ENVIRONMENTAL SCIENCES GRADUATE PROGRAM
Area of Concentration in Natural Resources

PURPOSE
Natural Resources is the scientific discipline that concerns the relationship between natural and managed population systems, human systems and the environment they all share. The Area of Concentration in Natural Resources is developed to integrate the sciences of biology, ecology and management with the study of human systems: sociology, economics, policy, ethics and communication. Program goals are to stimulate multidisciplinary research among the disciplines, and to promote responsible application of information toward resolution of natural resource problems. These relationships include studies at the species, sub-species, biological and human community, and ecosystem levels of scale. It also includes interactions of organisms and the human systems of production and economics, as well as the consequences of use.

The Natural Resources track is intended for students with strong natural sciences, management, or social sciences backgrounds and who wish to integrate their study to inform natural resource/environmental problems. Students must have the necessary course work in biology, statistics, social science, physical science, and mathematics to enroll in graduate courses that constitute the Area of Concentration in Natural Resources.

PROGRAM OF STUDY
Course work is divided into five categories, including ES Core courses, Methods and Numerical Skills, and courses in each of two other categories (1) Biology, Ecology and Management, (2) Sociology, Economics, Policy, and Ethics and Communication. Students must complete courses from each of the two categories, and elective courses (Ph.D. only) to provide either breadth or depth to each student's chosen area of focus.

A thesis is required for M.S. and Ph.D. degrees. The thesis should integrate across three of the four categories. Total course units required are a minimum of 45 credits for the M.S. degree and 108 credits for the Ph.D. degree. A student's graduate advisory committee will consist of a graduate representative and representatives from disciplines in three of the four emphasis areas. A student's major professor will usually be from a discipline in the primary focus area.

Typical Programs of Study will include the following minimum credits:

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>M.S. &amp; M.A. Degrees</th>
<th>Ph. D. Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES Core Courses</td>
<td>9-12 Cr</td>
<td>10-12 Cr</td>
</tr>
<tr>
<td>Methods and Numerical Skills</td>
<td>6 Cr</td>
<td>9 Cr</td>
</tr>
<tr>
<td>Ecology Courses</td>
<td>15 Cr</td>
<td>30 Cr</td>
</tr>
<tr>
<td>Electives</td>
<td>3-9 Cr</td>
<td>3-23 Cr</td>
</tr>
<tr>
<td>Thesis</td>
<td>6-12 Cr</td>
<td>36-56 Cr</td>
</tr>
<tr>
<td>Total</td>
<td>45 Cr</td>
<td>108 Cr</td>
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CORE COURSES

9-12 Cr. for the M.S and M.A. degree (required are ENSC 515, 520, 508 and one class from the approved list of core courses- below) and 10-12 Cr. for the Ph. D. degree. (required are ENSC 515, 520, 508 and classes from the approved list of core courses- below). These courses include Environmental Perspectives, Environmental Analysis, Environmental Profiles, and the Joint-Campus Workshop in Environmental Science, Studies, and Policy.

Approved Core Course List:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ANTH 581</td>
<td>Natural Resources and Community Values</td>
</tr>
<tr>
<td>ANTH 582</td>
<td>World Food and the Cultural Implications of International Development</td>
</tr>
<tr>
<td>BI 570</td>
<td>Community Structure and Analysis</td>
</tr>
<tr>
<td>BI 670</td>
<td>Community Structure and Analysis</td>
</tr>
</tbody>
</table>
CE 513 GIS in Water Resources
Comm 540 Theories of Conflict and Conflict Management
EC 539 Public Policy Analysis
FOR 561 Forest Policy Analysis
FS520 Posing Researchable Questions
FS521 Natural Resource Research Plan
FS565 Forest Ecosystem Management
FS646 Ecosystem Analysis and Evaluation
FW515 Model Selection and Inference
GEO 520 Geography of Resource Use
H524 Health Data Analysis
H525 Intro Epidemiology
H526 Epidemiological Methods
H549 Health Risk Communication
H575 Evaluation
H576 Proposal Writing
HIST 569 History of the Pacific Northwest
LA 607 Experimental Seminar in Biocomplexity and Alternative Futures
MRM515 Coastal Resources Management
PS 574 Bureaucratic Politics and Policy
PS 575 Politics of Environmental Problems
PS 576 Science and Politics
SED 580 Research and Evaluation
SOC 581 Society and Natural Resources
Z582 Molecular Methods in Ecology and Evolution

METHODS AND NUMERICAL SKILLS
BI 570 Community Structure Analysis
CSS 590 Field Plot Technique
FS 523 Natural Resource Data Analysis
Stat 511, 512, 513 Methods of Data Analysis

EMPHASIS AREA I: BIOLOGY, ECOLOGY AND MANAGEMENT
BOT 521 Advanced Plant Systematics
BOT 542 Plant Population Ecology
BOT 543 Plant Community Ecology
BOT 588 Environmental Physiology of Plants
BOT 668 Plant Disease Dynamics
CSS 535 Physics of Soil Ecosystems
CSS 555 Biology of Soil Ecosystems
ENT 520 Insect Ecology
FOR 536 Wildland Fire Science
FOR 543 Silvicultural Practices
FOR 544 Ecological Aspects of Park Management
FS 545 Advanced Forest Community Ecology
FS 548 Biology of Invasive Plants
FS 553 Forest Wildlife Habitat Management
FS 564 Interactions of Vegetation and the Atmosphere
FS 565 Forest Ecosystem Management
FW 458 Management of Big Game Animals
FW 551 Avian Conservation & Management
FW 571 Environmental Physiology of Fishes
FW 573 Fish Ecology
FW 586 Genetics and Demography of Small Populations
FW 580 Stream Ecology
MB 548 Microbial Ecology
OC 540 Biological Oceanography
OC 644 Marine Phytoplankton Ecology
OC 645 Marine Phytoplankton Physiology
OC 646 Physical/Biological Interactions in the Upper Oceans
OC 647 Marine Microbial Processes
RNG 521 Wildland Restoration & Ecology
RNG 550 Landscape Ecology and Analysis
RNG 555 Riparian Ecology and Management
RNG 662 Rangeland Ecology
Z 523 Environmental Physiology

**EMPHASIS AREA II: SOCIOLOGY, ECONOMICS, POLICY, ETHICS AND COMMUNICATION**

ANTH 577 Cultural Ecology
ANTH 581 Natural Resources and Community Values
AREC 532 Environmental Law
AREC 534 Environmental and Resource Economics
AREC 550 Environmental Economics
AREC 551 Natural Resource Economics
AREC 553 Public Land and Resource Law
COMM 524 Communication in Organizations: Theories and Issues
COMM 540 Theories of Conflict and Conflict Management
COMM 542 Bargaining and Negotiation Processes
COMM 544 Third Parties in Dispute Resolution: Mediation
FOR 530 Forest Resource Economics
FOR 551 History and Cultural Aspects of Recreation
FOR 559 Forest Resource Planning and Decision Making
FOR 560 Forest Policy
FOR 562 Natural Resource Policy and Law
FOR 593 Environmental Interpretation
PHL 540 Environmental Ethics
PHL 543 World Views and Environmental Values
PS 575 Environmental Politics and Policy
PS/SOC 585 Consensus and Natural Resources
SOC 580 Environmental Sociology
SOC 581 Society and Natural Resources

**ELECTIVE COURSES**

Students will work with their graduate advisor and committee to select elective courses from Emphasis areas I and II to develop necessary background to add either breadth or depth to a student's Program of Study. Other courses also may be included if believed to be appropriate by a student's guidance committee.

**THESIS**

6-12 credits for M.S. and 36-50 for Ph.D. degree. For the M.A. degree, 3 credits are required for the program project. Other appropriate courses will be selected to satisfy the 45 total unit requirement for the M.A. degree.