ENVIRONMENTAL STUDIES

College of Social Sciences and Interdisciplinary Studies

Program Description
The Environmental Studies program can help students use the resources of the entire University to gain an interdisciplinary understanding of such increasingly serious issues as pollution, wildlife and wilderness preservation, land use, biodiversity loss, resource depletion, energy conservation, and a generally healthful relationship between nature and society. The program offers both a major and a minor and also assists students in constructing special majors and identifying programs and individual courses in various departments that concern themselves with environmental questions.

The major is designed to help students understand environmental issues in their political, social, and scientific context. Because dealing with environmental issues requires an interdisciplinary approach, we emphasize the development of strong writing, research, and quantitative skills and a broad liberal arts perspective.

Environmental Studies students find work primarily in research, analysis, and enforcement activities in state, federal, and local governments. Others work for nonprofit organizations such as The Nature Conservancy, Audubon Society, and Sierra Club. Some work as consultants to private firms, and some graduates become teachers in primary schools, secondary schools, and universities. A few have created their own careers in such areas as organic farming, managing cooperatives, and social action.

Environmental Studies students often go on to professional and graduate schools in such fields as law, ecology, engineering, journalism, economics, public health, political science, public administration, special education, environmental policy, and human ecology.

Special Features
• Sacramento, as the state capital, offers excellent opportunities for study and employment. One of several ways to incorporate these opportunities into a student’s academic program is through Environmental Studies internship experiences.
• The faculty also carries on a field study program to introduce students to as many features as possible of the extraordinarily varied Northern California region.
• Faculty in the Environmental Studies Department represent disciplines including Biology, Ecology, Toxicology, Political Science, Environmental Engineering, among others.

Career Possibilities
Environmental Analyst · Pollution Analyst · Pollution Measurement Technician · Environmental Planner · Naturalist · Environmental Consultant · Energy Conservation Specialist · Environmental Journalist · Environmental Health Specialist · Lobbyist · Environmental Educator · Environmental Economist · Recycling Coordinator · Hazardous Materials Specialist · Legislative Researcher · Water Quality Technician · Park Interpretive Specialist · Transportation Planner · Waste Management Specialist · Levee Management Specialist · Conservation Analyst · Environmental Investigator · Environmental Interpreter · Environmental Resource Planner · Park Ranger · Permitting Officer · Ranger · Habitat Assessment Specialist · Environmental Compliance Officer · Legislative Aide · Air Pollution Specialist · Energy Manager · Game Warden · Wildlife Manager · Hazardous Waste Specialist · Pollution Prevention Specialist · Compliance Program Manager · Community Education Officer · Environmental Health and Safety Officer · Mosquito Control Technician · Public Works Program Manager · Water Conservation Manager · Environmental Impact and Review Assessment · Environmental Scientist · Environmental Policy Analyst

Contact Information
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Email: envs-sc@csus.edu
www.csus.edu/envs (http://www.csus.edu/envs)

Faculty
BURTON, DUDLEY J.
FLOWERS, CHRISTINE
FORAN, JEFFERY
FULTON, JULIAN
GOLDSTENE, JAMES
ISHIKAWA, CATHERINE “CATHY”
KROSS, SARA
PAPOUCHIS, CHRISTOPHER
POPEJOY, GREGORY
REEDE, JAMES

STEVENS, MICHELLE

BA Degree in Environmental Studies

Units required for Major: 65-66
Minimum total units required for BA: 120
Minimum GPA: “C-” is required in all courses required for the Environmental Studies B.S. and B.A. majors.

Required Lower Division Courses (23-24 Units)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>BIO 1</td>
<td>Biodiversity, Evolution and Ecology</td>
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<tr>
<td>BIO 2</td>
<td>Cells, Molecules and Genes</td>
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<tr>
<td>or BIO 10 &amp; BIO 15L</td>
<td>Basic Biological Concepts &amp; Laboratory Investigations in Biology</td>
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<tr>
<td>CHEM 1A</td>
<td>General Chemistry I</td>
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<td>or CHEM 6A</td>
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<tr>
<td>ECON 1B</td>
<td>Introduction to Microeconomic Analysis</td>
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<td>ENVS 10</td>
<td>Introduction to Environmental Science</td>
<td>3</td>
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<tr>
<td>GEOG 1</td>
<td>Physical Geography: The Distribution of Natural Phenomena</td>
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<tr>
<td>or GEOL 10</td>
<td>Physical Geology</td>
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Required Upper Division Courses (30 Units)

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tr>
<td>BIO 160</td>
<td>General Ecology</td>
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</tr>
<tr>
<td>ENVS 111</td>
<td>Environmental Ethics</td>
<td>3</td>
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</tbody>
</table>
**Environmental Studies**

- **ENVS 112** International Environmental Problems 3
- **ENVS 120** Quantitative Methods for Environmental Science 3
- **ENVS 121** Field Methods in Environmental Science 2
- **ENVS 122** Environmental Impact Analysis: CEQA and NEPA 3
- **ENVS/GOVT 128** Environmental and the Law 3
- **ENVS/GOVT 171** Environmental Politics and Policy 3
- **ENVS 187** Environmental Studies Seminar 1
- **ENVS 190** Senior Thesis 3
- **ENVS 195** Environmental Studies Internship 3

**Environmental Science Electives (6 Units)**
- Select two of the following courses: 6
  - **ENVS 110** Contemporary Environmental Issues
  - **ENVS 130** Environmental Toxicology
  - **ENVS 144** Sustainability in the Tropics
  - **ENVS 147** Urban Agriculture and Aquaponics
  - **ENVS 149** Agroecology
  - **ENVS 151** Restoration Ecology
  - **ENVS 158** Wetlands Ecology
  - **ENVS 163** Ethnoecology

**Interdisciplinary Electives (6 Units)**
- Select two of the following courses: 6
  - **ECON 110** Cost Benefit Analysis
  - **ECON 123** Resource Economics
  - **ECON 162** Energy Economics
  - **ENVS/HIST 165** American Environmental History
  - **ENVS/SOC 138** Introduction to Environmental Sociology
  - **GEOG 147** Urban Geography
  - **GEOG 148** Urban and Regional Planning
  - **GEOG 149** Transportation Geography
  - **GEOG 161** California’s Water Resources
  - **GOVT 180** California State and Local Government
  - **RPTA 148** Experiential Education in Outdoor Recreation Settings
  - or **RPTA 153** Environmental Interpretation and Outdoor Education

**Other Electives (permission of instructor) (1-3 Units)**
- **ENVS 199** Special Problems 1 - 3

**BS Degree in Environmental Studies**

Units required for Major: 65

Minimum total units required for BS: 120

Minimum GPA: “C-” is required in all courses required for the Environmental Studies B.S. and B.A. majors.

**Required Lower Division Courses (24 Units)**
- **BIO 1** Biodiversity, Evolution and Ecology 5
- **BIO 2** Cells, Molecules and Genes 5
  - or **BIO 10** Basic Biological Concepts
  - & **BIO 15L** Laboratory Investigations in Biology
- **CHEM 1A** General Chemistry I 5
  - or **CHEM 6A** Introduction to General Chemistry
- **ECON 1B** Introduction to Microeconomic Analysis 3
- **ENVS 10** Introduction to Environmental Science 3
- **GEOG 1** Physical Geography: The Distribution of Natural Phenomena 3
  - or **GEOL 10** Physical Geology

**Required Upper Division Courses (21 Units)**
- **BIO 160** General Ecology 3
- **ENVS 111** Environmental Ethics 3
- **ENVS 112** International Environmental Problems 3
- **ENVS 120** Quantitative Methods for Environmental Science 3
- **ENVS 121** Field Methods in Environmental Science 2
- **ENVS 187** Environmental Studies Seminar 1
- **ENVS 190** Senior Thesis 3
- **ENVS 195** Environmental Studies Internship 3

**Policy Electives (3 Units)**
- Select one of the following courses: 3
  - **ENVS 122** Environmental Impact Analysis: CEQA and NEPA
  - **ENVS/GOVT 128** Environment and the Law
  - **ENVS/GOVT 171** Environmental Politics and Policy

**Environmental Science Electives (9 Units)**
- Select three of the following courses: 9
  - **ENVS 110** Contemporary Environmental Issues
  - **ENVS 130** Environmental Toxicology
  - **ENVS 144** Sustainability in the Tropics
  - **ENVS 147** Urban Agriculture and Aquaponics
  - **ENVS 149** Agroecology
  - **ENVS 151** Restoration Ecology
  - **ENVS 158** Wetlands Ecology
  - **ENVS 163** Ethnoecology

**Interdisciplinary Electives (9 Units)**
- Select three of the following courses: 9
  - **BIO 103** Plants and Civilization
  - **BIO 112** Plant Taxonomy
  - **BIO 118** Natural Resource Conservation
  - **BIO 157** General Entomology
  - **BIO 162** Ichthyology: The Study of Fishes
  - **BIO 164** Amphibians and Reptiles: An Introduction to Herpetology
  - **BIO 166** Ornithology
  - **BIO 168** Mammalogy
  - **BIO 169** Animal Behavior
  - **BIO 173** Principles of Fisheries Biology
  - **BIO 179** Principles of Wildlife Management
  - **ENVS/SOC 138** Introduction to Environmental Sociology
  - **GEOG 107** Remote Sensing
  - **GEOG 109** Geographic Information Systems
  - **GEOG 110** Advanced Geographic Information Systems
  - **GEOG 111** Elements Of Meteorology
  - **GEOG 113** Climate

**Total Units:** 66-69
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**Minor in Environmental Studies**  
Units required for Minor: 25  

**Specific course requirements are:**

- **BIO 10** Basic Biological Concepts (3 units)  
- **ECON 1B** Introduction to Microeconomic Analysis (3 units)  
- **ENVS 10** Introduction to Environmental Science (3 units)  
- **ENVS 111** Environmental Ethics (3 units)  
- **ENVS 187** Environmental Studies Seminar (1 unit)  
- Select one of the following: (3 units)  
  - **ENVS 112** International Environmental Problems  
  - **ENVS 122** Environmental Impact Analysis: CEQA and NEPA  
  - **ENVS/GOVT 128** Environment and the Law  
- **ENVS/GOVT 171** Environmental Politics and Policy  
- Select one of the following: (3 units)  
  - **ENVS 110** Contemporary Environmental Issues  
  - **ENVS 130** Environmental Toxicology  
  - **ENVS 144** Sustainability in the Tropics  
  - **ENVS 149** Agroecology  
  - **ENVS 151** Restoration Ecology  
  - **ENVS 158** Wetlands Ecology  
  - **ENVS 163** Ethnobotany  
- Select one of the following: (3 units)  
  - **BIO 160** General Ecology  
  - **ENVS 120** Quantitative Methods for Environmental Science  
  - **ENVS 121** Field Methods in Environmental Science  
  - **GEOG 109** Geographic Information Systems  
  - **GEOG 113** Climate  
  - **GEOG 10** Physical Geology  
- Select one of the following: (3 units)  
  - **BIO 103** Plants and Civilization  
  - **BIO 112** Plant Taxonomy  
  - **BIO 118** Natural Resource Conservation  
  - **BIO 157** General Entomology  
  - **BIO 162** Ichthyology: The Study of Fishes  
  - **BIO 164** Amphibians and Reptiles: An Introduction to Herpetology  

**Total Units:** 25  

**Note:** A minimum grade of “C-” is required in all courses required for the Environmental Studies minor.

**ENVS 10. Introduction to Environmental Science.**  
**General Education Area/Graduation Requirement:** Life Forms (B2)  
Course looks at the earth as an ecosystem composed of biological, chemical, and physical systems. Focus is on the interaction of these systems with each other and with human population, technology, and production. Students should acquire the fundamentals of a scientific understanding of the ecological implications of human activities. Specific topics treated within the context of ecosystem analysis include energy flows, nutrient cycles, pollution, resource use, climate changes, species diversity, and population dynamics.
ENVS 10H. Honors Environmental Science. 3 Units
General Education Area/Graduation Requirement: Life Forms (B2)
The earth as an ecosystem composed of biological, chemical, and physical systems. Focus is on the interaction of these systems with each other and with human population, technology, and production. Students should acquire the fundamentals of a scientific understanding of the ecological implications of human activities. Specific topics treated within the context of the ecosystem analysis include energy flows, nutrient cycles, pollution, resource use, climate change, species diversity, and population dynamics. Students read important original research on topics. All students participate in a semester long project that applies the principles of the course to a real environmental issue.

ENVS 11. Environmental Issues and Critical Thinking. 3 Units
General Education Area/Graduation Requirement: Critical Thinking (A3)
Examines Western cultural values and personal beliefs toward the environment. Teaches critical thinking skills to analyze issues to make informed choices that may impact the earth, its resources and their management as consumers, leaders, professionals and moral agents.

ENVS 21. First Year Seminar: Becoming an Educated Person. 3 Units
General Education Area/Graduation Requirement: Understanding Personal Development (E)
Introduction to the nature and possible meanings of higher education, and the functions and resources of the University. Designed to help students develop and exercise fundamental academic success strategies and to improve their basic learning skills. Provides students with the opportunity to interact with fellow classmates and the seminar leader to build a community of academic and personal support.

ENVS 110. Contemporary Environmental Issues. 3 Units
Examination of a variety of environmental issues with emphasis on the social aspects of the problems and solutions. The class is conducted primarily through discussion, with an unusually high degree of student responsibility. Group and individual projects are designed to involve students in community affairs as well as to give them an opportunity to develop a personal perspective on environmental issues.

ENVS 111. Environmental Ethics. 3 Units
Consideration of how human beings should act with regard to the non-human natural world in the context of complex societal needs. Students will use critical thinking skills to integrate insights from the sciences, social sciences, and humanities to make ethical decisions.

ENVS 112. International Environmental Problems. 3 Units
Prerequisite(s): GWAR certification before Fall 09; or WPJ score of 80+; or 3-unit placement in ENGL 109M or ENGL 109W; or 4-unit placement in ENGL 109M or ENGL 109W and co-enrollment in ENGL 109X; or WPJ score 70 or 71 and co-enrollment in ENGL 109X.
General Education Area/Graduation Requirement: Writing Intensive Graduation Requirement (WI)
Global perspective on current problems of environmental protection and resource use. Population growth, food production, industrialization, technology and cultural change are considered, with heavy emphasis on the social dynamics of environmental problems. A variety of political views is studied, and an attempt is made to develop a perspective useful to students in personal and political decisions.

ENVS 120. Quantitative Methods for Environmental Science. 3 Units
Prerequisite(s): Must be an ENVS major or minor; STAT 1 or instructor permission.
Research tools and methods used by environmental professionals including selected statistical procedures, data sources and presentation and interpretation of results. Students will become familiar with the wide range of equipment available to fit their special needs including the computer time-sharing system.

ENVS 121. Field Methods in Environmental Science. 2 Units
Prerequisite(s): Must be an ENVS major or minor
This field course includes the direct observation of human impact on specific environments and examples of mitigation strategies. Students will learn information gathering and data presentation methodologies useful in environmental impact assessment. Lecture three hours per week; one-day and weekend field trips will be arranged.
Note: Course also substitutes for ENVS 175.

Field trip(s) may be required.

ENVS 122. Environmental Impact Analysis: CEQA and NEPA. 3 Units
Review of legislative and judicial requirements for environmental impact analysis. Students will be asked to review actual project environmental impact reports, analyze the methods employed, understand the relationship of the report to the planning process, and prepare such a document.
Note: It is recommended that students complete ENVS 128 or have some actual experience with environmental impact documentation before taking this course.

ENVS 124. Social Justice in Interdisciplinary Perspective. 3 Units
Prerequisite(s): Sophomore standing or instructor permission.
Examines the nature and forms of social justice and injustice. Addresses key philosophical and theoretical models and debates over the meaning of social justice, using historical and contemporary examples to highlight important concepts and controversies. Faculty from different departments within SSIS, and occasionally from other colleges, will address how their discipline understands and analyzes issues of social justice. Students will be encouraged to critically assess the assumptions of various perspectives on social justice, and to address the relationship of academe and social activism in achieving social justice. Cross listed as ANTH 130, ID 124, ETHN 124, FACS 124 and SOC 124. Only one may be counted for credit.

ENVS 128. Environment and the Law. 3 Units
Introduction to environmental law, including: the evolution of environmental legislation, environmental issues in the court system, environmental regulation and administrative law, and environmental torts. Emphasis is on understanding legal process and the special challenges environmental problems present to the legal system. Cross Listed: GOVT 128; only one may be counted for credit.

ENVS 130. Environmental Toxicology. 3 Units
Prerequisite(s): CHEM 6A or instructor permission.
Focuses on the aspects of toxicology which enable us to study and explore environmental issues concerning human and ecosystem health. It will explore the impact of human activity since World War II in contributing to human disease and ecosystem disruption. Risk perception and communication as it concerns environmental toxicology will also be discussed.
ENVS 135. California Water and Society. 3 Units
Prerequisite(s): ENVS 120 or instructor permission
This course provides the historical, scientific, legal, institutional, and economic background needed to understand the social and ecological challenges of providing water for California’s growing population, agricultural economy, and other uses- all of which are made more complex by climate change. We will look at past and current debates around cases ranging from local issues on the American River to statewide issues that converge in the Sacramento-San Joaquin Delta. Both physical and social science research skills will be developed.

ENVS 138. Introduction to Environmental Sociology. 3 Units
The study of human society, the natural environment, and their mutual interactions. Examines environmental sociology at several levels, from the micro level of individual communities to the meso level of government policies to macro theoretical considerations. Analyzes environmental issues in a global context also included. Cross Listed: SOC 138.

ENVS 140. Energy, Society, and the Environment. 3 Units
Prerequisite(s): Upper division standing
This course covers the concepts and tools necessary to understand society’s diverse technology and policy choices around energy production and use. Students will apply both quantitative and qualitative methods to analyze opportunities and impacts of energy systems with consideration for environmental sustainability, international development, and social equity. We will consider a range of energy technologies, their historical trajectories, current drivers, and prospects for addressing energy challenges at different scales, from households to the global climate.

ENVS 144. Sustainability in the Tropics. 3 Units
Examine environmental issues specific to the tropics, where 40% of the global population now lives and the bulk of future population growth will occur. Emphasis is placed on the uniqueness of tropical ecosystems in terms of climatic, geologic, pedological, and biological diversity; traditional, colonial, and modern industrial agricultural and forest management systems; and sociocultural and political aspects of environmental issues.

ENVS 147. Urban Agriculture and Aquaponics. 3 Units
This course uses campus initiatives in food and bio-waste recycling, combined with vermiculture and aquaponics, to address larger topics in urban food production. This subject has significance for addressing concerns about food access, security, quality, and even local economic development. The course will include hands-on activities on campus, projects with local urban agriculture organizations, and reports connecting the specifics of the course with core questions in environmental science and policy.

ENVS 149. Agroecology. 3 Units
Ecological aspects of the production of food and fiber, with emphasis on the sustainability and adequacy of the global food supply to meet the needs of a growing, urbanized population. Covers topics basic to all agricultural systems - soil development, fertility, irrigation, nutrient cycles, crop selection - while contrasting methods developed for large-scale industrial food production with traditional and/or organic farming methods.

Note: Required field trips.

Field trip(s) may be required.

ENVS 151. Restoration Ecology. 3 Units
Overview of concepts and practices in restoration ecology, emphasizing the application of ecological principles to restoration design, implementation, and monitoring. Major course topics will include historical ecology, soils and hydrology, plant and animal ecology, exotic species, endangered species concerns, mitigation, monitoring, planning, and assessment as they apply in a restoration context. Students will work in local restoration projects; field trips required.

Field trip(s) may be required.

ENVS 158. Wetlands Ecology. 3 Units
Introduces and discusses characteristics of wetland systems; principles of wetland ecology; functions of wetlands; and regulations and permitting process regarding development near and within wetlands. Appropriate for students planning careers in natural resource management. Though not a substitute for professional training in wetlands delineation and functional assessment, students will gain a basis for such assessments. Familiarity with basic principles of chemistry, physics, and biology recommended.

Note: Field trips required.

ENVS 163. Ethnoecology. 3 Units
Prerequisite(s): Instructor permission.
Evaluates sustainable management of ecosystems by local indigenous people, using traditional resource management, traditional ecological knowledge and Western science. Familiarizes students with the fields of ethnobiology, ethnoecology, and historical ecology. Students learn about the relationship between people and plants, with a focus on how traditional plant knowledge reflects and is reflected by environmental perceptions.

ENVS 165. American Environmental History. 3 Units
General Education Area/Graduation Requirement: GE AREA D
Traces the development of the changing relationship between human society and the natural environment. Focuses on changing attitudes and behaviors toward the environment from the pre-colonial era through the present. Also examines the relationship between industrialization and the technological revolution and nature and examine past and present conservation and environmental movements. Cross Listed: HIST 165; only one may be counted for credit.

ENVS 171. Environmental Politics and Policy. 3 Units
Prerequisite(s): instructor permission.
Politics of human interaction with land, air and water. Political analysis of agenda setting, policy formation and administration (national, state and local) of environmental programs. Focus on contemporary issues such as energy alternatives, management of toxics, land development, and pollution control. Course also substitutes for ENVS 128. Cross Listed: GOVT 171; only one may be counted for credit.

ENVS 175. Aquatic Pollution Assessment. 3 Units
Prerequisite(s): BIO 160, CHEM 1A or concurrent enrollment; or instructor permission.
Examines both the negative and positive impacts that anthropogenic effects have on groundwater, streams, and lakes by utilizing the application of field sampling techniques and laboratory analysis currently used to assess pollution impacts. Introduces the interrelationships among plants, animals and environmental factors within polluted aquatic ecosystems. Emphasizes laboratory and field procedures used in strategies taken to assess and manage these impacts.

Note: Course also substitutes for ENVS 121. Cross Listed: BIO 175; only one may be counted for credit.
ENVS 186B. Ecological and Environmental Issues Seminar. 1 Unit
Prerequisite(s): BIO 10 or both BIO 1 and BIO 2.
Series of at least 10 seminars in ecological and environmental issues. Topics with each seminar will vary each semester.
Note: May be repeated for credit. No more than one unit of ENVS 186B may be counted toward the upper division major requirement. Cross Listed: BIO 186B; only one may be counted for credit.

ENVS 187. Environmental Studies Seminar. 1 Unit
Students will participate in the semester-long University seminar and will be exposed to a variety of environmental issues and topics presented by speakers from CSUS, the USGS, government and professional organizations, among many others. Topics include issues such as climate change, water use and conversation, environmental sustainability, environmental policy and decision-making, and many important regional issues.

ENVS 189. Special Problems. 1 - 3 Units
Individual projects or directed reading.
Note: Open only to students who are competent to carry on individual work. Admission requires permission of the Director and the faculty member who will direct the work.

ENVS 190. Senior Thesis. 3 Units
Prerequisite(s): Instructor permission and completion of all lower and upper division Environmental Studies courses.
Explores an environmental problem or issue in great depth. It includes a detailed review of the scientific literature, synthesis, and integration of information from the literature, and evaluation of the information leading to conclusions and recommendations that address the problem or issue. Thesis subjects are chosen by the student, and can be from a myriad perspectives addressed in the Environmental Studies curriculum including scientific, social, political, economic, and cultural issues.

ENVS 195. Environmental Studies Internship. 3 Units
Supervised work experience in an approved legislative or administrative office at some level of local, state or federal government, or in a public or private organization that is concerned with the environment. Supervision is provided by the faculty instructor and responsible officials in the work situation.
Note: Open to majors only, subject to instructor permission.

ENVS 195M. Mini Internship. 1 Unit
This introductory work experience is designed for sophomores and juniors. The student must complete 45 hours of environmentally related work in a volunteer position with an environmental organization or participation in an environmentally focused event. Supervision is provided by the faculty instructor and responsible officials in the work situation.
Note: Open to majors only, subject to instructor permission.

ENVS 196. Youth Recreation in Camp Settings. 3 Units
This course examines camp programs in a wide variety of settings, for a variety of populations. Topics cover camp theories, camp management, risk-management, activity planning, inclusive programming, and staff training. Includes emphasis on leadership, supervision, and organizational development of camp programs. Course uses lecture, field experiences, guest speakers, and service learning.