# Department of Environmental Studies and Sciences

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The Department of Environmental Studies and Sciences (ESS) offers interdisciplinary programs of study leading to a bachelor of science in environmental science or environmental studies. A minor in environmental studies is also available. These programs provide students with the intellectual foundation they will need in addressing crucial environmental challenges of the 21st century such as human population growth, urban development, food and agricultural systems, deforestation, global climate change, waste disposal, air and water pollution, loss of biodiversity, and the need for renewable energy.

ESS programs are enriched by colloquia featuring presentations on environmental topics by scholars and practitioners. Majors in ESS are expected to apply their knowledge outside the classroom by completing an approved internship or research experience. During their senior year, ESS students conduct research or an interdisciplinary group project with community stakeholders in ENVS 101 (Capstone Seminar).

ESS students are encouraged to study abroad. Courses such as ENVS 144 (Natural History of Baja L&L) include one week of immersion travel during University academic year breaks. Some summer and academic year courses taken through approved study abroad programs will count toward the requirements of the environmental studies and sciences majors and minors.

Each student works with a faculty advisor, who helps integrate the classroom curriculum with the student’s plans for future study and/or work in environmental fields.

## Requirements for the Majors

**Major in Environmental Science**

In addition to fulfilling undergraduate Core Curriculum and College of Arts and Sciences requirements for the bachelor of science degree, students majoring in environmental science must complete the following departmental requirements:

* ENVS 21, 22, 23
* MATH 11 or MATH 35
* CHEM 11, 12, 31
* ENVS 79 or PHIL 29
* ENVS 100, 101, 122, 198
* ENVS 110/BIOL 160
* ENVS 116 or CENG 160
* One selection from the following course series: BIOL 1A, 1B, 1C or PHYS 11, 12, 13 (PHYS 31, 32, 33 can be substituted)
* One selection from approved upper-division social science courses
* Six upper-division environmental science courses from the following categories. At least three must be lab courses:
  + At least two courses from the approved list of applied biology courses
  + At least two courses from the list of approved physical sciences courses
  + Up to two courses from the approved electives list
* Attend 10 approved Environmental Studies and Sciences environmental colloquia
* All students must complete a 100-hour internship

**Major in Environmental Studies**

In addition to fulfilling undergraduate Core Curriculum and College of Arts and Sciences requirements for the bachelor of science degree, students majoring in environmental studies must complete the following departmental requirements:

* ENVS 21, 22, 23,
* ANTH 50/ENVS 50
* ENVS 79 or PHIL 29
* ENVS 100, 101, 122, 198
* One selection from approved statistics courses
* ENVS 111
* ENVS 116 or CENG 160
* One selection from approved upper-division natural science lab courses
* Five upper-division science courses from the following categories:
  + Select three-five classes from those offered in the Department of Environmental Studies and Sciences
  + Select up to two classes from outside the Department
* Attend 10 approved Environmental Studies and Sciences environmental colloquia
* All students must complete a 100-hour internship

## Requirements for the Minor

**Minor in Environmental Studies**

Students must fulfill the following requirements for a minor in environmental studies:

* ENVS 21, 22, 23
* One from approved methods courses
* One selection from approved social, political and legal perspectives courses
* One selection from ethical or spiritual dimensions courses

Three additional courses from approved electives. Attend six approved Environmental Studies and Sciences environmental colloquia.

### Lower-Division Courses: Environmental Studies and Sciences

### 1A. and 2A. Critical Thinking & Writing I and II

A two-course themed sequence featuring study and practice of academic discourse, with emphasis on critical reading and writing, composing processes, and rhetorical situation. The second course will feature more advanced study and practice of academic discourse, with additional emphasis on information literacy and skills related to developing and organizing longer and more complex documents. Topics may include the rhetoric surrounding current environmental issues, and environmental criticism with a variety of media. Successful completion of CTW I (ENVS 1A) is a prerequisite for CTW II (ENVS 2A). (4 units each quarter)

### 5. My Environment

What is the environment and how do I interact with it? This course explores fundamental questions about our relationship with the natural world centered around five themes: My Earth, My Water, My Food, My Pollution and My Climate. Through assignments and labs, students gain experience in geological reasoning and interpretation; groundwater and surface water resource management; ecological footprinting; air pollution impacts; and more. Laboratory 15 hours. (4 units)

### 11A. and 12A. Cultures & Ideas I and II

A two-course sequence focusing on a major theme in human experience and culture over a significant period of time. Courses emphasize either broad global interconnections or the construction of Western culture in its global context. Themes may include nature, imagination, and environment in myth, art, literature, music, drama, story, philosophy, and sacred text. Successful completion of C&I I (ENVS 11A) is a prerequisite for C&I II (ENVS 12A). (4 units each quarter)

### 20. The Water Wars of California L&L

This course will use the history of water resource use and abuse in the state of California as a backdrop for investigating the interplay of hydrology, climate, and human population growth. Students will examine factors that affect the supply, distribution, demand, and quality of fresh water in the state of California. The important roles of climatic processes, variability, and global climate change will be highlighted, and population pressures on water resources will be analyzed. Concepts will be reinforced by field projects and through comparative case studies from California and beyond. Laboratory 15 hours. (4 units)

### 21. Environmental Biology L&L

In this course, students will gain an understanding of how humans are affecting life on Earth. We will explore the principles of evolution and ecology in contexts ranging from agriculture and forestry, to pollution mitigation and public health. Lecture and laboratory exercises will prepare students for upper-division science courses required for the Environmental Science and Environmental Studies major or minor. Laboratory 30 hours. Saturday field trip may be required. (5 units)

### 22. Introduction to Environmental Studies

This course presents environmental studies as an interdisciplinary academic field focused on society-nature relations. In part one, we examine population, markets, institutions, ethics, hazards, political economy, and social construction as core social science perspectives. Part two uses these approaches to explain nature-society puzzles related to agriculture, food, energy, climate change, biodiversity, forests, oceans, and land use change. In each of these cases, we focus on specific objects and their context (e.g., tuna in the Pacific Ocean or redwood trees in Northern California), as we analyze human-environment interdependence, and assess the complex causes, consequences, and potential responses to change processes occurring at the local, national, and global scales. We will also consider the personal and collective dimensions of social change through environmental civic engagement. (4 units)

### 23. Introduction to Earth Systems L&L

This course will investigate the workings and complexities of the Earth system, including the interactions, synergies, and feedbacks that link the geologic, oceanic, hydrologic, and climate system. Building on basic physical and chemical principles, students will study how continents, soils, oceans, freshwater reservoirs, and the atmosphere formed, which processes are taking place to change them, and how they are affected by human action. Understanding of the concepts will be deepened by laboratory activities and a field trip. Laboratory 30 hours. (5 units)

### 50. World Geography

Provides an understanding of world geography through an appreciation of contemporary global problems in different world regions. Broad topics that will be covered include globalization, demographic trends, economic development and underdevelopment, human-environment interactions, changing cultures, and geopolitics. These topics will illustrate the distribution of political, cultural, socioeconomic, and physical processes and features around the world and will be covered at local, regional, and global scales. Also listed as ANTH 50. (4 units)

### 79. Environmental Thought

Using an ecocritical approach, this course examines primary and secondary sources related to the evolution of environmental thought in modern times. The work of seminal thinkers from within the conservation movement, environmental philosophy, and environmental sciences will be explored, as well as the social and economic influences in post-World War II America that created the modern environmental movement. (4 units)

### 80. Energy and the Environment

From oil spills to coal mine accidents, from foreign policy impacts to climate change, energy has been a top news story. This course explores the basics of traditional fossil fuel energy production and alternative energy sources including natural gas, nuclear, biomass, wind, solar, hydropower, and fuel cells. Students will explore the energy demands of the United States relative to other countries and seek to piece together the multifaceted puzzle of energy production, storage, and transmission, as well as conservation and efficiency. Students will gain an understanding of the vast array of societal and environmental impacts of our energy demands, while defining opportunities and challenges for the future. (4 units)

### 95. Sustainability 101

This course provides you with credit for participating in efforts at Santa Clara University to heighten awareness of sustainability; engage actively in opportunities that pursue the university’s sustainable mission; and reflect on experiences. (2 units)

### Upper-Division Courses: Environmental Studies and Sciences

### 100. Introduction to Capstone

This class will bridge the internship and capstone experience. The first part of the class will

focus on the internship and professional development, including a reflection and analysis of experiences and organizations, documentation of learning, and forward-looking vocational discernment. The second part will help students prepare for their winter quarter capstone experiences, through identifying appropriate methods, creating a proposal of work to be done winter quarter, and submitting projects for human subjects approval. (2 units)

### 101. Capstone Seminar

A guided group and individual research course that each year is aimed at tackling a wide range of environmental issues for a sustainable Silicon Valley. Most students work in groups as consultants for local stakeholders on a wide range of interdisciplinary projects, ranging from a proposal to expand bus rapid transit, determining wildlife mitigation corridors, and determining regulatory recommendations on greywater disposal, to assessing green space access and social equity. Individual capstone projects under faculty mentorship are also possible. Students develop project management skills, write individual and group papers, and present their research findings at a poster session for ESS faculty and community stakeholders at the end of the quarter. Some students pursue their research after the course, even to the point of publication. Prerequisites: Senior class standing; ENVS 21, 22, and 23; and ENVS 110, or 116. (5 units)

### 110. Environmental Statistics L&L

A course in applied statistics for environmental researchers. Students gain training in sampling, experimental design, survey design, quantitative analysis, and hypothesis testing. Theory and concepts are covered in lectures and readings. Laboratory sessions provide practical experience using statistical software. Examples used in lectures and lab assignments are derived from the fields of biology, public health, and environmental studies and sciences. Laboratory 30 hours. Also listed as BIOL 160. Prerequisite: BIOL 1C or BIOL 25 or ENVS 21. (5 units)

### 111. Mixed Methods for the Environment

This project-based will introduce and develop skills for the conduct of qualitative environmental research, drawing from several social science approaches, especially ethnography, participant observation, focus groups, interviews, and surveys. Students will learn strategies for conducting effective literature reviews and learn how to conduct interviews, write field notes, and be effective participant observers. (5 units)

### 116. Introduction to GIS

Spatial analysis helps to address critical questions in the environmental field, such as whether environmental burdens are disproportionately affecting disadvantaged communities or where habitat conservation measures might be most effective. Geographic Information Systems (GIS) can be used to overlay different kinds of spatial data for mapping and analysis. The class will use a project-based approach to generating, querying, analyzing, and displaying GIS data utilizing industry standard software. Prerequisite: ENVS 21 or 23 recommended. (5 units)

### 117. Intermediate GIS

This course is focused on using spatial analysis to solve urban and environmental problems. We use R and RStudio, along with other open source tools. We also explore spatial data in augmented reality (AR) and virtual reality (VR). The course includes a strong emphasis on data management, including acquiring, cleaning, and visualizing data. You will be introduced to new spatial analysis techniques, and will have the opportunity to apply these techniques through labs, homework assignments, and a final project. Given the importance of replication in science, you will also create and document code that may be useful for other researchers.Prerequisite: ENVS 116. (5 units)

### 120. Introduction to Environmental Law and Regulation in the United States

Introduction to the U.S. legal system’s approach to environmental protection. Topics include the roles of legislatures and environmental agencies at the federal, state, and local levels; the independent role of the judiciary in establishing environmental law; and specific statutes such as the Clean Air Act. Students evaluate questions of federalism, uses of economic incentives, and relationships between environmental protection and economic growth. Prerequisite: ENVS 22 recommended. (5 units)

### 122. Environmental Politics and Policy

This course analyzes environmental governance in the last half century and focuses on the social dimensions and impacts of policy change. Part one introduces environmental politics and policymaking processes in the context of history, different justifications, and competing interests and values. Part two compares regulatory approaches and policy tools, as we examine key pieces of environmental legislation in the United States, including the Clean Air, Clean Water, National Environmental Policy, and Endangered Species Acts. This section focuses on air pollution; climate policy and waste; addressing issues of local, state, and national regulations; environmental justice; scientific uncertainty; representation; and the politics of policy change. Part three examines the rise of sustainability agendas, highlighting the roles of civil society and corporate firms. A concluding discussion explores how civic engagement and innovations could accelerate transitions towards a greener economy. Students compose policy memos, participate in debates, and collaborate with their peers in a team-based role-playing simulation game. Also listed as POLI 157. Prerequisite: ENVS 22 or ENVS 79 or POLI 1. (5 units)

### 124. Water Law and Policy

Introduction to the legal and regulatory concepts related to water. Examines rights, policies, and laws, including issues related to water supply and access (water transfers/water markets, riparian and appropriative doctrines), flood control, water pollution and quality (the Clean Water Act, EPA standards, instream flows for fish), and on-site stormwater management/flood control. A focus on California water law and policy is complemented with some national and international case studies. Also listed as CENG 124. Prerequisite: ENVS 22 recommended. (5 units)

### 128. Urban and Environmental Planning

This course uses the lens of sustainability to examine major issues in land use, transportation, housing, economic development, public health, environmental planning and restoration, environmental justice, and public participation. In an age of climate change and rising economic inequality, students in this course will critically evaluate the role of urban planning in solving or sometimes exacerbating these kinds of incredible challenges. In doing so, this course will also offer students the opportunity to engage with real-world planning issues in the Bay Area and beyond. (5 units)

### 131. Environmental Education

Environmental education plays a fundamental role in our attempts to make human systems more sustainable. An introduction to the study and practice of environmental education. Surveys philosophies, theories, and methods of environmental education with a special emphasis on techniques for engaging K–12 students in outdoor settings to maximize learning of environmental concepts and to improve the students’ understanding of their personal connections to nature. Introduces creative ways that we as current or future teachers, parents, or mentors can use active study of and interactions with the outdoor environment to engage young people in the study of environmental systems and basic biological, chemical, and physical sciences. A portion of the course will be taught in field-based settings. Students will participate in service-learning projects that will give them practical experience planning and leading environmental education lessons. Especially valuable for future teachers. Prerequisite: ENVS 21, 22, 23, or BIOL 1C. (5 units)

### 132. Agroecology L&L

The goal of agroecology is to reduce the negative impact of farming while meeting the food needs of the world. Examines in a holistic framework the ecological principles and processes that govern agroecosystem productivity and stability. A wide variety of agricultural management practices and designs are assessed and discussed in terms of their capacity to sustain long-term production. Students will also learn research methods that explore the resilience and sustainability of agroecosystems. One required weekend field trip. Laboratory 30 hours. Prerequisite: BIOL 1C, or both ENVS 21 and 23. (5 units)

### 136. Food, Culture, and the Environment

Exploration of the history and impact that food choices have made on human societies and the environment. Several foods that have become staples in the world today, like sugar, pepper, and various grains, have significantly affected the environment, patterns of land use, economy (both local and global), cuisine, and the meaning of meals and food sharing. Class topics illustrate how food choices shape cultural groups and interaction, as well as how they shape environmental change. Also listed as ANTH 140. (5 units)

### 137. Historical Ecology

Historical ecology investigates the historical relationships between cultures and their environments. Students are introduced to methods used to reconstruct past environments. They draw on these, as well as historical documents, maps, and land use information, to learn how to reconstruct the historical ecology of the Santa Clara Valley. Also listed as ANTH 145. (5 units)

### 141. Environmental Biology in the Tropics

This summer course examines tropical biology and ecology and their relationship to issues of sustainable development. The course includes 1.5 weeks of instruction at SCU and 3.5 weeks of field study in Costa Rica. Particular emphasis on tropical ecology, community ecology, reforestation and restoration ecology, sustainable agriculture and fair trade, and ecotourism. Taught in conjunction with ANTH 197. Enrollment by application via International Programs. Prerequisite: ANTH 1 or BIOL 1C or ENVS 21. (5 units)

### 143. Advanced Writing for the Environment

This course examines a current topic in environmental humanities. It also satisfies the advanced writing requirement for the University Core. (5 units)

### 144. Natural History of Baja L&L

Examines the natural history of Baja California Sur, with emphasis on the taxonomy of marine and terrestrial organisms, the ecology of desert and coastal ecosystems, and the biogeography of the peninsula. Meets twice a week in winter quarter and culminates in a 10-day spring break trip to the Sierra de la Laguna region and the Isla Espiritu Santo complex. Students will become familiar with desert, riparian, beach, mangrove, and rocky intertidal habitats, develop field observation and species identification skills, and explore local conservation challenges. Laboratory 30 hours. Prerequisites: BIOL 1C or ENVS 21 or permission of instructor. Enrollment by application only. Travel fees required. Also listed as BIOL 144. (5 units)

### 145. Environmental Technology

A survey course covering a variety of environmentally conscious technologies. Addresses “bleeding edge” as well as more traditional technologies that enhance both human welfare and environmental quality in both the developed and developing countries. Students will concentrate on environmentally conscious technologies used in the general areas of air quality, biotic systems, climate, energy, land, population, transportation, waste, and water. Prerequisite: ENVS 23 or by permission of instructor. (5 units)

### 146. Agriculture, Environment, and Development: Latin America

Offers a cross-disciplinary examination of the prospects for “sustainable development” in rural areas of Latin America. Students will use diverse points of view to look at interactions between poverty, development, and environmental degradation. While there is no single, universally accepted definition of sustainable development, a central goal of this course is that each student will come away with the ability to understand the key elements that distinguish different discourses on this subject. Prerequisite: ENVS 22 recommended. (5 units)

### 147. International Environment and Development

Examines the intersection of environment and development in the developing world. Students will explore meanings and measures of development as well as international institutions that influence development and environmental policy. Conceptual frameworks for addressing human-environmental relationships, including globalization, famine and hunger, sustainable development, population-poverty interactions, and gender will be explored. Specific topics to be covered include deforestation, water use, conservation and development, oil extraction, and urbanization. Prerequisite: ENVS 22 or by permission of instructor. (5 units)

### 148. Solar Revolution

Solar energy is more than just photovoltaic (PV) arrays on a roof. Learn about different types of PV technologies as well as passive solar design, and concentrated solar thermal (making power at the level of a conventional power plant!). Find out the key technological, environmental, and economic issues, and what it would take to employ solar energy to greatly decrease our reliability on fossil fuels. Students will use the United States as well as numerous examples in developed and developing countries as case studies. Prerequisite: ENVS 21, 22, 23, or 80. (5 units)

### 149. African Environment and Development

Students will gain an in-depth understanding of Africa’s diversity and dynamism, considering how people and environments have interacted through space and time. We will examine Africa’s social, cultural, economic, political, and environmental systems to understand Africa’s trajectory of development. Also listed as POLI 146. (5 units)

### 150. Political Ecology

Explores political ecology as a field of study and as a critical tool to analyze environmental issues. Focuses on going beyond simplified explanations about environmental problems, tracing environmental change to broader political, economic, and cultural issues. Topics explored will include land degradation, conservation through parks and reserves, land use conflicts, science and power, social movements, urban pollution, and public health. Course readings include case studies from across the globe to examine how political ecology research engages issues and how it offers critical insights needed to address environmental problems. Challenges students to critically examine their own interpretations and understandings of today’s most important environmental issues. Prerequisite: ENVS 22 or by permission of instructor. (5 units)

### 151. Restoration Ecology L&L

The science and practice of restoring degraded ecosystems, from tidal marshes to coral reefs, with an emphasis on California habitats and local management challenges. Students will develop skills in reading scientific literature, interpreting data, and taking field measurements. Students will learn how to monitor the success of restoration projects at meeting the goals of biodiversity and ecosystem function. Laboratory and fieldwork 30 hours. Saturday field trip may be required. Also listed as BIOL 151. Prerequisite: BIOL 1C or both ENVS 21 and ENVS 23. (5 units)

### 153. Conservation Science

Conservation is a scientific enterprise and a social movement that seeks to protect nature, including Earth’s animals, plants, and ecosystems. Conservation science applies principles from ecology, population genetics, economics, political science, and other natural and social sciences to manage and protect the natural world. Conservation is all too often seen as being at odds with human well-being and economic development. This course explores the scientific foundations of conservation while highlighting strategies to better connect conservation with the needs of a growing human population. We will examine whether conservation can protect nature, not from people, but for people. Also listed as BIOL 153. Prerequisite: BIOL 1C, or both ENVS 21 and 23. (5 units)

### 155. Environmental and Food Justice

This course unites two vibrant fields for academic study and arenas for social, political, and ecological action. Environmental justice as a principle affirms the right of all people to healthy livable communities. Environmental injustice occurs when environmental benefits and burdens are unevenly distributed along the lines of identity, including race, class, and/or nationality. Food justice research addresses inequalities in food access and studies the patterns, causes, and solutions associated with increasing hunger and obesity among eaters and the accumulation of environmental costs in agricultural landscapes. After reviewing several seminal studies in environmental and food justice, this class delves into case studies in California and Central America. Learners will conduct a major research project, participate in team-based collaborations, and engage local communities as part of this course. Prerequisite: ENVS 22 or 79. (5 units)

### 156. General Ecology L&L

Quantitative study of the interrelationships of organisms with their biotic and abiotic environments. Emphasis on population dynamics, interspecific relationships, community structure, and ecosystem processes. Laboratory and field work 30 hours, including one weekend field trip. Also listed as BIOL 156. Prerequisites: BIOL 1C. (5 units)

**157. Conservation Biology L & L**

Explores the applications of ecological and genetic principles to the conservation of biological diversity. Emphasis on quantitative tools, including trend analysis, population viability analysis, and population genetics. Laboratory and fieldwork involve exercises with local plants and animals, as well as computer exercises using data for endangered species. Laboratory and field work 30 hours. Prerequisite: BIOL 1C. Also listed as BIOL 150. (5 units)

### 160. Water Resources L&L

This course covers fundamental concepts in hydrology and water resources management such as precipitation, runoff, and infiltration, flow in streams and aquifers, floods and droughts, water budgets, water delivery systems and stream restoration, water cycling, use, treatment, pollution, and conservation. Interactions between water and human societies, ecosystems, agriculture, natural resources, and climate are explored through domestic and international case studies. Course concepts are reinforced through indoor and outdoor class and laboratory exercises and field trips. Laboratory 30 hours. Prerequisite: ENVS 21 or 23, or by permission of instructor. (5 units)

### 161. Water Security

UN millennium development goals include access to safe drinking water and basic sanitation for all people, yet in many places those have remained an elusive goal. Water security invokes the idea of risk, but also of action, and resonates with governments, managers, academics, donors, activists, and organizations. In this course we will analyze frameworks and approaches to water security. Through critical evaluation of the recent literature and principles from the fields of environmental science and studies, students will gain perspectives on barriers and solutions to safeguarding access to adequate quantities of acceptable quality water for sustaining livelihoods, ecosystems, and human well-being. This class satisfies the requirements for an upper division elective in the environmental sciences, a natural science elective for environmental studies majors, and an advanced writing course for the University Core. (5 units)

### 166. Climate Change: Past to Future L&L

Human-caused changes to the climate system are now widely accepted and expected to have great effects on physical, biological, and human systems from sea level rise to human disease, ocean acidification and mass extinction. We will explore climate change in three broad units: (1) foundational aspects of the climate system such as Earth’s energy balance, greenhouse effect, carbon cycle, and circulation of the oceans and atmosphere; (2) evolution of the climate system throughout Earth’s history; and (3) impacts, vulnerabilities, and solutions for modern climate change. Students will model Earth’s energy balance, examine Earth’s carbon and water cycles in the field and lab, experimentally determine sea level rise with water isotopes, and use climate models to predict future changes. Lectures and discussions of current scientific literature and government documents will be motivated by student interest. Laboratory 30 hours. (5 units)

### 185. Garbology

This class follows the path of our waste products as they are landfilled, burned, treated, recycled, reused, dumped on minority communities, or shipped abroad. Building on basic chemical and biological principles, we explore the ultimate fate of organic and inorganic waste. We look to the past and to other societies to better understand how we got to this throw-away society and what we can learn from past practices and other cultures. We explore sustainable solutions including new efforts to reduce our waste such as “extended producer responsibility,” design-for-disassembly, green chemistry, and zero waste. Students will also learn how to utilize the “life cycle analysis” approach as a basis for those daily decisions such as paper versus plastic. Prerequisite: ENVS 23. (5 units)

### 195. Sustainable Living Undergraduate Research Project (SLURP)

This two-quarter research-based course is designed to promote a culture of sustainability at Santa Clara University and also fulfills the ESS internship requirement. Students engage in intensive research over the course of winter and spring quarters on projects to support SCU’s Center for Sustainability’s Sustainability Strategic Plan. (2 units in each of two academic quarters)

### 196. Special Topics in Environmental Studies

Course content and topics vary depending on the professor. (Variable units)

### 197. Special Topics in Environmental Science

Course content and topics vary depending on the professor. (Variable units)

### 198. Environmental Proseminar

A seminar course primarily for sophomores intended to permit reflection about vocation; develop skills at an internship or through research experience; and foster the further development of professional skills. Students are graded P/NP only. (2 units)

### 199. Directed Reading or Research

Students who want to enroll in 199A or 199B should meet with the faculty supervisor no later than the fifth week of the term preceding the start of the project. Prerequisite: A written description of the proposed project must be presented to the department chair for approval. (1–5 units)

### 199A. Directed Reading in Environmental Science or Environmental Studies

Detailed investigation based on directed readings on advanced environmental topics, under the close supervision of a faculty member. Prerequisite: Permission of department chair and instructor before registration. (1–5 units)

### 199B. Directed Environmental Research

Supervised laboratory, field, or other research under the guidance of a faculty member. The goal should be a written report suitable for publication or a conference presentation. Prerequisite: Permission of department chair and instructor before registration. (1–5 units)