural and Biological Engineering faculty. These courses must be chosen so that the engineering design and engineering science requirements for the major are met.

2 Students may apply 3 credits of ROTC to the technical selection category and 3 credits to the GHW category upon completion of the ROTC program.

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 and Inter-Domain courses do not meet this requirement.)

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

Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)

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

Integrative Studies

- **Inter-Domain Courses (Inter-Domain):** 6 credits

Exploration

- **GN,** may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher**:** 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 (https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/)). For more information, check the Suggested Academic Plan for your intended program.

Program Educational Objectives

Early career Biological Engineering graduates will be expected to:

1. Demonstrate proficiency in basic and engineering sciences related to biological processing, natural resource, and agricultural engineering fields;
2. Effectively identify, analyze and design sustainable solutions to address issues and opportunities throughout the world;
3. Work in teams and effectively communicate within and outside the profession;
4. Demonstrate strong leadership skills, ethical integrity, and professional engagement

Student Outcomes

Student outcomes describe what students are expected to know and be able to do by the time of graduation. The Biological Engineering program is designed to enable students to:

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. Communicate effectively with a range of audiences
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

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/students/policies-and-rules-for-undergraduate-students/32-00-advising-policy/)

University Park

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Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2025-26 academic year. To access previous years' suggested academic plans, please visit the archive (https://bulletins.psu.edu/undergraduate/archive/) to view the appropriate Undergraduate Bulletin edition.

Agricultural Engineering Option: Biological Engineering, B.S. at 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.

If you are starting at a campus other than the one this plan is ending at, please refer to: https://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

First Year

Fall	Credits	Spring	Credits
BE 1 (or First year Seminar)[†]	1	CHEM 111 (GN)	1
CHEM 110 (GN)[*#†]	3	ENGL 15, 30H, or ESL 15 (GWS)[*‡†]	3
EDSGN 100[*#]	3	MATH 141 or 141E (GQ)[*‡#†]	4
MATH 140 or 140E (GQ)[*‡#†]	4	PHYS 211 (GN)[*#†]	4
General Education Course[†]	3	General Education Course[†]	3
General Education Course[†]	3		
	17		**15**

Second Year

Fall	Credits	Spring	Credits
CAS 100A, 100B, or 100C (GWS)[*‡†]	3	EMCH 212[*]	3
EMCH 211[*]	3	EMCH 213[*]	3
MATH 251[*1]	4	MATH 231	2
PHYS 212 (GN)[†]	4	ME 300[*]	3
General Education Course[†]	3	Math/Basic Science Selection	3
		General Education Course[†]	3
	17		**17**

Third Year

Fall	Credits	Spring	Credits
BE 301[*]	3	BE 302[*]	4
BE 308[*]	3	BE 305[*]	3
BE 391 (GWS)[‡†]	2	BE 392 (GWS)[‡†]	2
CE 360 or ME 320[*]	3	BE 303, 306, or 307[*]	3
STAT 240, 250, 318, 401, 418, or IE 424	3	BE 303, 306, or 307[*]	3
General Education Course[†]	3		
	17		**15**

Fourth Year

Fall	Credits	Spring	Credits
BE 404	3	BE 466W	2
BE 460W	2	BE 4XX-Biological Engineering Selection	3
BE 4XX-Biological Engineering Selection	3	Engineering Science/Design Selection	3
BIO/AG Selection	3	Technical Selection	3
Engineering Science/Design Selection	3	Technical Selection	3
General Education Course (GHW)[†]	1.5	General Education Course (GHW)[†]	1.5
	15.5		**15.5**

Total Credits 129

* 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

[1] MATH 250 followed by MATH 252 is an alternate option in place of MATH 251

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity 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.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

College Notes:

- Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Technical Selection.
- BE 391 & BE 392 fulfill General Writing and Speaking requirements (taken instead of ENGL 202C).
- ***See selection lists in BE Advising Manual at* https://abe.psu.edu/files/be-advising-manual.pdf *for the following:***
  - BE 4XX - Biological Engineering Selection
  - BIO/AG Selection
  - Engineering Science/Design Selection
  - Math/Basic Science Selection
  - Technical Selection
- ***These courses offered at University Park in fall semester only:***
  - BE 301
  - BE 308
  - BE 391
  - BE 404
  - BE 460W
- ***These courses offered at University Park in spring semester only:***
  - BE 302
  - BE 303
  - BE 305
  - BE 306
  - BE 307
  - BE 392
  - BE 466W

Food & Biological Process Engineering Option: Biological Engineering, B.S. Ending at 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.

If you are starting at a campus other than the one this plan is ending at, please refer to: https://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

First Year

Fall	Credits	Spring	Credits
BE 1 (or First Year Seminar)†	1	CHEM 111 (GN)	1
CHEM 110 (GN)*#†	3	ENGL 15, 30H, or ESL 15 (GWS)*‡†	3
EDSGN 100*#	3	MATH 141 or 141E (GQ)*‡#†	4
MATH 140 or 140E (GQ)*‡#†	4	PHYS 211 (GN)*#†	4
General Education Course†	3	General Education Course†	3
General Education Course†	3		
	17		**15**

Second Year

Fall	Credits	Spring	Credits
CAS 100A, 100B, or 100C (GWS)*‡†	3	CHEM 202 or 210	3
EMCH 211*	3	EMCH 212*	3
MATH 251*[1]	4	EMCH 213*	3
PHYS 212 (GN)†	4	MATH 231	2
General Education Course†	3	ME 300*	3
		General Education Course†	3
	17		**17**

Third Year

Fall	Credits	Spring	Credits
BE 301*	3	BE 302*	4
BE 308*	3	BE 305*	3
BE 391 (GWS)‡†	2	BE 392 (GWS)‡†	2
CE 360 or ME 320*	3	BMB 211, 251, BIOL 230W, or BME 201	3-4
STAT 240, 250, 318, 401, 418, or IE 424	3	Engineering Science/Design Selection	3
General Education Course†	3		
	17		**15-16**

Fourth Year

Fall	Credits	Spring	Credits
BE 404	3	BE 466W	2
BE 460W	2	BE 468	3
BE 465	3	Engineering Science/Design Selection	3
Technical Selection	3	Technical Selection	3
Technical Selection	3	Technical Selection	3
General Education Course (GHW)	1.5	General Education Course (GHW)†	1.5
	15.5		**15.5**

Total Credits 129-130

* 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

[1] MATH 250 followed by MATH 252 is an alternate option in place of MATH 251

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity 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.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

College Notes:

- CHEM 210, BMB 251, BIOL 230W, and BME 201 require additional prerequisites that are not prescribed by major but might be used as selections.
- Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a Technical Selection.
- BE 391 & BE 392 will satisfy General Education Writing and Speaking requirements (taken instead of ENGL 202C).
- ***See selection lists in BE Advising Manual at* https://abe.psu.edu/files/be-advising-manual.pdf *for the following:***
  - Emphasis Technical Selection
  - Engineering Science/Design Selection
  - Technical Selection
- ***These courses offered at University Park in fall semester only:***
  - BE 301
  - BE 308
  - BE 391
  - BE 404
  - BE 460W
  - BE 465

- ***These courses offered at University Park in spring semester only:***
  - BE 302
  - BE 305
  - BE 392
  - BE 466W
  - BE 468

Natural Resource Engineering Option: Biological Engineering, B.S. Ending at 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.

If you are starting at a campus other than the one this plan is ending at, please refer to: https://advising.engr.psu.edu/degree-requirements/academic-plans-by-major.aspx

First Year

Fall	Credits	Spring	Credits
BE 1 (or First Year Seminar)†	1	CHEM 111 (GN)	1
CHEM 110 (GN)*#†	3	ENGL 15, 30H, or ESL 15 (GWS)*‡†	3
EDSGN 100*#	3	MATH 141 or 141E (GQ)*‡#†	4
MATH 140 or 140E (GQ)*‡#†	4	PHYS 211 (GN)*#†	4
General Education Course†	3	General Education Course†	3
General Education Course†	3		
	17		**15**

Second Year

Fall	Credits	Spring	Credits
CAS 100A, 100B, or 100C (GWS)*‡†	3	EMCH 212*	3
EMCH 211*	3	EMCH 213*	3
MATH 251*[1]	4	MATH 231	2
PHYS 212 (GN)†	4	ME 300*	3
General Education Course†	3	SOILS 101	3
		General Education Course†	3
	17		**17**

Third Year

Fall	Credits	Spring	Credits
ABSM 309*	3	BE 302*	4
BE 301*	3	BE 305*	3
BE 308*	3	BE 307*	3
BE 391 (GWS)‡†	3	BE 392 (GWS)‡†	2
CE 360*	3	Engineering Science/Design Selection	3
STAT 240, 250, 318, 401, 418, or IE 424	3		
	17		**15**

Fourth Year

Fall	Credits	Spring	Credits
BE 404	3	BE 466W	2
BE 460W	2	BE 487	3
BE 467	3	Engineering Science/Design Selection	3
BE 477	3	Technical Selection	3
BIO/ENV Selection	3	General Education Course†	3
General Education Course (GHW)†	1.5	General Education Course (GHW)†	1.5
	15.5		**15.5**

Total Credits 129

* 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

[1] MATH 250 followed by MATH 252 is an alternate option in place of MATH 251

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity 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.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

College Notes:

- Students who complete the ROTC Program may substitute 3 ROTC credits for the GHW requirement and 3 ROTC credits for a technical selection.
- BE 391 & BE 392 will satisfy General Education Writing and Speaking requirements (instead of taking ENGL 202C).
- ***See selection lists in BE Advising Manual at* https://abe.psu.edu/files/be-advising-manual.pdf *for the following:***
  - BIO/ENV Selection
  - Engineering Science/Design Selection
  - Technical Selection
- ***These courses offered at University Park in fall semester only:***
  - ABSM 309
  - BE 301
  - BE 308
  - BE 391
  - BE 404
  - BE 460W
  - BE 467
  - BE 477
- ***These courses offered at University Park in spring semester only:***

- BE 302
- BE 305
- BE 307
- BE 392
- BE 466W
- BE 487

Career Paths

With a bachelor of science in Biological Engineering, you can gain a broad background in engineering fundamentals and specialized training needed to succeed in industry, government, or graduate education. Specific career paths vary by option within the Biological Engineering major: Agricultural Engineering, Food and Biological Processing Engineering, and Natural Resources Engineering.

Careers

Agricultural Engineering

You can learn power and machinery systems and structural analysis, with a focus on the design of off-road equipment for agricultural production, construction, and food processing. You might work as a design or test engineer for agricultural or construction equipment companies.

Food and Biological Processing Engineering

You can learn to design microbiological systems for production of pharmaceuticals, renewable fuels, and vitamins and to engineer processing systems for production of safe, high-quality food. You might work as a process engineer or project manager for food, pharmaceutical, commodity, or consumer goods companies.

Natural Resources Engineering

You can learn to apply best management practices to minimize non-point source pollution, such as sediment loss or nutrient runoff, and to apply low-impact development strategies for stormwater management. You might work as a design engineer in a government agency or an engineering consulting/design firm.

Opportunities for Graduate Studies

As a Biological Engineering graduate, you may pursue an advanced degree in agricultural and biological engineering or related science and engineering disciplines, such as biomedical engineering, civil and environmental engineering, or food science. You may also pursue licensure as a professional engineer by passing the appropriate examinations and gaining practical engineering experience.

Professional Resources

- American Society of Agricultural and Biological Engineers (https://www.asabe.org)

Accreditation

The Bachelor of Science in Biological Engineering at University Park is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the commission's General Criteria and Program Criteria for Biological and Similarly Named Engineering Programs.

Professional Licensure/Certification

Many U.S. states and territories require professional licensure/certification to be employed. If you plan to pursue employment in a licensed profession after completing this program, please visit the Professional Licensure/Certification Disclosures by State (https://opair.psu.edu/plc/dashboard/) interactive map.

Contact

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