SCIENCE, B.S. (ALTOONA)

Begin Campus: Any Penn State Campus
End Campus: Altoona

Degree Requirements
For the Bachelor of Science degree in Science, a minimum of 124 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>Requirements for the Major</td>
<td>94</td>
</tr>
</tbody>
</table>

15 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.

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

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 6 credits

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.

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

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presented Courses</td>
<td></td>
<td></td>
</tr>
<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>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>Prescribed Courses: Require a grade of C or better</td>
<td></td>
<td></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>
</tbody>
</table>

Requirements for the Option
Select an option 74

Requirements for the Option
General Science Option (74 credits)
Available at the following campuses: Abington, Altoona, Berks, Harrisburg, Scranton, University Park, York
Available at the following campuses: University Park

**Prescribed Courses**

<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 of the following:

- **BIOL 129** Mammalian Anatomy
- **BIOL 141** & **BIOL 142** Introduction to Human Physiology 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 of the following:

- **HPA 101**

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

Select 3 credits from earth and mineral sciences

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

Select 8-12 credits of the following:

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<tr>
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<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics and General Physics: Electricity and Magnetism</td>
<td>8-12</td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and General Physics: Fluids and Thermal Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 213</td>
<td>and General Physics: Wave Motion and Quantum Physics</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 214</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I and Introductory Physics II</td>
<td>8-12</td>
</tr>
<tr>
<td>&amp; PHYS 251</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses and Related Areas**

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

Select 21-26 credits from program list (Students may apply 6 credits of ROTC)

Select 3 credits from earth and mineral sciences

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

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

*Available at the following campuses: University Park*

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

*Available at the following campuses: University Park*
Biology: Function and Development of Organisms

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

- STAT 200  Elementary Statistics
- STAT 250  Introduction to Biostatistics
- STAT 301  Statistical Analysis I
- STAT 401  Experimental Methods

Select 8-12 credits of 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)

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

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

**Mathematical Science Option (74 credits)**

**Available at the following campuses: Abington, Altoona**

<table>
<thead>
<tr>
<th>Code</th>
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</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 360  Discrete Mathematics for Computer Science
- or MATH 311W  Concepts of Discrete Mathematics

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<tr>
<td>MATH 230</td>
<td>Calculus and Vector Analysis</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Statistical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 318</td>
<td>Elementary Probability</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits of the following:

- BMB 211  Elementary Biochemistry
- BMB 251  Molecular and Cell Biology I
- MICRB 201  Introductory Microbiology

Select 8-12 credits of 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 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

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

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<tbody>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 212</td>
<td>and Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
<td></td>
</tr>
</tbody>
</table>

Select 8-12 credits of 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

**Life Science Option (74 credits)**

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

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<td>CMPSC 122</td>
<td>Intermediate Programming</td>
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</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
</tbody>
</table>

**Additional Courses**

- CMPSC 360  Discrete Mathematics for Computer Science
- or MATH 311W  Concepts of Discrete Mathematics

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</tr>
<tr>
<td>or STAT 318</td>
<td>Elementary Probability</td>
<td></td>
</tr>
</tbody>
</table>

Select 3 credits of the following:

- BMB 211  Elementary Biochemistry
- BMB 251  Molecular and Cell Biology I
- MICRB 201  Introductory Microbiology

Select 8-12 credits of 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 9 credits of 400-level BMB, BIOL, BIOTC, or MICRB courses

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.
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.

1. Only the 9 credits at the 400 level 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.
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.
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 6
Select 3 credits in Global, Social, and Personal Awareness 3
Select 3 credits in Teamwork and Interpersonal Communication 3

Supporting Courses and Related Areas: Require a grade of C or better
Select 9 credits of 400-level CMPSC, CSE, MATH, or STAT courses 9

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

Physical Science Option (74 credits)
Available at the following campuses: Altoona

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</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>
</tr>
<tr>
<td>PHYS 214</td>
<td>General Physics: Wave Motion and Quantum Physics</td>
<td>2</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

PHYS 211  General Physics: Mechanics 4

Additional Courses
Select 3 credits of the following: 3

- BMB 211  Elementary Biochemistry
- BMB 251  Molecular and Cell Biology I
- MICRB 201  Introductory Microbiology

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

- CHEM 210  & CHEM 212  Organic Chemistry I and Organic Chemistry II
- CHEM 213  & CHEM 213  Laboratory in Organic Chemistry
- MATH 230  or MATH 251  Calculus and Vector Analysis

Select 3 credits of the following: 3

- ASTRO 292  Astronomy of the Distant Universe
- EMCH 211  Statics
- ME 300  Engineering Thermodynamics I
- PHYS 237  Introduction to Modern Physics

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 6
Select 3 credits in Global, Social, and Personal Awareness 3
Select 3 credits in Teamwork and Interpersonal Communication 3

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