

# 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 law school.

## Admission to the Major

Freshman students 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 or change of college, please see the College of Natural Resources Undergraduate Student Handbook ([http://www.cnr.berkeley.edu/site/forms/oisa/undergrad\\_handbook.pdf](http://www.cnr.berkeley.edu/site/forms/oisa/undergrad_handbook.pdf)).

## Honors Program

Students with a GPA of 3.6 or higher may enroll in the College of Natural Resources Honors Program (H196) 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. For further information on registration for the Honors Symposium and the Honors requirements, please see the College of Natural Resources website ([http://nature.berkeley.edu/site/honors\\_program.php](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

Conservation and Resource Studies (<http://guide.berkeley.edu/archive/2014-15/undergraduate/degree-programs/conservation-resource-studies>) (Major and Minor)

Forestry and Natural Resources (<http://guide.berkeley.edu/archive/2014-15/undergraduate/degree-programs/forestry-natural-resources>) (Major and Minor)

Molecular Environmental Biology (<http://guide.berkeley.edu/archive/2014-15/undergraduate/degree-programs/molecular-environmental-biology>) (Major only)

Society and Environment (<http://guide.berkeley.edu/archive/2014-15/undergraduate/degree-programs/society-environment>) (Major only)

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. A minimum cumulative grade point average (GPA) of 2.0 is required.
3. A minimum GPA of 2.0 in upper-division major requirements is required.
4. At least 15 of the 36 required upper-division units must be taken in the College of Natural Resources (except for students majoring in Environmental Economics and Policy; please see the EEP major adviser for further information).
5. 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.
6. No more than 1/3 of the total units attempted at UC Berkeley may be taken Pass/Not Pass. This includes units in the Education Abroad Program and UC Intercampus Visitor or Exchange Programs.
7. 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.

Students in this major choose a concentration in Biological, Physical, or Social Sciences.

## Lower-division Requirements

### ESPM Environmental Science Core

Select one of the following:

ESPM 2	The Biosphere
ESPM 6	Environmental Biology
ESPM C10	Environmental Issues
ESPM 15	Introduction to Environmental Sciences

### ESPM Social Science Core

Select one of the following:

ESPM C11	Americans and the Global Forest
ESPM C12	Introduction to Environmental Studies
ESPM 50AC	Introduction to Culture and Natural Resource Management
ESPM 60	Environmental Policy, Administration, and Law

### Environmental Economics

ENVECON C1/ ECON C3	Introduction to Environmental Economics and Policy	4
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**Lower-division Concentration: Choose a concentration in Biological, Physical, or Social Sciences, based on intended research area (see below for requirements for each concentration)**

### Biological Science Concentration

MATH 16A or MATH 1A	Analytic Geometry and Calculus Calculus	3-4
MATH 16B or MATH 1B	Analytic Geometry and Calculus Calculus	3-4
CHEM 1A & 1AL	General Chemistry and General Chemistry Laboratory	4
CHEM 3A & 3AL	Chemical Structure and Reactivity and Organic Chemistry Laboratory	5
BIOLOGY 1A & 1AL	General Biology Lecture and General Biology Laboratory	5
BIOLOGY 1B	General Biology Lecture and Laboratory	4
PHYSICS 8A	Introductory Physics	4

### Physical Science Concentration

MATH 1A	Calculus	4
MATH 1B	Calculus	4
CHEM 1A & 1AL	General Chemistry and General Chemistry Laboratory	4
CHEM 3A & 3AL	Chemical Structure and Reactivity and Organic Chemistry Laboratory	5

Select one of the following:

BIOLOGY 1A & 1AL & BIOLOGY 1	General Biology Lecture and General Biology Laboratory and General Biology Lecture and Laboratory	
BIOLOGY 11 & BIOLOGY 11L,	plus one of the following: INTEGBI 153, INTEGBI 154, ESPM 102A, ESPM 111, ESPM 113, ESPM 114, ESPM 115B, or ESPM 116B	
PHYSICS 7A	Physics for Scientists and Engineers	4
PHYSICS 7B	Physics for Scientists and Engineers	4

### Social Science Concentration

MATH 16A or MATH 1A	Analytic Geometry and Calculus Calculus	3-4
MATH 16B or MATH 1B	Analytic Geometry and Calculus Calculus	3-4
CHEM 1A & 1AL	General Chemistry and General Chemistry Laboratory	4
CHEM 3A & 3AL or CHEM 1B	Chemical Structure and Reactivity and Organic Chemistry Laboratory General Chemistry	5

Select one of the following: 4-5

BIOLOGY 1A & 1AL & BIOLOGY 1	General Biology Lecture and General Biology Laboratory and General Biology Lecture and Laboratory	
BIOLOGY 11 & BIOLOGY 11L,	plus one of the following: INTEGBI 153, INTEGBI 154, ESPM 102A, ESPM 111, ESPM 113, ESPM 114, ESPM 115B, or ESPM 116B	
PHYSICS 8A	Introductory Physics	4

## Upper-division Requirements

**Statistics (must be completed before Spring of student's junior year) <sup>1</sup>**

Select one of the following:

STAT 131A	Introduction to Probability and Statistics for Life Scientists	
PB HLTH 141	Introduction to Biostatistics	
PB HLTH 142	Introduction to Probability and Statistics in Biology and Public Health	
ESPM 173	Introduction to Ecological Data Analysis	

### Intro to Methods of Environmental Science <sup>1</sup>

ESPM 100ES	Introduction to the Methods of Environmental Science (must be taken spring of junior year)	4
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### Sr. Research Seminar: First half <sup>1</sup>

ESPM 175A & ESPM 175L	Senior Research Seminar in Environmental Sciences and Senior Research Laboratory in Environmental Sciences (must be taken fall of senior year)	4
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### Sr. Research Seminar: Second half <sup>1</sup>

ESPM 175B & ESPM 175L	Senior Research Seminar in Environmental Sciences and Senior Research Laboratory in Environmental Sciences (must be taken spring of senior year)	4
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### Environmental Modeling

Select one of the following:

ENE,RES 102	Quantitative Aspects of Global Environmental Problems	
ESPM C104/ ENVECON C11	Modeling and Management of Biological Resources	
ESPM/ ENVECON C183	Forest Ecosystem Management	

### Human Environment Interactions

Select one of the following:

ESPM 102D	Climate and Energy Policy	
ESPM 151	Society, Environment, and Culture	
ESPM 155	Sociology and Political Ecology of Agro-Food Systems	
ESPM 160AC/ HISTORY 120AC	American Environmental and Cultural History	
ESPM 161	Environmental Philosophy and Ethics	
ESPM 162	Bioethics and Society	
ESPM 163AC/ SOCIOLOGY 137A	Environmental Justice: Race, Class, Equity, and the Environment	
ESPM 166	Natural Resource Policy and Indigenous Peoples	
ESPM C167/ PB HLTH C160	Environmental Health and Development	
ESPM 168	Political Ecology	
ESPM 169	International Environmental Politics	
ESPM 186	Management and Conservation of Rangeland Ecosystems	

ENVECON C101/ ECON C125	Environmental Economics	
ENVECON 131	Globalization and the Natural Environment	
ENVECON 140	Economics of Race, Agriculture, and the Environment	
ENVECON 153	Population, Environment, and Development	
ENVECON 162	Economics of Water Resources	
ENVECON C188	Ecological Economics in Historical Context	
ENE,RES 170	Environmental Classics	
ENE,RES 175	Water and Development	
GEOG 130	Food and the Environment	
GEOG 138	Global Environmental Politics	
ANTHRO 137	Energy, Culture and Social Organization	

**Area of Concentration Elective, 3-4 units (see below)**

**Additional ES Elective, 2-4 units: Selected from any Area of Concentration (see below)**

- <sup>1</sup> These four courses must be completed in the sequence listed, beginning the Fall 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.

**Biological Sciences Concentration Electives**

CHEM 103	Inorganic Chemistry in Living Systems	3
CHEM 112A	Organic Chemistry	5
CHEM 112B	Organic Chemistry	5
CHEM 115	Organic Chemistry--Advanced Laboratory Methods	4
CIV ENG 101	Fluid Mechanics of Rivers, Streams, and Wetlands	3
CIV ENG 107	Climate Change Mitigation	3
CIV ENG 110	Course Not Available	4
CIV ENG 114	Environmental Microbiology	3
EPS/INTEGBI C100/ GEOG C146	Communicating Ocean Science	4
EPS C120	Course Not Available	
EPS/ESPM C129	Biometeorology	3
EPS 185	Marine Geobiology	2
ENE,RES 102	Quantitative Aspects of Global Environmental Problems	4
ENE,RES C130/ EPS C120	Course Not Available	4
ENVECON C115/ ESPM C104	Modeling and Management of Biological Resources	4
ESPM 101A	Course Not Available	4
ESPM 102A	Terrestrial Resource Ecology	4
ESPM 102B & 102BL	Natural Resource Sampling and Laboratory in Natural Resource Sampling	4
ESPM C103/ INTEGBI C156	Principles of Conservation Biology	4
ESPM C104/ ENVECON C115	Modeling and Management of Biological Resources	4
ESPM 105A	Sierra Nevada Ecology	4
ESPM 106	American Wildlife: Identification and Conservation	3

ESPM C107/ INTEGBI 158LF	Biology and Geomorphology of Tropical Islands	13
ESPM 108A	Trees: Taxonomy, Growth, and Structures	3
ESPM 109	Course Not Available	4
ESPM 110	Primate Ecology	4
ESPM 111	Ecosystem Ecology	4
ESPM 112	Microbial Ecology	3
ESPM 113	Insect Ecology	2
ESPM 114	Wildlife Ecology	3
ESPM 115B	Biology of Aquatic Insects	2
ESPM 116A	Course Not Available	4
ESPM 116B	Range Ecology, Improvements, and Management	3
ESPM 116C	Tropical Forest Ecology	3
ESPM 117	Urban Garden Ecosystems	4
ESPM 118	Agricultural Ecology	3
ESPM 119	Chemical Ecology	2
ESPM 120	Soil Characteristics	3
ESPM 121	Development and Classification of Soils	3
ESPM/EPS C129	Biometeorology	3
ESPM 131	Soil Microbial Ecology	3
ESPM 134	Fire, Insects, and Diseases in Forest Ecosystems	3
ESPM 135	Course Not Available	4
ESPM C138/ MCELLBI C114/ PLANTBI C114	Introduction to Comparative Virology	4
ESPM 140	General Entomology	4
ESPM 144	Insect Physiology	3
ESPM 145	Course Not Available	4
ESPM 146 & 146L	Course Not Available and Medical and Veterinary Entomology Laboratory	4
ESPM 147	Field Entomology	1
ESPM C148/ NUSCTX C114	Pesticide Chemistry and Toxicology	3
ESPM C149 & C149L	Molecular Ecology and Course Not Available	4
ESPM 162	Bioethics and Society	4
ESPM 172	Photogrammetry and Remote Sensing	3
ESPM 181A	Fire Ecology	3
ESPM 184	Agroforestry Systems	3
ESPM 185	Applied Forest Ecology	4
ESPM 186	Management and Conservation of Rangeland Ecosystems	4
ESPM 187	Restoration Ecology	4
ESPM 188	Case Histories in Wildlife Management	2
GEOG 142	Climate Dynamics	4
GEOG 148	Biogeography	4
GEOG/LD ARCH C188	Geographic Information Systems	4
INTEGBI/ EPS C100/ GEOG C146	Communicating Ocean Science	4
INTEGBI C101 & C101L	Course Not Available and Course Not Available	4

INTEGBI 102LF	Introduction to California Plant Life with Laboratory	4
INTEGBI 103LF	Invertebrate Zoology with Laboratory	5
INTEGBI 104LF	Natural History of the Vertebrates with Laboratory	5
INTEGBI 106	Course Not Available	4
INTEGBI 106A	Physical and Chemical Environment of the Ocean	4
INTEGBI 106L	Course Not Available	4
INTEGBI 117 & 117L	Medical Ethnobotany and Course Not Available	2
INTEGBI C144	Animal Behavior	4
INTEGBI 146	Course Not Available	
INTEGBI C149L/ESPM C149	Course Not Available	4
INTEGBI 151 & 151L	Plant Physiological Ecology and Plant Physiological Ecology Laboratory	6
INTEGBI 152	Environmental Toxicology	4
INTEGBI 153 & 153L	Ecology and Course Not Available	3
INTEGBI 154 & 154L	Plant Ecology and Plant Ecology Laboratory	5
INTEGBI C156/ESPM C103	Principles of Conservation Biology	4
INTEGBI 157LF	Ecosystems of California	4
INTEGBI C158/ESPM C107	Course Not Available	4
INTEGBI 160	Evolution	4
INTEGBI 162	Ecological Genetics	4
INTEGBI C163/MCELLBI C142	Course Not Available	4
INTEGBI 168 & 168L	Systematics of Vascular Plants and Systematics of Vascular Plants with Laboratory	6
INTEGBI 173LF	Mammalogy with Laboratory	5
INTEGBI 174LF	Ornithology with Laboratory	4
INTEGBI 175LF	Herpetology with Laboratory	4
LD ARCH 110	Ecological Analysis	3
LD ARCH/GEOG C188	Geographic Information Systems	4
MCELLBI 102	Survey of the Principles of Biochemistry and Molecular Biology	4
MCELLBI C112 & C112L	General Microbiology and General Microbiology Laboratory	6
MCELLBI C114/ESPM C138/PLANTBI C114	Introduction to Comparative Virology	4
MCELLBI/PLANTBI C116	Microbial Diversity	3
NUSCTX 110	Toxicology	4
NUSCTX 113	Course Not Available	4
NUSCTX C114/ESPM C148	Pesticide Chemistry and Toxicology	3
NUSCTX C119/PB HLTH C170B	Course Not Available	
PLANTBI C102 & C102L	Course Not Available and Course Not Available	4

PLANTBI 110 & 110L	Course Not Available and Course Not Available	4
PLANTBI C112 & C112L	General Microbiology and General Microbiology Laboratory	6
PLANTBI C114/ESPM C138/MCELLBI C114	Introduction to Comparative Virology	4
PLANTBI/MCELLBI C116	Microbial Diversity	3
PLANTBI 120 & 120L	Biology of Algae and Laboratory for Biology of Algae	4
PLANTBI 180	Environmental Plant Biology	2
PSYCH C115B/INTEGBI C144	Course Not Available	4
PB HLTH 140	Introduction to Risk and Demographic Statistics	4
PB HLTH 150A	Introduction to Epidemiology and Human Disease	4
PB HLTH 150B	Introduction to Environmental Health Sciences	3
PB HLTH 162A & PB HLTH 162L	Public Health Microbiology and Public Health Microbiology Laboratory	4
PB HLTH C170B/NUSCTX C119	Course Not Available	

### Physical Sciences Concentration Electives

ARCH 140	Energy and Environment	4
ARCH 149	Special Topics in Energy and Environment	1-4
CHM ENG 140	Introduction to Chemical Process Analysis	4
CHM ENG 141	Chemical Engineering Thermodynamics	4
CHM ENG 142	Chemical Kinetics and Reaction Engineering	4
CHM ENG 150A	Transport Processes	4
CHM ENG 150B	Transport and Separation Processes	4
CHEM 103	Inorganic Chemistry in Living Systems	3
CHEM 104A	Advanced Inorganic Chemistry	3
CHEM 104B	Advanced Inorganic Chemistry	3
CHEM 105	Instrumental Methods in Analytical Chemistry	4
CHEM 112A	Organic Chemistry	5
CHEM 112B	Organic Chemistry	5
CHEM 120A	Physical Chemistry	3
CHEM 120B	Physical Chemistry	3
CHEM 125	Physical Chemistry Laboratory	3
CHEM 130B	Biophysical Chemistry	3
CHEM/EPS C182	Atmospheric Chemistry and Physics Laboratory	3
CIV ENG 100	Elementary Fluid Mechanics	4
CIV ENG 101	Fluid Mechanics of Rivers, Streams, and Wetlands	3
CIV ENG 103	Introduction to Hydrology	3
CIV ENG C106/EPS C180/ESPM C180	Air Pollution	3
CIV ENG 107	Climate Change Mitigation	3
CIV ENG 108	Course Not Available	
CIV ENG 109	Course Not Available	4
CIV ENG 110	Course Not Available	4
CIV ENG 111	Environmental Engineering	3
CIV ENG 115 & 115L	Water Chemistry and Course Not Available	3

CIV ENG C116/ ESPM C128	Chemistry of Soils	3	GEOG C139/ EPS C181	Atmospheric Physics and Dynamics	3
CIV ENG 117 & 117L	Course Not Available and Course Not Available	4	GEOG 140A	Physical Landscapes: Process and Form	4
CIV ENG 171	Introduction to Geological Engineering	3	GEOG 140B	Course Not Available	4
CIV ENG 173	Groundwater and Seepage	3	GEOG/EPS C141	Course Not Available	4
EPS/INTEGBI C100/ GEOG C146	Communicating Ocean Science	4	GEOG 143	Global Change Biogeochemistry	3
EPS 100A	Minerals: Their Constitution and Origin	4	GEOG 144	Principles of Meteorology	3
EPS 100B	Genesis and Interpretation of Rocks	4	GEOG C145/ EPS C146	Geological Oceanography	4
EPS 101	Field Geology and Digital Mapping	4	GEOG 180	Field Methods for Physical Geography	5
EPS 105	Course Not Available	4	GEOG 183	Cartographic Representation	5
EPS 117	Geomorphology	4	GEOG/LD ARCH C188	Geographic Information Systems	4
EPS 119	Geologic Field Studies	2	INTEGBI/ EPS C100/ GEOG C146	Communicating Ocean Science	4
EPS C120	Course Not Available	4	INTEGBI 106A	Physical and Chemical Environment of the Ocean	4
EPS/ESPM C129	Biometeorology	3	LD ARCH 120	Topographic Form and Design Technology	3
EPS 131	Geochemistry	4	LD ARCH/GEOG C188	Geographic Information Systems	4
EPS/GEOG C141	Course Not Available	4	L & S/EPS 170AC	Crossroads of Earth Resources and Society	4
EPS C146/ GEOG C145	Geological Oceanography	4	MATH 121A	Mathematical Tools for the Physical Sciences	4
EPS 170AC	Crossroads of Earth Resources and Society	4	MATH 121B	Mathematical Tools for the Physical Sciences	4
EPS/ESPM C180	Air Pollution	3	MEC ENG 106	Fluid Mechanics	3
EPS C181/ GEOG C139	Atmospheric Physics and Dynamics	3	PB HLTH 171	Course Not Available	4
EPS/CHEM C182	Atmospheric Chemistry and Physics Laboratory	3	<b>Social Sciences Concentration Electives</b>		
EPS 185	Marine Geobiology	2	CIV ENG 107	Climate Change Mitigation	3
ENE,RES C100	Energy and Society	4	DEMOG/SOCIOL C126	Social Consequences of Population Dynamics	4
ENE,RES 102	Quantitative Aspects of Global Environmental Problems	4	DEMOG/ECON C175	Economic Demography	3
ENE,RES 120	Course Not Available	4	EPS C120	Course Not Available	4
ENE,RES C130/ EPS C120	Course Not Available	4	EPS 170AC	Crossroads of Earth Resources and Society	4
ENE,RES 151	Course Not Available	4	ECON/ ENVECON C102	Natural Resource Economics	4
ENGIN 115	Engineering Thermodynamics	4	ECON C125/ ENVECON C101	Environmental Economics	4
ESPM 102B & 102BL	Natural Resource Sampling and Laboratory in Natural Resource Sampling	4	ECON C171/ ENVECON C151	Economic Development	4
ESPM 120	Soil Characteristics	3	ECON/DEMOG C175	Economic Demography	3
ESPM 121	Development and Classification of Soils	3	ENE,RES C100	Energy and Society	4
ESPM 122	Field Study of Soil Development	1	ENE,RES 102	Quantitative Aspects of Global Environmental Problems	4
ESPM 126	Course Not Available		ENE,RES C130/ EPS C120	Course Not Available	4
ESPM C128/ CIV ENG C116	Chemistry of Soils	3	ENE,RES 151	Course Not Available	4
ESPM C130/ GEOG C136	Terrestrial Hydrology	4	ENE,RES 170	Environmental Classics	3
ESPM 131	Soil Microbial Ecology	3	ENE,RES/ ENVECON C180	Ecological Economics in Historical Context	3
ESPM C148/ NUSCTX C114	Pesticide Chemistry and Toxicology	3	ENGIN 124	Course Not Available	4
ESPM 172	Photogrammetry and Remote Sensing	3			
ESPM/EPS C180	Air Pollution	3			
ESPM 181A	Fire Ecology	3			
GEOG C136/ ESPM C130	Terrestrial Hydrology	4			



ENVECON 100	Microeconomic Theory with Application to Natural Resources	4
ENVECON C101/ ECON C125	Environmental Economics	4
ENVECON/ ECON C102	Natural Resource Economics	4
ENVECON C115/ ESPM C104	Modeling and Management of Biological Resources	4
ENVECON 131	Globalization and the Natural Environment	3
ENVECON 141	Course Not Available	4
ENVECON C151/ ECON C171	Economic Development	4
ENVECON 153	Population, Environment, and Development	3
ENVECON 161	Advanced Topics in Environmental and Resource Economics	4
ENVECON 162	Economics of Water Resources	3
ESPM 102C	Resource Management	4
ESPM 102D	Climate and Energy Policy	4
ESPM C104/ ENVECON C115	Modeling and Management of Biological Resources	4
ESPM 117	Urban Garden Ecosystems	4
ESPM 155	Sociology and Political Ecology of Agro-Food Systems	4
ESPM 160AC/ HISTORY 120AC	American Environmental and Cultural History	4
ESPM 161	Environmental Philosophy and Ethics	4
ESPM 162	Bioethics and Society	4
ESPM 163AC	Environmental Justice: Race, Class, Equity, and the Environment	4
ESPM 165	International Rural Development Policy	4
ESPM 166	Natural Resource Policy and Indigenous Peoples	4
ESPM C167	Environmental Health and Development	4
ESPM 168	Political Ecology	4
ESPM 169	International Environmental Politics	4
ESPM 181B	Course Not Available	4
ESPM 183	Forest Planning and Management	4
GEOG 130	Food and the Environment	4
GEOG C188	Geographic Information Systems	4
HISTORY 120AC	American Environmental and Cultural History	4
INTEGBI 117 & 117L	Medical Ethnobotany and Course Not Available	2
LD ARCH 110	Ecological Analysis	3
LD ARCH C188	Geographic Information Systems	4
PB HLTH 140	Introduction to Risk and Demographic Statistics	4
SOCIOL C126	Social Consequences of Population Dynamics	4
SOCIOL 128AC	Course Not Available	4

For College Requirements, please refer to the College of Natural Resources (<http://guide.berkeley.edu/archive/2014-15/undergraduate/colleges-schools/natural-resources/#collegerequirementstext>) .

## 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 their 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

## Environmental Sciences

ENV SCI 8X Climate Change: The Interface of Science and Public Policy  
2 Units

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.

### 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

**ENV SCI 10 Introduction to Environmental Sciences 3 Units**

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.

**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.

**ENV SCI 10L Field Study in Environmental Sciences 1 Unit**

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.

**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

**ENV SCI 24 Freshman Seminar 1 Unit**

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.

**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:** The grading option will be decided by the instructor when the class is offered. Final exam required.

**ENV SCI 84 Sophomore Seminar 1 or 2 Units**

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.

**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.

**ENV SCI 100 Introduction to the Methods of Environmental Science 4 Units**

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**

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