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 pre-health programs), and environmental engineering.

For more information, visit the Environmental Sciences webpage (https://nature.berkeley.edu/advising/majors/environmental-sciences/).

Admission to the Major

Advice on admission for freshmen and transfer students can be found on the Rausser College of Natural Resources Admissions (http://guide.berkeley.edu/archive/2020-21/undergraduate/colleges-schools/natural-resources/#admissionstext) page or the Prospective Students (https://nature.berkeley.edu/prospective-students/) page. Freshman students may apply directly to the major, or they may select the college's undeclared option and declare the major by the end of their fourth semester. Transfer students may apply directly to the major through the UC application.

Information for current Berkeley students who would like to declare the major after admission, including information on a change of major or change of college, please see chapter 6 of the Rausser College Undergraduate Student Handbook (https://nature.berkeley.edu/handbook/). (https://nature.berkeley.edu/handbook/)

Honors Program

Students with a GPA of 3.6 or higher may enroll in the Honors Program (https://nature.berkeley.edu/advising/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 and ESPM H175L fall of their senior year, and ESPM H175B and ESPM H175L spring of their senior year. In this course series, students design, conduct, and report on an individual research project working with a faculty sponsor.

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/archive/2020-21/undergraduate/degree-programs/conservation-resource-studies/) (Major and Minor)
Ecosystem Management and Forestry (http://guide.berkeley.edu/archive/2020-21/undergraduate/degree-programs/ecosystem-management-forestry/) (Major, Forestry Minor)
Molecular Environmental Biology (http://guide.berkeley.edu/archive/2020-21/undergraduate/degree-programs/molecular-environmental-biology/) (Major only)
Society and Environment (http://guide.berkeley.edu/archive/2020-21/undergraduate/degree-programs/society-environment/) (Major only)

Students in this major choose a concentration in biological, physical, or social sciences based on their 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. Please see the ES Major Snapshot (https://nature.berkeley.edu/sites/default/files/ES%20Major%20Snapshot.pdf) for an overview.

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 is 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	The Biosphere [3]
ESPM 6	Environmental Biology [3]
ESPM C10	Environmental Issues [4]
ESPM 15	Introduction to Environmental Sciences [3]
ESPM C46	Climate Change and the Future of California [4]

ESPM Social Science Core (select one):

ESPM 5	FROM FARM TO TABLE: FOOD SYSTEMS IN A CHANGING WORLD [4]
ESPM C11	Americans and the Global Forest [4]
ESPM C22AC	Fire: Past, Present and Future Interactions with the People and Ecosystems of California [4]
ESPM 50AC	Introduction to Culture and Natural Resource Management [4]
ESPM 60	Environmental Policy, Administration, and Law [4]

Environmental Economics:

ENVECON C1/ECON C3	Introduction to Environmental Economics and Policy [4]

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 & MATH 16B	Analytic Geometry and Calculus and Analytic Geometry and Calculus
MATH 1A & MATH 1B	Calculus and Calculus

Chemistry (two courses):

CHEM 1A & 1AL	General Chemistry and General Chemistry Laboratory
CHEM 3A & 3AL	Chemical Structure and Reactivity and Organic Chemistry Laboratory

Biology (two courses):

BIOLOGY 1A & 1AL	General Biology Lecture and General Biology Laboratory
BIOLOGY 1B	General Biology Lecture and Laboratory [4]

Physics (one course):

PHYSICS 8A	Introductory Physics [4]

Physical Science Concentration

Math (two courses):

MATH 1A & MATH 1B	Calculus and Calculus

Chemistry (two courses):

CHEM 1A & 1AL	General Chemistry and General Chemistry Laboratory
CHEM 3A & 3AL	Chemical Structure and Reactivity and Organic Chemistry Laboratory

Biology (select one biology sequence):

BIOLOGY 1A & 1AL & BIOLOGY 1B	General Biology Lecture and General Biology Laboratory and General Biology Lecture and Laboratory

BIOLOGY 1B, plus one of the following: INTEGBI 153, INTEGBI 154, ESPM C103, ESPM 111, ESPM 113, ESPM 114, ESPM 115B, ESPM 116B, or ESPM 152

Physics (2 courses):

PHYSICS 7A & PHYSICS 7B	Physics for Scientists and Engineers and Physics for Scientists and Engineers (Math 53 strongly recommended for Physics 7B)

Social Science Concentration

Math (select one calculus sequence):

MATH 16A & MATH 16B	Analytic Geometry and Calculus and Analytic Geometry and Calculus
MATH 1A & MATH 1B	Calculus and Calculus

Chemistry (two courses):

CHEM 1A & 1AL	General Chemistry and General Chemistry Laboratory
CHEM 3A & 3AL	Chemical Structure and Reactivity and Organic Chemistry Laboratory
or CHEM 1B	General Chemistry

Biology (select one biology sequence):

BIOLOGY 1A & 1AL & BIOLOGY 1B	General Biology Lecture and General Biology Laboratory and General Biology Lecture and Laboratory

BIOLOGY 1B, plus one of the following: INTEGBI 153, INTEGBI 154, ESPM C103, ESPM 111, ESPM 113, ESPM 114, ESPM 115B, ESPM 116B, or ESPM 152

Physics (one course):

PHYSICS 8A	Introductory Physics [4]

Upper Division Requirements

Statistics (must be completed before spring semester of junior year):

Select one of the following:

ESPM 173	Introduction to Ecological Data Analysis [3]
PB HLTH 141	Introduction to Biostatistics [5]
PB HLTH 142	Introduction to Probability and Statistics in Biology and Public Health [4]
STAT 131A	Course Not Available

Intro to Methods of Environmental Science (must be taken spring of junior year): [1]

ESPM 100ES	Introduction to the Methods of Environmental Science [4]
Senior Research Seminar A (select one, must be taken fall of senior year): [1]	
ESPM 175A & ESPM 175L	Senior Research Seminar in Environmental Sciences and Senior Research Laboratory in Environmental Sciences (must be taken fall of senior year)
ESPM H175A & ESPM H175L	Senior Research Seminar in Environmental Sciences and Senior Research Laboratory in Environmental Sciences (must be taken fall of senior year) [2]
Senior Research Seminar B (select one, must be taken spring of senior year): [1]	
ESPM 175B & ESPM 175L	Senior Research Seminar in Environmental Sciences and Senior Research Laboratory in Environmental Sciences (must be taken spring of senior year)
ESPM H175B & ESPM H175L	Senior Research Seminar in Environmental Sciences and Senior Research Laboratory in Environmental Sciences (must be taken spring of senior year) [2]
Environmental Modeling (select one): [3]	
ENE,RES 102	Quantitative Aspects of Global Environmental Problems [4]
ENE,RES 131	Data, Environment and Society [4]
ESPM 102C	Resource Management [4] Satisfies the modeling requirement if taken Spring 2016 or later.
ESPM C104/ ENVECON C115	Modeling and Management of Biological Resources [4]
ESPM 157	Data Science in Global Change Ecology [4]
Human Environment Interactions (select one):	
ANTHRO 137	Energy, Culture and Social Organization [4]
ESPM 102D	Climate and Energy Policy [4]
ESPM 151	Society, Environment, and Culture [4]
ESPM 155AC	Sociology and Political Ecology of Agro-Food Systems [4] formerly ESPM 155
ESPM 160AC/ HISTORY 120A	American Environmental and Cultural History [4]
ESPM 161	Environmental Philosophy and Ethics [4]
ESPM 162	Bioethics and Society [4]
ESPM 163AC/ SOCIOL 137AC	Environmental Justice: Race, Class, Equity, and the Environment [4]
ESPM C167/ PB HLTH C160	Environmental Health and Development [4]
ESPM 168	Political Ecology [4]
ESPM 169	International Environmental Politics [4]
ESPM 186	Management and Conservation of Rangeland Ecosystems [4]
ENE,RES 160	Climate Justice [4]
ENE,RES 170	Environmental Classics [3]
ENE,RES 175	Water and Development [4]
ENE,RES 180	Ecological Economics in Historical Context [3]
ENVECON C101/ ECON C125	Environmental Economics [4]
ENVECON 131	Globalization and the Natural Environment [3]
ENVECON 140	Economics of Race, Agriculture, and the Environment [3]
ENVECON 153	Population, Environment, and Development [3]
ENVECON 162	Economics of Water Resources [3]
GEOG 130	Food and the Environment [4]
GEOG 138	Global Environmental Politics [4]
Area of Concentration Elective:	
Select one 3-5 unit elective from area of concentration (see list below)	
Additional ES Elective:	
Select one 3-5 unit elective from any area of concentration (see list below)	

1 These three courses must be completed in the sequence listed, beginning the spring semester of the student's junior year. Statistics must be completed before starting this series. 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 advisor.

2 The ESPM H175 sequence is for ES students who have an overall 3.6 or above GPA and want to participate in the Rausser College Honors Program.

3 ESPM C183/EEP C183 satisfies the modeling requirement only if taken Spring 2015 or earlier.

Upper Division Electives by Concentration

Biological Sciences Concentration Electives

CHEM 103	Inorganic Chemistry in Living Systems	3
CHEM 115	Organic Chemistry--Advanced Laboratory Methods	4
CHEM C130/ MCELLBI C100A	Biophysical Chemistry: Physical Principles and the Molecules of Life	4
CIV ENG 101	Course Not Available	
CIV ENG 107	Climate Change Mitigation	3
CIV ENG 113	Ecological Engineering for Water Quality Improvement	3
CIV ENG 114	Environmental Microbiology	3
ENGIN/IAS 157AC	Engineering, The Environment, and Society	4
ENE,RES 102	Quantitative Aspects of Global Environmental Problems	4
EPS/INTEGBI C100/ GEOG C146	Communicating Ocean Science	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: Management and Policy in the 21st Century	3
ESPM C107/ INTEGBI 158LF	Biology and Geomorphology of Tropical Islands	13
ESPM 108A	Trees: Taxonomy, Growth, and Structures	3
ESPM 108B	Environmental Change Genetics	3

ESPM 110	Primate Ecology	4
ESPM 111	Ecosystem Ecology	4
ESPM 112	Microbial Ecology	3
ESPM 113	Insect Ecology	3
ESPM 114	Wildlife Ecology	3
ESPM 115B	Biology of Aquatic Insects	2
ESPM C115C/ INTEGBI C176L	Fish Ecology	3
ESPM 116B	Grassland and Woodland Ecology	4
ESPM 116C	Tropical Forest Ecology	3
ESPM 117	Urban Garden Ecosystems	4
ESPM 118	Agricultural Ecology	4
ESPM 119	Chemical Ecology	2
ESPM 120	Science of Soils	3
ESPM 121	Development and Classification of Soils	3
ESPM C126/ INTEGBI C144	Animal Behavior	4
ESPM/EPS C129	Biometeorology	3
ESPM 131	Soil Microbiology and Biogeochemistry	4
ESPM 134	Fire, Insects, and Diseases in Forest Ecosystems	3
ESPM C138/ MCELLBI C114/ PLANTBI C114	Introduction to Comparative Virology	4
ESPM 140	General Entomology	4
ESPM 144	Insect Physiology	3
ESPM 146L	Medical and Veterinary Entomology Laboratory	1
ESPM 147	Field Entomology	1
ESPM C148/ NUSCTX C114	Pesticide Chemistry and Toxicology	3
ESPM/INTEGBI C149	Course Not Available	
ESPM 152	Global Change Biology	3
ESPM 157	Data Science in Global Change Ecology	4
ESPM 158	Biodiversity Conservation in Working Landscapes	4
ESPM 162	Bioethics and Society	4
ESPM C170	Carbon Cycle Dynamics	3
ESPM 172	Remote Sensing of the Environment	3
ESPM 173	Introduction to Ecological Data Analysis	3
ESPM 174	Design and Analysis of Ecological Research	4
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 C146	Communicating Ocean Science	4
GEOG C148	Biogeography	4
GEOG/LD ARCH C188	Geographic Information Systems	4
GLOBAL 126	Development and the Environment	4
INTEGBI C100	Communicating Ocean Science	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 106A	Physical and Chemical Environment of the Ocean	4
INTEGBI 117LF	Medical Ethnobotany Laboratory	2
INTEGBI C144	Animal Behavior	4
INTEGBI 146LF	Behavioral Ecology with Laboratory	5
INTEGBI C149	Course Not Available	4
INTEGBI 151 & 151L	Plant Physiological Ecology and Plant Physiological Ecology Laboratory	6
INTEGBI 152	Environmental Toxicology	4
INTEGBI 153	Course Not Available	
INTEGBI 154 & 154L	Plant Ecology and Plant Ecology Laboratory	5
INTEGBI C156	Principles of Conservation Biology	4
INTEGBI 157LF	Ecosystems of California	4
INTEGBI 158LF	Biology and Geomorphology of Tropical Islands	13
INTEGBI 162	Ecological Genetics	4
INTEGBI 163	Molecular and Genomic Evolution	3
INTEGBI 168 & 168L	Course Not Available and Plants: Diversity and Evolution	4
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 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	Introduction to Comparative Virology	4
MCELLBI C116	Microbial Diversity	3
NUSCTX 110	Toxicology	4
PLANTBI C110L	Biology of Fungi with Laboratory	4
PLANTBI C112 & C112L	General Microbiology and General Microbiology Laboratory	6
PLANTBI 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 122	Bioenergy	2
PLANTBI 180	Environmental Plant Biology	2
PB HLTH 150A	Introduction to Epidemiology and Human Disease	4
PB HLTH 150B	Human Health and the Environment in a Changing World	3
PB HLTH 162A & PB HLTH 162L	Public Health Microbiology and Public Health Microbiology Laboratory	6

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
CHM ENG 183	Climate Solutions Technologies	3
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 120A	Physical Chemistry	3
CHEM 120B	Physical Chemistry	3
CHEM 125	Physical Chemistry Laboratory	3
CHEM C130/ MCELLBI C100A	Biophysical Chemistry: Physical Principles and the Molecules of Life	4
CHEM 130B	Biophysical Chemistry	3
CHEM 135	Chemical Biology	3
CHEM/EPS C182	Atmospheric Chemistry and Physics Laboratory	3
CIV ENG 100	Elementary Fluid Mechanics	4
CIV ENG 101	Course Not Available	
CIV ENG 103	Introduction to Hydrology	3
CIV ENG C106	Air Pollution	3
CIV ENG 107	Climate Change Mitigation	3
CIV ENG 111	Environmental Engineering	3
CIV ENG 113	Ecological Engineering for Water Quality Improvement	3
CIV ENG 115	Water Chemistry	3
CIV ENG C116	Chemistry of Soils	3
CIV ENG 171	Rock Mechanics	3
CIV ENG 173	Groundwater and Seepage	3
ENGIN/IAS 157AC	Engineering, The Environment, and Society	4
EPS/INTEGBI C100/ GEOG C146	Communicating Ocean Science	4
EPS 100A	Minerals: Their Constitution and Origin	4
EPS 100B	Genesis and Interpretation of Rocks	4
EPS 101	Field Geology and Digital Mapping	4
EPS 117	Geomorphology	4
EPS 119	Geologic Field Studies	2
EPS 131	Geochemistry	4
EPS C146/ GEOG C145	Course Not Available	
EPS C180	Air Pollution	3
EPS C181/ GEOG C139	Atmospheric Physics and Dynamics	3
EPS C182	Atmospheric Chemistry and Physics Laboratory	3
ENE,RES C100/ PUB POL C184	Energy and Society	4
ENE,RES 102	Quantitative Aspects of Global Environmental Problems	4
ESPM 102B & 102BL	Natural Resource Sampling and Laboratory in Natural Resource Sampling	4
ESPM 120	Science of Soils	3
ESPM 121	Development and Classification of Soils	3
ESPM 122	Field Study of Soil Development	1
ESPM C128/ CIV ENG C116	Chemistry of Soils	3
ESPM/EPS C129	Biometeorology	3
ESPM C130/ GEOG C136	Terrestrial Hydrology	4
ESPM 131	Soil Microbiology and Biogeochemistry	4
ESPM C148/ NUSCTX C114	Pesticide Chemistry and Toxicology	3
ESPM 157	Data Science in Global Change Ecology	4
ESPM 164	GIS and Environmental Science	3
ESPM C170	Carbon Cycle Dynamics	3
ESPM 172	Remote Sensing of the Environment	3
ESPM 173	Introduction to Ecological Data Analysis	3
ESPM 174	Design and Analysis of Ecological Research	4
ESPM/ EPS C180/ CIV ENG C106	Air Pollution	3
ESPM 181A	Fire Ecology	3
GEOG C139	Atmospheric Physics and Dynamics	3
GEOG 140A	Physical Landscapes: Process and Form	4
GEOG 142	Climate Dynamics	4
GEOG 143	Global Change Biogeochemistry	3
GEOG 144	Principles of Meteorology	3
GEOG C145	Course Not Available	4
GEOG C146	Communicating Ocean Science	4
GEOG 180	Field Methods for Physical Geography	5
GEOG 183	Cartographic Representation	5
GEOG/LD ARCH C188	Geographic Information Systems	4
GLOBAL 126	Development and the Environment	4
INTEGBI 106A	Physical and Chemical Environment of the Ocean	4
LD ARCH 120	Topographic Form and Design Technology	3
LD ARCH C188	Geographic Information Systems	4
MATH 121A	Mathematical Tools for the Physical Sciences	4
MATH 121B	Mathematical Tools for the Physical Sciences	4
MEC ENG 106	Fluid Mechanics	3

Social Sciences Concentration Electives

CIV ENG 107	Climate Change Mitigation	3
DEMOG/SOCIOL C126	Sex, Death, and Data	4
DEMOG/ECON C175	Economic Demography	4
ECON/ ENVECON C102	Natural Resource Economics	4
ECON C125/ ENVECON C101	Environmental Economics	4
ECON C171/ ENVECON C151	Development Economics	4
ECON/DEMOG C175	Economic Demography	4
ENE,RES C100	Energy and Society	4
ENE,RES 101	Ecology and Society	3

ENE,RES 102	Quantitative Aspects of Global Environmental Problems	4
ENE,RES 175	Water and Development	4
ENE,RES 180	Ecological Economics in Historical Context	3
ENGIN 125	Ethics, Engineering, and Society	3
ENGIN 157AC	Engineering, The Environment, and Society	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 147	Regulation of Energy and the Environment	4
ENVECON C151/ ECON C171	Development Economics	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 151	Society, Environment, and Culture	4
ESPM 155AC	Sociology and Political Ecology of Agro-Food Systems formerly ESPM 155	4
ESPM 157	Data Science in Global Change Ecology	4
ESPM/NUSCTX C159	Human Diet	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/ SOCIOL 137AC	Environmental Justice: Race, Class, Equity, and the Environment	4
ESPM 165	International Rural Development Policy	4
ESPM C167/ PB HLTH C160	Environmental Health and Development	4
ESPM 168	Political Ecology	4
ESPM 169	International Environmental Politics	4
ESPM 183	Forest Ecosystem Management and Planning	4
GEOG 130	Food and the Environment	4
GEOG/LD ARCH C188	Geographic Information Systems	4
INTEGBI 117 & 117LF	Medical Ethnobotany and Medical Ethnobotany Laboratory	4
GLOBAL 126	Development and the Environment	4
LD ARCH 110	Ecological Analysis	3
LD ARCH 130	Sustainable Landscapes and Cities	4
LD ARCH C188	Geographic Information Systems	4
SOCIOL C126	Sex, Death, and Data	4
SOCIOL 137AC	Environmental Justice: Race, Class, Equity, and the Environment	4

Reading and Composition (http://guide.berkeley.edu/archive/2020-21/undergraduate/colleges-schools/natural-resources/reading-composition-requirement/)

In order to provide a solid foundation in reading, writing and critical thinking all majors in the College require two semesters of lower division work in composition. Students must complete a first-level reading and composition course by the end of their second semester and a second-level course by the end of their fourth semester.

Foreign Language (http://guide.berkeley.edu/archive/2020-21/undergraduate/colleges-schools/natural-resources/foreign-language-requirement/): **EEP Majors only**

The Foreign Language requirement is only required by Environmental Economics and Policy (EEP) majors. It 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.

Quantitative Reasoning (http://guide.berkeley.edu/archive/2020-21/undergraduate/colleges-schools/natural-resources/quantitative-reasoning-requirement/): **EEP Majors only**

The Quantitative Reasoning requirement is only required by Environmental Economics and Policy (EEP) majors. The requirement may be satisfied by exam or by taking an approved course.

Undergraduate Breadth

Undergraduate breadth provide Berkeley students with a rich and varied educational experience outside of their major program and many students complete their breadth courses in their first two years. Breadth courses are built into the Rausser College major requirements and each major requires a different number of breath courses and categories. The EEP major is the only college major that requires the entire 7 course breadth. Refer to the major snapshots on each Rausser College major page (https://nature.berkeley.edu/advising/majors-minors/) for for additional information.

High School Exam Credit

Rausser College 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 (https://nature.berkeley.edu/advising/courses-grades/#AP%20Exam%20Equivalency%20Chat) in the Rausser College Student Handbook (https://nature.berkeley.edu/handbook/) for more information.

Unit 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 Rausser College.
- 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 Rausser College students must enroll in at least 12 units each fall and spring semester.

Semester Unit Maximum

To request permission to take more than 20.5 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. Rausser College does not limit the number of total units a student can accrue.

Senior Residence Requirement

Once you achieve and exceed 90 units (senior status), you must complete at least 24 of the remaining 30 units in residence at the Rausser College of Natural Resources over at least 2 semesters. To count as residence, a semester must consist of at least 6 passed units taken while the student is a member of Rausser. At least one of the two terms must be a fall or spring semester. Senior residence terms do not need to be completed consecutively. All courses offered on campus for the fall, spring, and summer terms by Berkeley departments and programs and all Berkeley online ('W') courses count. 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 6 units of coursework are completed.

Modified Senior Residence Requirement

Participants in a fall, spring or summer UC Education Abroad Program (UCEAP), Berkeley Summer Abroad, 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. International travel study programs sponsored by Summer Sessions and education abroad programs offered outside of the UC system do not qualify for modified senior residence.

Most students automatically satisfy 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.
- A grade of at least C- is required in all courses for the major

Fall 2020 & Spring 2021 – Changes in Policies and Procedures

After much consultation across the colleges of UC Berkeley, and via our college Executive Committee, the following decisions have been made about the selection of the P/NP grade option (CPN) by undergraduate students during the Fall 2020 & Spring 2021 semesters for the Rausser College of Natural Resources.

- College Course Requirements: Reading and Composition, Quantitative Reasoning, and Foreign Language requirements normally satisfied with letter grades may be met with a passed (P) grade during the Fall 2020 semester. This does not include the system-wide Entry Level Writing requirement. College Writing R1A must be taken for a letter grade and completed with a C or better to fulfill the Entry Level Writing requirement.
- Requirements to Graduate: No changes in policy.
  - Rausser College students must have at least a 2.0 cumulative UC GPA to declare a Rausser College major.
  - Non-Rausser College students must have at least a 3.0 cumulative UC GPA to change to or add a Rausser College major.
  - Students must have at least a 2.0 cumulative UC GPA to graduate, both overall and in the upper-division courses required for the major.
- Academic Probation: The terms for Academic Probation (AP) have been modified.
  - Rausser CNR students currently in good standing who earn all “P” grades will remain in good standing.
  - Students currently in good standing who earn NP grades, Incompletes, or failing letter grades for more than 50% of units will be placed on academic probation and will be required to meet with their college advisor and complete an Academic Success Plan for the subsequent semester.
  - Students on AP must take all coursework for letter grades. Students on AP may be removed from probationary status with sufficient letter graded course work to raise their cumulative GPA above 2.0.
  - Students on Academic Probation who do not attain sufficient letter-graded coursework to be removed from AP (ie. enough grade points to raise cumulative GPA above 2.0 cumulative GPA) will remain on AP for the subsequent semesterand must complete an Academic Success Plan with their college advisor.
  - Students on Academic Probation who earn NP grades, Incompletes, or failing letter grades for more than 50% of units will be Subject to Dismissal and will be required to meet with their college advisor and complete an Academic Success Plan for the subsequent semester.

- Term Probation: Students in this category are placed on academic probation if their GPA falls below 1.5 in any fall or spring semester ("Term"). To get back into good standing, you must earn a UC Berkeley term GPA of 2.0 the following regular semester (fall/spring) and maintain an overall GPA of 2.0. If you fail to meet these conditions, you will be subject to dismissal from the University. For Fall 2020 & Spring 2021, the terms for Term Probation have been modified.
    - Rausser CNR students currently in good standing who earn all "P" grades will remain in good standing and will not be placed on Term Probation.
- Transferring Credit: If you are taking coursework through another institution in Fall 2020 & Spring 2021, P grades earned will be accepted for all degree requirements. Note: This does not include the systemwide Entry Level Writing requirement. College Writing R1A must be taken for a letter grade and completed with a C or better to fulfill the Entry Level Writing requirement.

For additional information, please see Changes to Policies and Procedures for Fall 2020 & Spring 2021 (https://nature.berkeley.edu/advising/AY-2020-2021-policy-adjustments/).

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, a 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.

Major Maps help undergraduate students discover academic, co-curricular, and discovery opportunities at UC Berkeley based on intended major or field of interest. Developed by the Division of Undergraduate Education in collaboration with academic departments, these experience maps will help you:

- **Explore** your major and gain a better understanding of your field of study
- **Connect** with people and programs that inspire and sustain your creativity, drive, curiosity and success
- **Discover** opportunities for independent inquiry, enterprise, and creative expression
- **Engage** locally and globally to broaden your perspectives and change the world
- **Reflect** on your academic career and prepare for life after Berkeley

Use the major map below as a guide to planning your undergraduate journey and designing your own unique Berkeley experience.

View the Environmental Sciences Major Map PDF. **(**https://vcue.berkeley.edu/sites/default/files/environmental_sciences.pdf**)**

At the Rausser 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 or minor, contact the undergraduate advisor for your intended major. To schedule an appointment or get in touch, please follow the instructions on our website (https://nature.berkeley.edu/advising/meet-rausser-advisors/).

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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 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 helping all students achieve:

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

Career and Internship Resources

The UC Berkeley Career Center (https://career.berkeley.edu/) 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/).