SCIENCE, B.S. (BERKS)

Begin Campus: Any Penn State Campus
End Campus: Berks

Degree Requirements

For the Bachelor of Science degree in Science, a minimum of 125 credits is required, with at least 15 credits at the 400 level:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>0-10</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>85-110</td>
</tr>
</tbody>
</table>

15-30 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. For the General Science Secondary Education Option, a total of 30 credits are used to satisfy General Education requirements: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses; 6 credits of GS courses; and 6 credits of GH courses.

Requirements for the Major

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
</tbody>
</table>

Requirements for the Option

Select an option 65-90

Supporting Courses and Related Areas

A maximum of 12 credits of Independent Study (296, 496) may be applied toward credits for graduation.

Select 21-25 credits from program list (Students may apply 6 credits of 21-25 of ROTC)

Select 3 credits from earth and mineral sciences 3
Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser
Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser
Select 6 credits of 400-level courses

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

Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level

1 A grade of C or better per course is required for teacher certification.
2 PHYS 211 and PHYS 250 require a grade of C or better.
3 Only the 9 credits at the 400 level require a grade of C or better.
4 Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.

General Science Secondary Education Option (90 credits)

Available at the following campuses: Harrisburg

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better for teacher certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDUC 313</td>
<td>Secondary Education Field Experience</td>
<td>2</td>
</tr>
<tr>
<td>EDUC 314</td>
<td>Learning Theory and Instructional Procedures</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 315Y</td>
<td>Social and Cultural Factors in Education</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 385</td>
<td>Professional Development in Teaching</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 400</td>
<td>Diversity and Cultural Awareness Practices in the K-12 Classroom</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 414</td>
<td>Teaching Secondary Science</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 458</td>
<td>Behavior Management Strategies for Inclusive Classrooms</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 459</td>
<td>Strategies for Effective Teaching in Inclusive Classrooms</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 490</td>
<td>Student Teaching</td>
<td>9</td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDPSY 14</td>
<td>Learning and Instruction</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 466N</td>
<td>Foundations of Teaching English as a Second Language</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 239</td>
<td>Adolescent Development</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
</tbody>
</table>
PHYS 251  Introductory Physics II  4

**Additional Courses**

*Additional Courses: Require a grade of C or better*

Select 4 credits from the following:  4

- BIOL 220W  Biology: Populations and Communities
- BIOL 230W  Biology: Molecules and Cells
- BIOL 240W  Biology: Function and Development of Organisms

**Supporting Courses and Related Areas**

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

Select 8-12 credits from the following:  

Select 3 credits from the following:  3

Select 3 credits in EARTH course from department list

Select 3 credits from the following:  3

Select a 3 credit ASTRO course

Select 9 credits of 400-level earth or physical science courses  9

Select 12 credits of science or education elective courses  12

**Biological Sciences and Health Professions Option (74 credits)**

*Available at the following campuses: University Park*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 4 credits from the following:  4

- BIOL 129  Mammalian Anatomy
- BIOL 220W  Biology: Populations and Communities
- BIOL 230W  Biology: Molecules and Cells
- BIOL 240W  Biology: Function and Development of Organisms
- BIOL 141  Introduction to Human Physiology
  & BIOL 142  Physiology Laboratory

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

- STAT 200  Elementary Statistics
- STAT 250  Introduction to Biostatistics
- STAT 401  Experimental Methods

Select 6-8 credits from the following:  6-8

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

Select 3 credits from the following:  3

- BIOL 222  Genetics
- BIOL 322  Genetic Analysis
- BMB 211  Elementary Biochemistry
- BMB/MICRB 251  Molecular and Cell Biology I
- MICRB 201  Introductory Microbiology

Select 8-12 credits from the following:  8-12

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

**Supporting Courses and Related Areas**

A maximum of 12 credits of Independent Study (296, 496) may be applied toward credits for graduation.

Select 15 credits from program list for Healthcare/ Medicine/Ethical Competencies.  15

Select 10-17 credits from program list (Students may apply 6 credits of ROTC)  3

Support 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser  3

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser  3

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

Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses  9

1  PHYS 211 and PHYS 250 require a grade of C or better.

2  Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.

**Legal Studies, Government Service, Public Policy Option (74 credits)**

*Available at the following campuses: University Park*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 101</td>
<td>Introduction to Health Services Organization</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

Select 4 credits from the following:  4

- BIOL 129  Mammalian Anatomy
- BIOL 141  Introduction to Human Physiology
  & BIOL 142  and Physiology Laboratory
- BIOL 220W  Biology: Populations and Communities
- BIOL 230W  Biology: Molecules and Cells
- BIOL 240W  Biology: Function and Development of Organisms

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

- STAT 200  Elementary Statistics
- STAT 250  Introduction to Biostatistics
- STAT 401  Experimental Methods

Select 8-12 credits from the following:  8-12

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

**Supporting Courses and Related Areas**

Select 12-17 credits from program list (Students may apply 6 credits of ROTC)  18

Select 18 credits from program list for Legal Studies, Government Service, Public Policy  18

Select 3 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser  3

Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser  3

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

Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level  18

1  PHYS 211 and PHYS 250 require a grade of C or better.

2  Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.
### Life Science Option (74 credits)
*Available at the following campuses: Abington, Berks, Harrisburg, Scranton, York*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CMPSC 122 Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 220 Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CMPSC 121 Introduction to Programming</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 230 Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>or MATH 251 Ordinary and Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3 credits from the following:</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>BMB 211 Elementary Biochemistry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BMB/MICRB Molecular and Cell Biology I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MICRB 201 Introductory Microbiology</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Supporting Courses and Related Areas</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A maximum of 12 credits of Independent Study (296, 496) may be applied toward credits for graduation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 18-24 credits from program list (Students may apply 6 credits of ROTC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in Global, Social, and Personal Awareness</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 3 credits in Teamwork and Interpersonal Communication</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 6 credits of 400-level courses</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>Supporting Courses and Related Areas: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 9 credits of 400-level CMPSC, CSE, MATH, or STAT courses</td>
<td>9</td>
</tr>
</tbody>
</table>

1 PHYS 211 and PHYS 250 require a grade of C or better.

### Physical Science Option (74 credits)
*Currently not available at any campus location*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prescribed Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASTRO 291 Astronomical Methods and the Solar System</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PHYS 212 General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PHYS 213 General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PHYS 214 General Physics: Wave Motion and Quantum Physics</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Prescribed Courses: Require a grade of C or better</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHYS 211 General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Additional Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 3 credits from the following:</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>BMB 211 Elementary Biochemistry</td>
<td></td>
</tr>
</tbody>
</table>

1 PHYS 211 and PHYS 250 require a grade of C or better.
BMB/MICRB 251
MICRB 201
Introduction to Modern Physics

Select 6-8 credits of the following:
  6-8
CHEM 202
Chemical Principles
CHEM 203
Chemical Principles
CHEM 210
Organic Chemistry I
CHEM 212
Organic Chemistry II
CHEM 213
Laboratory in Organic Chemistry
MATH 230
Calculus and Vector Analysis
or MATH 251
Ordinary and Partial Differential Equations

Supporting Courses and Related Areas
A maximum of 12 credits of Independent Study (296, 496) may be applied toward credits for graduation.

Select 20-22 credits from program list (Students may apply 6 credits of ROTC)

Select 6 credits of 400-level courses

Select 3 credits in Global, Social, and Personal Awareness
Select 3 credits in Teamwork and Interpersonal Communication

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of 400-level ASTRO, CHEM, or PHYS courses

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

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

Foundations (grade of C or better is required 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/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.