## EARTH SCIENCE AND POLICY, B.S.

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

### Degree Requirements

For the Bachelor of Science degree in Earth Science and Policy, a minimum of 120 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>Electives</td>
<td>0-2</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>106-108</td>
</tr>
</tbody>
</table>

33 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; 9 credits of GWS courses; 3 credits of GH courses; 6 credits of GS 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)

<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>EARTH 400</td>
<td>Earth Sciences Seminar</td>
<td>3</td>
</tr>
<tr>
<td>EARTH 495</td>
<td>Internship</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EMSC 100S</td>
<td>Earth and Mineral Sciences First-Year Seminar</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 126</td>
<td>Economic Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 364</td>
<td>Spatial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 118</td>
<td>Environmental Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 1</td>
<td>American Politics: Principles, Processes and Powers</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</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>EARTH 402</td>
<td>Modeling the Earth System</td>
<td>3</td>
</tr>
<tr>
<td>EBF 472</td>
<td>Quantitative Analysis in Earth Sciences</td>
<td>3</td>
</tr>
<tr>
<td>GEOSC 450</td>
<td>Risk Analysis in the Earth Sciences</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td></td>
</tr>
<tr>
<td>CED 201</td>
<td>Introductory Environmental and Resource Economics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Courses: Require a grade of C or better**

Select one of the following:

- MATH 83 Technical Calculus
- MATH 110 Techniques of Calculus I
- MATH 140 Calculus With Analytic Geometry I

Select 8 credits of the following:

- GEOSC 201 Earth Materials
- GEOSC 202 Chemical Processes in Geology
- GEOSC 203 Physical Processes in Geology

### Requirements for the Option

Select an option 27

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.

### Water and Land Use Option (27 credits)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTH 111N</td>
<td>ERM 300 Basic Principles and Calculations in Environmental Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 160</td>
<td>Mapping Our Changing World</td>
<td></td>
</tr>
<tr>
<td>SOILS 101</td>
<td>Introductory Soil Science</td>
<td></td>
</tr>
</tbody>
</table>

Select 12 credits of the following: 12

- ERM 300 Basic Principles and Calculations in Environmental Analysis
- FOR 455 Remote Sensing and Spatial Data Handling
- FOR 470 Watershed Management
- GEOG 363 Geographic Information Systems
- GEOSC 340 Geomorphology
- GEOSC 402Y Natural Disasters
- GEOSC 409W Geomicrobiology
- GEOSC 413W Techniques in Environmental Geochemistry
- GEOSC 452 Hydrogeology
- GEOSC 483 Environmental Geophysics
- SOILS 422 Natural Resources Conservation and Community Sustainability
- SOILS 450 Environmental Geographic Information Systems

Select a total of 12 credits of the following: 12

Select 3-6 credits of the following:

- CED 429 Natural Resource Economics
- CED 431
Earth Science and Policy, B.S.

Select 6-9 credits of the following:

- CED 309 Land Economics and Policy
- CED 409 Land Use Planning and Procedure
- CED 410 The Global Seminar
- GEOG 430 Human Use of Environment
- GEOG 431 Geography of Water Resources
- GEOG 434 Politics of the Environment
- GEOG 439 Property and the Global Environment
- PLSC/STS 460 Science, Technology, and Public Policy
- PUBPL 481 Seminar in Environmental Policy

**Climate Change Option (27 credits)**

**Additional Courses**

Select 3 credits of the following:

- EARTH 2 The Earth System and Global Change
- GEOG 110 Climates of the World
- METEO 3 Weather Revealed: Introductory Meteorology
- METEO 4 Weather and Risk

Select 12 credits of the following:

- GEOG 310 Introduction to Global Climatic Systems
- GEOG 412
- GEOSC 320 Geology of Climate Change
- METEO 201 Introduction to Weather Analysis
- METEO 466 Planetary Atmospheres

Select a total of 12 credits of the following:

Select 3-6 credits of the following:

- CED 429 Natural Resource Economics
- CED 431
- ECON 302 Intermediate Microeconomic Analysis

Select 6-9 credits of the following:

- CED 230 Development Issues in the Global Context
- CED 410 The Global Seminar
- EMSC/STS/SOC 420 Energy and Modern Society
- GEOG 430 Human Use of Environment
- GEOG 434 Politics of the Environment
- GEOG 438W Human Dimensions of Global Warming
- PLSC/STS 460 Science, Technology, and Public Policy
- STS 201 Climate Change, Energy, and Biodiversity

**Energy Option (27 credits)**

**Additional Courses**

- EBF 484 Energy Economics
- or GEOG 424 Geography of the Global Economy

Select 3 credits of the following:

- EARTH 100 Environment Earth
- EGE 101 Energy and the Environment
- EGE 102 Energy Conservation for Environmental Protection

Select 9 credits of the following:

- EGE 302 Principles of Energy Engineering
- EGE 401 Energy in a Changing World

- EGEE 412 Green Engineering & Environmental Compliance
- GEOSC 451 Natural Resources: Origins, Economics and Environmental Impact
- GEOSC 454 Geology of Oil and Gas
- GEOSC 483 Environmental Geophysics

Select 12 credits of the following:

- CED 230 Development Issues in the Global Context
- CED 410 The Global Seminar
- EMSC/STS/SOC 420 Energy and Modern Society
- GEOG 430 Human Use of Environment
- GEOG 434 Politics of the Environment
- GEOG 439 Property and the Global Environment
- GEOG 438W Human Dimensions of Global Warming
- PLSC/STS 460 Science, Technology, and Public Policy
- STS 201 Climate Change, Energy, and Biodiversity

**General Option (27 credits)**

**Additional Courses**

Select 3 credits of the following:

- EARTH 2 The Earth System and Global Change
- EARTH 100 Environment Earth
- EARTH 111N

- EGEE 101 Energy and the Environment
- GEOG 10 Physical Geography: An Introduction
- GEOG 30N Environment and Society in a Changing World
- GEOG 160 Mapping Our Changing World
- METEO 3 Weather Revealed: Introductory Meteorology
- METEO 4 Weather and Risk
- SOILS 101 Introductory Soil Science

Select 12 credits of the following:

- EGEE 302 Principles of Energy Engineering
- EGEE 412 Green Engineering & Environmental Compliance
- ERM 300 Basic Principles and Calculations in Environmental Analysis
- FOR 455 Remote Sensing and Spatial Data Handling
- FOR 470 Watershed Management
- GEOSC 320 Geology of Climate Change
- GEOSC 340 Geomorphology
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</thead>
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<tr>
<td>SOILS 450</td>
<td>Environmental Geographic Information Systems</td>
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</table>

Select a total of 12 credits of the following: 12

Select 3-6 credits of the following:

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<tr>
<td>CED 429</td>
<td>Natural Resource Economics</td>
</tr>
<tr>
<td>CED 431</td>
<td></td>
</tr>
<tr>
<td>EBF 484</td>
<td>Energy Economics</td>
</tr>
<tr>
<td>ECON 302</td>
<td>Intermediate Microeconomic Analysis</td>
</tr>
<tr>
<td>GEOG 424</td>
<td>Geography of the Global Economy</td>
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</tbody>
</table>

Select 6-9 credits of the following:

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<tbody>
<tr>
<td>CED 230</td>
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<td>CED 309</td>
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<td>Energy and Modern Society</td>
</tr>
<tr>
<td>ERM 411</td>
<td>Legal Aspects of Resource Management</td>
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<td>GEOG 430</td>
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<td>GEOG 438W</td>
<td>Human Dimensions of Global Warming</td>
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<tr>
<td>GEOG 439</td>
<td>Property and the Global Environment</td>
</tr>
<tr>
<td>PLSC 403</td>
<td>The Legislative Process</td>
</tr>
<tr>
<td>PLSC 412</td>
<td>International Political Economy</td>
</tr>
<tr>
<td>PLSC 426</td>
<td>Political Parties and Interest Groups</td>
</tr>
<tr>
<td>PLSC/STS 460</td>
<td>Science, Technology, and Public Policy</td>
</tr>
<tr>
<td>PLSC 471</td>
<td>American Constitutional Law</td>
</tr>
<tr>
<td>PLSC 490</td>
<td>Policy Making and Evaluation</td>
</tr>
<tr>
<td>STS 201</td>
<td>Climate Change, Energy, and Biodiversity</td>
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</table>

### 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/](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.

### 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 campus 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](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.

### 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