

ECOLOGY AND CONSERVATION BIOLOGY - BS, ECOINFORMATICS TRACK

The Department of Ecology and Conservation Biology provides one of the most advanced educational opportunities available to prepare undergraduate students for leadership in the science and stewardship of terrestrial and aquatic ecological systems. The BS in ECCB degree will emphasize acquisition of fundamental ecological knowledge and its application to biodiversity conservation, environmental health, and the management of complex systems, such as interactions involving aspects of ecology from genes to ecosystems, landscape, hydrology, and climate. Four tracks (Ecology and Conservation Biology, Ecoinformatics, Forest Resources, and Vertebrate Zoology) are offered to provide flexibility in one's chosen career path.

Ecoinformatics Track

Ecoinformatics is an emerging field that prepares graduates to become experts in integrating digital and information technologies, such as GPS (geographic position system), satellite and UAV (unmanned aerial vehicle) imagery, and advanced field sensors with ecological data analysis in complex ecosystems to detect, evaluate, and predict ecological patterns, disturbances, and processes. The Ecoinformatics track provides students with training in theories and applications of ecological data analysis, natural resources and ecological modeling, and spatial information sciences that will prepare them for handling complex and ever-increasing interdisciplinary ecological data and understanding of contemporary environmental challenges. Students successfully completing this track will have the ability to use advanced technologies used to collect data from genomic to landscape levels and beyond. The diversity of courses will give students the ability to use analytical and computer-based methods to perform quantitative data analysis, spatial analysis, and ecological modeling. This track prepares students for careers with natural resource agencies, environmental consulting companies, or for pursuing graduate degrees that require knowledge and ability to transform data into ecological information useful for solving environmental problems and informing policy and decision making.

Program Requirements

First Year

Fall		Semester Credit Hours
BIOL 111	Introductory Biology I	
ESSM 201	Exploring Ecosystem Science and Management	1
RENr 205	Fundamentals of Ecology	3
MATH 140	Mathematics for Business and Social Sciences	3
General elective ¹		3
Semester Credit Hours		14
Spring		
BIOL 112	Introductory Biology II	4
MATH 142	Business Calculus	3

American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history) ²	3	
Language, philosophy and culture (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture) ²	3	
Social and behavioral sciences (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences) ²	3	
Semester Credit Hours		16

Second Year

Fall		
CHEM 119	Fundamentals of Chemistry I	4
WFSC 302	Natural History of the Vertebrates	3
American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history) ²	3	
Creative arts (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts) ²	3	
Ecology practice ³	3	
Semester Credit Hours		16
Spring		
CHEM 222	Elements of Organic and Biological Chemistry	3
RENr 215	Fundamentals of Ecology–Laboratory	1
STAT 302	Statistical Methods	3
WFSC 304	Wildlife and Fisheries Conservation	3
GIS and remote sensing ⁴	3	
Government/Political science (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science) ²	3	
Semester Credit Hours		16

Third Year

Fall		
WFSC 403	Animal Ecology	3
Select one of the following:		4
CHEM 120	Fundamentals of Chemistry II	
GEOL 101 & GEOL 102	Principles of Geology and Principles of Geology Laboratory	
PHYS 201	College Physics	
SCSC 301	Soil Science	
Ecosystem		3
Select one of the following:		
ESSM 309	Forest Ecology	
ESSM 320	Ecosystem Restoration and Management	
ESSM 416	Fire Ecology and Natural Resource Management	
WFSC 404	Aquatic Ecosystems	
Organismal biology		3
Select one of the following:		
BESC 204	Molds and Mushrooms: The Impact of Fungi on Society and the Environment	
ENTO 201	General Entomology	

ESSM 203	Forest Trees of North America	
ESSM 302	Wildland Plants of North America	
ESSM 303	Agrostology	
ESSM 406	Natural Resources Policy	
WFSC 311	Ichthyology	
WFSC 315	Herpetology	
WFSC 335	Natural History of the Invertebrates	
WFSC 401	General Mammalogy	
WFSC 402	General Ornithology	
Communication (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication) ²		3
Semester Credit Hours		16
Spring		
ESSM 311	Biogeochemistry and Global Change	3
WFSC 433	Molecular Ecology in Wildlife and Fisheries	3
Government/Political science (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science) ²		3
Ecology practice ³		3
General elective ¹		1
Semester Credit Hours		13

Fourth Year**Fall**

ESSM 304	Rangeland Plant Taxonomy	3
Human-environment interaction		3
Select one of the following:		
ESSM 301	Wildland Watershed Management	
ESSM 314	Principles of Rangeland Management Around the World	
ESSM 319	Principles of Forestry	
ESSM 420	Ecological Restoration of Wetland and Riparian Systems	
ESSM 430	Advanced Restoration Ecology	
RENr 470	Environmental Impact Assessment	
WFSC 444	Aquaculture I: Principles and Practices	
WFSC 447	Aquaculture II: Aquatic Animal Nutrition, Feeding and Disease Management	
WFSC 457	Wildlife Ecotoxicology	
Communication (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication) ²		3
Ecology practice ³		3
GIS and remote sensing ⁴		3
Semester Credit Hours		15

Spring

CSCE 110 or ESSM 459	Programming I or Programming for Spatial Data Applications	3-4
ESSM 485	Directed Studies	1
Ethical dimensions		3
Select one of the following:		
AGEC 350	Environmental and Natural Resource Economics	

ESSM 308	Fundamentals of Environmental Decision-Making	
ESSM 318	Coupled Social and Ecological Systems	
ESSM 404	Changing Natural Resource Policy	
ESSM 405	Forest Resource Assessment and Management	
RENr 460/ RPTS 460	Nature, Values, and Protected Areas	
WFSC 303	Fish and Wildlife Laws and Administration	
Individual function		3-4
Select one of the following:		
BESC 401	Bioenvironmental Microbiology	
BIOL 318	Chordate Anatomy	
ENTO 306	Insect Physiology	
ESSM 307	Forest Protection	
ESSM 310	Forest Tree Improvement and Regeneration	
MEPS 313	Introduction to Plant Physiology	
WFSC 422	Ethology	
WFSC 448	Fish Ecophysiology	
GIS and remote sensing ⁴		3
General elective ¹		1
Semester Credit Hours		14
Total Semester Credit Hours		120

¹ Select from any 100-499 course not used elsewhere.

² Graduation requirements include a requirement for 3 hours of International and Cultural Diversity (<http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/>) courses and 3 hours of Cultural Discourse (<http://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/>) courses. A course satisfying a Core category, a college/department requirement, or a general elective can be used to satisfy this requirement.

³ Select from ESSM 305, ESSM 324, ESSM 417, ESSM 484, ESSM 485, ESSM 491; RENr 400, STAT 307, WFSC 300/ENTO 300, WFSC 314, WFSC 316, WFSC 408, WFSC 410, WFSC 415/MARB 415, WFSC 450/ENTO 450, WFSC 451/ENTO 451, WFSC 462/BIOL 462, WFSC 485.

⁴ Select from ESSM 351/RENr 405, ESSM 444, ESSM 446, ESSM 462/ GEOG 462.

Must make a grade of C or better in BIOL 111, BIOL 112, and all ECCB major core coursework (ESSM 201, ESSM 304, ESSM 311, ESSM 485, RENr 205, WFSC 302, WFSC 304, WFSC 403, and WFSC 433.)