Environmental Earth Science

Bachelor of Arts (BA)

The environmental earth science major is designed to provide students with a broad background in the earth sciences with an emphasis on environmental sciences. Interrelationships between physical, biological, and chemical processes at Earth's surface will be emphasized. The major focuses broadly on the natural sciences by primarily using earth science as a base for expanding outward depending upon students' interests by incorporating courses in biology, hydrology, hazardous waste management, ecology, and natural resources. The program is designed to provide background for graduate study in environmental science, preparation for work within governmental agencies such as the Environmental Protection Agency, Bureau of Land Management, United States Geological Survey or consulting firms, or broader involvement in land use planning, business, policy, law or management.

Declaring the Major

The department strongly encourages students to see the student services adviser as early as possible. Students are accepted into the major with a C average or better. There are a number of scholarships and research opportunities as well as other benefits available to declared majors.

Honors Program

Students in the honors program must fulfill the following additional requirements: (1) maintain a GPA of at least 3.3 in all courses in the major, and an overall GPA of at least 3.3 in the University; and (2) carry out an individual research or study project, involving at least 3 units of EPS H195. The project is chosen in consultation with a departmental adviser, and the written report is judged by the student's research supervisor and a departmental adviser.

Minor Program

For information regarding the requirements, please see the Minor Requirements tab. Program planning and confirmation should be done with the undergraduate student services adviser and the environmental earth science faculty adviser.

Other Majors and Minors Offered by the Department of Earth and Planetary Science

Atmospheric Science (http://guide.berkeley.edu/archive/2018-19/ undergraduate/degree-programs/atmospheric-science) (Major and Minor) Geology (http://guide.berkeley.edu/archive/2018-19/undergraduate/ degree-programs/geology) (Major and Minor)

Geophysics (http://guide.berkeley.edu/archive/2018-19/undergraduate/ degree-programs/geophysics) (Major and Minor)

Marine Science (http://guide.berkeley.edu/archive/2018-19/ undergraduate/degree-programs/marine-science) (Major and Minor) Planetary Science (http://guide.berkeley.edu/archive/2018-19/ undergraduate/degree-programs/planetary-science) (Major and Minor)

In addition to the University, campus, and college requirements, listed on the College Requirements tab, students must fulfill the below requirements specific to their major program.

General Guidelines

- All courses taken to fulfill the major requirements below must be taken for graded credit, other than courses listed which are offered on a *Pass/No Pass* basis only. Other exceptions to this requirement are noted as applicable.
- No more than one upper division course may be used to simultaneously fulfill requirements for a student's major and minor programs, with the exception of minors offered outside of the College of Letters & Science.
- A minimum grade point average (GPA) of 2.0 must be maintained in both upper and lower division courses used to fulfill the major requirements.

For information regarding residence requirements and unit requirements, please see the College Requirements tab.

Lower Division Requirements

EPS 50		The Planet Earth	4			
Se	Select one of the following math sequences:					
	MATH 16A & MATH 16B	Analytic Geometry and Calculus and Analytic Geometry and Calculus				
	MATH 1A & MATH 1B	Calculus and Calculus				
	MATH 10A & MATH 10B	Methods of Mathematics: Calculus, Statistics, and Combinatorics and Methods of Mathematics: Calculus, Statistics, and Combinatorics				
CHEM 1A		General Chemistry	4			
&	1AL	and General Chemistry Laboratory				
or	CHEM 4A	General Chemistry and Quantitative Analysis				
BI	OLOGY 1B	General Biology Lecture and Laboratory	4			
Select one of the following physics sequences:						
	PHYSICS 5A & PHYSICS 5E	Introductory Mechanics and Relativity Band Introductory Electromagnetism, Waves, and Optics				
	PHYSICS 8A & PHYSICS 8E	Introductory Physics Band Introductory Physics				
	PHYSICS 7A & PHYSICS 7E	Physics for Scientists and Engineers Band Physics for Scientists and Engineers				

Upper Division Requirements

EPS 102	History and Evolution of Planet Earth	4		
EPS 117	Geomorphology	4		
EPS 150	Case Studies in Earth Systems ¹	2		
ENE,RES 102	Quantitative Aspects of Global Environmental Problems	4		
Electives, select 12 upper division units from the following list of suggested courses: ²				
EPS 100A	Minerals: Their Constitution and Origin [4]			
EPS 100B	Genesis and Interpretation of Rocks [4]			
EPS C100	Communicating Ocean Science [4]			
EPS 103/203	Introduction to Aquatic and Marine Geochemistry [4]			
EPS 108	Geodynamics [4]			
EPS 109	Computer Simulations with Jupyter Notebooks [4]			
EPS 115	Stratigraphy and Earth History [4]			

EPS 122	Physics of the Earth and Planetary Interiors [3]
EPS 124	Isotopic Geochemistry [4]
EPS 125	Stable Isotope Geochemistry [4]
EPS 131	Geochemistry [4]
EPS C146	Geological Oceanography [4]
EPS C178	Applied Geophysics [3]
EPS C180	Air Pollution [3]
EPS C181	Atmospheric Physics and Dynamics [3]
ESPM 120	Science of Soils [3]
ESPM C125	Biogeography [4]
ESPM C128	Chemistry of Soils [3]
ESPM 130A	Forest Hydrology [4]
GEOG C136	Terrestrial Hydrology [4]
CIV ENG 115	Water Chemistry [3]
GEOG 140A	Physical Landscapes: Process and Form [4]
GEOG 140B	Physiography and Geomorphologic Extremes [4]
GEOG 142	Climate Dynamics [4]
GEOG 143	Global Change Biogeochemistry [3]
GEOG 144	Principles of Meteorology [3]
INTEGBI 113L	Paleobiological Perspectives on Ecology and Evolution [4]
INTEGBI 153	Ecology [3]
INTEGBI C155	Holocene Paleoecology: How Humans Changed the Earth [3]
INTEGBI 159	The Living Planet: Impact of the Biosphere on the Earth System [3]
INTEGBI 160	Evolution [4]
INTEGBI 184L	Morphology of the Vertebrate Skeleton with Laboratory [4]

This course can only be taken during the student's senior year.

² All elective courses used to fulfill the major requirements must be approved by the faculty adviser. This list is intended as a guide; the suggested courses are not limited to only courses included in this list.

Students who have a strong interest in an area of study outside their major often decide to complete a minor program. These programs have set requirements and are noted officially on the transcript in the memoranda section, but they are not noted on diplomas.

General Guidelines

- 1. All courses taken to fulfill the minor requirements below must be taken for graded credit.
- 2. A minimum of three of the upper division courses taken to fulfill the minor requirements must be completed at UC Berkeley.
- A minimum grade point average (GPA) of 2.0 is required for courses used to fulfill the minor requirements.
- Courses used to fulfill the minor requirements may be applied toward the Seven-Course Breadth requirement, for Letters & Science students.
- No more than one upper division course may be used to simultaneously fulfill requirements for a student's major and minor programs.
- 6. All minor requirements must be completed prior to the last day of finals during the semester in which you plan to graduate. If you

cannot finish all courses required for the minor by that time, please see a College of Letters & Science adviser.

 All minor requirements must be completed within the unit ceiling. (For further information regarding the unit ceiling, please see the College Requirements tab.)

Requirements

Lower Division						
EPS 50	The Planet Earth (or equivalent)	4				
Upper Division						
Select a minimum of five of the following:						
EPS 100A	Minerals: Their Constitution and Origin [4]					
EPS 100B	Genesis and Interpretation of Rocks [4]					
EPS C100	Communicating Ocean Science [4]					
EPS 102	History and Evolution of Planet Earth [4]					
EPS 103	Introduction to Aquatic and Marine Geochemistry [4]					
EPS 109	Computer Simulations with Jupyter Notebooks [4]					
EPS 115	Stratigraphy and Earth History [4]					
EPS 117	Geomorphology [4]					
EPS 131	Geochemistry [4]					
EPS C178	Applied Geophysics [3]					
EPS C180	Air Pollution [3]					
EPS C181	Atmospheric Physics and Dynamics [3]					

Undergraduate students must fulfill the following requirements in addition to those required by their major program.

For detailed lists of courses that fulfill college requirements, please review the College of Letters & Sciences (http://guide.berkeley.edu/ archive/2018-19/undergraduate/colleges-schools/letters-science) page in this Guide. For College advising appointments, please visit the L&S Advising (https://ls.berkeley.edu/advising/about-undergraduate-advisingservices) Pages.

University of California Requirements

Entry Level Writing (http://writing.berkeley.edu/node/78)

All students who will enter the University of California as freshmen must demonstrate their command of the English language by fulfilling the Entry Level Writing requirement. Fulfillment of this requirement is also a prerequisite to enrollment in all reading and composition courses at UC Berkeley.

American History and American Institutions (http:// guide.berkeley.edu/archive/2018-19/undergraduate/collegesschools/letters-science/american-history-institutions-requirement)

The American History and Institutions requirements are based on the principle that a US resident graduated from an American university, should have an understanding of the history and governmental institutions of the United States.

Berkeley Campus Requirement

American Cultures (http://americancultures.berkeley.edu/ students/courses)

All undergraduate students at Cal need to take and pass this course in order to graduate. The requirement offers an exciting intellectual environment centered on the study of race, ethnicity and culture of the United States. AC courses offer students opportunities to be part of research-led, highly accomplished teaching environments, grappling with the complexity of American Culture.

College of Letters & Science Essential Skills Requirements

Quantitative Reasoning (http://guide.berkeley.edu/ archive/2018-19/undergraduate/colleges-schools/letters-science/ quantitative-reasoning-requirement)

The Quantitative Reasoning requirement is designed to ensure that students graduate with basic understanding and competency in math, statistics, or computer science. The requirement may be satisfied by exam or by taking an approved course.

Foreign Language (http://guide.berkeley.edu/archive/2018-19/ undergraduate/colleges-schools/letters-science/foreignlanguage-requirement)

The Foreign Language requirement may be satisfied by demonstrating proficiency in reading comprehension, writing, and conversation in a foreign language equivalent to the second semester college level, either by passing an exam or by completing approved course work.

Reading and Composition (http://guide.berkeley.edu/ archive/2018-19/undergraduate/colleges-schools/letters-science/ reading-composition-requirement)

In order to provide a solid foundation in reading, writing, and critical thinking the College requires two semesters of lower division work in composition in sequence. Students must complete parts A & B reading and composition courses by the end of their second semester and a second-level course by the end of their fourth semester.

College of Letters & Science 7 Course Breadth Requirements

Breadth Requirements (http://guide.berkeley.edu/ archive/2018-19/undergraduate/colleges-schools/letters-science/ #breadthrequirementstext)

The undergraduate breadth requirements provide Berkeley students with a rich and varied educational experience outside of their major program. As the foundation of a liberal arts education, breadth courses give students a view into the intellectual life of the University while introducing them to a multitude of perspectives and approaches to research and scholarship. Engaging students in new disciplines and with peers from other majors, the breadth experience strengthens interdisciplinary connections and context that prepares Berkeley graduates to understand and solve the complex issues of their day.

Unit Requirements

- 120 total units
- · Of the 120 units, 36 must be upper division units
- Of the 36 upper division units, 6 must be taken in courses offered outside your major department

Residence Requirements

For units to be considered in "residence," you must be registered in courses on the Berkeley campus as a student in the College of Letters & Science. Most students automatically fulfill the residence requirement by attending classes here for four years. In general, there is no need to be concerned about this requirement, unless you go abroad for a semester or year or want to take courses at another institution or through

UC Extension during your senior year. In these cases, you should make an appointment to meet an adviser to determine how you can meet the Senior Residence Requirement.

Note: Courses taken through UC Extension do not count toward residence.

Senior Residence Requirement

After you become a senior (with 90 semester units earned toward your BA degree), you must complete at least 24 of the remaining 30 units in residence in at least two semesters. To count as residence, a semester must consist of at least 6 passed units. Intercampus Visitor, EAP, and UC Berkeley-Washington Program (UCDC) units are excluded.

You may use a Berkeley Summer Session to satisfy one semester of the Senior Residence requirement, provided that you successfully complete 6 units of course work in the Summer Session and that you have been enrolled previously in the college.

Modified Senior Residence Requirement

Participants in the UC Education Abroad Program (EAP), Berkeley Summer Abroad, or the UC Berkeley Washington Program (UCDC) may meet a Modified Senior Residence requirement by completing 24 (excluding EAP) of their final 60 semester units in residence. At least 12 of these 24 units must be completed after you have completed 90 units.

Upper Division Residence Requirement

You must complete in residence a minimum of 18 units of upper division courses (excluding UCEAP units), 12 of which must satisfy the requirements for your major.

Mission

The goal of the earth and planetary sciences (EPS) BA degree is to provide students with a broad and sound education that provides general and specialized knowledge and is intellectually challenging and stimulating. Upon completion of the degree students are ready to enter graduate school at top-ranking institutions (about half of them choose this path), find employment in the profession (geological and environmental engineering and consulting are major opportunities), continue in public education as teachers, or use their background as a sound basis for a new career such as in public policy, law or medical sciences.

Learning Goals for the Major

EPS majors acquire knowledge through course work, laboratory training (expertise in experimental techniques), primary field research, library research, and computer applications, with oral presentations and written reports required in many of our classes.

The undergraduate program provides strong technical training for those who wish to pursue professional careers in the earth, environmental and planetary sciences, as well as training in analytical, creative and critical thinking and communication that serves well those who choose paths in new fields.

The environmental earth science track focuses broadly on the natural sciences, using earth science as a base to expand outward. This track can accommodate the student's interest by incorporating classes in biology, hydrology, hazardous waste management, ecology, and natural resources. Interrelationships are key to this course of study, with an emphasis on how the physical, biological, and chemical processes at the earth's surface affect each other.

This track is excellent preparation for graduate study in environmental science, but it also provides a strong foundation for work within governmental agencies such as the Environmental Protection Agency, Bureau of Land Management, United States Geological Survey or consulting firms, or broader involvement in land use planning, business, policy, law or management. This is a great way to obtain a good science foundation for students who are interested in teaching science in elementary or secondary education.

Undergraduate Student Services Manager

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EPS Undergraduate Appointments

To make an appointment, please visit the Contact Undergraduate Adviser website (http://eps.berkeley.edu/undergraduate/contact-undergraduate-advisor).

Environmental Earth Science

Expand all course descriptions [+]Collapse all course descriptions [-]