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 more broadly on the natural sciences by using earth science mainly 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 written report is judged by the student's research supervisor and a departmental adviser. Application for the honors program should be made through the student's adviser no later than the end of the student's junior year.

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/undergraduate/degree-programs/atmospheric-science) (Major and Minor)
Geology (http://guide.berkeley.edu/undergraduate/degree-programs/geology) (Major and Minor)
Geophysics (http://guide.berkeley.edu/undergraduate/degree-programs/geophysics) (Major and Minor)
Marine Science (http://guide.berkeley.edu/undergraduate/degree-programs/marine-science) (Major and Minor)
Planetary Science (http://guide.berkeley.edu/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

1. 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.
2. 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.
3. 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS 50</td>
<td>The Planet Earth</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one of the following math sequences:

<table>
<thead>
<tr>
<th>Math Sequence</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 16A &amp; MATH 16B</td>
<td>Analytic Geometry and Calculus and Analytic Geometry and Calculus</td>
</tr>
<tr>
<td>MATH 1A &amp; MATH 1B</td>
<td>Calculus and Calculus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 1A &amp; 1AL or CHEM 4A</td>
<td>General Chemistry and General Chemistry Laboratory or General Chemistry and Quantitative Analysis</td>
</tr>
<tr>
<td>BIOLOGY 1B</td>
<td>General Biology Lecture and Laboratory</td>
</tr>
</tbody>
</table>

Select one of the following physics sequences:

<table>
<thead>
<tr>
<th>Physics Sequence</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICS 5A &amp; PHYSICS 5Band Introductory Electromagnetism, Waves, and Optics Introductory Mechanics and Relativity and Introductory Electromagnetism, Waves, and Optics</td>
<td></td>
</tr>
<tr>
<td>PHYSICS 7A &amp; PHYSICS 7Band Physics for Scientists and Engineers and Physics for Scientists and Engineers</td>
<td></td>
</tr>
</tbody>
</table>

Upper Division Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS 102</td>
<td>History and Evolution of Planet Earth</td>
</tr>
<tr>
<td>EPS 117</td>
<td>Geomorphology</td>
</tr>
<tr>
<td>EPS 150</td>
<td>Case Studies in Earth Systems</td>
</tr>
<tr>
<td>ENE,RES 102</td>
<td>Quantitative Aspects of Global Environmental Problems</td>
</tr>
</tbody>
</table>

Electives, select 12 upper division units from the following list of suggested courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS 100A</td>
<td>Minerals: Their Constitution and Origin</td>
</tr>
<tr>
<td>EPS 100B</td>
<td>Genesis and Interpretation of Rocks</td>
</tr>
<tr>
<td>EPS C100</td>
<td>Communicating Ocean Science</td>
</tr>
<tr>
<td>EPS 103/203</td>
<td>Introduction to Aquatic and Marine Geochemistry</td>
</tr>
<tr>
<td>EPS 108</td>
<td>Geodynamics</td>
</tr>
</tbody>
</table>
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.
3. A minimum grade point average (GPA) of 2.0 is required for courses
   used to fulfill the minor requirements.
4. Courses used to fulfill the minor requirements may be applied toward
   the Seven-Course Breadth requirement, for Letters & Science
   students.
5. 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.
7. 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS 50</td>
<td>The Planet Earth (or equivalent)</td>
</tr>
</tbody>
</table>

Upper Division

Select a minimum of five of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS 100A</td>
<td>Minerals: Their Constitution and Origin</td>
</tr>
<tr>
<td>EPS 100B</td>
<td>Genesis and Interpretation of Rocks</td>
</tr>
<tr>
<td>EPS C100</td>
<td>Communicating Ocean Science</td>
</tr>
<tr>
<td>EPS 102</td>
<td>History and Evolution of Planet Earth</td>
</tr>
<tr>
<td>EPS 103</td>
<td>Introduction to Aquatic and Marine Geochemistry</td>
</tr>
<tr>
<td>EPS 115</td>
<td>Stratigraphy and Earth History</td>
</tr>
<tr>
<td>EPS 117</td>
<td>Geomorphology</td>
</tr>
<tr>
<td>EPS 131</td>
<td>Geochemistry</td>
</tr>
<tr>
<td>EPS C178</td>
<td>Applied Geophysics</td>
</tr>
<tr>
<td>EPS C180</td>
<td>Air Pollution</td>
</tr>
<tr>
<td>EPS C181</td>
<td>Atmospheric Physics and Dynamics</td>
</tr>
</tbody>
</table>

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/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-advising-services) 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/undergraduate/colleges-schools/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**

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 passing an approved course.

**Foreign Language**

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**

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**

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.

**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**
Nadine Spingola-Hutton
nspingola@berkeley.edu
510-643-4068

**Faculty Adviser**
Professor Bruce Buffett
bbuffett@berkeley.edu

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**Environmental Earth Science**

**ENV SCI 8X Climate Change: The Interface of Science and Public Policy 2 Units**
Terms offered: Prior to 2007
The possible impacts of climate changes enhanced by or following from human activities create challenges for planners, policy-makers, industrialists, and all citizens of the globe. This course seeks to examine the science of climate change and the policy issues that follow from that change.

Climate Change: The Interface of Science and Public Policy: Read More [+]

**Hours & Format**

**Summer:** 6 weeks - 5 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Environmental Sciences/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

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**ENV SCI 10 Introduction to Environmental Sciences 3 Units**
Terms offered: Fall 2013, Spring 2013, Fall 2012
A survey of biological and physical environmental problems, focusing on geologic hazards, water and air quality, water supply, solid waste, introduced and endangered species, preservation of wetland ecosystems. Interaction of technical, social, and political approaches to environmental management.

Introduction to Environmental Sciences: Read More [+]

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

**Additional Details**

**Subject/Course Level:** Environmental Sciences/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

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**ENV SCI 10L Field Study in Environmental Sciences 1 Unit**
Terms offered: Fall 2010, Fall 2009, Fall 2008
Field and laboratory studies of Strawberry Creek throughout its course from the hills to the Bay are used to exemplify integration of the physical, biological, and social components of science-based approaches to environmental management.

Field Study in Environmental Sciences: Read More [+]

**Rules & Requirements**

**Prerequisites:** 10 (must be taken concurrently)

**Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of fieldwork per week

**Additional Details**

**Subject/Course Level:** Environmental Sciences/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam not required.

**Instructors:** Berry, Kondolf

Field Study in Environmental Sciences: Read Less [-]
ENV SCI 24 Freshman Seminar 1 Unit
Terms offered: Fall 2010, Fall 2009, Spring 2009
The Freshman Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Freshman Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. Enrollment limited to fifteen freshmen.

Freshman Seminar: Read More [+]

Rules & Requirements
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details
Subject/Course Level: Environmental Sciences/Undergraduate
Grading/Final exam status: The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman Seminar: Read Less [-]

ENV SCI 84 Sophomore Seminar 1 or 2 Units
Terms offered: Spring 2011, Fall 2010, Spring 2010
Sophomore seminars are small interactive courses offered by faculty members in departments all across the campus. Sophomore seminars offer opportunity for close, regular intellectual contact between faculty members and students in the crucial second year. The topics vary from department to department and semester to semester. Enrollment limited to 15 sophomores.

Sophomore Seminar: Read More [+]

Rules & Requirements
Prerequisites: At discretion of instructor
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week
10 weeks - 1.5-3 hours of seminar per week
15 weeks - 1-2 hours of seminar per week

Summer:
6 weeks - 2.5-5 hours of seminar per week
8 weeks - 1.5-3.5 hours of seminar and 2-4 hours of seminar per week

Additional Details
Subject/Course Level: Environmental Sciences/Undergraduate
Grading/Final exam status: The grading option will be decided by the instructor when the class is offered. Final exam required.

Sophomore Seminar: Read Less [-]

ENV SCI 100 Introduction to the Methods of Environmental Science 4 Units
Terms offered: Spring 2013, Spring 2012, Spring 2011
Introduction to basic methods used in environmental research by biological, physical, and social scientists. The course is designed to teach skills necessary for majors to conduct independent thesis research in the required senior seminar, 196A-196B/196L. Topics include development of research questions, sampling methods, experimental design, statistical analysis, scientific writing and graphics, and introductions to special techniques for characterizing environmental conditions and features. This course is the prerequisite to 196A, from which the senior thesis topic statement is determined.

Introduction to the Methods of Environmental Science: Read More [+]

Rules & Requirements
Prerequisites: Environmental science statistics requirement. Open only to declared environmental sciences majors

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture, 1 hour of discussion, and 1.5 hours of fieldwork per week

Additional Details
Subject/Course Level: Environmental Sciences/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.

Introduction to the Methods of Environmental Science: Read Less [-]

ENV SCI 125 Environments of the San Francisco Bay Area 3 Units
Terms offered: Spring 2011, Spring 2010, Spring 2009
The weather and climate, plants and animals, geology, landforms, and soils of the Bay Area, with an emphasis on the interaction of these physical elements, their modification by humans, and problems deriving from human use.

Environments of the San Francisco Bay Area: Read More [+]

Rules & Requirements

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Environmental Sciences/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Instructor: Berry

Environments of the San Francisco Bay Area: Read Less [-]