# SCIENCE, B.S. (SCIENCE)

**Begin Campus:** Any Penn State Campus  
**End Campus:** University Park

## 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](https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44)).

### Common Requirements for the Major (All Options)

<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 credits

### Requirements for the General Science Option (70-78 credits)

Available at the following campuses: Abington, Berks, Harrisburg, Scranton, University Park, York

<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>
</tbody>
</table>

### Additional Courses

Select 4 credits from the following: 4 credits

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

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

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<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Electricity and Magnetism</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>and Introductory Physics II</td>
<td></td>
</tr>
</tbody>
</table>

### Supporting Courses and Related Areas

- 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>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Prescribed Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<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>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<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>
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.  

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

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

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

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

Select 4 credits from the following:

PHYS 129 Mammalian Anatomy
&BIL 142 and Physiology Laboratory
&BIL 220W Biology: Populations and Communities
&BIL 230W Biology: Molecules and Cells
&BIL 420W Biology: Function and Development of Organisms
&BIL 141 and Physiology Laboratory
&BIL 142
Select 3-4 credits from the following:

STAT 200 Elementary Statistics
& STAT 250 and Biostatistics
& STAT 401 Experimental Methods

Select 6-8 credits from the following:

& 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:

& CHEM 250 Molecular Cell Biology I
& CHEM 251 Molecular Cell Biology II

Supporting Courses and Related Areas

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

Select 6 credits in Global, Social, and Personal Awareness from department approved course list in consultation with adviser

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

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

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

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

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

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

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

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

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

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<tr>
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<tbody>
<tr>
<td>BIOL 220W</td>
<td>Biology: Populations and Communities</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 230W</td>
<td>Biology: Molecules and Cells</td>
<td></td>
</tr>
<tr>
<td>BIOL 240W</td>
<td>Biology: Function and Development of Organisms</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits from the following:
- CMPSC 101 Introduction to Programming
- MATH 250 Ordinary Differential Equations
- STAT 250 Introduction to Biostatistics

Select 4 credits from the following:
- BIOL 220W Biology: Populations and Communities
- BIOL 230W Biology: Molecules and Cells
- BIOL 240W Biology: Function and Development of Organisms

Select 3 credits from the following:
- CMPSC 101 Introduction to Programming
- MATH 250 Ordinary Differential Equations
- STAT 250 Introduction to Biostatistics

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

Select 23-29 credits from program list (Students may apply 6 credits of ROTC)
Select 3 credits in Global, Social, and Personal Awareness
Select 3 credits in Teamwork and Interpersonal Communication
Select 6 credits of 400-level courses

Mathematical Science Option (65-77 credits)
Available at the following campuses: Abington

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
</tbody>
</table>

Additional Courses
- CMPSC 121 Introduction to Programming Techniques
- CMPSC 201 Programming for Engineers with C++
- MATH 230 Calculus and Vector Analysis
- MATH 251 Ordinary and Partial Differential Equations

Select 3 credits from the following:
- BMB 211 Elementary Biochemistry
- BMB/MICRB Molecular and Cell Biology I
- MICRB 201 Introductory Microbiology

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

Select 18-24 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

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

<table>
<thead>
<tr>
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<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 291</td>
<td>Astronomical Methods and the Solar System</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
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<td>1</td>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
</tbody>
</table>

Select 9 credits of 400-level CMPSC, CSE, MATH, or STAT courses

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses

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