

ECCB - ECO & CONSERVATION BIOL (ECCB)

ECCB 101 Introduction to Ecology and Conservation Biology

Credit 1. 1 Lecture Hour. Introduction to professional opportunities and activities in the areas of ecology and conservation biology; presentation of a variety of career options focusing on job descriptions, educational and training requirements, challenges, professional societies and opportunities for advancement; overview of departmental and campus resources that will assist with their collegiate goals including research, internships, resumé building and professional writing. **Prerequisite:** Freshman classification and ECCB major, or approval of instructor.

ECCB 105 Secondary Education in Ecology and Conservation Biology

Credit 1. 1 Lecture Hour. Introduction to a career as a secondary science teacher and classroom activities in the areas of ecology and conservation biology; presentation of education and certification requirements, exploration of the structure of schools and districts, classroom and professional expectations; overview of departmental and campus resources that will assist with collegiate and career goals.

ECCB 203 Forest Trees of North America

Credits 3. 2 Lecture Hours. 2 Lab Hours. Taxonomy, phylogeny, and identification of the important forest trees of North America and their ecological and social uses and benefits.

ECCB 205 Fundamentals of Ecology

Credits 3. 3 Lecture Hours. Principles of ecology using a holistic approach treating plants, animals and humans as one integrated whole; composition, structure, nutrient cycles and energetics of biotic communities; adaptations to environmental factors; biotic relationships; and problems of environmental quality and resource use.

ECCB 215 Fundamentals of Ecology--Laboratory

Credit 1. 3 Lab Hours. Sampling and estimating plant-animal populations, measuring environmental factors and recognizing and studying morphological, physiological and behavioral adaptations of plants and animals to biotic or abiotic influences.

ECCB 285 Directed Studies

Credit 1. 0 Lecture Hours. 1 Other Hour. Directed study of selected problems in an area of ecology and conservation biology not covered in other courses. **Prerequisite:** ECCB 101, RENR 205, and RENR 215.

ECCB 291 Research

Credits 0 to 4. 0 to 4 Other Hours. Research conducted under the direction of faculty member in ecosystem science and management. May be repeated 2 times for credit. **Prerequisites:** Freshman or sophomore classification and approval of instructor.

ECCB 300/ENTO 300 Field Studies

Credits 3. 3 Other Hours. Integration of principles of animal and plant ecology with environmental factors to characterize wildlife populations; intensive analysis of specific areas will emphasize either the development of a wildlife management plan or a general vertebrate natural history survey. **Prerequisites:** Prior approval of instructor and concurrent enrollment in ECCB 450/ENTO 450 and ECCB 451/ENTO 451. **Cross Listing:** ENTO 300/ECCB 300.

ECCB 301 Diversity and Evolution of Plants

Credits 3. 2 Lecture Hours. 2 Lab Hours. Interpretation of plant morphology for keying and identification of important flowering rangeland plants; vegetative and floral characters for important plant families including toxic compounds affecting domestic livestock. Plant collection required.

ECCB 302 Diversity and Evolution of Vertebrates

Credits 3. 2 Lecture Hours. 2 Lab Hours. Life histories of fishes, amphibians, reptiles, birds and mammals; lecture covers vertebrate groups on a worldwide scale and emphasizes a comparative approach to the study of adaptation to the environment; lecture topics include behavior, reproduction, feeding specializations, evolutionary history, locomotion, hibernation, migration, endangered species, zoogeography and importance to man; laboratory emphasizes the recognition of Texas vertebrates. Designed for both science and non-science majors. **Prerequisites:** Grade of C or better in BIOL 111 and BIOL 112 or BIOL 101 and BIOL 107 or equivalent.

ECCB 303 Fire Ecology and Biogeochemistry

Credits 3. 3 Lecture Hours. Cycling of the elements like carbon, nitrogen and phosphorus, and their influence on ecosystem functions and the climate system; human impacts on biogeochemistry; global changes that threaten the sustainability of ecosystem services; wildland fire science and fire ecology showing the interrelated nature of the climate system, vegetation and human activities; classic and current scientific literature. **Prerequisites:** Grade of A C or better in ECCB 205, BIOL 111, or BIOL 112; junior or senior classification or instructor approval.

ECCB 304 Conservation Biology

Credits 3. 3 Lecture Hours. Ecological principles used to conserve and manage wildlife and fisheries resources at the individual, population and community levels; topics include conservation biology, species interactions, animal-habitat relationships, population dynamics and harvesting, habitat management and restoration and human dimensions of fish and wildlife conservation. **Prerequisites:** Grade of C or better in ECCB 205 and junior or senior classification or approval of instructor.

ECCB 307 Forest Protection

Credits 3. 2 Lecture Hours. 3 Lab Hours. Destructive agents in forestry as related to importance, identification, cause, extent of losses and protective measures. **Prerequisites:** ECCB 205, or equivalent, junior or senior classification or approval of instructor.

ECCB 308 Fundamentals of Environmental Decision-Making

Credits 3. 3 Lecture Hours. Introduction to environmental issues in natural resources management; fundamental principles and methods for understanding biosocial interdependencies in complex environmental issues; use of computer-aided group decision-making techniques to develop cooperative strategies for resolving local or global environmental issues. **Prerequisites:** Junior or senior classification or approval of instructor.

ECCB 309 Forest Ecology

Credits 3. 3 Lecture Hours. Life history and general characteristics of trees; structure and function of forest ecosystems; fundamental principles of forest tree physiology and ecology applied to an analysis of tree growth in relation to environmental factors and present day forest management; global changes and forests. **Prerequisites:** Junior or senior classification or approval of instructor; introductory courses in ecology and chemistry recommended.

ECCB 310 Forest Tree Physiology and Breeding

Credits 3. 3 Lecture Hours. Genetic improvement or manipulation of forest trees through breeding or transformation; regeneration of forests including reproduction, nursery production, stand establishment, natural regeneration and problems affecting regeneration. **Prerequisites:** Grade of a C or better in BIOL 111; junior or senior classification or approval of instructor.

ECCB 311 Ichthyology

Credits 3. 2 Lecture Hours. 3 Lab Hours. Introduction to the study of fishes, their biology, classification, evolution, distribution, ecology and economic importance. **Prerequisites:** Grade of C or better in ECCB 302 or BIOL 318.

ECCB 312 Diversity, Evolution, and Ecology of Grasses

Credits 3. 1 Lecture Hour. 6 Lab Hours. Classification and identification of grasses based on macro- and micromorphological variations of spikelets; interpretation of spikelet variation and use of diagnostic keys to identify important species of North America including range, forest and other natural resources; a grass collection required. **Prerequisites:** Junior or senior classification or approval of instructor.

ECCB 313 Diversity and Evolution of Invertebrates

Credits 3. 3 Lecture Hours. Survey of invertebrate animal diversity focusing on phylogeny, body patterns, ecology, ethology, zoogeography, anatomy, physiology and adaptations to the environment. **Prerequisites:** Grade of C or better in BIOL 111 and 112.

ECCB 314 Down River: Biology of Gulf Coastal Fishes

Credits 3. 2 Lecture Hours. 3 Lab Hours. Understanding the biological complexity of Gulf coast river systems while gaining hands-on experience in field and museum ichthyological techniques; sampling of the Guadalupe and San Antonio rivers; participation in lectures, museum preparation and archiving specimens at the Biodiversity Research and Teaching Collections (BRTC). **Prerequisites:** ECCB 311 with a grade of B or better and approval of instructor.

ECCB 315 Herpetology

Credits 3. 2 Lecture Hours. 2 Lab Hours. Evolutionary ecology of reptiles and amphibians and conservation biology of the major groups; labs concentrate on the global diversity of herps and the herpetofauna of Texas; foundation for students in wildlife science and biology.

Prerequisites: Grade of C or better in ECCB 302 or BIOL 318, or approval of instructor.

ECCB 316 Field Herpetology

Credit 1. 3 Lab Hours. Field work involving collection and preservation of herpetological specimens; natural history, ecological relations; available for students enrolled in ECCB 315 who would like to have field trips.

Prerequisites: ECCB 315 or concurrent enrollment.

ECCB 318 Coupled Social and Ecological Systems

Credits 3. 3 Lecture Hours. Resilience-based stewardship of social-ecological systems including range, forest and other natural resources; ecological concepts of resilience, sustainability, ecosystem services and vulnerability; investigation of linkages among social and ecological system components; contribution to sustainability and provisioning of ecosystem services; evaluation of multiple knowledge sources as the basis for adaptive ecosystem management. **Prerequisites:** Grade of C or better in ECCB 205 and AGECE 105, ECON 202, or ECON 203; junior or senior classification, or approval of instructor.

ECCB 319 Principles of Forestry

Credits 3. 2 Lecture Hours. 2 Lab Hours. Theory and practice of forestry in controlling forest establishment, composition, structure and growth; principles of natural and artificial regeneration; intermediate cultural operations; silvicultural systems; use and control of fire in forests; principles of sustainable stand management. **Prerequisites:** ECCB 309 or instructor approval.

ECCB 320 Ecosystem Restoration and Management

Credits 3. 3 Lecture Hours. A basic conceptual framework for restoration ecology and ecological restoration including range, forest and other natural resources; major principles of ecology related to practical problems confronting humankind, such as, environmental pollution and degradation, exotic species invasions, land use and management trade-offs and consequences; importance of biological diversity. **Prerequisites:** ECCB 205 or approval of instructor.

ECCB 324 Forest Measurements

Credits 2. 4 Lab Hours. Measures and measurement of the dimensions and attributes of forested areas including the diameters, heights, volume and biomass of trees within a well-defined area; tools used for forest measurement; the conduct of forest inventories; summary measures and reports of inventory results; remote sensing and related technologies that assist forest measurements. **Prerequisites:** Junior or senior classification or approval of instructor.

ECCB 325 Field Studies in Forest Ecosystems

Credits 3. 1 Lecture Hour. 6 Lab Hours. Field-oriented focus on forest ecosystem science and management; problem-solve management questions through data collection and team-based research; investigate the relationships between landowner objectives, mensuration, silviculture, ecology, soils, and regeneration-focused harvesting systems; foster the development of student-faculty relationships; enhance professional knowledge and skills. **Prerequisites:** Junior or senior classification or approval of instructor.

ECCB 351 Geographic Information Systems for Resource Management

Credits 3. 2 Lecture Hours. 2 Lab Hours. Geographic Information Systems (GIS) approach to solving spatial problems and managing natural resources, including the acquisition, management, manipulation, analysis, and mapping of spatial and non-spatial databases; identification of natural and relevant features from various data sources; integration of relevant technologies and data; extensive use of GIS software to solve real-world problems. Only one of the following will satisfy the requirements for a degree: AGSM 461, ECCB 351, ECCB 651, BAEN 651, or RENR 651. **Prerequisites:** Junior or senior classification or approval of instructor. **Cross Listing:** AGSM 461 and RWFM 351.

ECCB 385 Communication in Ecology and Conservation Biology

Credit 1. 1 Other Hour. Formal development and delivery of scientific poster on topic related to ecology or conservation biology. **Prerequisites:** Grade of C or better in ECCB 101 and 205.

ECCB 400 Molecular Ecology

Credits 3. 3 Lecture Hours. Fundamentals of molecular ecology applied to conservation and management of wildlife and fisheries; presentation and discussion of scientific papers on wildlife and fisheries molecular ecology; topics in conservation, management and aquaculture. **Prerequisites:** Grade of a C or better in BIOL 112; MATH 142, MATH 151, or MATH 171; STAT 301, STAT 302, or STAT 303; junior or senior classification or approval of instructor.

ECCB 401 General Mammalogy

Credits 3. 2 Lecture Hours. 3 Lab Hours. Mammalian biology; evolution, classification, biogeography, reproduction, physiology, ecology, and behavior; focuses on basic concepts necessary for a foundation in both wildlife science and biology. **Prerequisites:** Grade of C or better in ECCB 302 or BIOL 318; junior classification.

ECCB 402 General Ornithology

Credits 3. 2 Lecture Hours. 3 Lab Hours. Introduction to study of birds, their structure, classification, geographic distribution, ecological relations and economic status; foundation of wildlife science, also for museum work. **Prerequisites:** Grade of C or better in ECCB 302 or BIOL 318; junior classification.

ECCB 403 Population and Community Ecology

Credits 3. 3 Lecture Hours. Concepts in animal ecology; topics include population dynamics, competition, predator-prey interactions, biodiversity, infectious disease, and harvesting. **Prerequisites:** Grade of C or better in ECCB 205 or approval of instructor; junior classification.

ECCB 405 Forest Resource Assessment and Management

Credits 3. 1 Lecture Hour. 4 Lab Hours. Integration of biophysical, economic and social factors in forest resource analysis, management planning and decision making; applications of interdisciplinary knowledge and multiple-use principles to practical forest management problems. **Prerequisites:** Senior classification or approval of instructor.

ECCB 406/GEOG 462 Advanced GIS Analysis for Natural Resources Management

Credits 3. 2 Lecture Hours. 2 Lab Hours. Advanced topics in geographic information systems (GIS) to solve natural resource problems; manipulation of raster data types; three-dimensional modeling; emphasis on geoprocessing as it relates to applied projects particularly with habitat suitability models; field and lab use of global positioning systems (GPS); internet-based GIS modeling. **Prerequisites:** ECCB 351, RWFM 351, or AGSM 461, or equivalent, or approval of instructor; junior or senior classification. **Cross Listing:** GEOG 462/ECCB 406.

ECCB 407 Programming for Spatial Data Applications with R

Credits 3. 3 Lecture Hours. 0 Lab Hours. Integration of geospatial data and R programming to support analyses in ecology and conservation biology; emphasis on managing and mapping spatial data, applying geocomputation to vector and raster data, conducting spatiotemporal analysis, and creating incident maps. **Prerequisites:** STAT 301, STAT 302, or STAT 303, or approval of instructor.

ECCB 408 Arboriculture

Credits 3. 2 Lecture Hours. 2 Lab Hours. Tree selection and planting to fit climatic, space and edaphic conditions; diagnosing tree abnormalities and practicing intensive tree care. Frequent field work and demonstrations. **Prerequisite:** Senior classification or approval of instructor.

ECCB 416 Fire Ecology and Natural Resource Management

Credits 3. 3 Lecture Hours. Behavior and use of fire in the management of natural resources including range, forest and other natural resources; principles underlying the role of weather, fuel characteristics and physical features of the environment related to the development and implementation of fire management plans. **Prerequisites:** ECCB 205 or equivalent, junior or senior classification or approval of instructor.

ECCB 417 Prescribed Fire

Credits 4. 2 Lecture Hours. 5 Lab Hours. Use of prescribed fire to achieve ecosystem management objectives; understanding of how to plan and implement prescribed fires; coursework on fire behavior, fuel properties and the social aspects of prescribed fire and wildfire; how to safely use fire to achieve multiple outcomes including biodiversity conservation, reduced hazardous fire risk, livestock production and timber management. **Prerequisites:** Junior or senior classification or approval of instructor.

ECCB 420 Ecological Restoration of Wetland and Riparian Systems

Credits 3. 2 Lecture Hours. 2 Lab Hours. How wetland and riparian areas link terrestrial and aquatic systems and function hydrologically and ecologically within watersheds; integrated approaches for restoration of degraded wetland and riparian systems; improving water resources through vegetation management with a special interest in rangelands. **Prerequisites:** ECCB 205, junior or senior classification or approval of instructor.

ECCB 422 Behavioral Ecology

Credits 3. 3 Lecture Hours. Survey of the control, ontogeny, function and natural selection of behavior in a variety of vertebrate and invertebrate species; interaction between the organism and its environment with regard to the mechanisms and adaptive significance of behavior; evolution of anti-predator, feeding, reproductive and cooperative traits. **Prerequisites:** Grade of C or better in BIOL 112 or equivalent.

ECCB 430 Advanced Restoration Ecology

Credits 3. 3 Lecture Hours. A dynamic discipline relying heavily on the fundamentals of ecology; practice translating and communicating key ecological concepts to advanced case studies in ecological restoration; enhance skills for professional applications. **Prerequisites:** ECCB 205 and ECCB 320; or approval of instructor.

ECCB 444 Remote Sensing of the Environment

Credits 3. 2 Lecture Hours. 3 Lab Hours. Principles and techniques necessary for applying remote sensing to diverse issues in studying and mapping land uses and land covers of the terrestrial environment; emphasizes a hands-on learning approach with theoretical foundations and applications in both aerial and satellite remote sensing, using optical and lidar datasets. **Prerequisites:** Junior or senior classification or approval of instructor.

ECCB 446 Drones for Environmental Remote Sensing

Credits 3. 2 Lecture Hours. 2 Lab Hours. Fundamental components of small unmanned aerial systems (sUAS), sensors and platforms, UAS operational concepts, the principles of UAS data collection, legal framework within which UAS should be operated and applied, data processing software and the generation of orthomosaics and 3D point clouds; emphasis on the use of UAS in a broad spatial sciences, technology and applications context, including vegetated ecosystems. **Prerequisites:** ECCB 444; junior or senior classification.

ECCB 448 Fish Ecophysiology

Credits 3. 3 Lecture Hours. Ecological domains and demands placed on physiological performance; physiological mechanisms and control in fishes, interaction of physiological mechanisms with environment, emphasis in adaptive value of physiological traits; analysis of physiology and adaptation with models; process and functional modeling. **Prerequisite:** Junior or senior classification or approval of instructor.

ECCB 450/ENTO 450 Caribbean Conservation

Credits 2. 6 Lab Hours. Provide experience in and appreciation for diverse tropical habitats and the problems associated with conserving these habitats; design and conduct individual research projects on topics of their choice with approval from the instructors on project design and feasibility. **Prerequisites:** Concurrent enrollment in ENTO 300/ECCB 300 and ENTO 451/ECCB 451; junior or senior classification. **Cross Listing:** ENTO 450/ECCB 450.

ECCB 451/ENTO 451 Caribbean Research Seminar

Credit 1. 1 Other Hour. Document research activities; keep a journal of activities and research methods during study abroad trips. **Prerequisites:** Concurrent enrollment in ENTO 300/ECCB 300 and ENTO 450/ECCB 450; junior or senior classification. **Cross Listing:** ENTO 451/ECCB 451.

ECCB 452/RWFM 400 Study Abroad in Natural Resources

Credits 2 to 12. 2 to 12 Lecture Hours. Focus on an individual student effort assessing the ecological and human dimensions of biodiversity conservation and nature tourism; exposure to the ecological aspects of managing natural resources, especially wildlife populations and their habitat, as well as the economic, social, and cultural factors affecting biodiversity conservation and nature tourism in a developing country. May be taken two times for credit. **Prerequisite:** Junior or senior classification or approval of instructor. **Cross Listing:** RWFM 400/ECCB 452.

ECCB 454 Amazon Field School

Credits 4. 4 Lecture Hours. Investigation of social and ecological complexities of biodiversity conservation in tropical ecosystems; biological and social science approaches to evaluate causes, consequences and solutions to biodiversity loss through ecology, culture and governance. **Prerequisites:** Junior or senior classification with a minimum GPA of 2.0 and approval of instructor.

ECCB 460/RPTS 460 Nature, Values, and Protected Areas

Credits 3. 3 Lecture Hours. Writing-intensive discussion of the ways in which protected areas reflect human values about nature; identify stakeholders in and around protected areas, exploring how interests either conflict or coincide; evaluate social, economic, cultural, and ecological trade-offs of different approaches to conservation. **Prerequisites:** Junior or senior classification or approval of instructor. **Cross Listing:** RPTS 460/ECCB 460.

ECCB 462 Amazon River Tropical Biology

Credits 3. 3 Lecture Hours. History, ecology, evolutionary-biology, geography and culture of the Amazon River and Rio Negro; exploration of the world's most bio-diverse river during a 10-day expedition from Manaus, Brazil; survey biota, record observations about the ecosystem, select research topics, development of presentations. **Prerequisites:** BIOL 107, BIOL 111, BIOL 357, or ECCB 205; or approval of instructor.

ECCB 481 Seminar

Credit 1. 1 Other Hour. Oral discussion of selected topics from technical literature on recent advances in the field. **Prerequisites:** Senior classification in wildlife and fisheries sciences; 6 hours of 300- or 400-level wildlife and fisheries sciences courses. May be repeated for credit.

ECCB 484 Internship

Credits 0 to 4. 0 to 4 Other Hours. Supervised experience program conducted in the student's area of specialization. **Prerequisites:** Approval of student's advisor.

ECCB 485 Directed Studies

Credits 0 to 3. 0 to 3 Other Hours. Individual study and research upon a selected range problem. **Prerequisites:** Approval of student's advisor.

ECCB 489 Special Topics in...

Credits 1 to 4. 1 to 4 Other Hours. Selected topics in an identified area of rangeland ecology and management. May be repeated for credit.

Prerequisites: Approval of instructor.

ECCB 491 Research

Credits 0 to 4. 0 to 4 Other Hours. Research conducted under the direction of faculty member in ecosystem science and management. May be repeated for credit. **Prerequisites:** Junior or senior classification and approval of instructor.