DESCRIPTION OF ESS CONCENTRATIONS

Environmental Biology and Applied Ecology Concentration (EBAE)

The EBAE concentration provides students with the scientific basis for understanding the sustainability of various ecological systems. Students will learn advanced principles of biology and ecology, and their application to problems of environmental management. Students with interests in many topics will undertake this concentration, for example, wildlife and fisheries management; forest, wetland and aquatic ecology; environmental microbiology; conservation science; endangered and invasive species management; biological and ecological consequences of pollutants in the environment.

Learning Goals: Students in the EBAE concentration will gain an in-depth understanding of the biological and ecological dimensions of environmental and sustainability sciences, and of the methods by which knowledge in this area of scholarship is acquired, analyzed, interpreted, evaluated, and used in natural and human-managed ecosystems. Students who complete the EBAE course of study will be able to apply fundamental current understanding of ecology and environmental biology to complex interdisciplinary environmental issues.

Note: Some courses in the concentration require more than the minimum core curriculum requirements, i.e., biology, math and physics. Always check course prerequisites.

Course Requirements: Ten courses beyond the ESS Core requirements.

1 additional Biology course: Choose **both** BIOEE 1610 **and** BIOEE 1780
BIOEE 1610: Ecology and the Environment* (F, S) [or BIOSM 1610]
BIOEE 1780: Evolution and Diversity* (F, S) [or BIOSM 1780]

2 Chemistry courses*: Choose Chem 1560 **and** Chem 1570 **OR** Chem 2070 **and** Chem 2080
* This assumes that EAS 1600: Environmental Physics is taken as the ESS Core requirement

Chem 1560: Introduction to General Chemistry* (F, Su)
Chem 1570: Introduction to Organic and Biological Chemistry* (S, Su)
OR
Chem 2070: General Chemistry I* (F, Su)
Chem 2080: General Chemistry II* (S, Su)

1 Calculus course: Choose Math 1106 **or** Math 1110: It is recommended **(but not required)** that students take a second semester of calculus, Math 1120.
Math 1106: Calculus for the Life and Social Sciences* (S)
Math 1110: Calculus 1* (F, S, Su)

1 Quantitative course: For detailed guidance, see Quantitative Proficiency, page 9.

1 Introductory Genetics course: Choose NTRES 2830 or BIOMG 2800 **and** 2801
NTRES 2830: DNA, Genes and Genetic Diversity (S)
BIOMG 2800 **and** 2801: Genetics and Genomics, lecture and lab (F, S)

1 Advanced Ecology course: Choose BIOEE 3610 **or** NTRES 3100
BIOEE 3610: Advanced Ecology (F)
NTRES 3100: Applied Population Ecology (F)

3 additional courses from EBAE elective lists

Choose one course from List 1, one course from List 2 and one more course from either list that must be at the 4000 level or above.

EBAE Elective Lists

EBAE List 1: Ecosystems – The physical and biological environment

BIOEE/EAS 3500	Dynamics of Marine Ecosystems in a Changing Ocean (F, alternate years)
BIOEE/EAS 3510	Conservation Oceanography (S, offered in Hawaii)
BIOEE 3610	Advanced Ecology (F)
BIOEE/BIONB/ENTOM 3690	Chemical Ecology (S)
BIOEE 4570	Limnology: Ecology of Lakes (F, alternate years)
BIOEE/EAS 4620	Marine Ecology (F, alternate years)
BIOEE 4690	Food, Agriculture, and Society (F)
BIOEE 4780	Ecosystem Biology (S, alternate years)
BIOSM 3650	Underwater Research (Su)
EAS 4830	Environmental Biophysics (F, alternate years)
EAS/NTRES 3030	Introduction to Biogeochemistry (F)
LA 3170	Design and Environmental Systems (F)
NTRES/BIOEE 2670	Introduction to Conservation Biology (F)
NTRES/EAS 3030	Introduction to Biogeochemistry (F)
NTRES 3220	Global Biodiversity (F)
NTRES 3240	Sustainable, Ecologically Based Management of Water Resources (S)
NTRES 3250	Forest Management and Maple Syrup Production (S, alternate years)
NTRES 4200	Forest Ecology (F, availability may vary)
NTRES/BIOEE 4560	Stream Ecology (F, alternate years)
PLHRT 3600	Climate Change and the Future of Food (F)
PLHRT/BIOEE 4730	Ecology of Agricultural Systems (F)
PLSCS 3210	Soil and Crop Management for Sustainability (S)
PLSCS 4660	Soil Ecology (S)

EBAE List 2: Organisms – plants, animals, microbes

BIOEE 2740	The Vertebrates: Comparative Anatomy, Function, and Evolution (S)
BIOEE 3610	Advanced Ecology (F)
BIOEE 3611	Field Ecology (F)
BIOEE/MATH 3620	Dynamic Models in Biology (S, alternate years)
BIOEE 3730	Biodiversity and Biology of the Marine Invertebrates (F, alternate years)
BIOEE/BIONB/PLSCI 4460	Plant Behavior and Biotic Interactions, Lecture (S)
BIOEE 4500/4501	Mammalogy, Lecture and Laboratory (F, alternate years)
BIOEE 4660	Physiological Plant Ecology, Lectures (S, alternate years)
BIOEE 4700/4701	Herpetology, Lectures/Laboratory (S, alternate years)
BIOEE 4750	Ornithology (S, alternate years)
BIOEE 4760	Biology of Fishes (F, alternate years)
BIOMI 2900	General Microbiology Lectures (F, S, Su)
BIOMI 3500/EAS 3555	Biological Oceanography and Ocean Biogeochemistry (S)
BIOMI/PLSCS 3970	Environmental Microbiology: Evolution, Biogeochemistry, Microbial Ecology (F, alternate years)
BIOMI 4140	Prokaryotic Diversity (S)
BIOSM 3210	Anatomy and Function of Marine Vertebrates (Su)
BIOSM 3730	Biodiversity and Biology of Marine Invertebrates (F)

BIOSM 3740	Field Ornithology (Su)
BIOSM 3830	Field Marine Invertebrate Biology (Su, availability will vary)
ENTOM 2120	Insect Biology (F)
ENTOM/TOX 3070	Pesticides, the Environment and Human Health (F, alternate years)
ENTOM 3150	Spider Biology (F)
ENTOM 3630	Bugs in Bugs: The World of Pathogens and Parasites (S, alternate years)
ENTOM 3440	Insect Conservation Biology (F, alternate years)
ENTOM/PLSCS 4440	Integrated Pest Management (S)
ENTOM/BIOEE 4550	Insect Ecology (F, alternate years)
NTRES 3100	Applied Population Ecology (F)
NTRES 3110	Fish Ecology, Conservation and Management (S, alternate years)
NTRES 3260	Applied Conservation Ecology (S)
NTRES 4100	Advanced Conservation Biology: Concepts and Techniques (F)
NTRES 4110	Quantitative Ecology and Management of Fisheries Resources (F)
NTRES 4120	Wildlife Population Analysis: Techniques and Models (S)
NTRES 4280	Principles and Practices of Applied Wildlife Science (S, alternate years)
PLBIO 2410	Introductory Plant Biodiversity and Evolution (F)
PLBIO 2450	Plant Biology (Su)
PLBIO 3420	Plant Physiology, Lectures (S)
PLBIO 3590	Biology of Grasses (S, alternate years)
PLPPM 3010	Biology and Management of Plant Diseases (F)
PLPPM 4010	Microbial Pathogens vs. Plants (S)
PLPPM 4020	Biology of Plant Pathogens (S)
PLPPM 4330	Infectious Disease Ecology and Evolution (F)
PLSCS/BSOC/IARD/STS/GOVT 4303	The GMO Debate: Science and Society (F)
PLSCS 3150	Weed Biology and Management (F)
PLSCS 4130	Physiology and Ecology of Yield (S)
PLSCI/BIOEE/BIONB 4460	Plant Behavior and Biotic Interactions, Lecture (S)