

# 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 124 credits is required, with at least 15 credits at the 400 level:

Requirement	Credits
General Education	45
Requirements for the Major	94

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.

### 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)

Code	Title	Credits
<b>Prescribed Courses</b>		
CHEM 111	Experimental Chemistry I	1
CHEM 112	Chemical Principles II	3
CHEM 113	Experimental Chemistry II	1
MATH 141	Calculus with Analytic Geometry II	4
<i>Prescribed Courses: Require a grade of C or better</i>		
BIOL 110	Biology: Basic Concepts and Biodiversity	4
CHEM 110	Chemical Principles I	3
MATH 140	Calculus With Analytic Geometry I	4
<b>Requirements for the Option</b>		
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*

Code	Title	Credits
<b>Additional Courses</b>		
Select 4 credits of the following:		4
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:		3-4
STAT 200	Elementary Statistics	
STAT 250	Introduction to Biostatistics	
STAT 301		

STAT 401	Experimental Methods	
Select 8-12 credits of the following:		8-12
PHYS 211 & PHYS 212 & PHYS 213 & PHYS 214	General Physics: Mechanics and General Physics: Electricity and Magnetism and General Physics: Fluids and Thermal Physics and General Physics: Wave Motion and Quantum Physics <sup>1</sup>	
PHYS 250 & PHYS 251	Introductory Physics I and Introductory Physics II <sup>1</sup>	

### 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	3
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
Select 6 credits of 400-level courses	6

*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 <sup>2,3</sup>

<sup>1</sup> PHYS 211 and PHYS 250 require a grade of C or better.

<sup>2</sup> Only the 9 credits at the 400 level require a grade of C or better.

<sup>3</sup> Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.

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

*Available at the following campuses: University Park*

Code	Title	Credits
<b>Prescribed Courses</b>		
HPA 101	Introduction to Health Services Organization	3
<b>Additional Courses</b>		
Select 4 credits of 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 & BIOL 142	Introduction to Human Physiology and Physiology Laboratory	
Select 3-4 credits of the following:		3-4
STAT 200	Elementary Statistics	
STAT 250	Introduction to Biostatistics	
STAT 301		
STAT 401	Experimental Methods	
Select 6-8 credits of the following:		6-8
CHEM 202 & CHEM 203	Fundamentals of Organic Chemistry I and Fundamentals of Organic Chemistry II	
CHEM 210 & CHEM 212 & CHEM 213	Organic Chemistry I and Organic Chemistry II and Laboratory in Organic Chemistry	
Select 3 credits of the following:		3

BIOL 222	Genetics	
BIOL 322	Genetic Analysis	
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 <sup>2</sup>	
PHYS 250	Introductory Physics I	
& PHYS 251	and Introductory Physics II <sup>2</sup>	

**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 <sup>1</sup> 15

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

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

<sup>1</sup> Six credits must be at the 400-level. Select from department approved course list in consultation with adviser.

<sup>2</sup> PHYS 211 and PHYS 250 require a grade of C or better.

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

*Available at the following campuses: University Park*

Code	Title	Credits
<b>Additional Courses</b>		
Select 4 credits of 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 of the following:		3-4
STAT 200	Elementary Statistics	
STAT 250	Introduction to Biostatistics	
STAT 301		
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 <sup>1</sup>	
PHYS 250	Introductory Physics I	
& PHYS 251	and Introductory Physics II <sup>1</sup>	

**Supporting Courses and Related Areas**

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

Select 18 credits from program list for Legal Studies, Government Service, Public Policy <sup>2</sup> 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 <sup>3,4</sup> 18

<sup>1</sup> PHYS 211 and PHYS 250 require a grade of C or better.

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

<sup>3</sup> Only the 9 credits at the 400 level require a grade of C or better.

<sup>4</sup> Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, BMB, MICRB.

**Life Science Option (74 credits)**

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

Code	Title	Credits
<b>Additional Courses</b>		
Select 4 credits of the following:		4
BIOL 220W	Biology: Populations and Communities	
BIOL 230W	Biology: Molecules and Cells	
BIOL 240W	Biology: Function and Development of Organisms	
Select 3 credits of the following:		3
CMPSC 101	Introduction to Programming	
MATH 250	Ordinary Differential Equations	
STAT 250	Introduction to Biostatistics	
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 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 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 <sup>1</sup>	
PHYS 250	Introductory Physics I	
& PHYS 251	and Introductory Physics II <sup>1</sup>	

**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 3

Select 3 credits in Teamwork and Interpersonal Communication 3

Select 6 credits of 400-level courses 6

*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

<sup>1</sup> PHYS 211 and PHYS 250 require a grade of C or better.

### Mathematical Science Option (74 credits)

*Available at the following campuses: Abington, Altoona*

Code	Title	Credits
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#### Prescribed Courses

CMPSC 122	Intermediate Programming	3
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MATH 220	Matrices	2-3
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#### Additional Courses

CMPSC 360	Discrete Mathematics for Computer Science or MATH 311W Concepts of Discrete Mathematics	3-4
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MATH 230	Calculus and Vector Analysis	4
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or MATH 251	Ordinary and Partial Differential Equations	
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STAT 301		3
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or STAT 318	Elementary Probability	
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Select 3 credits of the following: 3

BMB 211	Elementary Biochemistry	
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BMB 251	Molecular and Cell Biology I	
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MICRB 201	Introductory Microbiology	
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Select 3 credits of the following: 3

CMPSC 121	Introduction to Programming Techniques	
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CMPSC 201	Programming for Engineers with C++	
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CMPSC 202		
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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 <sup>1</sup>	

PHYS 250	Introductory Physics I	
& PHYS 251	and Introductory Physics II <sup>1</sup>	

#### 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 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

<sup>1</sup> PHYS 211 and PHYS 250 require a grade of C or better.

### Physical Science Option (74 credits)

*Available at the following campuses: Altoona*

Code	Title	Credits
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#### Prescribed Courses

ASTRO 291	Astronomical Methods and the Solar System	3
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PHYS 212	General Physics: Electricity and Magnetism	4
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PHYS 213	General Physics: Fluids and Thermal Physics	2
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PHYS 214	General Physics: Wave Motion and Quantum Physics	2
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*Prescribed Courses: Require a grade of C or better*

PHYS 211	General Physics: Mechanics	4
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#### Additional Courses

Select 3 credits of the following: 3

BMB 211	Elementary Biochemistry	
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BMB 251	Molecular and Cell Biology I	
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MICRB 201	Introductory Microbiology	
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Select 6-8 credits of the following: 6-8

CHEM 202	Fundamentals of Organic Chemistry I	
& CHEM 203	and Fundamentals of Organic Chemistry II	

CHEM 210	Organic Chemistry I	
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& CHEM 212	and Organic Chemistry II	
& CHEM 213	and Laboratory in Organic Chemistry	

MATH 230	Calculus and Vector Analysis	4
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or MATH 251	Ordinary and Partial Differential Equations	
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Select 3 credits of the following: 3

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

### 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.

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 (<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.