DEPARTMENT OF BIOLOGY

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www.bio.txstate.edu (http://www.bio.txstate.edu)

Biology is the study of living systems and how they function. Because the biological sciences have had and continue to have profound impact on questions of concern to human society - longevity, environmental quality, biotechnology - knowledge of the biological sciences is an essential aspect of higher education.

Biologists find employment in research laboratories, regulatory agencies, and education. Interested students should see the major area advisors.

Biology majors take a minimum of 11 courses that include the core curriculum of Functional Biology, Organismal Biology, Genetics, a biological diversity course, a physiology course, Ecology, and Evolution. At the sophomore level and above, a variety of courses in cellular and organismal biology assure a broad education in any of the regions of specialization. Additional required courses in chemistry, mathematics and physics provide a broad scientific background. A minor outside the Biology Department is required for all areas of study except for the Wildlife Biology program. The B.S. major in Biology or in Microbiology is often the choice for those seeking pre-medical and pre-dental education as the courses required for graduation fulfill all the prerequisites required for admission to medical school.

Teacher Certification

Students may earn the Life Science (Texas Grades 7-12) certification through a B.S. major in Biology. Initial or additional certification may also be acquired as a post-baccalaureate or graduate student. Students interested in certification are strongly encouraged to see the Science and Engineering Advisor early in their undergraduate program or certification process.

Bachelor of Science (B.S.)

- Major in Biology (http://mycatalog.txstate.edu/undergraduate/science-engineering/biology/biology-bs)
- Major in Biology (Teacher Certification in Life Sciences, Grades 7-12) (http://mycatalog.txstate.edu/undergraduate/science-engineering/biology/biology-teacher-certification-life-sciences-grades-7-12-bs)
- Major in Aquatic Biology (http://mycatalog.txstate.edu/undergraduate/science-engineering/biology/aquatic-bs)
- Major in Microbiology (http://mycatalog.txstate.edu/undergraduate/science-engineering/biology/microbiology-bs)

Minors

- Biology (http://mycatalog.txstate.edu/undergraduate/science-engineering/biology/biology-minor)

Information about graduate programs can be found in the Graduate Catalog (http://mycatalog.txstate.edu/graduate).

Subjects in this department include: BIO (p. 1), GS (p. 10)

Courses in Biology (BIO)

BIO 1320 and BIO 1421 may be taken in any order. BIO 1320 and BIO 1421 will not meet the requirements for medical or dental schools.

BIO 1130. Functional Biology Laboratory.

Fundamental techniques and instruments used in cellular biological research will be taught while emphasizing safety, measurements, and scientific methods. Students will design and implement controlled experiments, identify independent and dependent variables, analyze data, draw conclusions, and communicate results with appropriate tables and graphs in oral presentations and written papers. Co-requisite or Prerequisite: BIO 1330.

Grade Mode: Standard Letter
TCCN: BIOL 1106
about Functional Biology Laboratory

BIO 1131. Organismal Biology Laboratory.

This course introduces the students to the basics of experimental design, scientific method and inquiry, use of statistical analyses and writing research papers. Topics covered include Mendelian and population genetics, natural selection, population ecology, phylogeny, and behavioral ecology. Co-requisite or Prerequisite: BIO 1331.

Grade Mode: Standard Letter
TCCN: BIOL 1107
about Organismal Biology Laboratory

BIO 1320. Modern Biology I, Molecules, Cells, and Physiology.

Provides students with basic scientific and biological principles. Current problems in biology and the ethics of science are presented with perspectives of public policy from a scientific viewpoint. This course is not recommended for majors in the natural sciences, including biology, about Modern Biology I, Molecules, Cells, and Physiology

Grade Mode: Standard Letter
TCCN: BIOL 1308
about Modern Biology I, Molecules, Cells, and Physiology

BIO 1330. Functional Biology.

This course provides the students with a strong foundation in cellular and molecular biology. Topics include biochemistry, energy metabolism, molecular bases of gene regulation and protein functions, cell division and control, and cell signaling. This course is required for all biology majors and is not recommended for non-science majors. Co-requisite or Prerequisite: BIO 1130.

Grade Mode: Standard Letter
TCCN: BIOL 1306
about Functional Biology
BIO 1331. Organismal Biology. 
This course provides science majors with a foundation in organismal biology, Mendelian and population genetics, evolution and ecology. Topic include: patterns of inheritance, genetics, evolution, speciation, phylogenetics, and behavioral population, community, and ecosystem ecology. This course is required for all biology majors and is not recommended for non-science majors. Co-requisite or Prerequisite: BIO 1131.

about Organismal Biology

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Life & Physical Sciences Core|Lab Required
Grade Mode: Standard Letter
TCCN: BIOL 1307

about Organismal Biology

This course provides the nonscience major the strong and diverse background necessary to understand the structural and functional diversity of organisms, evolution and behavior, and interactions among organisms and their environment. Topics include issues such as the genetic basis of behavior, overpopulation and extinction, ozone depletion, and conservation biology. This course is not recommended for majors in the natural sciences, including biology.

about Modern Biology II, Organisms, Evolution, and Environment

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Life & Physical Sciences Core|Lab Required
Grade Mode: Standard Letter
TCCN: BIOL 1409

about Modern Biology II, Organisms, Evolution, and Environment

BIO 2410. Microbiology. 
Principles of microbiology, morphology, anatomy, physiology and taxonomy of representative groups of non-pathogenic organisms. Laboratory methods stress studies of pure cultures, the use of laboratory apparatus in quantitative determinations and the detection and identification of microbial populations in the environment. Prerequisites: BIO 1330 and BIO 1130, and BIO 1331 and BIO 1131; and CHEM 1341 all with grades of “C” or higher.

about Microbiology

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
TCCN: BIOL 2421

about Microbiology

BIO 2410. Intermediate General Botany. 
An introduction to the biology of plants and plant-like organisms, emphasizing their role in ecosystem processes, relationships between structure and function, and the evolutionary relationships among the major plant groups. Prerequisites: BIO 1330 and BIO 1130, and BIO 1331 and BIO 1131 with grades of “C” or higher.

about Intermediate General Botany

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
TCCN: BIOL 2416

about Genetics

BIO 2411. Intermediate Zoology. 
Provides biology majors a strong foundation in animal biology at the organismal level. The format will include details of animal form and function as well as concepts relating to classification, phylogeny, evolution, and ecology. Topics will include natural history, biogeography, adaptations to local environments, shared characters, and behavior. All material is presented in an accepted phylogenetic sequence. Prerequisites: BIO 1330/BIO 1130, and BIO 1331/BIO 1131 all with grades of “C” or higher.

about Intermediate Zoology

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
TCCN: BIOL 2411

about Intermediate Zoology

BIO 2430. Human Physiology and Anatomy. 
A course on human physiology covering the various organ systems. Principles of molecular biology, cell and tissue structure, anatomy and relationship of structure and function are stressed. May not be credited toward a Biology major or minor.

about Human Physiology and Anatomy

4 Credit Hours. 3 Lecture Contact Hours. 4 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
TCCN: BIOL 2404

about Human Physiology and Anatomy

BIO 2440. Principles of Microbiology. 
The Basic Principles of microbiology, morphology, physiology, immunology and the relationship of microorganisms to diseases. This course is designed primarily to meet the requirements for students in allied health sciences and other programs requiring only one semester of microbiology. This course may not be credited toward a biology major or minor. Prerequisites: BIO 1330 and CHEM 1341 with minimum grades of D.

about Principles of Microbiology

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
TCCN: BIOL 2420

about Principles of Microbiology

BIO 2450. Genetics. 
An introduction to basic principles of Genetics by studies of Mendelian, molecular, quantitative and population genetics. Topics include: classical transmission genetics, and gene mapping, DNA replication and repair, transcription, translation, control of gene expression, genetic engineering techniques, Hardy-Weinberg equilibrium, evolutionary change via natural selection, and genetic drift. Prerequisites: BIO 1330, BIO 1130, BIO 1331 and BIO 1131; CHEM 1341, CHEM 1342, and CHEM 1342 all with grades of “C” or higher.

about Genetics

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
TCCN: BIOL 2416

about Genetics
BIO 2451. Human Anatomy and Physiology I.
Part I of a two semester course on the structure and function of the human body. Designed specifically to prepare students for nursing and other health professions. Prerequisites: BIO 1330 and CHEM 1341 with grades of “C” or higher.
4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Human Anatomy and Physiology I

BIO 2452. Human Anatomy and Physiology II.
This course is the second part of a two semester course on the structure and function of the human body designed specifically to prepare students for nursing and other health professions. Prerequisites: BIO 1330, CHEM 1341, BIO 2451, with grades of "C" or higher.
4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Human Anatomy and Physiology II

BIO 3300. Cell and Molecular Biology.
Fundamentals of structure and function of prokaryotic and eukaryotic cells. Course includes cell and organelle structure, basic biochemistry, principles of thermodynamics and energy transformation, nucleic acid and protein synthesis, enzyme kinetics, cell motility and cell signaling. Prerequisites: BIO 1330, BIO 1130, BIO 2450, and CHEM 1342 with grades of "C" or higher, or permission of instructor.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Cell and Molecular Biology

An interdisciplinary introduction to the science of global environmental change. Emphasis will be placed on understanding principles of earth system science, the scientific basis underlying the major components of global environmental change, the linkages between these components, and the central role of humanity in contributing to the observed changes. Prerequisites: BIO 1330, BIO 1130, BIO 1331 and BIO 1131 with grades of “C” or higher. (MC) (WI).
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Multicultural Content|Writing Intensive
Grade Mode: Standard Letter
about Global Ecology

BIO 3351. Forensic and Human Genetics.
This course introduces students to basic principles of Mendelian, molecular, and forensic genetics as it relates to the problems of human populations. This course is intended for non-science majors. May not be credited towards a biology major or minor. Prerequisites: BIO 1320 and BIO 1421, or BIO 1330/BIO 1130 and BIO 1331/BIO 1131.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Forensic and Human Genetics

BIO 3406. Economic Botany.
An introduction to the utilization of plants by humans and their economic and ecological significance. Laboratories will stress plant features beneficial to economic and societal needs. Prerequisite: BIO 2450 with a grade of "C" or higher.
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Economic Botany

BIO 3410. Phycology.
A study of algal organisms, comparative and culture techniques. Prerequisites: 8 hours from BIO 1410, BIO 2410, BIO 2450, BIO 3400, or BIO 3450 with grades of "C" or higher.
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Phycology

BIO 3421. Vertebrate Physiology.
The study of the physiology of vertebrate organ systems, including the nervous system, musculoskeletal system, endocrine system, cardiovascular system, respiratory system, digestive system, reproductive system and urinary system. Mammalian systems will be emphasized. Prerequisites: BIO 2450 with a grade of C or higher.
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Vertebrate Physiology

BIO 3430. Mycology.
A study of the fungal kingdom including slime molds and lichens. Laboratory studies will emphasize taxonomy, morphology and culture techniques. Prerequisites: BIO 2410 or BIO 2400, BIO 2450 with grades of "C" or higher.
4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Mycology

BIO 3442. Virology.
The structure, multiplication and genetics of bacterial, plant, and animal viruses. The role of viruses in human and plant disease. Prerequisites: BIO 2400, BIO 2450 with grades of "C" or higher. (WI).
4 Credit Hours. 3 Lecture Contact Hours. 4 Lab Contact Hours.
Course Attribute(s): Lab Required|Writing Intensive
Grade Mode: Standard Letter
about Virology
BIO 3460. Aquatic Biology.
An introduction to plant and animal life in the fresh water habitats of the local area. Prerequisites: BIO 2411, BIO 2450 with grades of “C” or higher; and one year of Chemistry. (WI).

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Grade Mode: Standard Letter
about Aquatic Biology

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required

BIO 3461. Plant Taxonomy.
Principles of identification and classification of plants; nomenclature and characteristics of various plant groups with emphasis on the higher plants. Prerequisites: BIO 2450 with a grade of “C” or higher.

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Grade Mode: Standard Letter
about Plant Taxonomy

BIO 3465. Plant Physiology.
Basic principles of plant physiology studied in lecture and laboratory. Prerequisite: BIO 2450 with a grade of “C” or higher or consent of instructor. One semester of organic chemistry is strongly recommended.

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Plant Physiology

BIO 3470. Invertebrate Zoology.
A study of the comparative morphology, evolution, systematics and natural history of invertebrates. Prerequisites: BIO 2411, BIO 2450 with a grade of “C” or higher.

4 Credit Hours. 3 Lecture Contact Hours. 4 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Invertebrate Zoology

BIO 3480. Histology.
A study of the structural and functional relationships between cells and tissues in organs. The laboratory includes the study of prepared slides and of microtechnique. This course is designed to meet the needs of pre-professional students. Prerequisite: BIO 2450 with a grade of “C” or higher.

4 Credit Hours. 3 Lecture Contact Hours. 4 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Histology

This course will cover basic principles of developmental biology in both plant and animal systems. Course will mainly address cell, molecular and genetic mechanisms underlying the development of model organisms. Prerequisites: BIO 1430 and BIO 2450.

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Principles of Developmental Biology

BIO 4126. Immunology Laboratory.
This laboratory-based course will cover cells of the immune system and basic serological reactions, including bacterial and viral agglutination reactions, precipitation, immunoelectrophoresis, immunofluorescence, and enzyme-linked immunosorbent assays. Prerequisites: BIO 2400 and BIO 2450 with grades of C or higher. Pre- or co-requisite: BIO 4326. Course restricted to Microbiology majors.

1 Credit Hour. 0 Lecture Contact Hours. 3 Lab Contact Hours.
Grade Mode: Standard Letter
about Immunology Laboratory

BIO 4166. Medical Microbiology Laboratory.
This laboratory-based course will cover pathogenic bacteria emphasizing identification of selected groups of pathogens and the biological basis for virulence. Prerequisites: BIO 2400 and BIO 2450, with grades of C or higher. Corequisite: BIO 4345. Course restricted to Microbiology majors.

1 Credit Hour. 0 Lecture Contact Hours. 3 Lab Contact Hours.
Grade Mode: Standard Letter
about Medical Microbiology Laboratory

BIO 4299. Undergraduate Research.
Supervised individual research projects in a mentor-student relationship with a biology professor. Available only to biology majors with junior standing and at least a “B” average. May be repeated once for credit. Prerequisites: BIO 2450 with a grade of “C” or higher and consent of the supervising professor.

2 Credit Hours. 0 Lecture Contact Hours. 4 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Undergraduate Research

BIO 4300. Neurobiology.
This course will give students an overview of neuroscience, particularly the areas of neuroanatomy, neurophysiology, and evolutionary and developmental neurobiology. Prerequisite: BIO 2450 with a grade of “C” or higher. (MC).

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Neurobiology

BIO 4301. Evolution.
Basic genetic principles applied to natural selection, adaptation, populations, speciation and man’s future. Consideration is given to the origin of life, nature of chromosomal variation, evolution of genetic systems and certain other selected topics. Prerequisite: BIO 2450 with a grade of “C” or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Evolution
BIO 4304. Wildlife and Recreation: Impact, Policy, and Management. Students will be introduced to the impact human recreational activities have on wildlife habitats and populations. Management practices to enhance human-wildlife encounters or to minimize detrimental effects on wildlife populations will be presented. Prerequisite: BIO 4416.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Grade Mode: Standard Letter

about Wildlife and Recreation: Impact, Policy, and Management

BIO 4305. Nature Study. This course provides a comprehensive survey of natural events. It includes laboratory and field work emphasizing observation, collection and discovery of relationships. It is creditable only for those seeking elementary or middle school certification and is required for those seeking grade 4-8 Science or Science/Mathematics teaching certification. This course must be taken the semester immediately prior to student teaching.

3 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Lab Required
Grade Mode: Standard Letter

about Nature Study

BIO 4311. Cancer Biology. Cancer Biology provides a foundation for understanding the complex molecular, biochemical, and cellular processes associated with cancer development. Topics include the role of tumor suppressor genes, oncogenes, DNA repair, apoptosis, ECM, cell-cycle control, cell signaling pathways, immune function and cancer-causing viruses. Emerging diagnostics and/or therapeutics will also be discussed. Prerequisite: BIO 2450 Genetics with a grade of C or higher; or approval of instructor.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Grade Mode: Standard Letter

about Cancer Biology

BIO 4319. Biological Resources: Conservation and Planning. This course is an introduction to the protection and sustainable use of populations, species, habitats, and ecosystems. Course also includes study of the methods used to analyze biodiversity and population regulation. Prerequisite: BIO 4416 or concurrent enrollment.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Grade Mode: Standard Letter

about Biological Resources: Conservation and Planning

BIO 4326. Immunology. This lecture-based course will cover the biology of the immune system and its relationship to disease, emphasizing B and T cell immunity, immune diseases, hypersensitivities, transplantation, and cancer. Prerequisites: BIO 2400 and BIO 2450 with grades of C or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Grade Mode: Standard Letter

about Immunology

BIO 4350B. Biological Implications of Water Planning in Texas. Current topics in understanding the biological implications of water planning in Texas. This course will be of particular interest to students who have a background in aquatic biology and who intend to stay in Texas post-graduation. Prerequisites will be determined by topic and faculty offering the course. May be repeated once with different emphasis.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

about Biological Implications of Water Planning in Texas

BIO 4350D. Watershed Management Frameworks and Applications. Introduction to integrated watershed assessment and management tools for identifying programmatic water quality and quantity issues and their root causes and solutions, and their practical application. The scientific and socio-economic elements are considered within the context of planning and developing watershed protection plans and programs. Prerequisite: Instructor approval.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

about Watershed Management Frameworks and Applications

BIO 4350E. Techniques in Aquatic Biology. This course will provide hands on experience with a suite of physical, chemical, and biological sampling techniques and gear used in applied river studies. Students will be exposed to the fundamentals of data quality objectives, accuracy, precision, detection limits, data visualization, exploratory analysis, univariate and multivariate statistics.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

about Techniques in Aquatic Biology

BIO 4350F. Bird Conservation and Management. This course is an introduction to the conservation and management of bird populations in an ecological context. Course covers a variety of species and spatial scales from landscape to ecoregion. Laboratory portion will involve field trips, intensive computer-based labs, and class discussion. Prerequisites: BIO 4416 or concurrent enrollment.

3 Credit Hours. 2 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

about Bird Conservation and Management

BIO 4350J. Environmental Physiology of Animals. This course is a study of how animals respond physiologically to changes in environmental temperature, moisture, salinity, partial pressure of gases, and toxins. Prerequisites: BIO 1330, BIO 1331, and BIO 2450 with grades of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

about Environmental Physiology of Animals
BIO 4350K. Genomics.
The course is a lecture covering modern genomics, including principles of genome function, the human genome, comparative genomics, genome sequencing, evolution and genomic change, databases and medicine, ethical, legal and social issues. The course also includes discussion of transcriptomics, proteomics, metabolomics, directed evolution, protein design, and systems biology. Prerequisite: BIO 2450 with a grade of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Genomics

BIO 4350L. Bacterial Genetics.
This course will cover concepts and mechanisms involved in the genetics of Archaea and Bacteria.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Bacterial Genetics

BIO 4350M. Wildlife Policy and Law in North America.
This course provides the student with a historical and cultural context within which wildlife policy and law have developed in North America, particularly in the United States. Federal treaties, statutes, case law, and regulations pertaining to wildlife will be presented. Wildlife law from representative states will be referenced as well. Prerequisite: BIO 4423 or 4435 with a grade of "C" or higher.

about Wildlife Policy and Law in North America

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Wildlife Policy and Law in North America

BIO 4350O. Tropical Ecology and Conservation.
Students will obtain a first-hand knowledge of the ecology, biodiversity, conservation, and culture of tropical ecosystems. It is an immersive and intensive study abroad course combining traditional lecture and field-based laboratory instruction. All course work will be conducted during a ~1 month stay in the South American country of Ecuador. Restricted to juniors and seniors with a minimum 2.5 Overall GPA. Co-requisite: BIO 4350P.

3 Credit Hours. 6 Lecture Contact Hours. 0 Lab Contact Hours.
Co-requisite(s): BIO 4350P
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Tropical Ecology and Conservation

This laboratory course complements the lecture course BIO 4350O, in which students will obtain a first-hand knowledge of the ecology, biodiversity, conservation, and culture of tropical ecosystems. It is an immersive and intensive study abroad course combining traditional lecture and field-based laboratory instruction. All course work will be conducted during a ~1 month stay in the South American country of Ecuador. Restricted to juniors and seniors with a minimum 2.5 Overall GPA. Co-requisite: BIO 4350O.

3 Credit Hours. 0 Lecture Contact Hours. 9 Lab Contact Hours.
Co-requisite(s): BIO 4350O
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Tropical Ecology and Conservation Lab

BIO 4350Q. Biological Oceanography.
Students will be introduced to the principles of oceanography and will understand anthropogenic impacts on the oceans. Topics to be investigated will include: ocean formation and destruction, sediments, ocean circulation, waves, tides, estuaries, life in the oceans, hydrothermal vents, coral reefs, fisheries, marine pollution, and climate change. Must be at least a Junior to enroll with a minimum 2.5 Overall GPA.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Biological Oceanography

BIO 4350Q. Medical Microbiology.
This lecture-based course will cover pathogenic bacteria and their relationship to disease, epidemiology and the biological basis for virulence. Prerequisites: BIO 2400 and BIO 2450 with grades of C or higher. Students may take only one of BIO 4345, BIO 4350G or BIO 4445 for credit.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Medical Microbiology

BIO 4350Q. Biological Oceanography.
This lecture-based course will cover pathogenic bacteria and their relationship to disease, epidemiology and the biological basis for virulence. Prerequisites: BIO 2400 and BIO 2450 with grades of C or higher. Students may take only one of BIO 4345, BIO 4350G or BIO 4445 for credit.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Medical Microbiology

BIO 4369. Biosystematics.
Biological systematics is a multidisciplinary component of most biological disciplines. Course topics include: classification schemes, homology, homoplasy, the application of nomenclature, and phylogeny reconstruction. The course will also present relevant issues in conservation, biodiversity cataloguing, museum and collection management, and identification methods/dichotomous keys. Prerequisite: BIO 2450 with a grade of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Biosystematics
BIO 4402. Earth Science I.
The description and interpretation of earth phenomena considered from the standpoint of meteorology and astroscience. Includes field observations, methods of measurement and interpretation of data related to the physical environment and space technology. May not be counted toward a major or minor in biology. Required for those seeking grade 4-8 Science and Mathematics/Science certification.

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

Texas State University

BIO 4403. Earth Science II.
The description and interpretation of earth phenomena considered from the standpoint of geology and oceanography. Includes field observations, methods of sampling and interpretation of data related to the physical environment. May not be counted toward a major or a minor in biology. Required for those seeking grade 4-8 Science and Mathematics/Science certification.

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

BIO 4408. Science Processes and Research.
Students will analyze scientific research design, design research, interpret data, and communicate results. Stress will be placed on broad-field structure and integration of major science concepts and research-based science pedagogy. This course must be taken the semester prior to student teaching and is required for those seeking 7-12 Life Science or Science teacher certification. This course may not count as one of the four upper-level Biology courses required of general Biology majors, or one of the three upper-level Biology courses required of Biology minors. about Science Processes and Research

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

BIO 4410. Field Biology of Plants.
Ecological relationships and natural history of plants, including historical geology, geography, soils, vegetational regions and surface geology of central Texas. Emphasis is placed on plant-soil-water relationships to develop conservation concepts. Students will make a representative collection of plants. Prerequisite: BIO 2450 with a grade of “C” or higher.

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

The structure, life-cycles and evolution of fossil and living vascular plants. Emphasis on such topics as the origin of land plants, evolution of the ovule, angiospermy, the flower and fruit. Prerequisites: BIO 2450 with a grade of “C” or higher; one year of Chemistry.

Course Attribute(s): Lab Required
Grade Mode: Standard Letter

BIO 4412. Plant Anatomy.
The anatomy of vascular plants stressing descriptive, development and comparative aspects of seed plants and the anatomical adaptations of plants to environmental factors. Prerequisites: BIO 2450 with a grade of “C” or higher; one year of Chemistry.

Course Attribute(s): Lab Required
Grade Mode: Standard Letter

BIO 4413. Parasitology.
The biology and biological significance of the common parasites of man and animals. Prerequisites: BIO 2411, BIO 2450 with a grade of “C” or higher.

Course Attribute(s): Lab Required
Grade Mode: Standard Letter

BIO 4415. Ichthyology.
An introduction to the morphology, taxonomy, natural history and evolution of fishes. Field trips will be made to collect specimens and laboratory periods will be devoted to morphological and systematic analysis. Prerequisites: BIO 2411, 2450 with a grade of “C” or higher.

Course Attribute(s): Lab Required
Grade Mode: Standard Letter

BIO 4416. General Ecology.
The ecological relationships that exist between organisms and those relationships that exist between organism and environment. Laboratory sessions will be devoted to literature review and/or specific ecological problems. This course or BIO 4454 is required of all biology majors. Prerequisites: BIO 2450, BIO 2410, BIO 2411, or BIO 2400 with a grade of “C” or higher. (WI).

Course Attribute(s): Lab Required
Grade Mode: Standard Letter

Writing Intensive
BIO 4414. Field Ornithology. This course is designed to introduce and provide an advanced knowledge of the application of various field, laboratory, and statistical methods and techniques in the study of avian species. The course will include topics related to survey methodology, sampling design, marking/banding, measurement/sample extraction, and aging/sexing of avian species. Prerequisite: Field Ornithology
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Lab Required
Grade Mode: Standard Letter about Field Ornithology

BIO 4420. Natural History of the Vertebrates. Environmental relationships and natural history of vertebrates. Emphasis is upon taxonomy, speciation and biotic provinces. The laboratory will include field trips for the study and collection of animals in their natural habitats. Students will assemble a representative collection of animals. Prerequisites: BIO 2411, BIO 2450 with a grade of "C" or higher and permission of instructor required for non-wildlife majors. (WI)
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Lab Required
Grade Mode: Standard Letter about Natural History of the Vertebrates

BIO 4421. Ornithology. Introduction to anatomy, behavior, ecology and identification of birds of Texas. Laboratory will emphasize field studies of birds and their habitat requirements. Prerequisites: BIO 2411 and BIO 2450 with a grade of "C" or higher.
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Lab Required
Grade Mode: Standard Letter about Ornithology

BIO 4422. Mammalogy. The taxonomy, distribution, ecology, behavior and evolution of mammals with particular emphasis on wild animals of the southwest. Laboratory will emphasize anatomy, identification, preparation of specimens and field exercises in the methods of population analysis. Prerequisites: BIO 2411 and BIO 2450 with a grade of "C" or higher. BIO 4416 is also recommended.
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Lab Required
Grade Mode: Standard Letter about Mammalogy

BIO 4423. Wildlife Management. Applications of the principles of ecology and natural history to the management of wildlife habitats and control of wildlife populations. Laboratory will involve demonstrations and practice exercises with wildlife management techniques and instrumentation and field trips to observe wildlife management projects. Prerequisites: BIO 2410, BIO 2411, and BIO 2450 with a grade of "C" or higher. BIO 4416, BIO 4421, or BIO 4422 is also recommended. (WI)
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Lab Required
Grade Mode: Standard Letter Writing Intensive about Wildlife Management

BIO 4424. Experimental Techniques. Use of methods and instruments applicable to biological investigations, including colorimetry; UV-spectrophotometry; fluorescence; flame and atomic absorption spectrophotometry; paper, gas, gel filtration and ion exchange chromatography; radioactive counting; and electrophoresis. Prerequisite: BIO 2450 with a grade of "C" or higher. 
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Lab Required
Grade Mode: Standard Letter about Experimental Techniques

BIO 4425. Biometry. Basic principles of statistical methods as applied to biological problems such as sampling techniques, analysis of data, experimental design and population dynamics. Emphasis will be on practical application. Prerequisites: BIO 2450 with a grade of "C" or higher; MATH 1315.
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Lab Required
Grade Mode: Standard Letter about Biometry
BIO 4446. Microbial Ecology.
This course will illustrate the wide variety of bacteria in nature, their interactions with other organisms and the environments, and their roles in global cycling of elements such as carbon, nitrogen, and sulfur. The laboratories will feature enrichments for selected groups of microorganisms (sulfate reducers, nitrogen fixers) and analysis of these isolates by microscopy, gas chromatography and radiochemical substrate utilizations. Prerequisites: BIO 2400 and BIO 2450 with a grade of "C" or higher. (WI).
about Microbial Ecology
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required|Writing Intensive
Grade Mode: Standard Letter
about Microbial Ecology

BIO 4447. Microbial Physiology and Genetics.
This course will cover fundamental concepts in bacterial physiology and genetics, including central and specialized metabolism, and unique aspects of bacterial genetics. Prerequisites: BIO 2400 and BIO 2450; CHEM 2142 and CHEM 2342 with grades of "C" or higher. (WI).
about Microbial Physiology and Genetics
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required|Writing Intensive
Grade Mode: Standard Letter
about Microbial Physiology and Genetics

BIO 4450. Physiological Ecology of Animals.
This course will cover fundamental concepts in bacterial physiology and genetics, including central and specialized metabolism, and unique aspects of bacterial genetics. Prerequisites: BIO 2400, BIO 2450; CHEM 2142, CHEM 2342 with a grade of "C" or higher. (WI).
about Physiological Ecology of Animals
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Physiological Ecology of Animals

BIO 4454. Plant Ecology.
Physiological ecology and community structure and function in the organization of terrestrial plant ecosystems. Quantitative vegetational sampling and the use of field and laboratory physiological equipment are included in the laboratory. This course or BIO 4416 is required of all Biology majors. Prerequisite: BIO 2450 with a grade of "C" or higher. (WI).
about Plant Ecology
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required|Writing Intensive
Grade Mode: Standard Letter
about Plant Ecology

BIO 4464. Vertebrate Anatomy.
This course is a comparative study of vertebrate anatomy. Fossil histories are evaluated to understand how vertebrate radiation occurred in the geological past, along with changes in structure of organs and organ systems. Lab includes dissection of representative members of each major vertebrate group. Prerequisite: BIO 2450. (MC) (WI).
about Vertebrate Anatomy
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing|Lab Required|Writing Intensive
Grade Mode: Standard Letter
about Vertebrate Anatomy

BIO 4465. General Entomology.
Principles of morphology, physiology and taxonomy of insects. Laboratory time will be devoted to a taxonomic study of the common orders and families of insects. Prerequisites: BIO 2411 and BIO 2450 with a grade of "C" or higher.
about General Entomology
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about General Entomology

BIO 4470. Limnology.
The physical, chemical, and biological factors affecting productivity in lakes, ponds, and streams. Limnological sampling methods, chemical, and biological analysis of samples and hydrographic surveying are included in the laboratory. Prerequisites: BIO 2450 with a grade of "C" or higher; one year of chemistry. (WI).
about Limnology
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required|Writing Intensive
Grade Mode: Standard Letter
about Limnology

BIO 4472. Animal Behavior.
This course presents all the major facets of the study of animal behavior, giving special attention to its evolution and ecological significance. We will discuss major conceptual models guiding past and present research in the field. Laboratories will emphasize experimental techniques and statistical analysis. Prerequisites: BIO 2450; and BIO 2400, BIO 2410, or BIO 2411 with a grade of "C" or higher. (WI).
about Animal Behavior
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required|Writing Intensive
Grade Mode: Standard Letter
about Animal Behavior

BIO 4480. Cytology and Microtechnique.
A study of cellular structure and microscopic technique. The lecture portion of the course presents cytology of all cell types and theoretical aspects of microscopy including light and electron-based technologies. The laboratory portion of the course provides training in standard light and electron microscopy, laser scanning confocal microscopy, and digital microscopy. Prerequisite: BIO 2450 with a grade of "C" or higher.
about Cytology and Microtechnique
4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Cytology and Microtechnique

BIO 4481. Internship in Biological Laboratory Technologies.
The student will participate in the work of a selected biology unit (private, commercial, or governmental). A research paper, reporting the internship experience conducted at the biological unit under the supervision of a faculty member, will be required. This course may be credited toward a biology major with prior approval of the biology department adviser and chair. Prerequisite: BIO 2450 with a grade of "C" or higher.
about Internship in Biological Laboratory Technologies
4 Credit Hours. 0 Lecture Contact Hours. 15 Lab Contact Hours.
Grade Mode: Standard Letter
about Internship in Biological Laboratory Technologies
Courses in General Science (GS)

GS 3310. General Science.
This course is a laboratory course designed to acquaint the student with the fundamentals of chemistry and earth space science. It is non-creditable for science majors but is a required course for Elementary EC-6 Generalist certification. Prerequisites: PHYS 1310, PHYS 1320, and PHYS 1110; or PHYS 1410 and PHYS 1420.

3 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

GS 3320. General Science.
This course is a laboratory course designed to acquaint the student with the fundamentals of biological science. It is non-creditable for science majors but is a required course for Elementary EC-6 Generalist certification. Prerequisite: BIO 1320, BIO 1421, BIO 1330 and BIO 1130, or BIO 1331 and BIO 1131 completed with a grade of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

Abel, Michael Gregory, Senior Lecturer, Biology, Ph.D., University of Tennessee
Aspbury, Andrea, Senior Lecturer, Biology, Ph.D., Univ of Nebraska
Banta, Marilyn R, Senior Lecturer, Biology, Ph.D., University of Nevada, Reno
Bergh, Joel Justin, Senior Lecturer, Biology, Ph.D., University of Delaware
Bonner, Timothy H, Professor, Biology, Ph.D., Texas Tech University
Castro-Arellano, Ivan, Assistant Professor, Biology, Ph.D., Texas A&M University
Chandler, Aylaia, Lecturer, Biology, Ph.D., Texas A&M University
Daniel, Kris Lynn, Assistant Professor, Biology, Ph.D., Univ of Missouri-Columbia
Davenport, Rachel A, Senior Lecturer, Biology, Ph.D., Florida State University
Dharmasiri, Nihal, Associate Professor, Biology, Ph.D., Univ of Hawaii at Manoa
Dharmasiri, Sunethra, Senior Lecturer, Biology, Ph.D., Univ of Hawaii at Manoa
Dutton, Jessica, Assistant Professor, Biology
Forstner, Michael R, Regents’ Professor, Biology, Ph.D., Texas A&M University
Gabor, Caitlin, Professor, Biology, Ph.D., Univ of Louisiana at Lafayette
Garcia, Dana M, Professor, Biology, Ph.D., Univ of California-Berkeley
Green, Michael Clay, Associate Professor, Biology, Ph.D., Univ of Louisiana at Lafayette
Groeger, Alan W, Associate Professor, Biology, Ph.D., Univ of Oklahoma Norman Campus
Hahn, Dittmar, Chair - Professor, Biology, Ph.D., Wageningen Univ & Research Centre
Hardy, Thomas, Professor, Biology, Ph.D., Utah State University
Harper, Mary B, Senior Lecturer, Biology, M.Ed., Texas State University
Horne, Francis R, Professor, Biology, Ph.D., University of Wyoming
Huffman, David G, Professor, Biology, Ph.D., University of New Hampshire
Huston, Michael, Professor, Biology, Ph.D., University of Michigan-Ann Arbor
Kakirde, Kavita S, Senior Lecturer, Biology, Ph.D., Auburn University
Kang, Hong Gu, Assistant Professor, Biology, Ph.D., Univ of California-Los Angeles
Koke, Joseph Ralph, Distinguished Professor Emeritus, Biology, Ph.D., University of Alberta
Kumar, Manish, Senior Lecturer, Biology, Ph.D., Dr Ram Manohar Lohia Avadh Univ
Lemke, David E, Professor, Biology, Ph.D., University of Texas at Austin
Lemke, Maureen, Senior Lecturer, Biology, M.A., Texas State University
Lopes, Vicente, Professor, Biology, Ph.D., University of Arizona
Machalec, Paul G, Lecturer, Biology, BSAG, Stephen F Austin State Univ
Martin, Noland H, Associate Professor, Biology, Ph.D., Duke University
McCricken, Shawn F, Research Assistant Professor, Biology, Ph.D., Texas State University
McLean, Robert J C, Regents’ Professor, Biology, Ph.D., University of Calgary
Moody, Sandra West, Associate Professor, Biology, Ph.D., Texas A&M University
Nice, Chris, Professor, Biology, Ph.D., Univ of California-Davis
Nowlin, Weston Hugh, Associate Professor, Biology, Ph.D., University of Victoria
Ott, James R, Associate Professor, Biology, Ph.D., Univ of Maryland College Park
Pesthy, Carolyn, Senior Lecturer, Biology, Ph.D., Texas A&M University
Prabhakaran, Thoniot T, Senior Lecturer, Biology, Ph.D., Univ of Arkansas Main Campus
Rodriguez, David, Assistant Professor, Biology, Ph.D., Texas Tech University
Schwalb, Astrid Nadine, Assistant Professor, Biology, Ph.D., University of Guelph
Schwartz, Benjamin F, Associate Professor, Biology, Ph.D., Virginia Poly Inst & State Univ
Schwinning, Susan, Associate Professor, Biology, Ph.D., University of Arizona
Simpson, Erica N, Senior Lecturer, Biology, Ph.D., Tulane University
Simpson, Thomas R, Associate Professor, Biology, Ph.D., Texas A&M University
Smith, Daniel A, Senior Lecturer, Biology, M.S., Texas State University
Upchurch, Garland R, Associate Professor, Biology, Ph.D., University of Michigan-Ann Arbor
Veech, Joseph A, Associate Professor, Biology, Ph.D., University of Nevada, Reno
Wagner, Matthew Wayne, Lecturer, Biology, Ph.D., Texas A&M University
Weckerly, Floyd, Professor, Biology, Ph.D., The University of Memphis
Weigum, Shannon E, Assistant Professor, Biology, Ph.D., University of Texas at Austin
Westerlund, Julie F, Associate Professor, Biology, Ph.D., University of Texas at Austin
Williamson, Paula S, University Distinguished Professor, Biology, Ph.D., Univ of California-Santa Barbara
Woytek, Kelly Jo, Lecturer, Biology, Ph.D., Texas A&M University