

BIOLOGY, B.S. (BEHREND)

Seven Penn State campuses are scheduled for closure after Spring 2027: DuBois, Fayette, New Kensington, Mont Alto, Shenango, Wilkes-Barre, and York. New students are not being admitted at these campuses.

Begin Campus: Any Penn State Campus

End Campus: Erie

Program Description

The curriculum in Biology is designed to provide students with a strong background in the biological sciences. It provides preparation for students who intend to secure advanced degrees through graduate study, students who intend to prepare for careers in medicine or health-related fields, and students preparing for careers with companies or agencies requiring employees with biological backgrounds. The curriculum has six options allowing students to choose an area of specialization that will best meet their career goals. In addition to selecting an option, students are strongly encouraged to participate in faculty-supervised research. The options are:

1. *General Biology* - various areas of modern biology;
2. *Ecology, Evolution, and Behavior* - theoretical, practical, and applied ecology and evolution of plants and animals;
3. *Genetics and Developmental Biology* - genetics and developmental biology of plants and animals;
4. *Molecular and Cellular Biology and Biochemistry* - molecular and cellular mechanisms of biology;
5. *Medical Technology* - prepares students for careers in clinical laboratories; and
6. *Health Professions* - prepares students for careers in medicine and veterinary sciences; this option also allows exceptional students, who gain early admission to a professional school, to fulfill option requirements with a set number of academic credits taken during the first professional year.

What is Biology?

Biology is the scientific study of life: the diversity and organization of organisms, from single-celled bacteria to multi-cellular plants and animals, including humans. These different levels of biological organization range from the molecules and cells that compose an organism, to the interacting organisms that make up an ecosystem. Hands-on experiences, from designing and conducting lab experiments to making field observations using different procedures and instruments play an important role in gaining biological knowledge. Biologists explore ways to cure neurological diseases, conserve coral populations in tropical oceans, discover more efficient ways to use plants for food and bio-energy, develop vaccines for infectious diseases, and investigate many other facets of Biology.

You Might Like This Program If...

- You are curious about the natural world, from the smallest of cells to the largest of trees.
- You enjoy theoretical study as well as hands-on laboratory learning.
- You are interested chemistry, physics, and mathematics.
- You can envision yourself in a health care or medical career.

- You are looking for a foundational major that supports diverse career paths in the sciences, engineering, research, education, and health care.

Entrance to Major

In order for entrance to the Biology major, a student must have:

1. attained at least a 2.00 cumulative grade point average;
2. completed BIOL 110 and earned a grade of C or better; and
3. completed at least one of the following courses with a grade of C or better: BIOL 220W, or BIOL 240W.

Degree Requirements

For the Bachelor of Science degree in Biology, a minimum of 124 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	97-99

18 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; 3 credits of GWS courses.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned.

Requirements for the Major

Each student must earn at least a grade of C in each 200-, 300-, and 400-level BIOL, BMB, MICRB, PPEM and WFS course in the major field.

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		
CHEM 110	Chemical Principles I	3
CHEM 111	Experimental Chemistry I	1
CHEM 112	Chemical Principles II	3
CHEM 113	Experimental Chemistry II	1
ENGL 202C	Effective Writing: Technical Writing	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
STAT 250	Introduction to Biostatistics	3
<i>Prescribed Courses: Require a grade of C or better</i>		
BIOL 110	Biology: Basic Concepts and Biodiversity	4
BIOL 220W	Biology: Populations and Communities	4
BIOL 230W	Biology: Molecules and Cells	4
BIOL 240W	Biology: Function and Development of Organisms	4
BIOL 322	Genetic Analysis	3

Requirements for the Option

Select an option	56-58
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Requirements for the Option**Ecology, Evolution, and Behavior Option (56 credits)**

Students can select courses in theoretical or applied ecology, evolution, field biology and animal behavior to build strength in ecological science. The option prepares students for graduate study in ecology and evolution, or careers in zoo science, environmental consulting, environmental management, environmental education or positions with regulatory agencies.

Code	Title	Credits
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Prescribed Courses*Prescribed Courses: Require a grade of C or better*

BIOL 427	Evolution	3
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Additional Courses

Select one of the following:	3
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BIOL 402W	Biological Experimental Design ¹	
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STAT 461	Analysis of Variance	
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STAT 462	Applied Regression Analysis	
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STAT 464	Applied Nonparametric Statistics	
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STAT 466	Survey Sampling	
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Select one of the following sequences:	6-8
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CHEM 202 & CHEM 203	Fundamentals of Organic Chemistry I and Fundamentals of Organic Chemistry II	
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CHEM 210 & CHEM 212 & CHEM 213	Organic Chemistry I and Organic Chemistry II and Laboratory in Organic Chemistry	
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Select one of the following sequences:	8-10
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PHYS 211 & PHYS 212 & PHYS 213	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Fluids and Thermal Physics	
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PHYS 211 & PHYS 212 & PHYS 214	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Wave Motion and Quantum Physics	
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PHYS 250 & PHYS 251	Introductory Physics I and Introductory Physics II	
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Additional Courses: Require a grade of C or better

Select 9 credits of the following:	9
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BIOL 428	Population Genetics	
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BIOL 429	Animal Behavior	
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BIOL 435	Ecology of Lakes and Streams	
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BIOL 438		
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BIOL 446	Physiological Ecology	
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BIOL 463	General Ecology	
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Supporting Courses and Related Areas

Select item A or B:	17-21
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A

GEOG 160 & GEOG 161 & GEOG 363	Mapping Our Changing World and Applied Geographic Information Systems and Geographic Information Systems	
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Select 10-14 credits from school approved list	
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B

Select 17-21 credits from school approved list	
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Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits of 400-level BIOL, BMB, MICRB, PPEM, or WFS courses ²	6
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¹ Course requires a grade of C or better² Excluding BIOL 400 and any courses numbered 494, 495, 496, 497, 498, or 499.**General Biology Option (56 credits)**

Students can select courses from a variety of areas of contemporary biology. The option provides the flexibility to enable students to tailor their program for graduate study in many fields of biology or careers requiring broad backgrounds and diverse skills in the biological sciences.

Code	Title	Credits
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Prescribed Courses*Prescribed Courses: Require a grade of C or better*

BIOL 427	Evolution	3
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Additional Courses

Select one of the following sequences:	6-8
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CHEM 202 & CHEM 203	Fundamentals of Organic Chemistry I and Fundamentals of Organic Chemistry II	
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CHEM 210 & CHEM 212 & CHEM 213	Organic Chemistry I and Organic Chemistry II and Laboratory in Organic Chemistry	
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Select one of the following sequences:	8-10
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PHYS 211 & PHYS 212 & PHYS 213	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Fluids and Thermal Physics	
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PHYS 211 & PHYS 212 & PHYS 214	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Wave Motion and Quantum Physics	
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PHYS 250 & PHYS 251	Introductory Physics I and Introductory Physics II	
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Supporting Courses and Related Areas

Select 20-24 credits from school approved list	20-24
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Supporting Courses and Related Areas: Require a grade of C or better

Select 15 credits of 400-level BIOL, BMB, MICRB, PPEM, or WFS courses ¹	15
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¹ Excluding BIOL 400 and any courses numbered 494, 495, 496, 497, 498, or 499.**Genetics and Developmental Biology Option (56 credits)**

Students can select courses to develop strengths in various areas of transmission, medical, population or molecular genetics and/or study the developmental process at the organismal, histological or molecular levels. The option prepares students for admission to professional programs in the health sciences, graduate programs in genetic counseling, plant or animal breeding, developmental biology, or careers in research or biotechnology.

Code	Title	Credits
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Prescribed Courses

CHEM 210	Organic Chemistry I	3
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CHEM 212	Organic Chemistry II	3
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CHEM 213	Laboratory in Organic Chemistry	2
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Prescribed Courses: Require a grade of C or better

BIOL 427	Evolution	3
MICRB 201	Introductory Microbiology	3
MICRB 202	Introductory Microbiology Laboratory	2

Additional Courses

Select one of the following sequences: 8-10

PHYS 211 & PHYS 212 & PHYS 213	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Fluids and Thermal Physics	
PHYS 211 & PHYS 212 & PHYS 214	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Wave Motion and Quantum Physics	

PHYS 250 & PHYS 251	Introductory Physics I and Introductory Physics II	
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Additional Courses: Require a grade of C or better

Select three of the following: 9

BIOL 422	Advanced Genetics	
BIOL 428	Population Genetics	
BIOL 430	Developmental Biology	
BIOL 460	Human Genetics	
BMB 406	Molecular Biology	

Supporting Courses and Related Areas

Select 15-17 credits from school approved list 15-17

Supporting Courses and Related Areas: Require a grade of C or better

Select 6 credits of 400-level BIOL, BMB, MICRB, PPEM, or WFS courses¹ 6

¹ Excluding BIOL 400 and any courses numbered 494, 495, 496, 497, 498, or 499.

Medical Technology Option (56-58 credits)

Students spend approximately twelve months at an affiliated hospital¹ during their senior year to complete the clinical phase of their baccalaureate studies. A fixed number of spaces are available on a competitive basis of grade-point average and hospital approval. The Bachelor of Science degree in Biology is awarded upon successful completion of the clinical study. The graduate is also eligible to take the national examination for certification and registry as a medical technologist.

¹ Current affiliation is with St. Vincent Health Center, School of Medical Technology, Erie, PA.

Code	Title	Credits
Prescribed Courses		
PHYS 250	Introductory Physics I	4
PHYS 251	Introductory Physics II	4
<i>Prescribed Courses: Require a grade of C or better</i>		
MICRB 201	Introductory Microbiology	3
MICRB 202	Introductory Microbiology Laboratory	2
MICRB 405A	Seminar and Practicum in Medical Technology	8
MICRB 405B	Seminar and Practicum in Medical Technology	1
MICRB 405C	Seminar and Practicum in Medical Technology	6
MICRB 405D	Seminar and Practicum in Medical Technology	5

MICRB 405E	Seminar and Practicum in Medical Technology	7
MICRB 405F	Seminar and Practicum in Medical Technology	3
MICRB 408	Laboratory Instructional Practice	1

Additional Courses

Select one of the following sequences: 8-10

CHEM 202 & CHEM 203 & CHEM 227	Fundamentals of Organic Chemistry I and Fundamentals of Organic Chemistry II and Analytical Chemistry	
CHEM 210 & CHEM 212 & CHEM 213	Organic Chemistry I and Organic Chemistry II and Laboratory in Organic Chemistry	

Supporting Courses and Related Areas

Select 1 credit from approved list 1

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of 400-level BMB, BIOL, MICRB of the following: 3

BIOL 460	Human Genetics	
BIOL 472	Human Physiology	
BMB 402	General Biochemistry	
BMB 406	Molecular Biology	
MICRB 415	General Virology: Bacterial and Animal Viruses	

Molecular and Cellular Biology and Biochemistry Option (56 credits)

Students can select courses to develop strengths in the study of biology at the cellular and molecular levels, including basic metabolism and its regulations, DNA recombinant technology, bioinformatics and genomics. The option prepares students for admission to professional programs in the health sciences, graduate study, or careers in biotechnology or research.

Code	Title	Credits
Prescribed Courses		
CHEM 210	Organic Chemistry I	3
CHEM 212	Organic Chemistry II	3
CHEM 213	Laboratory in Organic Chemistry	2
<i>Prescribed Courses: Require a grade of C or better</i>		
BIOL 427	Evolution	3
BMB 401	General Biochemistry	3
BMB 402	General Biochemistry	3
BMB 403	Biochemistry Laboratory	1
BMB 406	Molecular Biology	3
MICRB 201	Introductory Microbiology	3
MICRB 202	Introductory Microbiology Laboratory	2

Additional Courses

Select one of the following sequences: 8-10

PHYS 211 & PHYS 212 & PHYS 213	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Fluids and Thermal Physics	
PHYS 211 & PHYS 212 & PHYS 214	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Wave Motion and Quantum Physics	
PHYS 250 & PHYS 251	Introductory Physics I and Introductory Physics II	

Additional Courses: Require a grade of C or better

Select one of the following: 3

BIOL 404	Cellular Mechanisms in Vertebrate Physiology	
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BIOL 439	Practical Bioinformatics
BIOL 441	Plant Physiology
BMB 465	Protein Structure and Function
MICRB 410	Principles of Immunology
MICRB 412	Medical Microbiology
MICRB 415	General Virology: Bacterial and Animal Viruses

Supporting Courses and Related Areas

Select 14-16 credits from school approved list 14-16

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of 400-level BIOL, BMB, MICRB, PPEM, or WFS courses ¹ 3

¹ Excluding BIOL 400 and any courses numbered 494, 495, 496, 497, 498, or 499.

Health Professions Option (56 credits)

Students can prepare for the rigors of advanced health professions education by following the course of study outlined in this option. This option is also provided for exceptional students who are admitted into a "3+4" accelerated or early acceptance program at an approved or affiliated professional school. Students are granted 21 credits toward the Bachelor of Science degree following the successful completion of the first professional academic year. The Health Professions Committee will work with such students to develop an appropriate program of study.

Code	Title	Credits
Prescribed Courses		

CHEM 210	Organic Chemistry I	3
CHEM 212	Organic Chemistry II	3
CHEM 213	Laboratory in Organic Chemistry	2

Prescribed Courses: Require a grade of C or better

BIOL 421	Comparative Anatomy of Vertebrates	4
BIOL 427	Evolution	3
BIOL 472	Human Physiology	3
BIOL 473	Laboratory in Mammalian Physiology	2
BMB 402	General Biochemistry	3
BMB 403	Biochemistry Laboratory	1
MICRB 201	Introductory Microbiology	3
MICRB 202	Introductory Microbiology Laboratory	2

Additional Courses

Select one of the following sequences: 8-10

PHYS 211 & PHYS 212 & PHYS 213	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Fluids and Thermal Physics	
PHYS 211 & PHYS 212 & PHYS 214	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Wave Motion and Quantum Physics	
PHYS 250 & PHYS 251	Introductory Physics I and Introductory Physics II	

Additional Courses: Require a grade of C or better

BMB 401 or CHEM 472	General Biochemistry General Biochemistry I	3
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Supporting Courses and Related Areas

Select 11-13 credits from school approved list 11-13

Supporting Courses and Related Areas: Require a grade of C or better

Select 3 credits of 400-level BIOL, BMB, MICRB, PPEM, or WFS courses ¹ 3

¹ Excluding BIOL 400 and any courses numbered 494, 495, 496, 497, 498, or 499.

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 Learning Objectives

- **Biological Structures:** Students will be able to articulate and explain for multiple levels of the biological hierarchy the physical and chemical characteristics of biological structures influence their function.
- **Microbiology Laboratory Skills:** Learn methods to cultivate microorganisms using aseptic techniques to transfer and handle pure cultures of microorganisms, navigate the light microscope well and determine the results of bacterial stains, and theoretically estimate the number of microorganisms in a sample using dilutions.

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/>)

Erie

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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 2026-27 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.

General Biology Option: Biology, B.S. at Erie 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
BIOL 110 or 114 <i>and</i> 115 ^{*#}	4 BIOL 240W ^{*#}	4
ENGL 15 or 30H [†]	3 MATH 141 ^{*††}	4
CHEM 110 ^{*†}	3 CHEM 112 [†]	3
CHEM 111 [†]	1 CHEM 113 [†]	1
MATH 140 (or appropriate MATH Course from ALEKS test) ^{*†}	4 General Education Course	3
PSU 7	1 General Education Course (GHW)	1.5
General Education Course (GHW)	1.5	
	17.5	16.5

Second Year

Fall	Credits Spring	Credits
BIOL 220W or 224 <i>and</i> 225W ^{*#}	4 BIOL 230W ^{*#}	4
CHEM 202 or 210	3 STAT 250 [*]	3
Supporting Course (School Approved List)	3 CAS 100 [†]	3
General Education Course	3 CHEM 203 or 212 <i>and</i> 213	3
General Education Course	3 General Education Course	3
	16	16

Third Year

Fall	Credits Spring	Credits
BIOL 322 [*]	3 PHYS 251	4
PHYS 250 [†]	4 BIOL, MICRB, BMB, PPBM, ENT, or WFS 400-level Course [*]	3
ENGL 202C ^{††}	3 Supporting Course (School Approved List)	3

BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course* or Supporting Course (School Approved List)	3-4 General Education Course	3
General Education Course	3	
16-17		13
Fourth Year		
Fall	Credits Spring	Credits
BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course*	3-4 BIOL 427*	3
BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course*	3-4 BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course*	3-4
Supporting Course (School Approved List)	3 Supporting Course (School Approved List)	3
Supporting Course (School Approved List)	3 Supporting Course (School Approved List)	3
Supporting Course (School Approved List)	2 Supporting Course (School Approved List)	3
14-16		15-16
Total Credits 124-128		

- BIOL no course under 100
- MATH no course under MATH 140, MATH 140A(2 of 6 credits)
- BISC 1, BISC 2, BISC 3, BISC 4
- MICRB 106 and MICRB 107
- BMB 1, BMB 3
- PHYS 1, PHYS 150, PHYS 151
- CHEM 1, CHEM 3, CHEM 101, CHEM 106(2 of 5 credits), CHEM 108
- PLSC 7N, PLSC 8, PLSC 11
- CMPSC 1, CMPSC 100
- LLED 5, LLED 10
- ENGL 4, ENGL 5
- STAT 100

Advising Notes:

- CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALKES) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41
- Take PHYS 213 if you have taken PHYS 211 and PHYS 212
- Take PHYS 214 if you have taken PHYS 211 and PHYS 212

* 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 See adviser for acceptable substitutions.

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.

Program Notes:

- Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.
- **School Approved List of Supporting Courses** - All courses listed in the Penn State University course listings except those specifically listed in the 'non-approved courses' below are considered approved courses and can be used as supporting courses electives.
- **School of Science Non-Approved List of Courses for the BIOBC Major:**

Genetics and Development Option: Biology, B.S. at Erie 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
BIOL 110 or 114 <i>and</i> 115 ^{*#}	4 BIOL 240W [*]	4
ENGL 15 or 30H [†]	3 MATH 141 ^{*†1}	4
CHEM 110 ^{*†}	3 CHEM 112 [†]	3
CHEM 111 [†]	1 CHEM 113 [†]	1
MATH 140 (or appropriate MATH Course from ALEKS test) ^{*†}	4 General Education Course	3
PSU 7	1 General Education Course (GHW)	1.5
General Education Course (GHW)	1.5	
	17.5	16.5

Second Year

Fall	Credits Spring	Credits
BIOL 220W or 224 <i>and</i> 225W ^{*#}	4 BIOL 230W [*]	4
CHEM 210	3 CHEM 212	3
General Education Course	3 CHEM 213	2
General Education Course	3 STAT 250 [*]	3
CAS 100 [‡]	3 General Education Course	3
	16	15

Third Year

Fall	Credits Spring	Credits
BIOL 322 [*]	3 PHYS 251	4
PHYS 250 [†]	4 General Education Course	3
MICRB 201 [*]	3 BIOL 422, 428, 430, 460, or BMB 406 ^{*1}	3
MICRB 202 [*]	2 BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course [*]	3
ENGL 202C ^{††}	3 Supporting Course (School Approved List)	3
General Education Course	3	
	18	16

Fourth Year

Fall	Credits Spring	Credits
BIOL 422, 428, 430, 460, or BMB 406 ^{*2}	3 BIOL 427 [*]	3
BIOL 422, 428, 430, 460, or BMB 406 ^{*2}	3 BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level Course [*]	3
Supporting Course (School Approved List)	3 Supporting Course (School Approved List)	3

Supporting Course (School Approved List)	3 Supporting Course (School Approved List)	3
Supporting Course (School Approved List)	3	
	15	12

Total Credits 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

¹ See adviser for acceptable substitutions.

² Please meet with your adviser to discuss in which semesters and years these courses are offered.

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.

Program Notes:

- Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.
- School Approved List of Supporting Courses:** All courses listed in the Penn State University course listings except those specifically listed in the 'non-approved courses' below are considered approved courses and can be used as supporting courses electives.
- School of Science Non-Approved List of Courses for the BIOBC Major:**
 - BIOL no course under 100
 - MATH no course under MATH 140, MATH 140A(2 of 6 credits)
 - BISC 1, BISC 2, BISC 3, BISC 4
 - MICRB 106 and MICRB 107
 - BMB 1, BMB 3
 - PHYS 1, PHYS 150, PHYS 151
 - CHEM 1, CHEM 3, CHEM 101, CHEM 106 (2 of 5 credits), CHEM 108
 - PLSC 7N, PLSC 8, PLSC 11
 - CMPSC 1, CMPSC 100
 - LLED 5, LLED 10
 - ENGL 4, ENGL 5
 - STAT 100

Advising Notes:

- CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALKES) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41
- MICRB 201 should be taken concurrently with MICRB 202 Lab
- Take PHYS 213 if you have taken PHYS 211 and PHYS 212
- Take PHYS 214 if you have taken PHYS 211 and PHYS 212

Health Professions Option: Biology, B.S. at Erie 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
BIOL 110 or 114 <i>and</i> 115 ^{*#}	4 BIOL 240W [*]	4
ENGL 15 or 30H [‡]	3 MATH 141 ^{**†}	4
CHEM 110 ^{**†}	3 CHEM 112 [†]	3
CHEM 111 [†]	1 CHEM 113 [†]	1
MATH 140 (or appropriate MATH Course from ALEKS test) ^{**†}	4 General Education Course	3
PSU 7	1 General Education Course (GHW)	1.5
General Education Course (GHW)	1.5	
	17.5	16.5

Second Year

Fall	Credits Spring	Credits
BIOL 220W or 224 <i>and</i> 225W ^{*#}	4 BIOL 230W [*]	4
CHEM 210	3 CAS 100 ^{††}	3
SC 201	1 CHEM 212	3
General Education Course	3 CHEM 213	2
Supporting Course (School Approved List)	3-4 STAT 250 [*]	3
General Education Course	3	
	17-18	15

Third Year

Fall	Credits Spring	Credits
BIOL 322 [*]	3 BIOL 472 [*]	3
PHYS 250 [†]	4 BIOL 473 [*]	2
MICRB 201 [*]	3 BMB 402 [*]	3
MICRB 202 [*]	2 BMB 403 [†]	1
CHEM 472 [*]	3 ENGL 202C ^{††}	3
	PHYS 251	4
	15	16

Fourth Year

Fall	Credits Spring	Credits
BIOL 421 ^{*†}	4 BIOL 427 [*]	3
Supporting Course (School Approved List)	3 BIOL 430, MICRB 410, or MICRB 412 [*]	3
Supporting Course (School Approved List)	3 BIOL, MICRB, BMB, PPBM, ENT, or WFS 400-level Course [*]	3
General Education Course	3 General Education Course	3

General Education Course	3
	16
	12

Total Credits 125-126

- * 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

[†] See adviser for acceptable substitutions

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.

Program Notes:

- Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.
- **School Approved list of Supporting Courses:** All courses listed in the Penn State University course listings except those specifically listed in the 'non-approved courses' below are considered approved courses and can be used as supporting courses electives.
- **School of Science Non-Approved List of Courses for the BIOBC Major:**
 - BIOL no course under 100
 - MATH no course under MATH 140, MATH 140A (2 of 6 credits)
 - BISC 1, BISC 2, BISC 3, BISC 4
 - MICRB 106 and MICRB 107
 - BMB 1, BMB 3
 - PHYS 1, PHYS 150, PHYS 151
 - CHEM 1, CHEM 3, CHEM 101, CHEM 106 (2 of 5 credits), CHEM 108
 - PLSC 7N, PLSC 8, PLSC 11
 - CMPSC 1, CMPSC 100
 - LLED 5, LLED 10
 - ENGL 4, ENGL 5
 - STAT 100
 - BIOL 421 (Comparative Anatomy) and BIOL 476 (Human Anatomy) alternate each year

Advising Notes:

- CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALKES) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41

Medical Technology Option: Biology, B.S. at Erie 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
BIOL 110 or 114 <i>and</i> 115 ^{*#}	4 BIOL 240W [*]	4
ENGL 15 or 30H [‡]	3 MATH 141 ^{**†}	4
CHEM 110 ^{**†}	3 CHEM 112 [†]	3
CHEM 111 [†]	1 CHEM 113 [†]	1
MATH 140 (or appropriate MATH Course from ALEKS test) ^{**†}	4 General Education Course	3
PSU 7	1 General Education Course (GHW)	1.5
General Education Course (GHW)	1.5	
	17.5	16.5

Second Year

Fall	Credits Spring	Credits
BIOL 220W or 224 <i>and</i> 225W ^{*#}	4 BIOL 230W [*]	4
CHEM 202 or 210	3 STAT 250 [*]	3
Supporting Course (School Approved List)	3 ENGL 202C ^{††}	3
General Education Course	3 CHEM 203 or 212 <i>and</i> 213	3
General Education Course	3 General Education Course	3
	16	16

Third Year

Fall	Credits Spring	Credits
BIOL 322 [*]	3 MICRB 410 ^{*2}	3
MICRB 201 [*]	3 PHYS 251	4
MICRB 202 [*]	2 General Education Course	3
PHYS 250 [†]	4 BIOL 472 or BMB 406 ^{*1}	3
CAS 100 [‡]	3	
General Education Course	3	
	18	13

Fourth Year

Fall	Credits Spring	Credits
MICRB 405A [*]	8 MICRB 405B [*]	1
MICRB 405C [*]	6 MICRB 405D [*]	5
MICRB 405F [*]	3 MICRB 405E [*]	7
	MICRB 408 [*]	1
	17	14

Total Credits 128

* 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 See adviser for acceptable substitutions.

² MICRB 410 must be completed before clinical courses at St. Vincent.

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.

• Program Notes:

- Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.
- **School Approved List of Supporting Courses:** All courses listed in the Penn State University course listings except those specifically listed in the 'non-approved courses' below are considered approved courses and can be used as supporting courses electives.
- **School of Science Non-Approved List of Courses for the BIOBC Major:**
 - BIOL no course under 100
 - MATH no course under MATH 140, MATH 140A (2 of 6 credits)
 - BISC 1, BISC 2, BISC 3, BISC 4
 - MICRB 106 and MICRB 107
 - BMB 1, BMB 3
 - PHYS 1, PHYS 150, PHYS 151
 - CHEM 1, CHEM 3, CHEM 101, CHEM 106 (2 of 5 credits), CHEM 108
 - PLSC 7N, PLSC 8, PLSC 11
 - CMPSC 1, CMPSC 100
 - LLED 5, LLED 10
 - ENGL 4, ENGL 5
 - STAT 100

Advising Notes:

- CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALKES) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41
- MICRB 201 should be taken concurrently with MICRB 202 Lab
- MICRB 410 required for admission to clinical program

Molecular and Cell Biology and Biochemistry Option: Biology, B.S. at Erie 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
BIOL 110 or 114 <i>and</i> 115 ^{*#}	4 BIOL 240W [*]	4
ENGL 15 or 30H [†]	3 MATH 141 ^{**†}	4
CHEM 110 ^{**†}	3 CHEM 112 [†]	3
CHEM 111 [†]	1 CHEM 113 [†]	1
MATH 140 (or appropriate MATH Course from ALEKS test) ^{**†}	4 General Education Course	3
PSU 7	1 General Education Course (GHW)	1.5
General Education Course (GHW)	1.5	
17.5		16.5

Second Year

Fall	Credits Spring	Credits
BIOL 220W or 224 <i>and</i> 225W ^{*#}	4 BIOL 230W [*]	4
CHEM 210	3 CAS 100	3
Supporting Course (School Approved List)	3 CHEM 212 & CHEM 213	5
General Education Course	3 STAT 250 [*]	3
General Education Course	3 General Education Course	3
16		18

Third Year

Fall	Credits Spring	Credits
BIOL 322 [*]	3 PHYS 251	4
PHYS 250 [†]	4 BMB 406 ^{*†}	3
ENGL 202C ^{††}	3 MICRB 410 [*]	3
MICRB 201 [*]	3 Supporting Course (School Approved List)	3
MICRB 202 [*]	2 General Education Course	3
15		16

Fourth Year

Fall	Credits Spring	Credits
BIOL, MICRB, BMB, PPEM, ENT, or WFS 400-level course [*]	3-4 BIOL 427 [*]	3
CHEM 472 [*]	3 BMB 402 [*]	3
General Education Course	3 BMB 403 ^{*†}	1
Supporting Course (School Approved List)	3 Supporting Course (School Approved List)	3

Supporting Course (School Approved List)	3 Supporting Course (School Approved List)	3
15-16		13

Total Credits 127-128

- * 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 See adviser for acceptable substitutions

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.

Program Notes:

- Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.
- **School Approved List of Supporting Courses:** All courses listed in the Penn State University course listings except those specifically listed in the 'non-approved courses' below are considered approved courses and can be used as supporting courses electives.
- **School of Science Non-Approved List of Courses for the BIOBC Major:**
 - BIOL no course under 100
 - MATH no course under MATH 140, MATH 140A (2 of 6 credits)
 - BISC 1, BISC 2, BISC 3, BISC 4
 - MICRB 106 and MICRB 107
 - BMB 1, BMB 3
 - PHYS 1, PHYS 150, PHYS 151
 - CHEM 1, CHEM 3, CHEM 101, CHEM 106 (2 of 5 credits), CHEM 108
 - PLSC 7N, PLSC 8, PLSC 11
 - CMPSC 1, CMPSC 100
 - LLED 5, LLED 10
 - ENGL 4, ENGL 5
 - STAT 100

Advising Notes:

- CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALKES) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41

Ecology, Evolution, and Behavior Option: Biology, B.S. at Erie 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
BIOL 110 or 114 <i>and</i> 115 ^{*#}	4 BIOL 240W [*]	4
ENGL 15 or 30H [†]	3 MATH 141 ^{†1}	4
CHEM 110 ^{**†}	3 CHEM 112 [†]	3
CHEM 111 [†]	1 CHEM 113 [†]	1
MATH 140 (or appropriate MATH Course based on ALEKS scores) ^{**†}	4 General Education Course	3
PSU 7	1 General Education Course (GHW)	1.5
General Education Course (GHW)	1.5	
	17.5	16.5

Second Year

Fall	Credits Spring	Credits
BIOL 220W or 224 <i>and</i> 225W ^{**#}	4 BIOL 230W [*]	4
CHEM 202 or 210	3 CAS 100	3
Supporting Course (School Approved List)	3 CHEM 203 or 212 <i>and</i> 213	3-5
General Education Course	3 STAT 250 [*]	3
General Education Course	3 General Education Course	3
	16	16-18

Third Year

Fall	Credits Spring	Credits
BIOL 322 [*]	3 BIOL 429 (or BIOL, MICRB, BMB, PPEM, or WFS 400-level Course) [*]	3
BIOL 435 or 446 (or other BIOL, MICRB, BMB, or WFS 400-level Course) [*]	3-4 BIOL 402W [*]	3
PHYS 250 [†]	4 PHYS 251	4
General Education Course	3 ENGL 202C ^{††}	3
Supporting Course	3 General Education Course	3
	16-17	16

Fourth Year

Fall	Credits Spring	Credits
BIOL 435 or 446 (or other BIOL, MICRB, BMB, or WFS 400-level Course) [*]	3-4 BIOL 427 [*]	3
BIOL 435 or 446 (or other BIOL, MICRB, BMB, or WFS 400-level Course) [*]	3-4 Supporting Course (School Approved List)	3
Supporting Course (School Approved List)	3 Supporting Course (School Approved List)	3

Supporting Course (School Approved List) or STAT Selection [*]	3 Supporting Course (School Approved List)	3
	BIOL 429 (or BIOL, MICRB, BMB, PPEM, or WFS 400-level Course) [*]	3
	12-14	15

Total Credits 125-130

* 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 See adviser for acceptable substitutions.

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.

Program Notes:

- Students who have not met the admission requirement of two units of a high school world language must complete a college level-one world language within their first 60 credits.
- School Approved List of Supporting Courses:** All courses listed in the Penn State University course listings except those specifically listed in the 'non-approved courses' below are considered approved courses and can be used as supporting courses electives.
- School of Science Non-Approved List of Courses for the BIOBC Major:**
 - BIOL no course under 100
 - MATH no course under MATH 140, MATH 140A(2 of 6 credits)
 - BISC 1, BISC 2, BISC 3, BISC 4
 - MICRB 106 and MICRB 107
 - BMB 1, BMB 3
 - PHYS 1, PHYS 150, PHYS 151
 - CHEM 1, CHEM 3, CHEM 101, CHEM 106 (2 of 5 credits), CHEM 108
 - PLSC 7N, PLSC 8, PLSC 11
 - CMPSC 1, CMPSC 100
 - LLED 5, LLED 10
 - ENGL 4, ENGL 5
 - STAT 100

Advising Notes:

- CHEM 110: Prerequisite satisfactory performance on the MATH placement test (ALKES) - i.e. placement beyond the level of MATH 22; or CHEM 101 and MATH 22 or MATH 41
- Take PHYS 213 if you have taken PHYS 211 and PHYS 212
- Take PHYS 214 if you have taken PHYS 211 and PHYS 212
- Supporting STAT Courses: STAT 461, STAT 462, STAT 464, STAT 466

Career Paths

Biology is among the most versatile of college majors and a jumping-off point for careers that can range from astrobiologist to microbiologist to zoologist. Whether you envision a career working with cancer cells or California condors, a Biology degree from Penn State Behrend can make that happen. Penn State Behrend has a comprehensive support system to help you identify and achieve your goals for college and beyond. Meet with your academic adviser often and take advantage of the services offered by the Academic and Career Planning Center beginning in your first semester.

Careers

Biologists are everywhere! Penn State Behrend biology graduates include bioforensic identification specialists, orthotists, research biologists, biophysicists, anesthesiologist, dentists, veterinarians, national park rangers, doctors, high school teachers, physician assistants, college professors, lawyers, and even a lead elephant zookeeper!

MORE INFORMATION ABOUT POTENTIAL CAREER PATHS FOR GRADUATES OF THE BIOLOGY PROGRAM (<https://behrend.psu.edu/school-of-science/academic-programs/biology>)

Opportunities for Graduate Studies

Biology is a common foundational major for graduate study in a specialized subdiscipline such as aquatic biology or genetics. Its broad diversity of experiences make it a popular undergraduate major for future medical doctors, veterinarians, physician assistants, and other health-care professionals. Penn State Behrend offers numerous pre-health profession options within its degree program, including 3+4 and early admissions programs.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (<https://behrend.psu.edu/school-of-science/academic-programs/biology>)

Professional Resources

- American Institute of Biological Sciences (<https://www.aibs.org>)
- American Society for Cell Biology (<https://www.ascb.org/>)
- American Society for Microbiology (<https://www.ascb.org/>)
- American Society of Human Genetics (<https://www.ashg.org/>)
- Entomological Society of America (<https://entsoc.org>)
- National Association of Biology Teachers (<https://nabt.org>)
- Society for the Study of Evolution (<https://www.evolutionarysociety.org>)

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.

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