

# BIOLOGY, MINOR

## Program Description

The Biology Minor provides students from any discipline the opportunity to explore the life sciences beyond the University Core Curriculum. It is recommended that students who wish to take the Biology Minor use Biology I and Biology II to fulfill the Life and Physical Sciences requirement in the University Core Curriculum. **All coursework in the Biology Minor must be from either the Biology BS program, or, with approval, the Biomedical BS program. Non-majors courses in either prefix (BIOL or BIMS) cannot be applied to the Biology Minor.**

Students majoring in Biomedical Sciences **may not** minor in Biology.

## Program Requirements

Code	Title	Hours
<b>Required Courses</b>		
BIOL 1406	Biology I	4
BIOL 1407	Biology II	4
Select one of the following 2000-level courses:		3-4
BIOL 2371	Principles of Evolution	
BIOL 2416	Genetics	
BIOL 2421	Microbiology	
BIOL 2472	Principles of Botany <sup>^</sup>	
<b>Electives</b>		
Select 8-9 hours of upper-level electives (p. 1)		8-9
<b>Total Hours</b>		<b>19-21</b>

<sup>^</sup>

Blended offering

Note: At least one of the required 2000-level courses OR one of the upper division (3000- or 4000-level) electives must have a lab (i.e., must be a 4 SCH course).

## Upper-level Electives

A minor requires at least six hours of upper-division (3000-4000 level) courses. With the exception of the courses listed below, any upper-division course with the BIOL prefix can be taken as an elective provided required prerequisites are met.

Upper division BIMS courses may be taken as electives with approval and if required prerequisites are met.

BIOL 4590 Selected Topics (5 sch) or BIMS 4590 Selected Topics (5 sch) may be taken with approval but no more than 4 hours of Selected Topics coursework can be applied to the Biology Minor.

The following courses **will not** count toward the Biology Minor:

Code	Title	Hours
BIMS 4299 or BIOL 4399	Directed Independent Research	1-2
BIOL/BIMS 4396	Directed Independent Study	1-3

## Courses

### BIOL 1308 Science for Life I (Non-Majors Biology)

#### 3 Semester Credit Hours (3 Lecture Hours)

A non-majors science course. Students will learn basic biological principles, identify the relevance of science in everyday life, and will understand the scientific method. This course does NOT substitute for BIOL 1406 - Biology I or BIOL 1407 - Biology II for science majors. Offered in Spring, Summer, Fall.

TCCNS: BIOL 1308

### BIOL 1406 Biology I

#### 4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)

Presentation of basic biological concepts including scientific method, cytology, energetics, nucleic acids and genetics. This course is suitable for all majors. Offered every semester.

**Prerequisite:** (MATH 1314, 1316, 2305, 2413, minimum score of 24 in 'ACT Math' or minimum score of 580 in 'SAT Math').

**Co-requisite:** SMTE 0091.

TCCNS: BIOL 1406

### BIOL 1407 Biology II

#### 4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)

This course is an overview of the major concepts in biological diversity and plant and animal biology. Laboratory work will include individual/team activities as well as technology-related assignments. Offered every semester.

**Prerequisite:** BIOL 1406.

**Co-requisite:** SMTE 0091.

TCCNS: BIOL 1407

### BIOL 2300 Science Communication

#### 3 Semester Credit Hours (3 Lecture Hours)

This course involves presentation and discussion of selected topics relating to the professional skills of practicing biological scientists, including basic software instruction, a review of library services pertinent to science, the application of scientific literature research skills, hypothesis generation and statistical tests, critical reviews of scientific articles, and an introduction to ethical issues in science. Offered Spring and Fall.

### BIOL 2371 Principles of Evolution

#### 3 Semester Credit Hours (3 Lecture Hours)

An overview of the mechanisms by which heritable information changes, adaptations develop, and species diversify. Provides a foundation for molecular, cellular, and organismal studies in the biological sciences. Offered Fall and Spring.

**Prerequisite:** BIOL 1407.

### BIOL 2401 Anatomy and Physiology I

#### 4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)

Structure and function of the human body emphasizing biological chemistry, cell biology, tissues, and the integumentary, skeletal, muscular, and nervous systems. Offered every semester. Not recommended for majors in the College of Science. To count this course toward a major in the Department of Life Sciences, a student must demonstrate that it is required by professional schools in their career track and obtain approval for a substitution from their faculty mentor. Students may not receive credit for both this course and either BIOL 3425 - Functional Anatomy or BIOL 3430 - Physiology.

**Co-requisite:** SMTE 0091.

TCCNS: BIOL 2401

**BIOL 2402 Anatomy and Physiology II****4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)**

Structure and function of the human body emphasizing blood, growth, development, genetics, and the endocrine, digestive, respiratory, cardiovascular, lymphatic, immune and urogenital systems. Offered every semester. Not recommended for majors in the College of Science. To count this course toward a major in the Department of Life Sciences, a student must demonstrate that is required by professional schools in their career track and obtain approval for a substitution from their mentor. Students may not receive credit for both this course and either BIOL 3425 - Functional Anatomy or BIOL 3430 - Physiology.

**Prerequisite:** BIOL 2401.

**Co-requisite:** SMTE 0091.

**TCCNS:** BIOL 2402

**BIOL 2416 Genetics****4 Semester Credit Hours (3 Lecture Hours)**

Principles of genetic transmissions and molecular basis of heredity and variation. Weekly recitation periods will involve team assignments, problem solving activities, and seminars. Offered Fall and Spring.

**Prerequisite:** BIOL 1406 and 1407.

**TCCNS:** BIOL 2416

**BIOL 2420 Principles of Microbiology****4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)**

Introduction to microorganisms with emphasis on those of importance in patient care. Principles of disinfection, sterilization, immunity. This class is intended for nursing majors; it cannot substitute for BIOL 2421 - Microbiology. Offered Fall and Spring.

**Co-requisite:** SMTE 0092.

**TCCNS:** BIOL 2420

**BIOL 2421 Microbiology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

An introduction to microorganisms including the bacteria, fungi, and viruses. Laboratory involves microbiological techniques and development of basic laboratory skills. Offered Fall and Spring.

**Prerequisite:** BIOL 1406, 1407, CHEM 1411 and 1412.

**Co-requisite:** SMTE 0092.

**TCCNS:** BIOL 2421

**BIOL 2472 Principles of Botany****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Introduction to the structure, function, diversity and application of plants. Laboratory focuses on anatomical features, physiological adaptations, classification, and life cycles. Offered odd Spring.

**Prerequisite:** BIOL 1407 and CHEM 1411.

**Co-requisite:** SMTE 0091.

**BIOL 3300 Animal Nutrition****3 Semester Credit Hours (3 Lecture Hours)**

Examines dietary requirements of companion animals and livestock. Includes anatomy, physiology, and biochemistry of the gastrointestinal system, nutrient procurement and use, feed additives, growth stimulants, metabolic diseases, and diet therapy. Offered odd Spring. Cross-listed with BIMS 3300.

**Prerequisite:** BIOL 1407 and CHEM 3411 and (CHEM 3412 or 3412\*).

\* May be taken concurrently.

**BIOL 3325 Biostatistics****3 Semester Credit Hours (3 Lecture Hours)**

The application of statistical analyses to biological data. Students will gain an understanding of how to apply statistical analyses to biological data through study of the principles of experimental design including how to frame informative research questions. At a fundamental level, these concepts are linked to the philosophy of science and our understanding of the way the world works. Juniors or Seniors only. Offered every Spring.

**BIOL 3345 Cell Physiology****3 Semester Credit Hours (3 Lecture Hours)**

Course emphasizes cellular functions that underlie physiological processes, transport across membranes, membrane potential and excitability, the cell nucleus, and organelles and their relationship to energy, metabolism, and transport mechanisms within the cell. Offered odd Spring.

**Prerequisite:** (BIMS 2200 or BIOL 2300) and BIOL 3410.

**BIOL 3403 Molecular Biology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Principles of molecular biology including advanced concepts of gene structure, expression and regulation, chromatin structure, recombination, and current molecular biology techniques. Laboratory emphasis is on basic skills for nucleic acid analyses, including extraction, PCR amplification, quantification, restriction, and electrophoresis. DNA sequencing-based approaches are covered including bioinformatics for sequence comparisons, polymorphisms, and molecular identification. Offered every Spring. Cross listed with BIMS 3403.

**Prerequisite:** BIOL 2416 and 2421.

**Co-requisite:** SMTE 0092.

**BIOL 3410 Cell Biology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Study of cellular architecture and function. Topics include membranes, transport, organelles, cytoskeleton, and signaling mechanisms. Interrelationships of structure, function, energy and metabolism are explored. Laboratory will emphasize basic techniques of cell biology. Offered every Fall.

**Prerequisite:** BIOL 2416 and CHEM 3411.

**Co-requisite:** SMTE 0092.

**BIOL 3413 Invertebrate Zoology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Structure, life history, and evolution of the invertebrates with special emphasis on the phylogeny and ecological relationships of the major phyla. Laboratory will involve field trips and survey collections. Offered every Fall.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 3414 Vertebrate Zoology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Structure, life history, and evolution of the vertebrates with special emphasis on the phylogeny and ecological relationships of the classes. Laboratory focuses on internal and external anatomy and identification of representative organisms. Offered every Spring.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 3425 Comparative Vertebrate Anatomy****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

General trends in morphological development and adaptation as demonstrated by the anatomy of nonhuman vertebrate species. Offered every Spring. Students may not receive credit for both this course and either BIOL 2401 - Anatomy and Physiology I or BIOL 2402 - Anatomy and Physiology II. Juniors or Seniors only.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 3428 Principles of Ecology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Introduction to the interrelationships of organisms and their environment. Population structure, community classification and regulation, and energy flow in ecosystems will also be covered. Laboratory sections will focus on experimental design and field techniques in ecology.

**Prerequisite:** BIOL 1407 and (BIOL 2200, 2300, BIMS 2200 or UNIV 1101 and UNIV 1102) and CHEM 1411 and (MATH 2413 or 2413<sup>\*</sup>).

<sup>\*</sup> May be taken concurrently.

**Co-requisite:** SMTE 0091.

**BIOL 3430 Physiology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

The study of physiological processes that are the product of complex interactions between tissues, organs and organ systems, with emphasis on the circulatory, respiratory, endocrine, muscular, digestive, and urogenital systems. Particular focus on homeostasis, and the role of the environment and evolution on organ systems. Offered every Fall. Students may not receive credit for both this course and either BIOL 2401 - Anatomy and Physiology I, or BIOL 2402 - Anatomy and Physiology II.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 3455 Plant form and Function****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Anatomy of vegetative and reproductive organs of plants, unique cellular features, development and differentiation of cell and tissue types. Emphasis on physiological mechanisms of response and adaptation to the environment. Offered even Spring.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 3479 Plant Ecology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Structure, physiology, life cycles, and economic impact of plants. Factors influencing diversity, succession and ecological distribution of plants. Offered odd Spring.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4301 Embryology****3 Semester Credit Hours (3 Lecture Hours)**

This course explores the events that occur just prior to and during gestation. Includes gametogenesis, chromosomal and single gene aberrations, teratology, and the development of the body systems. Offered every Fall.

**Prerequisite:** BIOL 2416.

**BIOL 4302 Coral Reef Conservation****3 Semester Credit Hours (3 Lecture Hours)**

Survey of challenges and threats facing coral reef ecosystems in the 21st century and discussion of conservation and management strategies. Topics include biology and ecology of reef ecosystems, climate change impacts, coral bleaching, over-fishing and effectiveness of and design of marine protected areas. Juniors or Seniors only. Offered every Fall.

**BIOL 4304 Biology of Viruses****3 Semester Credit Hours (3 Lecture Hours)**

Introduction to the study of viruses, including viral life cycles, replication schemes and Baltimore classification of representative bacteriophages, plant and animal viruses. Emphasis on analysis and review of primary literature on viruses. Offered Summer II every year.

**Prerequisite:** BIOL 2416, 2421 and CHEM 1411.

**BIOL 4307 Fungal Biology and Ecology****3 Semester Credit Hours (3 Lecture Hours)**

Overview of the fungi, including their characteristics, diversity, and ecology. Interactions between fungi and other organisms are explored along with the role and importance of the fungi. Juniors or Seniors only. Offered odd Spring. Stacked with BIOL 5307.

**Prerequisite:** BIOL 2421.

**BIOL 4308 Biogeography****3 Semester Credit Hours (3 Lecture Hours)**

This course offers an overview of the theories, methods, and current directions in modern biogeography, emphasizing marine and terrestrial plant and animal species and communities. Offered even Spring.

**BIOL 4311 Biological Bases of Behavior****3 Semester Credit Hours (3 Lecture Hours)**

This lecture-based course examines the processes by which neuronal circuits generate behaviors and the mechanisms by which experience modulates the activity of these circuits. Offered every Fall.

**Prerequisite:** BIMS 4323.

**BIOL 4312 Mariculture Techniques****3 Semester Credit Hours (3 Lecture Hours)**

Application of biological, mechanical, and other concepts required to develop the skills and techniques necessary for efficient operation and management of public and private aquaculture facilities. Offered odd Fall.

**Prerequisite:** BIOL 4370.

**BIOL 4315 Animal Behavior****3 Semester Credit Hours (3 Lecture Hours)**

What mechanisms cause behavior? How does behavior develop? How does behavior affect survival and reproduction? How does behavior evolve? These questions will be explored in vertebrate and invertebrate species. Junior or Senior only. Offered every Fall. Stacked with BIOL 5315.

**BIOL 4319 Biology of Marine Mammals****3 Semester Credit Hours (3 Lecture Hours)**

Introduction to marine mammals, with a focus on their interactions with their biotic and abiotic environment. Juniors or Seniors only. Offered every Fall. Stacked with BIOL 5319.

**Prerequisite:** BIOL 1407.

**BIOL 4323 Global Change Ecology****3 Semester Credit Hours (3 Lecture Hours)**

An introduction to the effects of climatic and anthropogenic change on terrestrial and aquatic structure and function. Includes readings from the current literature and discussion of controversial articles. Offered odd Spring.

**Prerequisite:** BIOL 3428.

**BIOL 4328 Fisheries****3 Semester Credit Hours (3 Lecture Hours)**

A study of theory and techniques in fisheries science, including practical fisheries sampling designs and techniques, behavior of fisheries populations and application to resource management with emphasis in tide-influenced waters. Includes readings in the current literature. Offered even Spring.

**Prerequisite:** BIOL 1407.

**BIOL 4330 Conservation Biology****3 Semester Credit Hours (3 Lecture Hours)**

Principles and theories relating to the conservation of biological diversity, including patterns and processes creating biological diversity, estimates of extinction rates, consequences of losses of biodiversity and causes of diversity loss. Juniors or Seniors only. Offered every Fall.

**Prerequisite:** BIOL 3428.

**BIOL 4334 Biology and Ecology of Coral Reefs****3 Semester Credit Hours (3 Lecture Hours)**

This course will introduce the biology of corals, describe the abiotic and biotic interactions among coral reef ecosystem inhabitants, identify the threats of climate change, and discuss the conservation and management of reefs for the future. Offered every Spring.

**Prerequisite:** BIOL 3428.

**BIOL 4336 Marine Ecology****3 Semester Credit Hours (3 Lecture Hours)**

Habitats and community structure in marine environments; biotic and abiotic factors governing the distribution of marine organisms. Offered every Spring.

**Prerequisite:** BIOL 3428.

**BIOL 4340 Genomics, Proteomics and Bioinformatics****3 Semester Credit Hours (3 Lecture Hours)**

An introduction to integrative biological study using genome-wide approaches and bioinformatics. The "-omics" technologies (Genomics, Proteomics, Metabolomics, etc.) will be surveyed for current and potential contributions to understanding biological function at molecular, cellular, organismal and ecosystem levels. Offered every Fall. Stacked with BIOL 5340.

**Prerequisite:** BIOL 2416 and (BIOL 3410, 3403 or CHEM 4401).

**BIOL 4343 Oceans and Human Health****3 Semester Credit Hours (3 Lecture Hours)**

Healthy oceans are essential to the habitability of our planet – for humans and all other forms of life. Students will explore links between oceans, pollution, human well-being, ecosystem services, resource management, and the science and legislation governing the enforcement of water quality standards. Juniors or Seniors only. Offered every Fall.

**BIOL 4350 Research and Design****1-4 Semester Credit Hours (1-3 Lecture Hours, 3 Lab Hours)**

Course will include experimental design, literature review of a research topic and laboratory work on the research topic. Consent of Instructor.

**BIOL 4353 Down the River: Biology of Gulf Coast Fishes****3 Semester Credit Hours (3 Lecture Hours)**

This course covers aspects of ecology and biogeography of riverine and estuarine fishes while exposing students to field sampling techniques and museum preparation of specimens. This will be a unique opportunity for students to gain an in-depth understanding of the biological complexity of Texas Gulf Coast river systems while gaining hands-on experience in field and museum ichthyological techniques that are employed by state, federal and academic researchers alike. Offered during Maymester.

**Co-requisite:** SMTE 0091.

**BIOL 4355 Public Aquarium and Animal Care Operations****3 Semester Credit Hours (3 Lecture Hours)**

This course examines the unique requirements needed for public aquariums and zoos to balance animal care and health with public display for general education and conservation research. Offered during Summer.

**Co-requisite:** SMTE 0091.

**BIOL 4360 Computation for 21st Century Biologists****3 Semester Credit Hours (3 Lecture Hours)**

This course is designed to prepare and enable students to use computational tools for bioinformatic applications in advanced courses and independent research projects. Students will be introduced to powerful open-source computing tools used in biological research for creation, organization, manipulation, processing, analysis, and archiving of big data. While not a formal requirement, it is assumed that students have a firm command of basic algebra. Juniors or Seniors only. Offered every Fall. Stacked with BIOL 5360.

**BIOL 4370 Mariculture****3 Semester Credit Hours (3 Lecture Hours)**

Survey of the physiological, behavioral, environmental, and economic parameters governing the culture of selected aquatic species. Included are techniques employed worldwide to produce aquatic products. Offered every Fall. Cross-listed with FAMA 5370.

**Prerequisite:** BIOL 1407.

**BIOL 4396 Directed Independent Study****1-3 Semester Credit Hours (1-3 Lecture Hours)**

Research in areas of current interest. Written report required. May be repeated for a maximum of 6 semester hours.

**Prerequisite:** BIOL 1407 and CHEM 1412.

**BIOL 4399 Directed Independent Research****3-6 Semester Credit Hours (3-6 Lecture Hours)**

Independent laboratory- or field-based research project on topic of current interest. Project developed in conjunction with a faculty advisor. Written report required. May be repeated once for a total of 6 semester credit hours. Sophomores or Juniors or Seniors and Permission of Instructor (faculty advisor).

**BIOL 4406 Immunology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

An overview of immunology with emphasis on current knowledge of the immune system. Detailed examination of the specific cells, cytokines, antibodies, and molecules that comprise the immune system. Laboratory exercises demonstrate the basic principles and techniques used in immunologic studies. Offered every Spring semester. Cross listed with BIMS 4406.

**Prerequisite:** BIOL 2421.

**Co-requisite:** SMTE 0092.

**BIOL 4408 Microbial Diversity and Ecology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Biodiversity and roles of microorganisms in natural environments. Interactions with other micro- and macro-organisms (humans, animals and plants) and with abiotic factors. Unique abilities of microorganisms such as nitrogen fixation and adaptation to extreme environments. Offered every Fall. Stacked with BIOL 5408; Cross-listed with MARB 6408.

**Prerequisite:** BIOL 2421 and 3428.

**Co-requisite:** SMTE 0092.

**BIOL 4410 Mammalogy****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Systematics and ecology of mammals including mammalian origins, structure and function, diversity, ecology, behavior, and conservation. Juniors or Seniors only. Offered even Fall. Stacked with BIOL 5410.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4413 Entomology****4 Semester Credit Hours (3 Lecture Hours)**

A broad overview of the natural history, classification, phylogeny, ecology, behavior, development and physiology of insects and their kin. The lab will involve field work, collection and curation. Juniors and Seniors only. Offered even Spring. Stacked with BIOL 5413.

**Prerequisite:** BIOL 3413.

**Co-requisite:** SMTE 0091.

**BIOL 4425 Ornithology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Systematics, anatomy, physiology, ecology, behavior, and field identification of birds. Juniors and Seniors only. Offered odd Fall. Stacked with BIOL 5425.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4429 Marine Botany****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

The ecology of marine plants with emphasis on identification, life histories, and environmental factors of distribution. Offered every Fall. Stacked with BIOL 5429.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4430 Marine Plankton****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

In this class we will investigate the systematics, distribution, and ecology of major marine plankton groups and introduce major concepts in biological oceanography. Juniors or Seniors only. Offered odd Spring. Stacked with BIOL 5430; Cross-listed with MARB 6430.

**BIOL 4432 Ichthyology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Systematics, evolution, biology, and ecology of fishes. Laboratory identification of marine and freshwater fishes collected during field excursions. Juniors or Seniors only. Offered every Fall. Stacked with BIOL 5432; Cross-listed with MARB 6432.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4433 Parasitology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

An introduction to parasitology with emphasis on internal parasites and appropriate references to human endoparasites and parasites of veterinary importance. Juniors and Seniors only. Offered every Spring.

**Prerequisite:** BIOL 2421.

**Co-requisite:** SMTE 0092.

**BIOL 4439 Case Work Methods in Forensic Anthropology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

This course combines the study of human bones (osteology) and skeletal anatomy with established and validated forensic anthropological methods to solve theoretical and actual forensic cases involving human remains. BIOL 2401 or permission of Instructor. Offered every Spring. Stacked with BIOL 5439; Cross-listed with BIMS 4439.

**Prerequisite:** BIOL 2401.

**BIOL 4442 Herpetology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Systematics, ecology, and behavior of amphibians and reptiles. Juniors or Seniors only. Offered odd Spring. Stacked with BIOL 5442.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4444 Estuarine Organisms****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

Systematics, distribution, and ecology of estuarine macrofauna. Required field trip. Individual study required. Juniors and Seniors only.

**Prerequisite:** BIOL 3413.

**Co-requisite:** SMTE 0091.

**BIOL 4547 Marine Science Field Camp****5 Semester Credit Hours (3 Lecture Hours, 6 Lab Hours)**

Students learn techniques required to properly conduct marine science field research. Practical, hands-on experience is gained in a variety of topics including biotic and abiotic sample collection and processing, quantitative analysis of field data, evaluation of environmental factors, survival and distribution of living organisms, and the structure of biotic communities. Juniors or Seniors. Offered Maymester.

**BIOL 4590 Selected Topics****5 Semester Credit Hours (5 Lecture Hours)**

Variable content. May be repeated for credit.

**BIOL 4598 Biology Internship****6 Semester Credit Hours**

Two to six semester credit hours may be earned by working in an internship position in a governmental agency, private industry, or other appropriate venue.

**BIOL 4609 Field and Sampling Techniques****6 Semester Credit Hours (3 Lecture Hours, 6 Lab Hours)**

The study of techniques required for proper field work in the biological sciences. The course includes ecological sampling methods, safety, logistics, equipment operation and maintenance and travel concerns. Offered in Summer.

**Co-requisite:** SMTE 0091.