Biological Sciences

Faculty/Staff

Arthur Schwarz, Chair; Emily De La Garza, Eric Gren, Erin Maloney, Jared Wood

Adjunct: John Barroso, Arthur Chadwick

Aims of the Department

The mission of the Department of Biological Sciences is to encourage thoughtful investigation of living systems.

Student Learning Outcomes

Biological Sciences graduates will be able to:

- Use scientific processes (observe nature, pose problems, generate and test hypotheses, design experiments, interpret and evaluate data, and determine how to follow up on findings), especially involving quantitative reasoning and analysis.
- Integrate the social and ethical implications of how biological science impacts their faith and community as demonstrated by service.
- Think critically and respond intelligently to contemporary issues in biology.

Programs

The department offers a Bachelor of Arts and a Bachelor of Science degree in biology. The B.A. degree requires 30 semester hours in biology, 18 hours in a minor area and includes a foreign language component. The B.S. degree allows a choice between three areas of emphasis: Ecology, and Conservation Biology emphasis, or Integrative Biology emphasis. Students may also choose to pursue a B.S. or minor in Life Science towards Secondary Certification in coordination with the Education Department.

Biological Sciences Degrees and Certificates

B.A. Biology

General Education Requirements for all Bachelor's degrees

B.A. Foreign Language Requirement

Quality Enhancement Plan (QEP) Requirement

A minor is required for this degree.

Required Courses

*Include one botany elective.

Item #	Title	credits
BIOL 111	General Biology I	4
BIOL 112	General Biology II	4
BIOL 230	Ecology	4
BIOL 320	Genetics	4
BIOL 340	Cell and Molecular Biology I	4
BIOL 419	Philosophy of Science	3

Biology BA Electives (6-8 credit hours)

Item #	Title	credits
BIOL 314	Systematic Botany	4
BIOL 318	Microbiology & Immunology	4
BIOL 325	Field Ecology	4
BIOL 331	Vertebrate Ectotherms	4
BIOL 333	Parasitology	3
BIOL 336	Endotherms	4
BIOL 341	Cell and Molecular Biology II	4
BIOL 345	Environment and Mankind	4
BIOL 360	Plant Biology	4
BIOL 410	Human Physiology	4
BIOL 443	Comparative Vertebrate Anatomy	4
BIOL 450	Histology	4
BIOL 455	Immunology	3
BIOL 465	Plant Physiology	4

Required Cognates

Item #	Title	credits
CHEM 111	General Chemistry I	4
CHEM 112	General Chemistry II	4
	MATH 141 or 180	3-4
	Total credits:	**45-47**

Category Descriptions

MATH 141 or 180

Credits: 3-4

Item #	Title	credits
MATH 141	Introduction to Probability and Statistics	3
MATH 180	Precalculus	4

B.S. Biology, Ecology and Conservation Biology Emphasis

General Education Requirements for all Bachelor's degrees

Quality Enhancement Plan (QEP) Requirement

Biology B.S. Core Curriculum

Required of all B.S. students.

Item #	Title	credits
BIOL 111	General Biology I	4
BIOL 112	General Biology II	4
BIOL 230	Ecology	4
BIOL 320	Genetics	4
BIOL 419	Philosophy of Science	3

Required Courses

In consultation with the advisor, BIOL 480 Research in Biology, may replace one of the electives. In order for BIOL 480 to count as an elective, at least three credit hours of BIOL 480 must be completed and a final presentation must be given.

Item #	Title	credits
BIOL 328	Biostatistics	3
BIOL 345	Environment and Mankind	4
BIOL 360	Plant Biology	4
BIOL 443	Comparative Vertebrate Anatomy	4
BIOL 475	Management of Fish & Wildlife Resources	4

Botany electives:

Item #	Title	credits
BIOL 314	Systematic Botany	4
BIOL 465	Plant Physiology	4

Ecology electives:

Item #	Title	credits
BIOL 325	Field Ecology	4
BIOL 335	Limnology	4

Zoology electives:

Choose one course.

Item #	Title	credits
BIOL 331	Vertebrate Ectotherms	4
BIOL 336	Endotherms	4
BIOL 443	Comparative Vertebrate Anatomy	4

Required Cognates

Item #	Title	credits
CHEM 111	General Chemistry I	4
CHEM 112	General Chemistry II	4
	MATH 141 or 180	3-4
	Total credits:	**64-66**

Category Descriptions

MATH 141 or 180

Credits: 3-4

Item #	Title	credits
MATH 141	Introduction to Probability and Statistics	3
MATH 180	Precalculus	4

B.S. Integrative Biology

General Education Requirements for all Bachelor's degrees

Quality Enhancement Plan (QEP) Requirement

Biology B.S. Core Curriculum

Required of all B.S. students

Item #	Title	credits
BIOL 111	General Biology I	4
BIOL 112	General Biology II	4
BIOL 230	Ecology	4
BIOL 320	Genetics	4
BIOL 419	Philosophy of Science	3

Choose one course from each of the following groups:

Choose two additional electives from any group for 6-8 credits.

Item #	Title	credits
	Biomedical Electives	3-4
	Botany electives:	4
	Ecology electives:	4
	Research Techniques Electives:	3-4
	Zoology Electives:	3-4

Required Cognates:

Item #	Title	credits
CHEM 111	General Chemistry I	4
CHEM 112	General Chemistry II	4
	MATH 141 or 180	3-4
	Total credits:	**54-59**

Category Descriptions

Biomedical Electives

Credits: 3-4

Item #	Title	credits
BIOL 318	Microbiology & Immunology	4
BIOL 410	Human Physiology	4
BIOL 450	Histology	4
BIOL 455	Immunology	3

Botany electives:

Credits: 4

Item #	Title	credits
BIOL 314	Systematic Botany	4
BIOL 360	Plant Biology	4
BIOL 465	Plant Physiology	4

Ecology electives:

Credits: 4

Item #	Title	credits
BIOL 325	Field Ecology	4
BIOL 335	Limnology	4
BIOL 345	Environment and Mankind	4
BIOL 474	Management of Plant Resources	4
BIOL 475	Management of Fish & Wildlife Resources	4

Research Techniques Electives:

Credits: 3-4

Item #	Title	credits
BIOL 210	Introduction to Geographic Information Systems	3
BIOL 328	Biostatistics	3
BIOL 340	Cell and Molecular Biology I	4
BIOL 341	Cell and Molecular Biology II	4
BIOL 480	Research in Biology	3

Zoology Electives:

Credits: 3-4

Item #	Title	credits
BIOL 331	Vertebrate Ectotherms	4
BIOL 336	Endotherms	4
BIOL 443	Comparative Vertebrate Anatomy	4
GEOL 240	The Dinosaurs	4

MATH 141 or 180

Credits: 3-4

Item #	Title	credits
MATH 141	Introduction to Probability and Statistics	3
MATH 180	Precalculus	4

B.S. Life Science Secondary Certification

General Education Requirements for all Bachelor's degrees

Quality Enhancement Plan (QEP) Requirement

Teacher Certification Program

This program is designed to train High School Biology teachers, conducted in conjunction with the Education Department. Requirements for certification are listed in the Education section of this *Bulletin.*

You must make formal application for admittance to the Teacher Education Program. Applications are available at the Education Department Office.

Content Area + Teaching Certification

Required Courses

Must include one botany elective and one zoology elective.

Item #	Title	credits
BIOL 111	General Biology I	4
BIOL 112	General Biology II	4
BIOL 230	Ecology	4
BIOL 320	Genetics	4
BIOL 419	Philosophy of Science	3
	BIOL Upper Division Electives (x3-4)	12

Required Cognates

Item #	Title	credits
CHEM 111	General Chemistry I	4
CHEM 112	General Chemistry II	4
	MATH 141 or 180	3-4
	Total credits:	**42-43**

Category Descriptions

BIOL Upper Division Electives (x3-4)

Credits: 12

Must include one botany elective and one zoology elective.

MATH 141 or 180

Credits: 3-4

Item #	Title	credits
MATH 141	Introduction to Probability and Statistics	3
MATH 180	Precalculus	4

Minor in Biology

Required Courses

Item #	Title	credits
BIOL 111	General Biology I	4
BIOL 112	General Biology II	4
	BIOL Minor - Electives (6 hours must be upper division)	10
	Total credits:	**18**

Category Descriptions

BIOL Minor - Electives (6 hours must be upper division)

Credits: 10

See advisor for list of classes.

Minor in Life Science - Secondary Certification

You must make formal application for admittance to the Teacher Education Program. Applications are available at the Education Department Office.

Minor in Life Science - Secondary Certification

Item #	Title	credits
BIOL 111	General Biology I	4
BIOL 112	General Biology II	4
BIOL 230	Ecology	4
BIOL 320	Genetics	4
BIOL 419	Philosophy of Science	3
	LIfe Science Minor Electives - upper division (x2)	8
	Total credits:	**27**

Category Descriptions

LIfe Science Minor Electives - upper division (x2)

Credits: 8

Item #	Title	credits
BIOL 314	Systematic Botany	4
BIOL 318	Microbiology & Immunology	4
BIOL 325	Field Ecology	4
BIOL 333	Parasitology	3
BIOL 335	Limnology	4
BIOL 341	Cell and Molecular Biology II	4
BIOL 345	Environment and Mankind	4
BIOL 360	Plant Biology	4
BIOL 410	Human Physiology	4
BIOL 443	Comparative Vertebrate Anatomy	4
BIOL 450	Histology	4
BIOL 455	Immunology	3
BIOL 465	Plant Physiology	4

Biological Sciences Classes

BIOL 101: Anatomy & Physiology I

An integrated study of the anatomy and physiology of human organ systems with a focus on homeostasis and the role of cellular processes involved with maintaining that homeostasis. Topics include basic cell biology and histology, skin, skeletal, reproductive, endocrine, cardiovascular, and immune systems. Does not apply toward a biology major or minor. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Program: Biological Sciences
Semester Offered: Fall

BIOL 102: Anatomy & Physiology II

An integrated study of the anatomy and physiology of human organ systems with a focus on homeostasis and the role of cellular processes involved with maintaining that homeostasis. Topics include the cardiovascular, immune, respiratory, digestive, urinary, muscular, and nervous systems, as well as an introduction to metabolism, nutrition, and chemical balance. Does not apply toward a biology major or minor. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Program: Biological Sciences
Semester Offered: Spring

BIOL 103: Human Biology

This is a survey course, concerning the structure and function of the human body. Important themes in this course include understanding our bodies' systems, the impact of disease and injury, as well as disease prevention and the principles of healthful living. This course fulfills the Life Science Competency requirement as specified in the Core Curriculum. Does not apply toward a biology major or minor. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Program: Biological Sciences
Semester Offered: Fall

BIOL 111: General Biology I

A survey course covering the basic disciplines of life science. Topics include cell biology, metabolism, genetics, molecular biology, natural history, and microorganisms. A full sequence of high school biology and chemistry is highly recommended. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Program: Biological Sciences
Semester Offered: Fall

BIOL 112: General Biology II

A survey course covering the basic disciplines of life science. Topics include protists, fungi, plants, animals, and ecology. Basic animal anatomy and physiology is emphasized. A full sequence of high school biology and chemistry is highly recommended. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Program: Biological Sciences
Semester Offered: Spring

BIOL 210: Introduction to Geographic Information Systems

This course is designed to provide students with a basic, hands-on introduction to Geographic Information Systems (GIS). Students will be taught the basic tools and skills needed for using GIS software, specifically QGIS, to capture, analyze, manage, and display spatial and non-spatial data.

Credits: 3
Program: Biological Sciences
Semester Offered: Spring even years

BIOL 220: Microbiology and Immunology

Introduction to the structure, function and control of microorganisms in the environment with special emphasis on those organisms of medical importance. Introduction to immune responses and mechanisms including antibody and host-antigen interactions, and humoral and cellular immunological response mechanisms. 3 Theory 1 Lab. Lab fee. (Biology or MLS majors should take BIOL 318.)

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Program: Biological Sciences
Semester Offered: Fall

BIOL 225: Field Biology

This course is a field study of the plants, animals, natural features, and climate of a particular region of North America, an island archipelago, or perhaps another continent, and may involve camping and extensive travel to National Parks, games reserves, and natural areas. It includes the study of ecological relationships in the selected study area. Offered concurrently with BIOL 325. Non-Biology majors should register for BIOL 225.) A field trip fee will be charged commensurate with the distance traveled. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Program: Biological Sciences
Semester Offered: Spring

BIOL 230: Ecology

This course will examine the principles governing relationships between organisms and the physical and chemical environment and among organisms. Important topics will include population and community dynamics, ecosystem processes, and the distribution of the earth's biomes. The principles of ecology will be brought to bear on issues such as conservation of biodiversity and wise use of natural resources. The laboratory includes a four-day field trip. 3 Theory 1 Lab. Field trip fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Fall

BIOL 298: Individual Study Topics

A study in an area of student interest under the direction of a staff member. This study may involve data collection, or library work and will involve a written report. Content and method of study must be arranged prior to registration. May be repeated for a total of 3 credits.

Credits: 1-3
Prerequisites:

BIOL 111
BIOL 112
Instructor approval required.
Program: Biological Sciences
Semester Offered: Periodically

BIOL 299: Directed Group Study Topics

Provides academic departments an opportunity to offer courses in specialized or experimental areas, either lower or upper division, not listed in the undergraduate *Bulletin*. May be repeated for a total of 3 credits.

Credits: 1-3
Prerequisites:
Approval by department chair
Program: Biological Sciences
Semester Offered: Periodically

BIOL 314: Systematic Botany

This is a taxonomic study of the flowering plants of Texas. It includes methods for identification and preservation of plant specimens. Laboratory includes a four-day field trip. Field trip fee. 3 Theory 1 Lab

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Spring odd years

BIOL 315: Field Invertebrate Zoology

A taxonomic and ecological study of invertebrates from marine, freshwater, and terrestrial environments. Some attention is focused on the direct role of invertebrates on human life. Laboratory studies include field work locally and at the Texas Gulf Coast. Field trip fee covering cost of transportation, room and board, and use of a research vessel. 3 Theory 1 Lab. Field trip fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Periodically

BIOL 318: Microbiology & Immunology

This course is an introduction to the structure, function and control of microorganisms in the environment with special emphasis on those organisms of medical importance. Included is an introduction to immune responses and mechanisms, antibody and host-antigen interactions, bursal and thymic influences on the lymphoid system, and humoral and cellular immunological response mechanisms. Students cannot take both BIOL220 and this course for credit. (Class counts toward a Biology or MLS major.) 3 Theory 1 Lab. Lab fee.

Credits: 4

Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Fall

BIOL 320: Genetics

The study of inheritance and the molecular mechanisms which impact it with an emphasis on problem-solving and independent laboratory work. Course requires a comprehensive written report of results from a semester-long laboratory project. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Spring

BIOL 325: Field Ecology

This course is a field study of the plants, animals, natural features, and climate of a particular region of North America, an island archipelago, or perhaps another continent and may involve camping and extensive travel to National Parks, game reserves, and natural areas. It includes the study of ecological relationships in the selected study area. This intensive field course may involve camping and extensive travel to National Parks, game reserves, and natural areas. A field trip fee will be charged commensurate with the distance traveled. Offered concurrently with BIOL 225. Biology majors or minors should register for BIOL 325.) 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Spring

BIOL 328: Biostatistics

Students will learn basic statistical skills, such as hypothesis testing, probability, statistical inference, correlation, regression, curve fitting, and population and sample comparison techniques. Students will also learn to analyze data and generate appropriate graphs using R, SPSS, and Excel.

Credits: 3
Prerequisites:
BIOL 230
MATH 141
Program: Biological Sciences
Semester Offered: Spring

BIOL 330: Bacteriology and Virology

Biology of bacteria, viruses, fungi, and other microorganisms, and their interactions with their environment. Includes surveys of microbial diversity and taxonomy, human-microbe relationships, environmental and industrial microbiology. Bacteria and viruses will be used in the laboratory to provide training and experimental methodology. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
BIOL 320
Program: Biological Sciences
Semester Offered: Periodically

BIOL 331: Vertebrate Ectotherms

Lectures will introduce students to topics of importance to the study of fishes, amphibians, and reptiles. In lecture, we will focus on anatomy, physiology, taxonomy, ecology, behavior, and conservation. In laboratories, we will focus on external anatomy, identification skills, habitat preferences, distribution, and collection techniques. Emphasis will be placed on the fauna in north Texas, but we will also discuss fishes, amphibians, and reptiles of the world in lectures.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Fall, even years

BIOL 333: Parasitology

This course is a comparative survey of the primary parasites of human and veterinary importance with an emphasis on morphology, life cycles, epidemiology, pathogenesis and the interface between the parasite and the host immune system. Students will develop a global perspective of the burden of parasitic diseases and will analyze current literature in molecular parasitology topics.

Credits: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Periodically

BIOL 335: Limnology

In this course, we will examine topics dealing with the biological and ecological characteristics and economic importance of surface waters, including lakes, streams, and wetlands. Specific topics will include light and heat in aquatic environments, dissolved gasses, nutrients, dynamics of phytoplankton, periphyton, and consumers, and the impact of human society on natural surface waters. Laboratory includes a four-day field trip. Field trip fee. 3 Theory 1 Lab.

Credits: 4

Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 230
Program: Biological Sciences
Semester Offered: Spring even years

BIOL 336: Endotherms

Lectures will introduce students to topics of importance to the study of birds and mammals. In lecture, we will focus on anatomy, physiology, taxonomy, ecology, behavior, and conservation. In laboratories, we will focus on external anatomy, identification skills, habitat preferences, distribution, and collection techniques. Emphasis will be placed on the fauna in north Texas, but we will also discuss birds and mammals of the world in lectures.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Fall, odd years

BIOL 340: Cell and Molecular Biology I

A study of the internal workings of the cell. The molecular basis of various cell activities is emphasized. Particular attention is paid to molecular genetics, DNA replication, protein synthesis, regulation of gene expression, and methods in molecular biology. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 320
Program: Biological Sciences
Semester Offered: Fall

BIOL 341: Cell and Molecular Biology II

A study of the internal workings of the cell. The molecular basis of various cell activities is emphasized. Particular attention is paid to membrane structure and transport mechanisms, cellular energetics, cell signaling, the cell cycle, cell division in embryonic development, and apoptosis. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 340
Program: Biological Sciences
Semester Offered: Spring

BIOL 345: Environment and Mankind

Environmental science is a discipline that encompasses learning in the sciences, and touches on human development, governance and policy, and ethics. This course will provide the student with the tools to think critically about the

environment and how human decisions and activities influence the quality of our lives and the other creatures we share the earth with. We will engage in lecture, discussion, debate and group projects concerning the impact of environmental problems, such as waste management, climate change, water issues, biodiversity, air pollution, human population, and resource use by society. We will also focus on local problems concerning our environment (Also taught as HNRS 345). 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Program: Biological Sciences
Semester Offered: Spring

BIOL 346: Environmental and Natural Resources Law and Policy

This course will introduce students to the fundamentals of environmental and natural resources law and policy. By gaining an understanding of the structural framework of our legal system and how environmental and natural resources policies and laws are made and administered, students will develop the practical tools necessary to oversee compliance with relevant state and federal regulations.

Credits: 3
Program: Biological Sciences
Semester Offered: Fall

BIOL 360: Plant Biology

This is a broad course emphasizing the importance of plants and their role in human life. This is an applied botany course in which physiology, structure, development, and economic botany are studied. The systematic survey section will include algae, mosses, non-seed plants, and seed plants. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
or permission of instructor
Program: Biological Sciences
Semester Offered: Spring even years

BIOL 410: Human Physiology

This course explores the inner workings of the human body and how it maintains homeostasis. Emphasis is placed on understanding structure-function relationships and the interconnectedness of organ systems. Students learn diagnostic problem-solving skills, quantitative laboratory techniques used by physiologists, and methods to evaluate health information using peer-reviewed sources. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111, 112 or BIOL 101, 102
Program: Biological Sciences
Semester Offered: Fall, even years

BIOL 419: Philosophy of Science

A study of the philosophies and methodologies of science. Includes a review of the history of scientific and religious thought and the role each has played in the development of modern theories of origin (Also taught as RELT 419 or GEOL 419 or HNRS 404).

Credits: 3
Program: Biological Sciences
Semester Offered: Spring

BIOL 420: Animal Behavior

This course covers the topic of animal behavior— how animals interact with each other, with other living beings, and with their environment. Both proximate causes of behavior and ultimate causes of behavior will be covered. Special emphasis will be given to developing experimental design, data collection techniques, and hypothesis testing. Topics to be covered include: natural selection and adaptive change; hypothesis testing; ecology of feeding and antipredatory strategies; habitat use and competition for resources; sexual selection and the ecology of mating and parenting strategies; the ecology of social behavior; evolution of cooperation and altruism; ecological constraints on communication; and sociobiology. 3 Theory 1 Lab. Lab fee. (Also taught as PSYC 420)

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 112
Recommended Prerequisite or permission of the instructor
Program: Biological Sciences
Semester Offered: Fall, even years

BIOL 443: Comparative Vertebrate Anatomy

An introduction to the classification and diversity of chordates and a comparison of the different vertebrate organ systems. Special consideration will be given to taxonomic comparisons of the skeletal and muscular systems. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Fall, even years

BIOL 450: Histology

An investigation of the structure and function of the tissues of the human body. The course is lab-intensive and is intended to acquaint the student with the microscopic characteristics of tissues. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112

Program: Biological Sciences
Semester Offered: Fall, odd years

BIOL 455: Immunology

This course presents the basic concepts of the innate and adaptive immune systems including details about the molecules, cells and organs involved. Emphasis will be placed on mechanisms of immune system development and response to pathogens, as well as on the classic experiments performed to make key discoveries in immunology.

Credits: 3
Prerequisites:
BIOL 320
Program: Biological Sciences
Semester Offered: Spring even years

BIOL 465: Plant Physiology

This is a study of primary plant metabolic processes, including the movement of materials in and out of plant cells and within plants, photosynthesis, respiration, mineral nutrition, and nitrogen metabolism. Other topics include environmental physiology such as the effects of temperature, salt, and water stress and the implications of globally rising carbon dioxide. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 111
BIOL 112
Program: Biological Sciences
Semester Offered: Fall

BIOL 474: Management of Plant Resources

This integrative course focuses on physiological attributes and ecological principles as they are applied to the conservation and management of wetlands, rangelands, and forests, including their soils. We will also discuss how conservation and management are influenced by politics and law, history, culture, social acceptability, and economic feasibility. Lab activities will involve field trips and hands on experiences in soils, wetlands, rangelands, and forests. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3
Lecture Hours: 3
Prerequisites:
BIOL 230
Program: Biological Sciences
Semester Offered: Fall, even years

BIOL 475: Management of Fish & Wildlife Resources

This integrative course focuses on ecological principles as they are applied to the conservation and management of fisheries and wildlife resources. We will also discuss how conservation practices are influenced by politics and law, culture, social acceptability, and economic feasibility. In the lab, you will be introduced to the techniques and equipment used to survey fisheries and wildlife populations. 3 Theory 1 Lab. Lab fee.

Credits: 4
Lab Hours: 3

Lecture Hours: 3
Prerequisites:
BIOL 230
Program: Biological Sciences
Semester Offered: Fall, odd years

BIOL 480: Research in Biology

A supervised research experience involving the development of a research question, data collection, and data analysis. May be repeated for a total of 6 credits. May count as one Biology Elective with approval of the Department if research results are formally presented. Eligible for IP grading.

Credits: 3
Prerequisites:
Approval of research advisor
Program: Biological Sciences
Semester Offered: Periodically

BIOL 498: Individual Study Topics

Special study may be pursued beyond completed course work under the direction of a staff member. This study may involve data collection or library work and will involve a written report. Content and method of study must be arranged prior to registration. May be repeated for a total of 3 credits.

Credits: 1-3
Prerequisites:
BIOL 111
BIOL 112
Two upper division courses; and permission of the instructor
Program: Biological Sciences
Semester Offered: Periodically

BIOL 499: Directed Group Study Topics

Provides academic departments an opportunity to offer courses in specialized or experimental areas, either lower or upper division, not listed in the undergraduate *Bulletin*. Student may be allowed to repeat the course for credit.

Credits: 1-3
Prerequisites:
BIOL 112
Approval by department chair
Program: Biological Sciences