

Area: Science and Engineering  
 Dean: Dr. Rina Roy  
 Assistant Dean: Dr. Derrick Booth  
 Phone: (916) 484-8107  
 Counseling: (916) 484-8572

Degree: A.S. - Natural Resources  
 Certificate: Natural Resources

### Natural Resources Degree

Natural Resources is an interdisciplinary program that advances understanding of ecological systems and their interrelationships, including those with human society. Core study involves plant and animal ecology and natural history, field methods and study design, and conservation and management of ecosystems and natural resources. This program includes courses in a wide range of areas of environmental studies, and provides many unique opportunities for hands-on and real-world field experience and coursework.

#### Student Learning Outcomes

*Upon completion of this program, the student will be able to:*

- apply the scientific method and critical analysis to environmental investigations
- evaluate natural resource systems, including their past and present use and management and future sustainability
- analyze social, ethical, and biological implications of environmental management alternatives
- identify ecological phenomena in one's everyday experiences and apply ecological principles to understand local, national and global environmental issues
- assess the relationships of plants and animals to their environment and to each other
- measure and analyze the physical environment of plant and animal populations
- evaluate basic land survey, water quality, vegetation, and wildlife data
- examine the significance of biodiversity conservation

#### Requirements for Degree 42.5-44.5 Units

BIOL 305	Natural History .....	4
BIOL 310	General Biology .....	4
ENGWR 344	Technical/Professional Communication: Writing Reports .....	1.5
GEOG 330	Introduction to Geographic Information .....	5 - 6
	Systems (3)	
and GEOG 334	Introduction to Desktop GIS (3)	
or CISC 300	Computer Familiarization (1)	
and CISA 315	Introduction to Electronic Spreadsheets (2)	
and CISA 305	Beginning Word Processing (2)	
or CISA 306	Intermediate Word Processing (2)	
GEOL 300	Physical Geology (3) .....	3
or GEOG 300	Physical Geography: Exploring Earth's Environmental Systems (3)	
NATR 300	Introduction to Natural Resource Management .....	3
NATR 302	Introduction to Wildlife Biology .....	4
NATR 304	The Forest Environment .....	3
NATR 310	Natural Resource Measurements (4) .....	4
or NATR 311	Natural Resource Measurements-Land Surveying Methods (1)	
and NATR 312	Natural Resource Measurements-Field Methods and Study Design (1)	
and NATR 313	Natural Resource Measurements-Vegetation Analysis and Forest Sampling (1)	
and NATR 314	Natural Resource Measurements-Aquatic Resource Sampling (1)	

NATR 320	Principles of Ecology .....	4
NATR 330	Native trees and shrubs of California .....	4
STAT 301	Introduction to Probability and Statistics .....	3

**Associate Degree Requirements:** The Natural Resources Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

### Natural Resources Certificate

#### Requirements for Certificate 22 Units

NATR 300	Introduction to Natural Resource Management .....	3
NATR 302	Introduction to Wildlife Biology .....	4
NATR 304	The Forest Environment .....	3
NATR 310	Natural Resource Measurements (4) .....	4
or NATR 311	Natural Resource Measurements-Land Surveying Methods (1)	
and NATR 312	Natural Resource Measurements-Field Methods and Study Design (1)	
and NATR 313	Natural Resource Measurements-Vegetation Analysis and Forest Sampling (1)	
and NATR 314	Natural Resource Measurements-Aquatic Resource Sampling (1)	
NATR 320	Principles of Ecology .....	4
NATR 330	Native trees and shrubs of California .....	4

#### NATR 294 Topics in Natural Resources .5-5 Units

*Hours: 9-72 hours LEC; 27-54 hours LAB*

Current topics in natural resources conservation and management not covered by regular catalog offerings are examined. Topics and field locations vary. Course topics may include but are not limited to: advanced subjects related to wildlife, fisheries, soil and water resources, conservation biology, forest resources and management, restoration ecology and aquatic ecology. Field trips may be required. This course may be taken four times on different topics.

#### NATR 300 Introduction to Natural Resource Management 3 Units

*General Education: AA/AS Area IV*

*Course Transferable to UC/CSU*

*Hours: 54 hours LEC*

This course provides a survey of natural resources, such as soils, water, wildlife, fisheries, rangeland, and forests, with a focus on their sustainable management and conservation. Overexploitation, pollution, and waste issues are integrated throughout the course. Principles, problems, and solutions are explored in the context of economics, ethics, and past, present, and future natural resource issues. Critical thinking and ecological dynamics are stressed. Sustainability, global environmental problems, and energy are major themes of the course. Field trips are required.

#### NATR 302 Introduction to Wildlife Biology 4 Units

*General Education: AA/AS Area IV*

*Course Transferable to CSU*

*Hours: 54 hours LEC; 54 hours LAB*

This course is an introduction to wildlife biology and the basic principles and techniques related to the practice of wildlife management.

It emphasizes ecological principles of populations and communities as they relate to the interdependence of wildlife and human populations. Topics include the social, political and biological implications of wildlife management. Game, non-game, threatened and endangered, and invasive species of wildlife are explored. Additionally, this course covers habitat and population sampling, radio telemetry, and the development of a wildlife management plan. Field trips are required.

### **NATR 303 Energy and Sustainability** **3 Units**

*Same As: ENERGY 303 and ET 303*

*General Education: AA/AS Area IV (effective Summer 2009)*

*Course Transferable to CSU*

*Hours: 54 hours LEC*

Fundamentals of energy and its impact on society and the environment are covered in this course. The mechanics, advantages and disadvantages of current and future renewable, green and nonrenewable energy sources are investigated. Residential energy audits are covered. Field trips are required. This course is not open to students who have completed ENERGY 303 or ET 303.

### **NATR 304 The Forest Environment** **3 Units**

*General Education: AA/AS Area IV*

*Course Transferable to UC/CSU*

*Hours: 54 hours LEC*

This course covers basic biological and physical science concepts important to a general understanding of forest ecology and forestry. Forest history, forests of the United States, general tree taxonomy, forest ecology, soils, silvics, and insects and diseases of forest trees are investigated. Additional topics include the role of fire in forest management, forest measurements, multiple use management, and current forest issues and policies related to forest resource use. Field trips are required.

### **NATR 306 Introduction to Range Management** **3 Units**

*Course Transferable to CSU*

*Hours: 36 hours LEC; 54 hours LAB*

This course examines the historical developments of range management and theory and application of grazing strategies. This course focuses on the effects of grazing on range ecosystems, the taxonomy and physiology of range plants, ruminant nutrition and physiology. In addition, sampling techniques of field vegetation, the use of fire and other methods for range conversion and maintenance are explored. Field trips are required.

### **NATR 310 Natural Resource Measurements** **4 Units**

*Course Transferable to CSU*

*Hours: 54 hours LEC; 54 hours LAB*

This course provides basic natural resource measurement and survey skills. Included are elementary surveying, public land surveying, distance and direction measurement, topographic map reading, stream flow measurement, basic aquatic and water quality sampling. It focuses on forest and herbaceous vegetation sampling techniques such as transects and quadrates. Also included are the fundamentals of wildlife sampling techniques such as radio telemetry, population sampling techniques, Global Positioning Systems (GPS), Geographic Information Systems (GIS), and use of the internet as a research tool. Field trips are required.

### **NATR 311 Natural Resource Measurements-Land Surveying Methods** **1 Unit**

*Course Transferable to CSU*

*Hours: 9 hours LEC; 27 hours LAB*

This course provides basic natural resource land survey skills. Included in this course are elementary surveying, public land survey, distance and direction measurements, and topographic map reading. Field trips are required.

### **NATR 312 Natural Resource Measurements-Field Methods and Study Design** **1 Unit**

*Course Transferable to CSU*

*Hours: 9 hours LEC; 27 hours LAB*

This course provides basic statistics and study design as well as fundamental wildlife sampling techniques and an introduction to field applications of Global Positioning Systems (GPS) and Geographic Information Systems (GIS). Field trips are required.

### **NATR 313 Natural Resource Measurements-Vegetation Analysis and Forest Sampling** **1 Unit**

*Course Transferable to CSU*

*Hours: 9 hours LEC; 27 hours LAB*

This course provides basic forest and vegetation sampling skills. Included in this are forest sampling techniques such as tree heights, diameters, volume, and age. Vegetation sampling techniques such as quantitative and semi-quantitative analysis, and single species surveys will be covered. Field trips are required.

### **NATR 314 Natural Resource Measurements-Aquatic Resource Sampling** **1 Unit**

*Course Transferable to CSU*

*Hours: 9 hours LEC; 27 hours LAB*

This course provides basic aquatic resource sampling skills. Included in this course are stream flow measurements and water quality sampling. Sampling techniques for fisheries and other aquatic organisms will also be addressed. Field trips are required.

### **NATR 320 Principles of Ecology** **4 Units**

*General Education: AA/AS Area IV*

*Course Transferable to UC/CSU*

*Hours: 54 hours LEC; 54 hours LAB*

This course covers basic principles of ecology, including the physical and biological factors of different environments in relation to the distribution and abundance of plants and animals. Emphasis is on the management of ecosystems using ecological principles and the understanding of current ecological issues. Field trips are required.

### **NATR 325 Black Bear Ecology and Management in California** **2 Units**

*Course Transferable to CSU*

*Hours: 27 hours LEC; 27 hours LAB*

This course explores the natural history, habitat, and management of the black bear. Topics include the distribution, abundance, physiology, reproduction, and behavior of black bears. A field trip into black bear country is required to allow observation of bear sign and appreciation of the natural habitat of this animal.

### **NATR 326 Analysis of a Predator-The Mountain Lion** **1.5 Units**

*Course Transferable to CSU*

*Hours: 27 hours LEC*

This course explores the natural history and political history of the mountain lion. Topics include the distribution and abundance of mountain lions in California and throughout western North America; the important ecological role of these predators; problems associated with mountain lions, and the legal status of mountain lions in California. A field trip into mountain lion country is required to allow observation of lion sign and appreciation of the natural habitat of this predator.

**NATR 330 Native trees and shrubs of California****4 Units***General Education: AA/AS Area IV (effective Summer 2009)**Course Transferable to CSU**Hours: 54 hours LEC; 54 hours LAB*

This dendrology course covers classification and ecology of major natural plant communities of California and their tree and shrub component species. It focuses on characterization of the dominant vegetation types and identification of native woody species using plant keys and sight identification. Topics include natural history and life cycle, physiology, evolution, and human uses of--and threats to--California plant communities and individual species. The course involves the creation of a plant collection including at least 60 representative native woody species. Field trips are required.

**NATR 332 Wildflowers of the Sacramento Region****4 Units***General Education: AA/AS Area IV**Course Transferable to UC/CSU**Hours: 54 hours LEC; 54 hours LAB*

This course focuses on the wildflowers of the Sacramento Region. The identification, distribution, and interrelationships of herbaceous plants in their natural environment, ecological principles, and representative plant communities are examined. Special emphasis will be given to the study of plant families in our local grasslands, vernal pools, oak woodlands and foothills, and the use of taxonomic keys. AA/AS area A

**NATR 340 John Muir "Conservationist"****2 Units***Course Transferable to CSU**Hours: 36 hours LEC*

This course covers the life, writings, and philosophy of John Muir, one of the founders of the American Conservation Movement. It focuses on his significant contributions to the formation of the National Park System. This course is recommended for elementary and secondary educators and those interested in natural resources, conservation, and California history. Field trips are required.

**NATR 498 Work Experience in Natural Resources****1-4 Units**

*Advisory: ENGWR 102 or 103, and ENGRD 116 with a grade of ?C? or better; OR ESLR 320 and ESLW 320 with a grade of ?C? or better; OR placement through assessment process.*

*General Education: AA/AS Area III(b)*

*Enrollment Limitation: Be in a paid or non-paid internship, volunteer opportunity or job related to natural resources. Students are advised to consult with the Natural Resources Department faculty to review specific certificate and degree work experience requirements.*

*Course Transferable to CSU**Hours: 60-300 hours LAB*

This course provides students with opportunities to develop marketable skills in preparation for employment or advancement within the field of natural resources. It is designed for students interested in work experience and/or internships in transfer level degree occupational programs. Course content includes understanding the application of education to the workforce; completion of required forms which document the student's progress and hours spent at the work site; and developing workplace skills and competencies. Appropriate level learning objectives are established by the student and the employer. During the semester, the student is required to fulfill a weekly orientation and 75 hours of related paid work experience, or 60 hours of unpaid work experience for one unit. An additional 75 or 60 hours of related work experience is required for each additional unit. The weekly orientation is required for first time participants, returning participants are not required to attend the orientation but are required to meet with the instructor as needed to complete all program forms and assignments. Work Experience may be taken for a total of 16 units when there are new or expanded learning objectives.