# EARTH SCIENCE: GEOLOGY, BA

The Earth Science major provides graduates with a broad understanding of the physical and chemical processes that operate in and on the planet and how direct and indirect methods are used to examine and understand the structure, composition, and dynamics of the Earth. Graduates appreciate how humans and ecosystems interact with the dynamic Earth, and they have an in-depth knowledge of the atmosphere and climate change, the rock cycle, natural hazards, and the hydrologic and biogeochemical cycles. Additionally, they understand how to measure and use the structure, sequence, and properties of rocks, sediments, and fossils to reconstruct events in Earth's history and identify potential natural hazards or earth resources.

Students in the Geology concentration learn the various processes at work within the planet and on its surface. Students gain hands-on experience with fossils, rocks, minerals, maps, aerial photographs, and satellite images in the laboratory and on field trips.

The minimum total course units (https://www.college.upenn.edu/credits-needed-major) for graduation in this major is 35. Double majors may entail more course units.

For more information: http://www.sas.upenn.edu/earth/earth-science/geology-concentration

For information about the General Education requirements, please visit the College of Arts & Sciences Curriculum (https://www.college.upenn.edu/curriculum) page.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Foundational Approaches + Sectors + Free Electives</td>
<td>20</td>
</tr>
</tbody>
</table>

## Major Requirements

### Required Courses

- **GEOL 100**: Introduction to Geology 1
- **GEOL 111**: Geology Laboratory 1
- **GEOL 201**: Mineralogy 1
- **GEOL 205**: Advanced Paleontology 1
- **GEOL 206**: Stratigraphy 1
- **GEOL 208**: Structural Geology 1
- **GEOL 317**: Petrology and Petrography 1
- **MATH 104**: Calculus, Part I 1
- **PHYS 101**: General Physics: Mechanics, Heat and Sound 1.5
- **CHEM 101** & **CHEM 053**: General Chemistry I and General Chemistry Laboratory I 1.5

### Related Disciplines

Select 2 course units with one course from each of two disciplines 2

Mathematics:

- **MATH 114**: Calculus, Part II
- **MATH 115**: Calculus, Part II with Probability and Matrices
- **STAT 111**: Introductory Statistics

## Advanced Courses

Select 2 course units of 400 or 500 level Advanced courses 2 2

Total Course Units 35

1 You may count no more than one course toward both a Major and a Sector requirement. For Exceptions, check the Policy Statement (http://www.college.upenn.edu/sectors-policy).

2 Equivalents may be substituted with prior approval from the Earth Sciences advisor.

### Honors

Applicants must have a 3.25 GPA in the major and complete a Senior Thesis with a B+ or above.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 399</td>
<td>Geology Research Seminar for Juniors</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 420</td>
<td>Introduction to Geophysics</td>
<td>1</td>
</tr>
</tbody>
</table>

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2019 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.

2019-20 Catalog | Generated 11/25/19