GEOSCIENCES, B.S.

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

Degree Requirements
For the Bachelor of Science degree in Geosciences, a minimum of 121 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>97</td>
</tr>
</tbody>
</table>

21 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, 6 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).

Common Requirements for the Major (All Options)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<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>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>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 1</td>
<td>Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 204</td>
<td>Geobiology</td>
<td>4</td>
</tr>
<tr>
<td>GEOSC 472A</td>
<td>Field Geology I (Introduction to Field Methods)</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 472B</td>
<td>Field Geology II (Advanced Field Methods)</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 494W</td>
<td>Senior Thesis</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 496</td>
<td>Independent Studies</td>
<td>1</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>General Physics: Fluids and Thermal Physics</td>
<td>2</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better
GEOSC 201  Earth Materials  4
GEOSC 202  Chemical Processes in Geology  4
GEOSC 203  Physical Processes in Geology  4
GEOSC 310  Earth History  4
GEOSC 465  Structural Geology  4
MATH 140  Calculus With Analytic Geometry I  4

Additional Courses
ENGL 15  Rhetoric and Composition  3
or ENGL 30H  Honors Rhetoric and Composition

Requirements for the Option
Select an option  28

1 The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 or ENGL 202C can be substituted for EMSC 100S.

2 If GEOSC 1 is not available, GEOSC 20 may be substituted

Requirements for the Option
General Option (28 credits)

Code  Title  Credits

Additional Courses
Select 14 credits of the following 300- and 400-level GEOSC courses:  14
GEOSC 303  Introduction to Environmental Geology
GEOSC 340  Geomorphology
GEOSC 402Y  Natural Disasters
GEOSC 416  Stable and Radioactive Isotopes in Geosciences: Introduction
GEOSC 422  Vertebrate Paleontology
GEOSC 424  Paleontology and Fossils
GEOSC 434  Volcanology
GEOSC 439  Principles of Stratigraphy
GEOSC 440  Marine Geology
GEOSC 451  Natural Resources: Origins, Economics and Environmental Impact
GEOSC 452  Hydrogeology
GEOSC 454  Geology of Oil and Gas
GEOSC 470W  Introduction to Field Geology
GEOSC 489  Dynamics of the Earth

Supporting Courses and Related Areas
Select at least 2 credits in physics from approved departmental list  2
Select 8 credits, in consultation with advisor, supportive of the student's interest (students may apply 6 credits of ROTC)  8

1 If STAT 250 is not available, STAT 200 may be substituted.

Hydrogeology Option (28 credits)

Code  Title  Credits

Prescribed Courses
GEOSC 452  Hydrogeology  3

Additional Courses
Select one of the following:  3
CMPSC 201  Programming for Engineers with C++
CMPSC 202
CMPSC 203  Introduction to Spreadsheets and Databases

Select one of the following:  3
ASM 327  Soil and Water Resource Management
ERM 450  Wetland Conservation
SOILS 101  Introductory Soil Science

Select 9 credits from options A and B, with at least 3 credits from A and 3 credits from B:

Option A
CHEM 202  Fundamentals of Organic Chemistry I
CHEM 450  Physical Chemistry - Thermodynamics
ERM 433  Transformation of Pollutants in Soils
GEOSC 413W  Techniques in Environmental Geochemistry
GEOSC 419  The Organic Geochemistry of Natural Waters and Sediments

Option B
ENVSE 408  Contaminant Hydrology
GEOG 362  Image Analysis
GEOSC 340  Geomorphology
GEOSC 439  Principles of Stratigraphy
GEOSC 454  Geology of Oil and Gas
GEOSC 483  Environmental Geophysics

Supporting Courses and Related Areas
Select at least 2 credits in Physics from approved departmental list  2
Select 8 credits, in consultation with advisor, supportive of the student's interest (students may apply 6 credits of ROTC)  8

1 Above the level of MATH 141