

# ENVIRONMENTAL STUDIES AND PLANNING

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## DEPARTMENT OFFICE

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## ADMINISTRATIVE COORDINATOR

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Steven C. Orlick / Planning  
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Alexandra von Meier / Energy Management and Design  
Laura Watt / Conservation and Restoration

## Programs Offered

- Bachelor of Arts in Environmental Studies
  - General Major (several study plans)
  - Planning concentration  
(community and environmental planning study plan)
- Bachelor of Science in Environmental Studies
  - Environmental Technology study plans
- Minor in Environmental Studies and Planning
- Elementary Teacher Credential Subject Matter Preparation in Environmental Studies
- Green Building Professional Certificate
- Double Major with Economics

Dedicated to producing environmental problem solvers, the Department of Environmental Studies and Planning offers a distinctive program of interdisciplinary study. Students and faculty work together to develop an understanding of environmental "sustainability" in all its dimensions. The program addresses current environmental concerns that have far-reaching implications for human society, natural systems, and the fate of diverse species of plants and animals. This involves an integration of knowledge from a variety of disciplines to understand the functioning of ecological systems and the nature of human impact upon these systems at local, regional, and global scales. The department's two goals are: to prepare students for careers in the environmental professions, for graduate studies, and for positive action in their own lives; and to promote ecological literacy in order to help maintain and enhance the quality of the human and natural environments.

All students receive fundamental instruction related to ecology and the environment based on knowledge from the biological, physical, and social sciences and the humanities. This broad understanding is applied in a particular area of environmental concern through a student's concentration in one of the ENSP study plans. Career-oriented study plans are offered in environmental conservation and restoration, energy management and design, hazardous materials and water quality, environmental education and outdoor leadership, and city and regional planning. These study plans are described below. Many students pursue double majors, or a major and minor, in conjunction with traditional disciplines to prepare for specific environmental-related careers.

All students complete a senior project or internship.

## Admission Requirements

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When applying to Sonoma State University, a student may declare a major in environmental studies and planning. A student considering this major should make an appointment to see a faculty member for academic advising. (Students seeking financial aid to assist them in their studies should contact the financial aid office. Several scholarships are provided specifically for ENSP students through the University scholarship program; please refer to the Scholarships section of this catalog.)

## Advisory Plans for the Freshman and Sophomore Years

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In fulfilling their general education requirements, students who intend to major in environmental studies and planning should select courses that will also meet the prerequisites for their intended study plans. Required and recommended prerequisites for study plans may be obtained by contacting the department office.

A broadly based program of lower-division work in the liberal arts and sciences is generally sufficient to meet the requirements for the B.A. degree. This program should include at least one course in biology; one in geology, chemistry, or physics; one in philosophy; and two or more in the social sciences, including a course in introductory economics (either microeconomics or macroeconomics is recommended). Additional course work is required for certain study plans.

## Bachelor of Arts in Environmental Studies

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Degree Requirements	Units
General education	51
Major requirements	36-53
General electives	26-33
<b>Total units needed for graduation</b>	<b>120</b>

### Course Requirements for the B.A. Degree

Courses required for the major must be taken for a traditional letter grade, except for courses that are offered Cr/NC only.

#### Courses required for most B.A. study plans:

ENSP 200* Global Environmental Issues	3
ENSP 201 Environmental Forum	1
ENSP 301 The Human Environment	3-4
ENSP 302 The Biological Environment	3-4
ENSP 303 The Physical Environment	3-4
ENSP 499 Internship	4

#### And one of the three following courses selected according to advisory plan:

ENSP 310 Introduction to Planning (3)	
ENSP 330 Energy, Technology, and Society (4)	
ENSP 440 Education and the Environment (3)	
<b>Total units basic courses</b>	<b>21-24</b>

and 16-33 additional units as determined by the study plan.  
At least 24 units of ENSP course work is required for the B.A. degree.

### Bachelor of Science in Environmental Studies

Available for environmental technology study plan only.

Degree Requirements	Units
General education	51
Natural science support courses	32-34
Major requirements	22-35
General electives	10-15
<b>Total units needed for graduation</b>	<b>120</b>

### Course Requirements for the B.S. degree

Courses required for the major must be taken for a traditional letter grade, except for courses that are offered on a Cr/NC only basis.

CS 101 Introduction to Computers and Computing	3
CHEM 115A* General Chemistry	5
CHEM 115B* General Chemistry	5
ENSP 200* Global Environmental Issues	3
ENSP 201 Environmental Forum	1
ENSP 403 Computer Modeling	3
MATH 161* Calculus I	4
MATH 211S Calculus II	2
MATH 165 Elementary Statistics	4
PHYS 210A* General Physics (Algebra/Trig or Calculus-based)	3-4
PHYS 210B General Physics	3-4
<b>Total units basic courses</b>	<b>36-38</b>

and 16-33 additional units as determined by the study plan.  
At least 24 units of course work in ENSP is required for the B.S. degree.

\* Courses that meet general education requirements.

### Study Plans

In consultation with an advisor, students must complete an additional 16-33 units in one of the four study plans outlined below. Details of each plan, including specific courses and options, are available from the office of the Department of Environmental Studies

and Planning. Plans I and II lead to a B.A. degree in environmental studies. Plan III leads to a B.A. or B.S. degree in environmental studies. Plan IV leads to a B.A. degree in environmental studies with a concentration in planning.

**Total additional units in study plans** 16-33

**Total units in the major** 36-53

#### Plan I. Conservation and Restoration

An interdisciplinary science-based study plan for students who intend to pursue a career or graduate study in a variety of fields related to conservation, restoration, and management of habitats, ecosystems, and biological resources. Under the plan, students combine a broad-based Environmental Studies education with in-depth work in a particular area of interest, giving them a specific area of expertise within the broader field of environmental conservation. Electives in the plan are organized to facilitate a double major or minor in biology or geography, which is strongly encouraged.

#### Plan II. Environmental Education

This track in environmental education is designed as a Subject Matter Preparation Program, approved by the California Commission on Teacher Credentialing, to prepare students in subject matter competency as defined by the K-8 Academic Standards of California. This track is excellent preparation for passing of the California Subject Examination for Teachers as well as for careers in outdoor leadership and education.

#### Plan III. Environmental Technology (B.A. and B.S. degree options)

There are two tracks in this study plan: 1) energy management and design, 2) hazardous materials management and water quality.

##### Energy Management and Design

Designed to prepare students for careers or for graduate studies in the fields of residential and commercial energy management, energy-efficient architecture and design, energy planning in industry and government, renewable energy applications, and other energy-related businesses.

##### Hazardous Materials and Water Quality

This program prepares students for employment in environmental enforcement agencies, large private corporations, engineering firms which serve the public and private sectors, and in public action agencies which provide water or treat wastewater. Some of these agencies and firms are very small and rural, others are large and urban. The course work provides a comprehensive foundation in the science of environmental quality. Our program welcomes students who are new to this field and also provides upper-division course work for students who have had previous training in community college hazardous materials and water technology programs, and gives additional training to workers already employed in water-related occupations.

## **Plan IV. Planning Concentration (City and Regional Planning)**

Students in the CSU-approved planning concentration follow a general preprofessional curriculum in planning, and may choose to develop a specialization to suit their interests through a program of recommended electives or a minor. Focus is on sustainable community planning, including land use, growth management, environmental impact assessment, transportation, and natural resource planning. Graduates may work for a wide variety of governmental agencies or private firms, or may pursue graduate studies in planning or related fields. Note: Students interested in future careers in environmental law usually follow the planning concentration.

## **Minor in Environmental Studies and Planning**

The purpose of the minor in environmental studies and planning is to help students from traditional disciplines apply their expertise to environmental and planning problems and issues. A minimum of 20 units is required. Recommended course work is normally the same 20-24 units required in most study plans, as outlined above.

## **Double Major with Economics**

The double major in economics and environmental studies and planning is intended for those students whose particular academic and career interests lie in natural resource economics, economic planning, energy management, and/or community development and redevelopment. The double major is also designed especially for students who intend to pursue graduate studies in natural resource management, urban planning, law, or related career fields.

## **Environmental Studies and Planning Courses (ENSP)**

Classes are usually offered in the semesters indicated. Please see the Schedule of Classes for most current information and faculty assignments.

### **200 GLOBAL ENVIRONMENTAL ISSUES (3) FALL, SPRING**

Lecture/discussion, 3 hours. An introduction to environmental studies and planning, including: humans in relation to the global ecosystem; an overview of problems of energy use, pollution, resource depletion, population growth, food supply, urbanization, climate change and biodiversity, and the search for solutions and future prospects. Satisfies GE, category D5 (Contemporary International Perspectives). Prerequisite or Corequisite: enrollment in ENGL 101 or PHIL 101.

### **201 ENVIRONMENTAL FORUM (1) FALL**

Regular weekly departmental lecture series. Outside professional speakers and student reports on environmental topics and opportunities for environmental action. Cr/NC only.

### **202 QUANTITATIVE METHODS IN ENVIRONMENTAL STUDIES (3) SPRING**

Lectures and workshop designed to enhance students' confidence in analytical problem solving. Essential techniques emphasizing environmental applications: translating knowledge into abstract and mathematical models, numerical estimates, basic geometry and trigonometry, dimensional analysis, unit conversions, interpreting statistical data, graphic display of information. Conceptual introduction to calculus, differential equations, and complex numbers. Prerequisite: completion or concurrent enrollment in GE math course. Cr/NC only.

### **301 THE HUMAN ENVIRONMENT (3-4) FALL, SPRING**

Human cultural adaptations in evolutionary/historical perspective. Effects of human technology and social institutions upon the natural environment. Beliefs, values, attitudes in relation to human and non-human environment. Emphasis on critical thinking and ethical implications of human ideas and behavior. Prerequisites: ENSP 200 or equivalent and junior standing.

### **302 THE BIOLOGICAL ENVIRONMENT (3-4) FALL OR SPRING**

This course explores major concepts of ecology and examines current environmental issues in light of these concepts. Topics include: relationship between organisms and the physical environment, community-level ecological processes, the structure and function of ecosystems and their distribution on the planet, evolutionary processes, and population ecology. Environmental issues include pest control, deforestation, loss of biodiversity, global climate change, and others. Development of speaking and writing skills is a significant element of the course. Field trip required. Prerequisite: ENSP 200 or permission of instructor.

### **303 THE PHYSICAL ENVIRONMENT (3-4) FALL**

A review of the field physical sciences for environmentalists. Develops an understanding of the problems and challenges in environmental control of air, water, soil, natural hazards, and nonrenewable resources by applying scientific principles to practical environmental problems. Prerequisite: completion of lower-division GE categories B1 & B3 and ENSP 200, or permission of instructor.

### **305L COMPUTER-AIDED COMMUNICATIONS IN ENVIRONMENTAL STUDIES (2) FALL AND/OR SPRING**

Designed to introduce ENSP students to theory and techniques of computer-aided environmental communication. The fundamentals of environmental communication will be addressed, demonstrated, and applied through a variety of instructional technologies. Presentation graphics, the Web, and desktop publishing are the three areas primarily addressed.

### **306 ENVIRONMENTAL ETHICS (3) FALL**

An examination of philosophical issues; concepts of extending rights to nonhuman entities of nature, and the question of humans' place in nature; logical and conceptual foundations for an environmental ethic. Prerequisite: completion of GE, area A.

### **308 ENVIRONMENTAL LITERATURE (3) SPRING**

A survey of great American environmental books, including H. D. Thoreau's *Walden*, John Muir's *Mountains of California*, and more recent works by Mary Austin, Edward Abbey, Annie Dillard, and other environmental authors. The natural, political, artistic, and historical environment of the writers, and cultural results of the environmental movement in various major periods. Prerequisite: completion of GE, category C2 (World Literature).

### **309 SOIL SCIENCE (3-4) SPRING**

An introduction to soil science emphasizing applications to agronomy, archaeology, botany, ecology, engineering, geography, geology, natural resource planning, hazardous materials management, and water quality. Technical exercises emphasize low-cost scientific analytical equipment. Prerequisite: completion of GE, area B (Natural Science and Mathematics).

### **310 INTRODUCTION TO PLANNING (3) FALL, SPRING**

An overview of land use planning and associated concerns, such as transportation, open space preservation, housing, economic development, environmental protection, urban design, and public finance. Consideration of the evolving forms and functions of cities, towns, and rural areas and society's attitudes toward development, environmental concerns, and the appropriate role of government in regulating land use. Course addresses general plans, zoning, growth management, environmental impact assessment, and the local political process relating to planning. Current trends in planning and sustainable community development.

**311 PLANNING THEORY AND METHODOLOGY (4) SPRING**

Exploration of evolving planning thought and processes as a basis for understanding planning practice. Comprehensive planning, incremental, and communicative action models. Planning and local politics. The values and ethics of the professional planner. Mediating environmental and land use disputes. Basic analytical, methodological, and communication skills utilized in urban, environmental, and business planning.

**315 ENVIRONMENTAL IMPACT REPORTING (3) FALL AND/OR SPRING**

The practice and theory of environmental impact assessment and analysis. The process of preparing environmental impact reports (EIRs) and statements (EISs) as mandated by state and federal statutes and regulations. Reviewing and commenting on environmental documents. Relationship between EIRs and comprehensive planning activities. Litigation of EIRs and environmental mediation. Prerequisite: ENSP 310 recommended.

**322 CONSERVATION BIOLOGY (4) SPRING**

Interdisciplinary investigation into biological, management, economic, and ethical issues associated with the current extinction of species. Course will cover principles and applications of ecology, population biology and genetics, biogeography, and social sciences for protection and management of biodiversity in the face of current widespread alteration of the environment. At least one field trip required. Prerequisite: ENSP 302 or BIOL 122, or permission of instructor.

**324A AGROECOLOGY (1-2) FALL**

An applied field course focuses on the study and practice of sustainable agriculture. Fall topics include soil testing, composting, seed beds for winter crops, planting green manure crops, and pest control. Environmental concerns concentrate on genetic diversity, seed saving, and decreased dependence on chemical pesticides and herbicides. Class time is divided between classroom lectures/discussions and field research/experimentation.

**324B AGROECOLOGY (1-2) SPRING**

An applied field course focuses on the study and practice of sustainable agriculture. Spring topics include composting green manure, preparation of greenhouse seed beds, pest and weed control, and spring planting in open beds. Environmental concerns concentrate on large-scale irrigation; greenhouse management; fruit, nut, and forest production; and health effects of pesticides and herbicides. Class time is divided between classroom lectures/discussions and field research/experimentation.

**326A NATIVE PLANT PROPAGATION (2) FALL**

Fall field course in applied aspects of propagation of plants native to the local area for purposes of restoration. Topics include: local native plants and plant communities; techniques for collecting, propagating, and storing native plants; and ecologically sound guidelines for collection of native plants. Experimental approaches to improve collection and propagation success are emphasized. Course provides native stock for local restoration projects. Class takes several field trips to local sites for seed collection.

**326B NATIVE PLANT PROPAGATION (1) SPRING**

Spring field course in applied aspects of propagation of plants native to the local area for purposes of restoration. Topics include: local native plants and plant communities; techniques for propagating, maintaining, and planting native plants; collecting and propagating cuttings; and ecologically sound guidelines for collection and reintroduction of native plants. Experimental approaches are emphasized. Course provides native stock for local restoration projects.

**330 ENERGY, TECHNOLOGY, AND SOCIETY (4) FALL**

Designed to assist students in understanding energy as a fundamental measure of organization, structure, and transformation in society. Principal topics include: energy history, thermodynamics, energy resources and technologies, global issues and trends, energy economics, institutions, and politics. Analysis of current energy trends and future possibilities. Lectures/discussion, student presentations, and field trips. Prerequisite: ENSP 202 recommended.

**337 THERMAL ENERGY MANAGEMENT (3-4) FALL, EVERY OTHER YEAR**

An introduction to energy management in residential and commercial buildings, focusing on space heating and cooling, and hot water. Fundamentals of heat transfer, thermal properties of building materials, building load calculations, and energy economics. Strong algebra background and PHYS 210A recommended.

**338 ELECTRICAL ENERGY MANAGEMENT (3-4) SPRING, EVERY OTHER YEAR**

An overview of energy management approaches in residential and commercial settings that involve electrical devices, including lighting, motors, and HVAC. Fundamentals of electricity, electric power delivery, and the workings of common appliances; energy economics. Strong algebra background and PHYS 210 recommended.

**345 PORTFOLIO DEVELOPMENT AND REVIEW (3) FALL**

Course designed to introduce students to critical issues in elementary education as well as conduct an initial assessment of students entering ENSP multiple subject preparation program. Assessment of student's past coursework and experience in relation to academic standards required in credential programs. Students develop portfolios of individual training and achievement. Majors only or consent of instructor. Cr/NC only. Recommended for juniors.

**350 HAZARDOUS MATERIALS MANAGEMENT (3) SPRING, EVERY OTHER YEAR**

Through lecture, discussion, and guest experts, the scope of the newly emerging field of hazardous materials management is discussed. Includes such topics as the public's right to know; environmental auditing; emergency response planning; transfer, storage, and treatment facilities; update of local and regional public agencies' activities; and career development for students.

**360 ASSISTANCE PROJECTS (1-4) FALL, SPRING**

Involvement in on-campus environmental and planning activities. Requires preapproval of activities by faculty supervisor.

**395 COMMUNITY INVOLVEMENT PROGRAM (1-4) FALL, SPRING**

Involvement in human, social, biological, or physical problems of the off-campus community. A total of 6 units may be applied toward the degree.

**399 STUDENT-INSTRUCTED COURSE (1-4)**

Topic will differ each semester.

**400 SELECTED TOPICS IN ENVIRONMENTAL STUDIES AND PLANNING (1-4)**

Intensive study of selected topics related to environmental studies and planning. Topics vary from semester to semester. May be repeated for credit with consent of instructor.

**403 COMPUTER MODELING (3) SPRING**

A practical course in simulating complex systems using digital computers and dynamic programming. The simulation language STELLA is taught. The principles examined in the course can be applied to any simulation language. Applications in land use planning, hazardous materials management, energy, water quality, environmental impact reporting, and public policy are emphasized. Prerequisites: junior standing and GE mathematics.

**404 ENVIRONMENTAL LAW (3) FALL**

Review of environmental law and regulation in the United States generally and California in particular. Overview of federal and California legal systems with emphasis on their role in environmental protection. Evolution of environmental law in the U.S., including property rights and environmental justice.

**411A PLANNING WORKSHOP (4) FALL**

The first semester of an intensive, year-long project that provides practical experience in preparation of a general (comprehensive) plan for an actual community or geographic area. The fall semester focuses on background studies and field surveys of land use, public opinion, transportation, economic base, and environmental conditions. Class fee required at time of registration. Prerequisites: ENSP 310 and 311, senior standing, and consent of instructor.

#### **411B PLANNING WORKSHOP (4) SPRING**

Continuation of ENSP 411A. Spring semester focuses on preparation of the plan, including implementation programs, following state guidelines. Public presentations of class project. Class fee is required at time of registration. Prerequisites: ENSP 411A and consent of instructor.

#### **415 LAND USE LAW (4) SPRING**

Overview of the law governing land use in California. Fundamentals of the legal system and legal analysis. Substantive law regarding planning and zoning, subdivision, development conditions, growth management, land use initiatives, vested rights, and design review. Constitutional protection of property rights. Prerequisite: ENSP 310 recommended.

#### **416 ENVIRONMENTAL PLANNING (3) FALL OR SPRING**

Review of land use planning and regulation as it relates to the protection of various natural resources and environmental systems. Course subject matter varies and may include wetlands, open space, biodiversity, endangered species, coastal resources, agricultural land, forests, land subject to flooding, multi-species habitat planning, and air quality. Regulatory tools used to ensure resource and environmental protection. Prerequisite: ENSP 310 recommended.

#### **417 URBAN DESIGN (3) FALL, EVERY OTHER YEAR**

An exploration of the creative process of deliberate design of the physical and visual form of urban communities. The appearance and aesthetic qualities of public open spaces, streets, buildings, neighborhoods, city gateways, signs, and other elements of the urban scene. Creating a sense of place. The effects of public policy and regulations on urban form. The scale, pattern, and image of urban form elements. Planning for new communities, historic preservation, urban plazas, and public art. Prerequisite: ENSP 310 is recommended.

#### **418 PLANNING FOR SUSTAINABLE COMMUNITIES (3) FALL OR SPRING**

Sustainability as a concept in environmental and land use planning. Definitions and models of sustainability. Evaluation of sustainable development on global, national, regional, and local levels. Practical experience with city and county planning for sustainability. Prerequisite: ENSP 310 recommended.

#### **419 TRANSPORTATION PLANNING (3) FALL, EVERY OTHER YEAR**

Theory, methods, and tools related to the systematic analysis of city, regional, and rural transportation problems. The focus is on fundamental land use and transportation interrelationships. Transportation as an integrated system composed of automobiles, public transit, bicycles, and pedestrian travel modes. Level of service and traffic impact assessment. Congestion management, energy conservation, sustainability, and environmental impact considerations. Prerequisite: ENSP 310 recommended.

#### **421 SEMINAR ON RESOURCE ISSUES OF THE AMERICAN WEST (1-2) SPRING**

Interdisciplinary seminar addressing ecological, historical, cultural, social, and policy aspects of a different regional resource issue. Examples of topics are forestry, livestock grazing, and mining on public lands. Students will read and discuss material from diverse sources and achieve broad understanding of an issue, allowing them to constructively participate in the ongoing policy debate. This course is the prerequisite for the summer field course, ENSP 422. Applies to ENSP Environmental Conservation and Restoration upper division course requirements. Course may be repeated for credit. Prerequisite: ENSP 200 or consent of instructor.

#### **422 INTERDISCIPLINARY FIELD STUDY OF RESOURCE ISSUES OF THE AMERICAN WEST (2-3) SUMMER**

Field class addressing subject of most recent ENSP 421 class (see above). Course is held at a field location in California or elsewhere in the Western U.S. Students will observe resource use on-site, conduct field studies to assess ecological effects, and develop broad firsthand understanding of the issue. Depending on topic, class may require camping and/or backpacking. Grade only. Prerequisite: ENSP 421 or permission of instructor. A course fee to cover food and transportation is required. Applies to ENSP Environmental Conservation and Restoration upper-division course requirements. Course may be repeated for credit.

#### **423 ENVIRONMENTAL RESTORATION (4) FALL**

Field course introducing major concepts and practical aspects of environmental restoration. Topics include: the conservation context of restoration, restoration goals, measuring success, experimental approaches, dynamic systems and change over time, disturbance, restoring animal populations and the role of animals in ecosystem restoration, and educational elements of restoration. Practical techniques covered include: seed collection, ex-situ seed and plant management, invasive species removal, planting native species, and others. Topics are addressed in a variety of diverse local ecosystems. Prerequisite: ENSP 302 or BIOL 122, or permission of instructor.

#### **427 CONSERVATION DESIGN (3) SPRING**

This course applies principles of conservation biology and landscape ecology to a case study in biodiversity planning. Focusing on a local area with both high conservation value and high development pressure, students work in design teams to develop strategies for development and biodiversity conservation, and evaluate those strategies as alternative scenarios in a geographic information system (GIS) environment. Prerequisite: ENSP 322, permission of instructor, senior or graduate student standing. Prior familiarity with GIS not necessary.

#### **428 CONSERVATION RESEARCH (1-2) FALL OR SPRING**

Research seminar addressing a current topic of applied and theoretical interest in the field of conservation biology. We will investigate the topic through a field research project, along with readings and discussion. Students will contribute to all phases of the research, from collection of data in the field and generation of hypotheses, to interpretation of results and writing of a scientific paper based on the results. Prerequisite: permission of instructor.

#### **430 ENERGY FORUM (1-2) SPRING**

Speakers, including community professionals and University faculty, cover a wide variety of energy issues with formal presentations followed by discussion period. Several field trips included. May be repeated for credit.

#### **437 PASSIVE SOLAR DESIGN (3-4) FALL, EVERY OTHER YEAR**

Fundamentals and advanced applications of passive solar design, including: site analysis and design; passive applications (sunspace, trombe wall, convective loop, direct, and indirect gain systems); passive performance predictions; and economic payback analysis. Computer applications and student design projects. Prerequisite: ENSP 337.

#### **438 SMALL-SCALE ENERGY SOURCES (3-4) SPRING**

Course will focus on functional design of small-scale wind, photovoltaic, biomass, and hydroelectric energy sources. Siting, evaluating potentially available power, design of fully operable installation, and by-products and waste streams will be discussed. Energy storage mechanisms, interconnections to existing energy networks, and energy cost comparisons will be examined. Prerequisite: ENSP 338.

#### **439L COMPUTER APPLICATIONS IN ENERGY MANAGEMENT LAB (1-2) SPRING, EVERY OTHER YEAR**

Applications laboratory addressing state-of-the-art computer programs in this field. Focus on simulation-and-design programs utilized in residential and commercial building compliance. Student projects and presentations. Prerequisite: ENSP 337 or 437 or consent of instructor.

#### **440 EDUCATION AND THE ENVIRONMENT (4) FALL**

This course is designed to provide an introduction to the history and current scope of environmental education; contemporary frameworks for learning and teaching; self, site, and audience assessment; and program options for schools and education centers. One overnight field trip; class fee required at time of registration.

#### **442 METHODS AND MODELS IN EDUCATION AND THE ENVIRONMENT (3) SPRING**

An advanced course in environment-based education to build upon the fundamental theory and techniques presented in ENSP 440. The focus is on exemplary programs, place-based delivery techniques, curriculum and technologies. Several

field trips to local schools and environmental education centers. Cr/NC only.  
Prerequisite: ENSP 440 or consent of instructor.

#### **444 OUTDOOR LEADERSHIP (3) FALL**

This course is designed to provide both an overview of this growing field as well as the development of specific outdoor leadership, education, and communication skills. Specific outdoor skills addressed includes ropes courses, wilderness first aid, whitewater and sea kayaking, and rock climbing. This course works in cooperation with the University's Outdoor Pursuits Program as well as with practicing professionals. Overnight field trips; class fee required at time of registration.

#### **445 PORTFOLIO ASSESSMENT (1-2)**

Course for summative assessment of student preparation in ENSP multiple subject preparation program. Prerequisite: ENSP 375 or consent of instructor. Majors only. Cr/NC only. Recommended for seniors.

#### **448 CLASSROOM GARDEN (1-2) SPRING**

Development of curriculum materials and teaching techniques to utilize school and community gardens as outdoor classrooms. Curriculum materials will relate to such topics as plant identification, growth cycles, photosynthesis, soils and nutrients, nutrition, insects, predator/prey relationships, pesticides, and soil and water pollution. Lesson plans suitable for elementary school level will be developed.

#### **450 WATER TECHNOLOGY (1-3) FALL**

The science and engineering of purifying polluted water including industrial and domestic waste water, but emphasizing drinking water techniques. Applications of mathematics, microbial ecology, and chemistry to the practical problems of working toward California certification in water supply and water treatment. Course has extensive homework and field trips. Prerequisites: GE math and one semester of chemistry.

#### **460 TEACHING ASSISTANTSHIP (1-4)**

Open only to advanced students. Intended to give students experience in assisting the instructor in an environmental studies course by doing research and tutoring students in the class. Prerequisite: consent of instructor.

#### **470 PLANNING INDEPENDENT STUDY (1-4) FALL, SPRING**

Contracts for group and individual interdisciplinary study for those qualified to work independently. Internships may be a part of the study. Prerequisite: consent of instructor required prior to registration.

#### **490 SENIOR PROJECT (1-4) FALL, SPRING**

Group and some individual studies. This major senior activity may be coordinated with independent studies and/or special problems to total 12 units. May be repeated for credit.

#### **495 SPECIAL STUDIES (1-4) FALL, SPRING**

Independent study designed in consultation with an instructor. Prerequisite: successful completion of at least two ENSP courses and submission of a completed SSU special studies form.

#### **498 SENIOR SEMINAR: ISSUES IN PROFESSIONAL PRACTICE (1-2) SPRING**

Discussion of situations and challenges new planners are likely to encounter early in their professional careers. Seminars include discussions with professional planners on such topics as working with the public, elected officials, and other professionals; maintaining relations with the press; ethical dilemmas; and other matters of current concern. Discussion of students' internship experiences. Required for senior students in the planning concentration. Must be taken within one semester of graduation. Cr/NC only.

#### **499 INTERNSHIPS (1-8) FALL, SPRING, SUMMER**

For senior students (in most cases) working off-campus in experiential learning positions with written contract and faculty guidance. Cr/NC or a grade, depending on study plan. Prerequisites: major only, senior standing, permission of instructor.