Environmental Sciences

Bachelor of Science (BS)

The environmental sciences (ES) major is designed for students interested in studying environmental problems from a scientific perspective. The ES major prepares students to deal with issues arising from the impact of human interaction on natural systems. To address these problems, all ES students acquire strong backgrounds in math, biological sciences, and physical sciences. Students may choose to specialize further in a biological or physical science field such as ecology, conservation biology, toxicology, geology, hydrology, meteorology, engineering, or a social science field such as planning, policy analysis, economics, environmental justice, or education. Each ES student completes a year-long senior research project with the support of a mentor in a biological, physical, or interdisciplinary research area.

Graduates are well-prepared for careers in fields such as environmental consulting, education, health, or law as well as community, urban, or regional planning and other related areas of environmentalism in public agencies, non-profit conservation organizations, and private companies. Graduates are well-qualified for a variety of graduate programs, including environmental policy and management, law school, medical school (and other prehealth programs), and environmental engineering.

Admission to the Major

Freshman applicants may apply directly to the major or may select the College of Natural Resource's undeclared option, and declare the major by the end of their fourth semester. For further information regarding how to declare the major after admission, including information on a change of major and/or change of college, please see the College of Natural Resources Undergraduate Student Handbook (https://nature.berkeley.edu/handbook).

Honors Program

Students with a GPA of 3.6 or higher may enroll in the College of Natural Resources honors program once they have reached upper division standing. To fulfill the program requirements, students design, conduct, and report on an individual research project working with a faculty sponsor. Qualified ES students enroll in ESPM H175A Senior Research Laboratory in Environmental Sciences and ESPM H175L Senior Research Laboratory in Environmental Sciences fall of their senior year, and ESPM H175B Senior Research Seminar in Environmental Sciences and ESPM H175L Senior Research Laboratory in Environmental Sciences spring of their senior year. For further information on the CNR Honors Program, please see the College of Natural Resources website (http://nature.berkeley.edu/site/honors_program.php).

Minor Program

There is no minor program in environmental sciences.

Other Majors Offered by the Department of Environmental Science, Policy, and Management (ESPM)

Conservation and Resource Studies (http://guide.berkeley.edu/undergraduate/degree-programs/conservation-resource-studies) (Major and Minor)

Forestry and Natural Resources (http://guide.berkeley.edu/undergraduate/degree-programs/forestry-natural-resources) (Major and Minor)

Molecular Environmental Biology (http://guide.berkeley.edu/undergraduate/degree-programs/molecular-environmental-biology) (Major only)

Society and Environment (http://guide.berkeley.edu/undergraduate/degree-programs/society-environment) (Major only)

Students in this major choose a concentration in biological, physical, or social sciences based on intended research area, or general area of interest. The specific requirements for each concentration are outlined below.

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. All courses taken to fulfill major requirements must be passed with a C- or better letter grade.

3. A minimum cumulative grade point average (GPA) of 2.0 is required.

4. A minimum GPA of 2.0 in upper division major requirements is required.

5. A minimum of 30 upper division units are required in the Environmental Sciences major. 15 of the required upper division units must be taken in the College of Natural Resources.

6. A maximum of 16 units of independent study (courses numbered 97, 98, 99, 197, 198, and 199) may count toward graduation, with a maximum of 4 units of independent study per semester.

7. No more than 1/3 of the total units attempted at UC Berkeley may be taken Pass/No Pass. This includes units in the Education Abroad Program and UC Intercampus Visitor or Exchange Programs.

8. A maximum of 4 units of physical education courses will count toward graduation.

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

Lower Division Requirements for all ES Majors

**ESPM Environmental Science Core (select one):**

- ESPM 2 &nbsp;&nbsp;&nbsp;&nbsp;&nbsp; The Biosphere
- ESPM 6 &nbsp;&nbsp;&nbsp;&nbsp;&nbsp; Environmental Biology
- ESPM C10 &nbsp;&nbsp;&nbsp;&nbsp;&nbsp; Environmental Issues
- ESPM 15 &nbsp;&nbsp;&nbsp;&nbsp;&nbsp; Introduction to Environmental Sciences
- ESPM C46 &nbsp;&nbsp;&nbsp;&nbsp;&nbsp; Climate Change and the Future of California

**ESPM Social Science Core (select one):**

- ESPM C11 &nbsp;&nbsp;&nbsp;&nbsp;&nbsp; Americans and the Global Forest
### Environmental Sciences

#### Introduction to Environmental Studies
- **ESPM C12/ENGLISH C77**

#### Introduction to Culture and Natural Resource Management
- **ESPM 50AC**

#### Environmental Policy, Administration, and Law
- **ESPM 60**

### Environmental Economics
- **ENVECON C1/ECON C3**

#### Introduction to Environmental Economics and Policy
- **ESPM 50AC**

### Breadth Requirements (two courses):
- Select courses from the Seven Course Breadth listing on the College of Letters & Science website.
  - 1 course from the Arts & Literature, Historical Studies, or Philosophy & Values category (3-4 units)
  - 1 course from the Social & Behavioral Science or International Studies category (3-4 units)

### Area of Concentration: Choose a concentration in Biological, Physical, or Social Sciences (see below for requirements for each concentration)

#### Lower Division Requirements by Concentration

##### Biological Science Concentration

- **Math (select one calculus sequence):**
  - **MATH 16A** Analytic Geometry and Calculus
  - **MATH 16B** Analytic Geometry and Calculus
  - **MATH 1A** Calculus
  - **MATH 1B** Calculus

- **Chemistry (two courses):**
  - **CHEM 1A** General Chemistry
  - **1AL** General Chemistry Laboratory
  - **CHEM 3A** Chemical Structure and Reactivity
  - **3AL** Organic Chemistry Laboratory

- **Biology (two courses):**
  - **BIOLOGY 1A** General Biology Lecture
  - **1AL** General Biology Laboratory
  - **BIOLOGY 1B** General Biology Lecture and Laboratory

- **Physics (one course):**
  - **PHYSICS 8A** Introductory Physics

##### Physical Science Concentration

- **Math (two courses):**
  - **MATH 1A** Calculus
  - **MATH 1B** Calculus

- **Chemistry (two courses):**
  - **CHEM 1A** General Chemistry
  - **1AL** General Chemistry Laboratory
  - **CHEM 3A** Chemical Structure and Reactivity
  - **3AL** Organic Chemistry Laboratory

- **Biology (select one biology sequence):**
  - **BIOLOGY 1A** General Biology Lecture
  - **1AL** General Biology Laboratory
  - **BIOLOGY 1B** General Biology Lecture and Laboratory

- **Physics (one course):**
  - **PHYSICS 8A** Introductory Physics

### Upper Division Requirements

- **Statistics (must be completed before spring semester of student's junior year)**
  - Select one of the following:
    - **ESPM 173** Introduction to Ecological Data Analysis
    - **PB HLTH 141** Introduction to Biostatistics
    - **PB HLTH 142** Introduction to Probability and Statistics in Biology and Public Health
    - **STAT 131A** Introduction to Probability and Statistics for Life Scientists

#### Intro to Methods of Environmental Science
- **ESPM 100ES** Introduction to the Methods of Environmental Science (must be taken spring of junior year)

#### Senior Research Seminar: First Half (select one): 1, 2
- **ESPM 175A** Senior Research Seminar in Environmental Sciences
- **ESPM 175L** Senior Research Laboratory in Environmental Sciences (must be taken fall of senior year)

#### Senior Research Seminar: Second Half (select one) 1, 2
- **ESPM 175B** Senior Research Seminar in Environmental Sciences
- **ESPM 175L** Senior Research Laboratory in Environmental Sciences (must be taken spring of senior year)

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**Physics (2 courses):**
- **PHYSICS 7A** Physics for Scientists and Engineers
- **PHYSICS 7Band Physics for Scientists and Engineers** Math 53 strongly recommended for Physics 7B

### Social Science Concentration

- **Math (select one calculus sequence):**
  - **MATH 16A** Analytic Geometry and Calculus
  - **MATH 16B** Analytic Geometry and Calculus
  - **MATH 1A** Calculus
  - **MATH 1B** Calculus

- **Chemistry (two courses):**
  - **CHEM 1A** General Chemistry
  - **1AL** General Chemistry Laboratory
  - **CHEM 3A** Chemical Structure and Reactivity
  - **3AL** Organic Chemistry Laboratory
  - or **CHEM 1B** General Chemistry

- **Biology (select one biology sequence):**
  - **BIOLOGY 1A** General Biology Lecture
  - **1AL** General Biology Laboratory
  - **BIOLOGY 1Band General Biology Lecture and Laboratory**
  - **BIOLOGY 1B**, plus one of the following: **INTEGBI 153**, **INTEGBI 154**, **ESPM 111**, **ESPM 113**, **ESPM 114**, **ESPM 115B**, or **ESPM 116B**

- **Physics (one course):**
  - **PHYSICS 8A** Introductory Physics
ESPM H175B  Senior Research Seminar in Environmental & ESPM H175S|Sciences
and Senior Research Laboratory in Environmental Sciences (must be taken spring of senior year)

Environmental Modeling (select one): ESPM C183/EPP C183 satisfies the modeling requirement only if taken Spring 2015 or earlier

- ENE,RES 102  Quantitative Aspects of Global Environmental Problems
- ESPM 102C  Resource Management Satisfies the modeling requirement if taken Spring 2016 or later.
- ESPM C104/ ENVECON C11|Resources

Human Environment Interactions (select one):
- ANTHRO 137  Energy, Culture and Social Organization
- ESPM 102D  Climate and Energy Policy
- ESPM 151  Society, Environment, and Culture
- ESPM 155AC  Sociology and Political Ecology of Agro-Food Systems formerly ESPM 155
- ESPM 160AC/ HISTORY 120  American Environmental and Cultural History
- ESPM 161  Environmental Philosophy and Ethics
- ESPM 162  Bioethics and Society
- ESPM 163AC/ SOCIOL 137A|qhe Environment
- ESPM 166  Natural Resource Policy and Indigenous Peoples
- ESPM C167/ PBL HLT C160  Environmental Health and Development
- ESPM 168  Political Ecology
- ESPM 169  International Environmental Politics
- ESPM 186  Management and Conservation of Rangeland Ecosystems
- ENE,RES 175  Water and Development
- ENE,RES 180  Ecological Economics in Historical Context
- ENVECON C101/ ECON C125  Environmental Economics
- ENVECON 131|Globalization and the Natural Environment
- ENVECON 140Economics of Race, Agriculture, and the Environment
- ENVECON 153|Population, Environment, and Development
- ENVECON 162|Economics of Water Resources
- GEOG 130  Food and the Environment
- GEOG 138  Global Environmental Politics

Area of Concentration Elective
Select one 3-5 unit elective from area of concentration (see list below)

Additional ES Elective
Select one 2-5 unit elective from any area of concentration (see list below)

1 These four courses must be completed in the sequence listed, beginning the fall semester of the student's junior year. Students who plan to study abroad or otherwise not continuously enroll at UC Berkeley for their junior and senior years should meet with the ES adviser.

2 The ESPM H175 sequence is for ES students who have an overall 3.6 or above GPA and will enroll in the CNR honors program.

Upper Division Electives by Concentration

### Biological Sciences Concentration Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 103</td>
<td>Inorganic Chemistry in Living Systems</td>
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<tr>
<td>CHEM 115</td>
<td>Organic Chemistry-Advanced Laboratory Methods</td>
<td>4</td>
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<tr>
<td>CHEM C130/ MCELLBI C100A</td>
<td>Biophysical Chemistry: Physical Principles and the Environment</td>
<td>4</td>
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<tr>
<td>CIV ENG 101</td>
<td>Fluid Mechanics of Rivers, Streams, and Wetlands</td>
<td>3</td>
</tr>
<tr>
<td>CIV ENG 107</td>
<td>Climate Change Mitigation</td>
<td>3</td>
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<tr>
<td>CIV ENG 113</td>
<td>Ecological Engineering for Water Quality Improvement</td>
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<tr>
<td>CIV ENG 114</td>
<td>Environmental Microbiology</td>
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<tr>
<td>EPS/INTEGBI C100/ GEOG C146</td>
<td>Communicating Ocean Science</td>
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<tr>
<td>ENE,RES 101</td>
<td>Ecology and Society</td>
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<tr>
<td>ENE,RES 102</td>
<td>Quantitative Aspects of Global Environmental Problems</td>
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<tr>
<td>ESPM 102A</td>
<td>Terrestrial Resource Ecology</td>
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<td>ESPM 102B</td>
<td>Natural Resource Sampling &amp; Laboratory in Natural Resource Sampling</td>
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<td>ESPM C103/ INTEGBI C156</td>
<td>Principles of Conservation Biology</td>
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<td>ESPM C104/ ENVECON C115</td>
<td>Modeling and Management of Biological Resources</td>
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<td>ESPM 105A</td>
<td>Sierra Nevada Ecology</td>
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<td>ESPM 106</td>
<td>American Wildlife: Identification and Conservation</td>
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<td>ESPM C107/ INTEGBI 158LF</td>
<td>Biology and Geomorphology of Tropical Islands</td>
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<td>ESPM 108A</td>
<td>Trees: Taxonomy, Growth, and Structures</td>
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<td>ESPM 108B</td>
<td>Environmental Change Genetics</td>
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<td>ESPM 110</td>
<td>Primate Ecology</td>
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<td>ESPM 111</td>
<td>Ecosystem Ecology</td>
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<td>ESPM 112</td>
<td>Microbial Ecology</td>
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<td>ESPM 113</td>
<td>Insect Ecology</td>
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<td>ESPM 114</td>
<td>Wildlife Ecology</td>
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<td>ESPM 115B</td>
<td>Biology of Aquatic Insects</td>
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<td>ESPM C115C/ INTEGBI C176L</td>
<td>Fish Ecology</td>
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<td>ESPM 116B</td>
<td>Range Ecology, Improvements, and Management</td>
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<td>ESPM 116C</td>
<td>Tropical Forest Ecology</td>
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<td>ESPM 117</td>
<td>Urban Garden Ecosystems</td>
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<td>ESPM 118</td>
<td>Agricultural Ecology</td>
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<td>ESPM 119</td>
<td>Chemical Ecology</td>
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<td>ESPM 120</td>
<td>Soil Characteristics</td>
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<td>ESPM 121</td>
<td>Development and Classification of Soils</td>
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<tr>
<td>ESPM C126/ INTEGBI C144</td>
<td>Animal Behavior</td>
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<td>ESPM/EPS C129</td>
<td>Biometeorology</td>
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<td>ESPM 131</td>
<td>Soil Microbial Ecology</td>
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<tr>
<td>ESPM 134</td>
<td>Fire, Insects, and Diseases in Forest Ecosystems</td>
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### Environmental Sciences

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>MCELLBI 112</td>
<td>General Microbiology</td>
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<tr>
<td>MCELLBI 112L</td>
<td>General Microbiology Laboratory</td>
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<tr>
<td>MCELLBI C114</td>
<td>Introduction to Comparative Virology</td>
<td>3</td>
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<tr>
<td>MCELLBI C116</td>
<td>Microbial Diversity</td>
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<td>NUSCTX 110</td>
<td>Toxicology</td>
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<td>PLANTBI C110L</td>
<td>Biology of Fungi with Laboratory</td>
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<td>PLANTBI 112</td>
<td>General Microbiology</td>
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<td>PLANTBI 112L</td>
<td>General Microbiology Laboratory</td>
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<td>PB HLTH 140</td>
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<tr>
<td>PB HLTH 150A</td>
<td>Introduction to Epidemiology and Human Disease</td>
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<tr>
<td>PB HLTH 150B</td>
<td>Introduction to Environmental Health Sciences</td>
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<tr>
<td>PB HLTH 162A</td>
<td>Public Health Microbiology</td>
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<td>PB HLTH 162L</td>
<td>Public Health Microbiology Laboratory</td>
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<tr>
<td>PB HLTH 170B</td>
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### Physical Sciences Concentration Electives

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<tr>
<td>ARCH 140</td>
<td>Energy and Environment</td>
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<tr>
<td>ARCH 149</td>
<td>Special Topics in Energy and Environment</td>
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<tr>
<td>CHM ENG 140</td>
<td>Introduction to Chemical Process Analysis</td>
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<td>CHM ENG 141</td>
<td>Chemical Engineering Thermodynamics</td>
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<td>CHM ENG 142</td>
<td>Chemical Kinetics and Reaction Engineering</td>
<td>4</td>
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<tr>
<td>CHM ENG 150A</td>
<td>Transport Processes</td>
<td>4</td>
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<tr>
<td>CHM ENG 150B</td>
<td>Transport and Separation Processes</td>
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<tr>
<td>CHEM 103</td>
<td>Inorganic Chemistry in Living Systems</td>
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<td>CHEM 104A</td>
<td>Advanced Inorganic Chemistry</td>
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<td>CHEM 104B</td>
<td>Advanced Inorganic Chemistry</td>
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<td>CHEM 105</td>
<td>Instrumental Methods in Analytical Chemistry</td>
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<td>CHEM 120A</td>
<td>Physical Chemistry</td>
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<td>CHEM 120B</td>
<td>Physical Chemistry</td>
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<td>CHEM 125</td>
<td>Physical Chemistry Laboratory</td>
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<tr>
<td>CHEM C130</td>
<td>Biophysical Chemistry: Physical Principles and the Molecules of Life</td>
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<td>MCELLBI C100A</td>
<td>Introduction to Comparative Virology</td>
<td>3</td>
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<td>CHEM 135</td>
<td>Chemical Biology</td>
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<td>CHEM 130B</td>
<td>Biophysical Chemistry</td>
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<td>CHEM 135</td>
<td>Chemical Biology</td>
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<td>CHEM 130A</td>
<td>Biophysical Chemistry</td>
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<td>CIV ENG 100</td>
<td>Elementary Fluid Mechanics</td>
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<tr>
<td>CIV ENG 101</td>
<td>Fluid Mechanics of Rivers, Streams, and Wetlands</td>
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<tr>
<td>CIV ENG 103</td>
<td>Introduction to Hydrology</td>
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<tr>
<td>CIV ENG 106</td>
<td>Air Pollution</td>
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<td>CIV ENG 107</td>
<td>Climate Change Mitigation</td>
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<tr>
<td>CIV ENG 111</td>
<td>Environmental Engineering</td>
<td>3</td>
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<tr>
<td>CIV ENG 113</td>
<td>Ecological Engineering for Water Quality Improvement</td>
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### Social Sciences Concentration Electives

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<tr>
<th>Course Code</th>
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<tr>
<td>CIV ENG 107</td>
<td>Climate Change Mitigation</td>
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<tr>
<td>DEMOG/SOCIO</td>
<td>Sex, Death, and Data</td>
<td>4</td>
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<td>C126</td>
<td>Economic Demography</td>
<td>4</td>
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<tr>
<td>ECON/</td>
<td>Natural Resource Economics</td>
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<td>ENVECON C102</td>
<td>Environmental Economics</td>
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<td>ECON C125/</td>
<td>Environmental Economics</td>
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<td>ENVECON C101</td>
<td>Economic Development</td>
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<td>ECON C171/</td>
<td>Economic Development</td>
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<td>ENVECON C151</td>
<td>Economic Demography</td>
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<td>C175</td>
<td>Energy and Society</td>
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<td>ENE,RES C100</td>
<td>Soil Microbial Ecology</td>
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<td>ENE,RES 101</td>
<td>Ecology and Society</td>
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<td>ENE,RES 102</td>
<td>Soil Microbial Ecology</td>
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<td>ENE,RES 175</td>
<td>Water and Development</td>
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<td>ENE,RES 180</td>
<td>Soil Microbial Ecology</td>
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<td>ENGIN 125</td>
<td>Ethics, Engineering, and Society</td>
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<td>ENGIN 157AC</td>
<td>Engineering, The Environment, and Society</td>
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<td>ENVECON 100</td>
<td>Microeconomic Theory with Application to Natural Resources</td>
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<td>ENVECON C101</td>
<td>Environmental Economics</td>
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<td>ECON C125</td>
<td>Economic Demography</td>
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<td>ENVECON/</td>
<td>Energy and Society</td>
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<td>ECON C102</td>
<td>Natural Resource Economics</td>
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<tr>
<td>ENVECON C115</td>
<td>Modeling and Management of Biological Resources</td>
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<td>ECON C104</td>
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<td>ENVECON 131</td>
<td>Globalization and the Natural Environment</td>
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<td>ENVECON 147</td>
<td>Regulation of Energy and the Environment</td>
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<td>ENVECON C151</td>
<td>Economic Development</td>
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<td>ECON C171</td>
<td>Population, Environment, and Development</td>
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<tr>
<td>ENVECON 161</td>
<td>Advanced Topics in Environmental and Resource Economics</td>
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<td>ENVECON 162</td>
<td>Economics of Water Resources</td>
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<td>ESPM 102C</td>
<td>Resource Management</td>
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<td>ESPM 102D</td>
<td>Climate and Energy Policy</td>
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<td>ESPM C104/</td>
<td>Modeling and Management of Biological Resources</td>
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<td>ENVECON C115</td>
<td>Environmental Economics</td>
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<td>ESPM 117</td>
<td>Urban Garden Ecosystem</td>
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<td>ESPM 151</td>
<td>Society, Environment, and Culture</td>
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<tr>
<td>ESPM 155AC</td>
<td>Sociology and Political Ecology of Agro-Food Systems (formerly ESPM 155)</td>
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Undergraduate 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.

### High School Exam Credit
CNR students may apply high school exam credit (Advanced Placement, International Baccalaureate, A-Level Exam) towards many College and Major Requirements. See AP Exam Equivalency Chart and Higher Level IB Exam Equivalency Chart in the CNR Student Handbook (https://nature.berkeley.edu/handbook) for more information.

### Units Requirements
Students must complete at least 120 semester units of courses subject to certain guidelines:

- At least 36 units must be upper division courses, including a minimum of 15 units of upper division courses in the College of Natural Resources.
- A maximum of 16 units of Special Studies coursework (courses numbered 97, 98, 99, 197, 198, or 199) is allowed towards the 120 units; a maximum of four is allowed in a given semester.
- A maximum of 4 units of Physical Education from any school attended will count towards the 120 units.
- Students may receive unit credit for courses graded P (including P/NP units taken through EAP) up to a limit of one-third of the total units taken and passed on the Berkeley campus at the time of graduation.

### Semester Unit Minimum
All CNR students must enroll in at least 13 units each fall and spring semester.

### Semester Unit Maximum
To request permission to take more than 19.5 units in a semester, please see the major adviser.

### Semester Limit
Students admitted as freshmen must graduate within 8 fall/spring semesters at UC Berkeley. Students admitted as transfer students must graduate within 4 fall/spring semesters at UC Berkeley. Students who go on EAP and UCDC can petition for additional semesters. Summer session, UC Extension and non-UC study abroad programs do not count towards this semester limit. Students approved for double majors or simultaneous degrees in two colleges may be granted an additional semester. CNR does not limit the number of total units a student can accrue.

### Senior Residence Requirement
After reaching senior status (90 semester units earned), students must complete at least 24 of the remaining 30 units in at least two semesters in residence at the College of Natural Resources. To count as residence, a semester must consist of at least four passed units. Inter-campus Visitor, Education Abroad Program, UC Berkeley Washington Program, and UC Berkeley Extension units do not count toward this requirement.
Students may use Summer Session to satisfy one semester of the Senior Residence Requirement, provided that four units of coursework are completed.

**Modified Senior Residence Requirement**

Participants in the UC Education Abroad Program (UCEAP) or the UC Berkeley Washington Program may meet a modified Senior Residence Requirement by completing 24 of their final 60 semester units in residence (excluding UCEAP). At least 12 of these 24 units must be completed after senior status is reached.

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 students go abroad for a semester or year or want to take courses at another institution or through University Extension during their senior year. In these cases, students should make an appointment to see an adviser to determine how they can meet the Senior Residence Requirement.

**Grade Requirements**

- A 2.0 UC GPA is required for graduation.
- A 2.0 average in all upper division courses required of the major program is required for graduation.

**Learning Goals for the Major**

1. Develop a broad, interdisciplinary framework for approaching complex, interconnected environmental problems facing our world at multiple scales.
2. Develop strong analytic and quantitative skills needed to identify problems, develop a program to address the problem, execute a rigorous analysis of the issue, and reach independent conclusions.
3. Develop a rigorous scientific base across multiple disciplines (social, biological, and physical sciences) but with a strong concentration in one area so as to develop depth of expertise in that field.
4. Learn how to communicate findings effectively to the scientific community, government agencies, non-government environmental organizations, and the public.

**Skills**

1. Recognition of and knowledge about environmental problems and areas of research.
2. Comprehensive training in basic mathematics and the biological and physical sciences (calculus, biology, chemistry, and physics).
3. Introduction to the social science concepts and methods (environmental economics, course in human environment interactions).
4. Training in sampling and experimental design, and quantitative methods of data analysis and interpretation (statistics, introduction to estimation and modeling techniques).
5. Development of critical thinking and evaluation skills.
6. Training in general research methods.
7. Training in written communication, especially scientific writing.
8. Training in oral and visual communication skills.
9. Additional training in specialized research methods in the student’s area of concentration.

In the College of Natural Resources, we provide holistic, individual advising services to prospective and current students who are pursuing major and minors in our college. We assist with a range of issues including course selection, academic decision-making, achieving personal and academic goals, and maximizing the Berkeley experience.

If you are looking to explore your options, or you are ready to declare a major, double major, or minor, contact the undergraduate adviser for your intended major. Visit our website (https://nature.berkeley.edu/advising/meet-cnr-advisors) to explore all of our advising services.

**Undergraduate Adviser, Environmental Sciences**

Ginnie Sadil
gsadil@berkeley.edu
260 Mulford Hall
510-642-7895
Contact Ginnie via email or visit 260 Mulford Hall to schedule an appointment.
Advising hours: Monday to Friday, 9 to noon and 1 to 4 p.m. Our office is closed from noon to 1 p.m.

**Career Services Overview**

The UC Berkeley Career Center (https://career.berkeley.edu) prepares undergraduates, graduate students, and alumni to make informed decisions about their futures by providing comprehensive resources, programs, and counseling on career development, internships, employment, and graduate school. Whether it be through a resume critique, an alumni networking event, or an interviewing skills workshop, the Career Center is committed to help all students achieve:

- **Career Clarity**: providing students the opportunity to identify their career direction.
- **Career Competitiveness**: providing students the opportunities to enhance their marketability via real world experiences.
- **Career Connections**: providing students opportunities to engage with alumni and employers.

**Common Career Paths for Environmental Sciences Majors**

**Career Destinations Survey**

Every year the Career Center surveys graduating seniors (https://career.berkeley.edu/Survey/Survey) about their post-graduation plans to better understand the career outcomes of our alumni including: career fields, job titles, specific employers, entry-level salaries, and graduate/professional school destinations. The data profiles by major provide an impressive overview of the diverse interests and achievements of recent graduates from UC Berkeley, including specific data for the Environmental Sciences (https://career.berkeley.edu/sites/default/files/pdf/Survey/2015EnvSci.pdf) major within the College of Natural Resources. Each annual data set includes the August, December, and May graduating cohorts for that survey year. This data is designed to provide students, alumni, and employers with critical information about where Cal students go after graduation. As expected, college major does not restrict the employment or graduate school options that Cal students pursue. With careful planning (https://career.berkeley.edu/Plan/Plan), you can develop career-related skills and experiences that can prepare you for almost any job or graduate school field.

**Sample Career Pathways**

Environmental Sciences majors go on to pursue a wide variety of career options including, but not limited to:
• Federal Government Agencies (e.g. Environmental Protection Agency; Department of Agriculture)/environmental remediation & compliance: soil, water, air & sediments
• Nonprofit Organizations (Environment & Sustainability focused): Administration, management, public relations, fundraising/development, program coordination, grant writing, volunteer management
• Business: Sales (e.g. solar), regulatory/compliance; corporate social responsibility (CSR), environmental consulting
• Waste Management: Risk assessment, quality control, logistics, planning, recycling, transportation, public health
• Air & Water Quality Management: Testing/analysis, watershed management, stream restoration, sustainable infrastructure, risk assessment, compliance/permitting
• Soil Science: Waste disposal, environmental compliance, landfill operation and monitoring, fertilizer technology, agricultural production, research, organic farming
• Planning and Conservation: Natural resource management, sustainability programs, water resources, transportation and aviation planning, building/zoning, land use/acquisition, recreation and parks management, mining
• Education/Environmental Education: Teaching (elementary, secondary, post-secondary, research); public/community education, public health, outdoor education
• Communications: Technical writing, editing, illustrating, photography, public relations
• Health/Medical: Physician, allied health professions, nutrition, alternative medicine
• Environmental Law: Political action/lobbying, regulatory affairs, science policy, patent law, public interest, environmental law, mediation

Visit our Connecting Majors to Careers (https://career.berkeley.edu/InfoLab/Majors2Careers) resource to explore additional career paths most commonly associated with over 80 majors, including Environmental Sciences (http://whatcanidowiththismajor.com/major/wp-content/uploads/2011/05/environmentalstudies-science3.pdf).

Career and Internship Resources

The Career Center offers a wide variety of programs and resources to support students of all majors and class levels.

• Job Search Tools (https://career.berkeley.edu/Tools/Tools): Resume and cover letter writing, job search strategies, networking tools, interviewing skills, and more.
• Career Counseling (https://career.berkeley.edu/Info/MakeAppt): A wide variety of scheduled and drop-in appointment options based on major and topic.
• Internships (https://career.berkeley.edu/Internships/Internships): Internship listings, search strategies, FAQs, and more.
• Career Exploration (https://career.berkeley.edu/Info/CareerExp): Resources to explore career options, identify career goals, and develop effective career plans.
• Events and Workshops (https://career.berkeley.edu/Info/Events): Over 70 events each semester including workshops, alumni networking events, career panels, conferences, and on-campus Career Chats.
• Career Fairs and Employer Information Sessions (https://career.berkeley.edu/Callisto/Infosession): We offer 14 career fairs each year across a variety of career fields and partner with numerous employers for on-campus information sessions.
• Graduate and Professional School (https://career.berkeley.edu/Info/GradProf): Counseling and resources to help students research and apply for graduate and professional school including medical school (https://career.berkeley.edu/Medical/Medical) and law school (https://career.berkeley.edu/Law/Law).

*The above services are available to all currently enrolled UC Berkeley students and members of the Career Center’s Alumni Advantage (https://career.berkeley.edu/Alumni/AlumniAdv) program.

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.
Instructor: Berry
Climate Change: The Interface of Science and Public Policy: Read Less [-]

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.
Introduction to Environmental Sciences: Read Less [-]
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 as topic varies. 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: Letter grade. Final exam not required.
Instructors: Berry, Kondolf
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 as topic varies. Course may be repeated for credit when topic changes.
Hours & Format
Fall and/or spring:
5 weeks - 3-6 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.

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.

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.

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