

EARTH SCIENCES, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Degree Requirements

For the Bachelor of Science degree in Earth Sciences, a minimum of 123 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	99-101

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.

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>).

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
EMSC 100S	Earth and Mineral Sciences First-Year Seminar ¹	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
PHYS 211	General Physics: Mechanics	4
PHYS 212	General Physics: Electricity and Magnetism	4
Additional Courses		
ENGL 15	Rhetoric and Composition	3
or ENGL 30H	Honors Rhetoric and Composition	
Select 15 credits of introductory earth science of the following: ²		15
EARTH 2	The Earth System and Global Change	
EARTH 101	Natural Disasters: Hollywood vs. Reality	
EARTH 103N	Earth in the Future: Predicting Climate Change and Its Impacts Over the Next Century	
EARTH 105N	Environments of Africa: Geology and Climate Change	
GEOG 30N	Environment and Society in a Changing World	
GEOG 110	Climates of the World	
GEOG 111		
GEOG 115	Landforms of the World	
GEOG 160	Mapping Our Changing World	
GEOSC 1	Physical Geology	
GEOSC 21	Earth and Life: Origin and Evolution	
METEO 3	Weather Revealed: Introductory Meteorology	
SOILS 101	Introductory Soil Science	

Select 3 credits of writing-intensive courses from within Earth and Mineral Sciences to include, but not limited to the following: 3

GEOG 310 Introduction to Global Climatic Systems

GEOG 412

GEOSC 402Y Natural Disasters

GEOSC 470W Introduction to Field Geology

METEO 471

Additional Courses: Require a grade of C or better

Select 15 credits of advanced earth science of the following: ² 15

GEOG 412

GEOG 430 Human Use of Environment

GEOG 438W Human Dimensions of Global Warming

GEOSC 204 Geobiology

GEOSC 320 Geology of Climate Change

GEOSC 340 Geomorphology

GEOSC 402Y Natural Disasters

GEOSC 416 Stable and Radioactive Isotopes in Geosciences: Introduction

METEO 300 Fundamentals of Atmospheric Science

METEO 431 Atmospheric Thermodynamics

Supporting Courses and Related Areas

Select 3-4 credits of advanced math, statistics, computer science in consultation with an adviser 3-4

Select 3 credits of field, laboratory experience in consultation with an adviser 3

Select 8-9 credits in other approved courses (students may apply 6 credits of ROTC) 8-9

Supporting Courses and Related Areas: Require a grade of C or better

Select 18 credits, in consultation from an adviser, from one of the following Earth and Mineral Sciences interdisciplinary minors: 18

Climatology

Marine Science

Watersheds & Water Resources

Earth Systems

Global Business Strategies for Earth and Environmental Industries

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 Courses may not double count with minor requirements.

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.