

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:

Requirement	Credits
General Education	45
Electives	0-2
Requirements for the Major	106-108

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 (<https://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
Prescribed Courses		
BIOL 110	Biology: Basic Concepts and Biodiversity	4
CHEM 110	Chemical Principles I	3
CHEM 111	Experimental Chemistry I	1
CHEM 112	Chemical Principles II	3
CHEM 113	Experimental Chemistry II	1
EARTH 400	Earth Sciences Seminar	3
EARTH 495	Internship	3
ECON 102	Introductory Microeconomic Analysis and Policy	3
EMSC 100S	Earth and Mineral Sciences First-Year Seminar ¹	3
GEOG 126	Economic Geography	3
GEOG 364	Spatial Analysis	3
PHIL 118	Environmental Philosophy	3
PLSC 1	American Politics: Principles, Processes and Powers	3
STAT 200	Elementary Statistics	4
<i>Prescribed Courses: Require a grade of C or better</i>		
EARTH 402	Modeling the Earth System	3
EBF 472	Quantitative Analysis in Earth Sciences	3
GEOC 450	Risk Analysis in the Earth Sciences	3
Additional Courses		
CAS 100	Effective Speech	3
or ENGL 202C	Effective Writing: Technical Writing	
CED 201	Introductory Environmental and Resource Economics	3

or EBF 200	Introduction to Energy and Earth Sciences Economics	
ENGL 15	Rhetoric and Composition	3
or ENGL 30H	Honors Rhetoric and Composition	
GEOC 1	Physical Geology	3
or GEOC 20	Planet Earth	
MATH 111	Techniques of Calculus II	2-4
or MATH 141	Calculus with Analytic Geometry II	
PHYS 211	General Physics: Mechanics	4
or PHYS 250	Introductory Physics I	

Additional Courses: Require a grade of C or better

Select one of the following:		4
MATH 83	Technical Calculus	
MATH 110	Techniques of Calculus I	
MATH 140	Calculus With Analytic Geometry I	
Select 8 credits of the following:		8
GEOC 201	Earth Materials	
GEOC 202	Chemical Processes in Geology	
GEOC 203	Physical Processes in Geology	

Requirements for the Option

Select an option		27
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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.

Requirements for the Option

All options must include one W course.

Water and Land Use Option (27 credits)

Code	Title	Credits
Additional Courses		
Select 3 credits of the following:		3
EARTH 111N	Water: Science and Society	
GEOG 160	Mapping Our Changing World	
SOILS 101	Introductory Soil Science	
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	
GEOC 340	Geomorphology	
GEOC 402Y	Natural Disasters	
GEOC 409W	Geomicrobiology	
GEOC 413W	Techniques in Environmental Geochemistry	
GEOC 452	Hydrogeology	
GEOC 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		

ECON 302	Intermediate Microeconomic Analysis	
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)

Code	Title	Credits
Additional Courses		
Select 3 credits of the following:		3
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:		12
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:		12
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)

Code	Title	Credits
Additional Courses		
EBF 484	Energy Economics	3
or GEOG 424	Geography of the Global Economy	
Select 3 credits of the following:		3
EARTH 100	Environment Earth	
EGEE 101	Energy and the Environment	
EGEE 102	Energy Conservation for Environmental Protection	
Select 9 credits of the following:		9
EGEE 302	Principles of Energy Engineering	
EGEE 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:		12
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)

Code	Title	Credits
Additional Courses		
Select 3 credits of the following:		3
EARTH 2	The Earth System and Global Change	
EARTH 100	Environment Earth	
EARTH 111N	Water: Science and Society	
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:		12
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	
GEOG 310	Introduction to Global Climatic Systems	
GEOG 363	Geographic Information Systems	
GEOG 412		
GEOSC 320	Geology of Climate Change	
GEOSC 340	Geomorphology	
GEOSC 402Y	Natural Disasters	
GEOSC 409W	Geomicrobiology	
GEOSC 413W	Techniques in Environmental Geochemistry	
GEOSC 451	Natural Resources: Origins, Economics and Environmental Impact	
GEOSC 452	Hydrogeology	
GEOSC 454	Geology of Oil and Gas	
GEOSC 483	Environmental Geophysics	
METEO 466	Planetary Atmospheres	
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		
EBF 484	Energy Economics	
ECON 302	Intermediate Microeconomic Analysis	
GEOG 424	Geography of the Global Economy	
Select 6-9 credits of the following:		
CED 230	Development Issues in the Global Context	
CED 309	Land Economics and Policy	
CED 409	Land Use Planning and Procedure	
CED 410	The Global Seminar	
EMSC/STS/ SOC 420	Energy and Modern Society	
ERM 411	Legal Aspects of Resource Management	
GEOG 430	Human Use of Environment	
GEOG 431	Geography of Water Resources	
GEOG 434	Politics of the Environment	
GEOG 438W	Human Dimensions of Global Warming	
GEOG 439	Property and the Global Environment	
PLSC 403	The Legislative Process	
PLSC 412	International Political Economy	
PLSC 426	Political Parties and Interest Groups	
PLSC/STS 460	Science, Technology, and Public Policy	
PLSC 471	American Constitutional Law	
PLSC 490	Policy Making and Evaluation	
STS 201	Climate Change, Energy, and Biodiversity	

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 and Inter-Domain courses do not meet this requirement.)

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)

- **Arts (GA):** 3 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 3 credits

- **Social and Behavioral Sciences (GS):** 3 credits
- **Natural Sciences (GN):** 3 credits

Integrative Studies

- **Inter-Domain Courses (Inter-Domain):** 6 credits

Exploration

- **GN**, may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 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 (<https://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.