### PLANETARY SCIENCE AND ASTRONOMY, B.S.

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

## Degree Requirements

For the Bachelor of Science degree in Planetary Science and Astronomy, a minimum of 122 credits is required:

<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>95-99</td>
</tr>
</tbody>
</table>

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.

## 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.

### 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).

<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 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</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>ASTRO 401</td>
<td>Fundamentals of Planetary Science and Astronomy</td>
<td>4</td>
</tr>
<tr>
<td>ASTRO 402W</td>
<td>Astronomical Telescopes, Techniques, and Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BIOL/GEOSC 474</td>
<td>Astrobiology</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 250</td>
<td>Introductory Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 251</td>
<td>Introductory Physics II</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 3

- **ASTRO 1** Astronomical Universe
- **ASTRO 5** The Sky and Planets
- **ASTRO 6** Stars, Galaxies, and the Universe
- **ASTRO 291** Astronomical Methods and the Solar System

Select one of the following: 3-4

- **CMPSC 101** Introduction to Programming
- **CMPSC 121** Introduction to Programming Techniques
- **CMPSC 201** Programming for Engineers with C++
- **CMPSC 202**
- **CMPSC 203** Introduction to Spreadsheets and Databases

Select three of the following: 9

- **ASTRO 120** The Big Bang Universe
- **ASTRO 130** Black Holes in the Universe
- **ASTRO 140** Life in the Universe
- **ASTRO 292** Astronomy of the Distant Universe

Select one of the following: 3

- **EARTH 2** The Earth System and Global Change
- **GEOSC 1** Physical Geology
- **GEOSC 20** Planet Earth

Select 12 credits of the following: 12

- **EARTH 100** Environment Earth
- **EARTH 103N** Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century
- **EARTH 106** The African Continent: Earthquakes, Tectonics and Geology
- **EARTH 150** Dinosaur Extinctions and Other Controversies
- **EARTH 402** Modeling the Earth System
- **GEOG 160** Mapping Our Changing World
- **GEOSC 201** Earth Materials
- **GEOSC 202** Chemical Processes in Geology
- **GEOSC 203** Physical Processes in Geology
- **GEOSC 204** Geobiology
- **METEO 101** Understanding Weather Forecasting
- **METEO 201** Introduction to Weather Analysis

**Supporting Courses and Related Areas**

Select 11 credits in consultation with adviser from department list: 11

Select 9-12 credits from program list of advanced electives: 9-12

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1. At least 6 credits from the below categories must be at the 400 level.