



ENVIRONMENTAL SCIENCES GRADUATE PROGRAM AREA OF CONCENTRATION IN ECOLOGY

PURPOSE

The Area of Concentration in Ecology is developed to unify the science of ecology at Oregon State University and related Institutions of higher learning. Program goals will be to stimulate interdisciplinary ecological research, increase communication among disciplines, and promote responsible application of ecological data and principles to the solutions of environmental problems. Ecology is the scientific discipline that is concerned with the relationships between organisms and their past, present, and future environments. These relationships include biochemical and physiological responses of individuals, structure, and dynamics of populations, interactions among species, organization of biological communities, processing of energy and matter in ecosystems, and interactions between biota and physical chemical, and climatic features of their environment. Ecology includes elements of life, physical, and social sciences.

The ecology track is designed for students who have a strong natural sciences background and want to focus in the ecological sciences. Students must have the necessary course work background in statistics, mathematics, biology, and chemistry to enroll in courses that constitute the Area of Concentration in Ecology.

PROGRAM OF STUDY

Course work is divided into 5 categories, including ES Core courses. Methods and Numerical Skills courses. Ecology courses. Elective courses, and Thesis. Total credits required are a minimum of 45 Cr for the M.S. and M.A. degree and 108 Cr for the Ph. D. degree. Typical Programs of Study will include minimum credits as follow:

<u>Subject Area</u>	<u>M.S. & M.A. Degrees</u>	<u>Ph. D. Degree</u>
ES Core Courses	9-12 Cr	10-12 Cr
Methods and Numerical Skills	6 Cr	9 Cr
Ecology Courses	15 Cr	30 Cr
Electives	3-9 Cr	3-23 Cr
Thesis	6-12 Cr	36-56 Cr
Total	45 Cr	108 Cr

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:

ANTH 581	Natural Resources and Community Values
ANTH 582	World Food and the Cultural Implications of International Development
BI/BOT 589	Analysis of Environmental Issues
BI 570	Community Structure and Analysis
BI 670	Community Structure and Analysis
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
RNG 650	GIS Watersheds Analysis
SED 580	Research and Evaluation
SOC 581	Society and Natural Resources
Z582	Molecular Methods in Ecology and Evolution

METHODS AND NUMERICAL SKILL COURSES

6 Cr for M.S. and M.A. degree and 9 Cr for Ph. D. degree. These courses are to ensure students have sufficient skills in research methods including mathematics, statistics, and computer science. Courses are to be selected by the student, advisor, and advising committee from the list below and from other offerings.

BI 570 Community Structure and Analysis
 CSS 555 Modeling Soil Ecosystems
 CSS 590 Field Plot Techniques
 ENT 591 Modeling Complex Biological Systems
 FS 523 Natural Resource Data Analysis
 FW661 Wildlife Population Analysis
 STAT 511, 512, 513 Methods of Data Analysis
 STAT 515 Design and Analysis of Planned Experiments
 STAT 531 Sampling Methods
 STAT 535 Quantitative Ecology
 STAT 557 Applied Multivariate Analysis

ECOLOGY COURSES

15 Cr for M. S., and M.A. degree and 30 Cr for Ph. D. degree. Students in the Ecological Area of Concentration must build academic depth and breadth in ecology by taking at least one course in each of the following four categories: Biochemical and Physiological Ecology, Population Ecology and Evolution, Community Ecology, and Landscape/Ecosystem/Process Ecology.

The following is a partial listing of currently available classes that would fulfill the requirements for students enrolled in the Area of Concentration in Ecology. The list presented here is by no means a complete catalog of courses available in the track. The thesis advisor and graduate committee will assist the student in identifying other courses that will be considered within the theme areas and will count towards the credits needed to satisfy Ecological Course requirements.

A. Biochemical and Physiological Ecology Courses

BB 653 Plant Biochemistry
 BI/BOT 488/588 Environmental Physiology of Plants
 BOT 541 Plant Autecology
 CSS 615 Plant Nutrient Availability
 CSS 645 Soil Biology and Biochemistry
 CSS 655 Plant-Water Relations
 ENT 522 Physiological Ecology of Insects
 FS 542 Physiological Laboratory Techniques
 FS 547 Nutrient Cycles
 FS 564 Interaction of Vegetation and the Atmosphere
 FW 571 Environmental Physiology of Fishes
 OC 645 Marine Phytoplankton Physiology
 RNG 643 Aridland Plant Physiology
 Z 523 Environmental Physiology

B. Population Ecology and Evolution Courses

BI 545 Evolution
BOT 521 Plant Biosystematics
BOT 542 Plant Population Ecology
BOT 668 Host Parasite Interactions: Populations
ENT 520 Insect Ecology
FW 573 Fish Ecology
FW 551 Biology of Game Birds
FW 633 Conservation of Genetic Resources
FW 661 Wildlife Population Analysis
FW 669 Population Dynamics
FS 548 Weed Ecology and Management
MB 548 Microbial Ecology
OC 546 Ecology of Coastal Marine Fishes
OC 644 Marine Phytoplankton Ecology
OC 647 Marine Microbial Processes
Z 527 Paleobiology
Z 593 Behavioral Ecology
Z 591 Population Biology

C. Community Ecology Courses

BI 570/670 Community Structure and Analysis
BOT 543 Plant Community Ecology
FS 545 Advanced Forest Community Ecology
FS 553 Managed Forest and Wildlife Interactions
RNG 662 Rangeland Ecology
Z 594 Community Ecology

D. Landscape/Ecosystem/Process Ecology Courses

CSS 545 Soil Ecosystem Processes
CSS 535 Soil Ecosystem Properties
CSS 555 Modeling Soil Ecosystems
FRR 551 Ecological Aspects of Park Management
FW 580 Stream Ecology
FS 531 Ecosystem Approach to Forest Manipulation
FS 546 Ecosystem Analysis
FS 547 Nutrient Cycles
GEO 533 Ecological Biogeography
OC 646 Physical/Biological Interactions in the Upper Oceans
RNG 667 Fire Ecology
RNG 555 Riparian Ecology and Management
RNG 550 Landscape Ecology and Analysis
RNG 521 Rangeland Improvements and Restoration Ecology

ELECTIVE COURSES

3-9 Cr for M.S. and M.A. degree and 3-23 Cr for Ph. D. degree. Students will work with their graduate advisor and committee to select elective courses to develop necessary background to add breadth and depth to the student's Program of Study.

THESIS:

6-12 Cr for M.S. and M.A. degree and 36-56 Cr for Ph. D. degree.