

BIOLOGY (BIOL)

BIOL 1102 Medical Terminology 1 Credit

Department: College of Arts and Sciences

An entry-level course which provides basic vocabulary needed to function in the medical environment. Course content stresses prefix and suffix usage derived from Greek and Latin as applied to Biology. This course does not fulfill BS in Biology degree requirements

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 1108 General Biology (Non-Science Majors) Lab 1 Credit

Department: College of Arts and Sciences

This course provides a laboratory experience in biological principles, including chemistry of life, cell structure and function, reproduction, evolution and ecology. THIS COURSE IS NOT INTENDED FOR SCIENCE MAJORS

Corequisite(s): BIOL 1308

Restriction(s):

Students who are registered in the following programs may **not** enroll:

- BA-CHMA
- BA-PSYA
- BS-BIOL
- BS-CHMS
- BS-COSC
- BS-GAMD
- BS-PSYS

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 1115 Plants and Human Society (Non-Majors) Lab 1 Credit

Department: College of Arts and Sciences

A plant-oriented, non-chemically based laboratory course for non-science majors including plant anatomy, growth and development and multiple uses of plants by human society.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 1308 General Biology (Non-Science Majors) 3 Credits

Department: College of Arts and Sciences

Provides a survey of biological principles with an emphasis on humans, including chemistry of life, cell structure and function, reproduction, inheritance, evolution and ecology. THIS COURSE IS NOT INTENDED FOR SCIENCE MAJORS.

Restriction(s):

Students who are registered in the following programs may **not** enroll:

- BA-CHMA
- BA-PSYA
- BS-BIOL
- BS-CHMS
- BS-COSC
- BS-GAMD
- BS-PSYS

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 1315 Plants and Human Society (Non-Majors) 3 Credits

Department: College of Arts and Sciences

A plant oriented, non-chemically based course for non-science majors including plant anatomy, growth and development and multiple uses of plants by human society.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 1406 General Biology I (Majors) 4 Credits

Department: College of Arts and Sciences

A survey of organisms, molecules, cells, tissues, photosynthesis, genetics, and evolution.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 1407 General Biology II (Majors) 4 Credits

Department: College of Arts and Sciences

Plant and vertebrate structure and function, development, reproduction, and ecology.

Prerequisite(s): BIOL 1406

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 2306 Environmental Science 3 Credits

Department: College of Arts and Sciences

An introduction to contemporary environmental issues and human interactions with ecosystems. Not to be used as a biology major course.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 2401 Anatomy and Physiology I 4 Credits

Department: College of Arts and Sciences

Structure and function of cells, tissues, and muscle, skeletal and nervous systems.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 2402 Anatomy and Physiology II 4 Credits

Department: College of Arts and Sciences

Structure and function of the circulatory, digestive, excretory and reproductive systems.

Prerequisite(s): BIOL 2401

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 2420 Microbiology 4 Credits

Department: College of Arts and Sciences

Microorganisms with emphasis on those of medical significance and problems of personal and community health.

Prerequisite(s): (BIOL 1406 and BIOL 1407) or (BIOL 2401 and BIOL 2402)

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 2421 Microbiology for Science Majors 4 Credits**Department:** College of Arts and Sciences

Students in this course will learn specific information on the fundamentals of microbiology including cell types, cell structure, microbial growth and control, microbial metabolism, microbial genetics and biotechnology, microbes and human interactions, microbial pathogenesis and applied and industrial microbiology. Cause and effect relationships between microbial growth and human disease, interpretation of symptomatic and laboratory information in diagnosis of disease, prevention of disease and treatment of diseases are stressed. Laboratory activities will reinforce principles of microbiology, including metabolism, structure, function, genetics and phylogeny of microbes.

Prerequisite(s): (BIOL 1406 and BIOL 1407) or (BIOL 2401 and BIOL 2402)**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 3428 Comparative Anatomy 4 Credits****Department:** College of Arts and Sciences

Comparative anatomy presented from systemic viewpoint.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 3440 Advanced Physiology 4 Credits****Department:** College of Arts and Sciences

General physiology; muscle-nerve relations; digestive, circulatory, respiratory, excretory, nervous and endocrine systems.

Prerequisite(s): BIOL 1406 and BIOL 1407 and CHEM 1411 and CHEM 1412**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 3450 General Botany 4 Credits****Department:** College of Arts and Sciences

Introduction to plant structure and function with emphasis on the seed plants.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 3460 Invertebrate Zoology 4 Credits****Department:** College of Arts and Sciences

Classification, natural history, phylogenetic relationships and economic importance of the invertebrate phyla.

Prerequisite(s): BIOL 1407**Prerequisite(s)/Corequisite(s):** BIOL 1406**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 3470 Genetics 4 Credits****Department:** College of Arts and Sciences

General principles of heredity, including human inheritance.

Prerequisite(s): BIOL 1406 and BIOL 1407 and (BIOL 2420 or BIOL 2421)**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4101 Special Topics 1 Credit****Department:** College of Arts and Sciences

Physiological, anatomical, taxonomic and ecological biology. Laboratory and/or library work and conferences with a faculty member. May be repeated for credit when the area of study differs.

May be Repeated for a maximum of 2 hours

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4201 Special Problems in Biology 2 Credits****Department:** College of Arts and Sciences

Physiological, anatomical, taxonomic, molecular, and ecological biology. Laboratory, field, and/or library work and conferences with a faculty member. May be repeated for credit when the area of study differs.

Restriction(s):Students with a class of Freshman or Sophomore may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4300 Undergraduate Problems 3 Credits****Department:** College of Arts and Sciences

Individual investigation of a research problem in biology. Formal report to be approved by faculty members.

May be Repeated for a maximum of 9 hours

Restriction(s):

Enrollment limited to students with a class of Junior or Senior.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4301 Biology Special Topics 3 Credits****Department:** College of Arts and Sciences

An investigation into specialized areas of Biology under the guidance of a faculty member. This course may be repeated for credit when topics of investigation differ.

May be Repeated for a maximum of 12 hours

Prerequisite(s): BIOL 1406 and BIOL 1407 and (BIOL 2420 or BIOL 2421)**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4302 Conservation Biology 3 Credits****Department:** College of Arts and Sciences

Introduces general concepts of conservation biology, with an emphasis on basic and applied research in such fields as ecology, behavior, population genetics, and systematics, as they relate to the preservation of biodiversity at all levels.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4303 Medical Microbiology 3 Credits****Department:** College of Arts and Sciences

This course will familiarize students with the disease and health relationships between microorganisms and humans. The goal of the course is to have students understand, especially from a molecular point of view, the process by which microorganisms cause disease, virulence factors they possess, portals of entry and the consequences, host responses to disease conditions, the signs and symptoms of a disease, chemical means by which diseases can be treated, methods used for identification of pathogenic organisms and current information on pathogens and infectious diseases. Thus, this course will focus on why the biological properties of organisms are important to disease in humans and will examine etiology, epidemiology, host defenses, identification, diagnoses, prevention and control for each microbe. The course will focus on representative examples of bacterial, fungal, protozoan and viral pathogens.

Prerequisite(s): BIOL 1406 and BIOL 1407 and (BIOL 2420 or BIOL 2421)**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 4307 Life in the Extreme 3 Credits**Department:** College of Arts and Sciences

Course is designed to examine the basic physiological problems that all organisms face and then see these principles applied to extreme environments.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4308 Medical Botany 3 Credits****Department:** College of Arts and Sciences

A writing-intensive course covering the history, current uses and trends, and future prospects of medical botany and medical plant use by human society. Prerequisites: BIOL 1406, 1407, 2421 with a minimum grade of C in each

Prerequisite(s): BIOL 1406 and BIOL 1407 and BIOL 2421**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4344 Development of Biological Thought 3 Credits****Department:** College of Arts and Sciences

The history of biological thought and the development of evolutionary concepts and inheritance will be examined. The influence of prevailing philosophies and social contexts and scientific discoveries on how biological systems and concepts were interpreted and theories were formulated will be emphasized.

Prerequisite(s): PSYC 2317**Prerequisite(s)/Corequisite(s):** BIOL 3470**Restriction(s):**

Students with a class of Freshman, Junior or Sophomore may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4401 Special Topics 4 Credits****Department:** College of Arts and Sciences

Physiological, anatomical, taxonomic and ecological biology. Laboratory and/or library work and conferences with a faculty member. May be repeated for credit when the area of study differs.

May be Repeated for a maximum of 12 hours

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4403 Field Botany 4 Credits****Department:** College of Arts and Sciences

A field-oriented course that will introduce students to the flora of the surrounding region. Emphasis will be placed on the sight identification of common species as well as the use of dichotomous keys in identification to the family level.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4404 Molecular Biology 4 Credits****Department:** College of Arts and Sciences

Concepts and applications of procedures for isolation and identification of components found in cells. Addresses structure and function of proteins and nucleic acids as well as the roles of these molecules in important biochemical processes.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4405 Immunology 4 Credits****Department:** College of Arts and Sciences

Organs, tissues, cells, and molecules of the immune response and their interactions.

Prerequisite(s): BIOL 2420 or BIOL 2421**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4408 Mammalogy 4 Credits****Department:** College of Arts and Sciences

Classification, identification, ecology and natural history of the mammals. Required field trips.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4409 Ornithology 4 Credits****Department:** College of Arts and Sciences

Identification, taxonomy, behavior and biogeography of birds.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4410 Parasitology 4 Credits****Department:** College of Arts and Sciences

A study of the morphology, life history and host-parasite relationships of parasites of man and other animals.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4411 Biomedical Technology and Applications 4 Credits****Department:** College of Arts and Sciences

Introduction to modern biomedical technology topics such as the process of targeted therapeutic development, biomaterials, nanotechnology, tissue engineering, as well as diagnosis and clinical instrumentations. The course will also provide hand-on experience for quantitative PCR gene expression analysis, next generation sequencing principles, 3D printing technologies and molecular-based diagnosis using various bio-markers. A special emphasis on the regulatory, legal and ethics issues related to modern biotechnology will also be discussed.

Prerequisite(s): BIOL 1406 and BIOL 1407 and (BIOL 2420 or BIOL 2421)**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4413 Medical Neuroscience 4 Credits****Department:** College of Arts and Sciences

This senior-level course is an introduction to neuroscience and nervous system disorders. It will focus on cellular and molecular neuroscience in individual nerve cells, and system neuroscience based on the nerve cells connection and performance. The course is designed to provide the foundations needed for upper division courses in the health sciences and related fields.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4416 Field Parasitology 4 Credits****Department:** College of Arts and Sciences

A laboratory field based study of the major parasitic animal groups. Several required field trips.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 4430 Limnology 4 Credits**Department:** College of Arts and Sciences

Fauna, flora, ecology and productivity of fresh water.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4431 Ichthyology 4 Credits****Department:** College of Arts and Sciences

Natural history, taxonomy and ecology of freshwater and marine fishes. Required field trip.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4432 Tropical Terrestrial and Watershed Biology 4 Credits****Department:** College of Arts and Sciences

This is a two part course, combining traditional lecture with practical field experience. The lecture portion will examine the basic principles of terrestrial and aquatic ecology as they apply to tropical watersheds. Special emphasis will be given to the biogeography, water cycle and watersheds, nutrient cycling, biodiversity and evolution, animal natural history, land-sea margins, and conservation of tropical ecosystems. The practical field experience takes the form of a mandatory two week field trip to Belize where students will experience first-hand biographically distinct watersheds, terrestrial biomes, fish and wildlife, as well as interact with native people and cultures.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4435 Environmental Toxicology 4 Credits****Department:** College of Arts and Sciences

Principals of how contaminants are absorbed, transformed, and eliminated in different organisms. Toxin effects on organismal physiology. Student-lead laboratory experimentation and field trips.

Prerequisite(s): BIOL 1406 and BIOL 1407 and CHEM 1411 or (CHEM 1111 and CHEM 1311) and CHEM 1412 or (CHEM 1112 and CHEM 1312)**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4437 Environmental Microbiology 4 Credits****Department:** College of Arts and Sciences

Ecology and application of microorganisms in natural and synthetic environments. Research report writing intensive.

Prerequisite(s): BIOL 2420 or BIOL 2421**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4440 Vertebrate Natural History 4 Credits****Department:** College of Arts and Sciences

Collection, identification and natural history of area fish, amphibians, reptiles, birds and mammals.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4443 Embryology and Development 4 Credits****Department:** College of Arts and Sciences

Students in this course will focus their studies primarily on the embryonic development of vertebrate organisms, although development patterns of some of the invertebrate and even non-animal groups will be visited as well. Pathways and mechanisms of development will be explored at the molecular, cellular, tissue, and organismal levels from pre-fertilization through the complete development of the embryo. The interaction of evolution and development will also be considered.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4445 Herpetology 4 Credits****Department:** College of Arts and Sciences

Classification, evolution, natural history, and conservation of amphibians and reptiles.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4450 Marine Biology 4 Credits****Department:** College of Arts and Sciences

Habitats and community relationships of marine plants and animals.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4452 Tropical Marine Biology 4 Credits****Department:** College of Arts and Sciences

This is a two part course, combining traditional lecture with practical field experience. the lecture portion will examine the basic principles of marine biology as they apply to tropical waters. Special emphasis will be given to the tropical ocean and coastal ecosystems of seagrass beds, mangals and coral reefs. the practical experience takes the form of a two-week field trip to Belize where students will get to examine these systems firsthand as well as interact with native cultures.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4460 Ecology 4 Credits****Department:** College of Arts and Sciences

Quantitative approach to both field and experimental studies. Interrelationships of organisms and their environment.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4470 Cell Biology/Histology 4 Credits****Department:** College of Arts and Sciences

Structural and physiological functions of cells at the biochemical and molecular level. Laboratory emphasis on structure and function of mammalian cells and tissues.

Prerequisite(s): CHEM 3411 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 4480 Aquatic Entomology 4 Credits****Department:** College of Arts and Sciences

Biology, morphology, life history, and classification of aquatic insects. Field trips and personal collection required.

Prerequisite(s): BIOL 1406 and BIOL 1407**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 4490 Comparative Physiology 4 Credits**Department:** College of Arts and Sciences

Course is designed to examine how organisms have solved the problems of gas exchange, circulation, osmoregulation, thermoregulation, locomotion and communication between body parts. Will take an evolutionary view of these solutions and will focus on how organisms maintain homeostasis.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5101 Special Topics 1 Credit****Department:** College of Arts and Sciences

Research in areas other than thesis. May be repeated when topic changes

May be Repeated for a maximum of 4 hours

Restriction(s):Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5110 Graduate Seminar 1 Credit****Department:** College of Arts and Sciences

Current topics in biological research. See requirement 3 under Degree Requirements.

May be Repeated for a maximum of 3 hours

Restriction(s):Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5201 Special Problems in Biology 2 Credits****Department:** College of Arts and Sciences

Physiological, anatomical, taxonomic, molecular, and ecological biology. Laboratory, field, and/or library work and conferences with a faculty member. May be repeated for credit when the area of study differs.

Restriction(s):Students with a class of Freshman or Sophomore may **not** enroll.Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5301 Special Topics 3 Credits****Department:** College of Arts and Sciences

Research in areas other than thesis.

May be Repeated for a maximum of 9 hours

Restriction(s):Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5302 Graduate Conservation Biology 3 Credits****Department:** College of Arts and Sciences

Introduces general concepts of conservation biology, with an emphasis on basic and applied research in such fields as ecology, behavior, population genetics, and systematics, as they relate to the preservation of biodiversity at all levels. Emphasizes analysis and synthesis of scientific literature and communication of scientific knowledge.

Restriction(s):Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5303 Medical Microbiology 3 Credits****Department:** College of Arts and Sciences

An investigation into specialized areas of biology under the guidance of a faculty member.

Prerequisite(s): BIOL 1406 and BIOL 1407 and (BIOL 2420 or BIOL 2421)**Restriction(s):**Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5307 Life in the Extreme 3 Credits****Department:** College of Arts and Sciences

Examines the basic physiological problems that all organisms face and then sees these principles applied to extreme environments.

Restriction(s):Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5344 Dev of Biological Thought 3 Credits****Department:** College of Arts and Sciences

The history of biological thought and the development of evolutionary concepts and inheritance will be examined. The influence of prevailing philosophies and social contexts and scientific discoveries on how biological systems and concepts were interpreted and theories were formulated will be emphasized.

Restriction(s):Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5390 Thesis 3 Credits****Department:** College of Arts and Sciences

Prerequisite: Approval of graduate advisor. Must complete both for required 6 credits.

Restriction(s):Undergraduate level students may **not** enroll.**Grade Mode(s):** Satisfactory/Unsatisfactory, Registrar do not use FN, Registrar do not use FS, Thesis/Dissertation

BIOL 5391 Thesis 3 Credits

Department: College of Arts and Sciences

Prerequisite: Approval of graduate advisor. Must complete both for required 6 credits.

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Satisfactory/Unsatisfactory, Registrar do not use FN, Registrar do not use FS, Thesis/Dissertation, Standard Letter

BIOL 5401 Special Topics 4 Credits

Department: College of Arts and Sciences

Research in areas other than thesis. May be repeated when topic changes

May be Repeated for a maximum of 12 hours

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5403 Field Botany 4 Credits

Department: College of Arts and Sciences

A field-oriented course that will introduce students to the flora of the surrounding region. Emphasis will be placed on the sight identification of common species as well as the use of dichotomous keys in identification to the family level.

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5404 Molecular Biology 4 Credits

Department: College of Arts and Sciences

Concepts and application of procedures for isolation and identification of components found in cells. Addresses structure and function of proteins and nucleic acids as well as the roles of these molecules in important biochemical processes.

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5405 Immunology 4 Credits

Department: College of Arts and Sciences

Organs, tissues, cells, and molecules of the immune response and their interactions.

Prerequisite(s): BIOL 2420 or BIOL 2421

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5406 Parasitology 4 Credits

Department: College of Arts and Sciences

A graduate level study of the morphology, life history and host parasite relationships of parasites of man and other animals.

Prerequisite(s): BIOL 1406 and BIOL 1407

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5409 Graduate Ornithology 4 Credits

Department: College of Arts and Sciences

The lecture will introduce you to the general concepts of avian biology with an emphasis on the evolution, ecology and behavior of birds.

The lecture emphasizes scientific analysis and synthesis of scientific literature and communication of scientific knowledge. The lab will introduce you to the external anatomy of birds and will explore how form is related to function in birds. The lab will also introduce you to the identification of common birds of southeast Texas.

Prerequisite(s): BIOL 1406 and BIOL 1407

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5410 Animal Behavior 4 Credits

Department: College of Arts and Sciences

An analysis of the development and significance of various behavior patterns in animals from an evolutionary point of view.

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5411 Biomedical Technology and Applications 4 Credits

Department: College of Arts and Sciences

Introduction to modern biomedical technology topics such as the process of targeted therapeutic development, biomaterials, nanotechnology, tissue engineering, as well as diagnosis and clinical instrumentations. The course will also provide hands-on experience for quantitative PCR gene expression analysis, next generation sequencing principles, 3D printing technologies and molecular-based diagnosis using various bio-markers. A special emphasis in the regulatory, legal and ethics issues related to modern biotechnology will also be discussed.

Prerequisite(s): BIOL 1406 and BIOL 1407 and (BIOL 2420 or BIOL 2421)

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5412 Graduate Molecular Genetics 4 Credits**Department:** College of Arts and Sciences

In this course you will learn advanced knowledge about human genes and their contribution to human traits and disorders. The course focuses on the mode of inheritance of human genes, structure and organization of the human genome, mapping of the human genome, the technology behind sequencing the human genome, identifying human disease genes, cancer genetics, pharmacogenetics and new approaches to treating diseases (gene therapy). The course is designed to provide academic training to graduate students to extend their knowledge for additional post-graduate training or professional appointment.

Prerequisite(s): BIOL 1406 and BIOL 1407**Restriction(s):**Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5413 Graduate Medical Neuroscience 4 Credits****Department:** College of Arts and Sciences

This course is an introduction to neuroscience and nervous system disorders. It will focus on cellular and molecular neuroscience in individual nerve cells and system neuroscience based on the nerve cells connection and performance. The course is designed to provide the foundations needed for upper division courses in the health sciences and related fields.

Prerequisite(s): BIOL 1406 and BIOL 1407**Restriction(s):**Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5416 Field Parasitology 4 Credits****Department:** College of Arts and Sciences

A laboratory and field based study of the major parasitic animal groups. Several required field trips.

Restriction(s):Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5430 Limnology 4 Credits****Department:** College of Arts and Sciences

A graduate level study of fauna, flora, ecology and productivity of fresh water.

Restriction(s):Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5431 Graduate Ichthyology 4 Credits****Department:** College of Arts and Sciences

Taxonomy of freshwater and marine fishes, current issues in fisheries, experimental design and a professional publication.

Prerequisite(s): BIOL 1406 and BIOL 1407**Restriction(s):**Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5432 Tropical Terrestrial and Watershed Biology 4 Credits****Department:** College of Arts and Sciences

This is a two part course, combining traditional lecture with practical field experience. The lecture portion will examine the basic principles of terrestrial and aquatic ecology as they apply to tropical watersheds. Special emphasis will be given to the biogeography, water cycle and watersheds, nutrient cycling, biodiversity and evolution, animal natural history, land-sea margins, and conservation of tropical ecosystems. The practical field experience takes the form of a mandatory two week field trip to Belize where students will experience first-hand biographically distinct watersheds, terrestrial biomes, fish and wildlife, as well as interact with native people and cultures.

Prerequisite(s): BIOL 1406 and BIOL 1407**Restriction(s):**Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5435 Environmental Toxicology 4 Credits****Department:** College of Arts and Sciences

Principals of how contaminants are absorbed, transformed, and eliminated in different organisms. Toxin effects on organismal physiology. Student-led laboratory experimentation and field trips.

Restriction(s):Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS**BIOL 5437 Environmental Microbiology 4 Credits****Department:** College of Arts and Sciences

Ecology and application of microorganisms in natural and synthetic environments.

Prerequisite(s): BIOL 2420 or BIOL 2421**Restriction(s):**Undergraduate level students may **not** enroll.**Grade Mode(s):** Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5440 Graduate Vertebrate Natural History 4 Credits

Department: College of Arts and Sciences

Collection, identification and natural history of area fish, amphibians, reptiles, birds and mammals. The course emphasizes analysis and synthesis of scientific literature and communication of scientific knowledge.

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5443 Embryology and Development 4 Credits

Department: College of Arts and Sciences

Students in this course will focus their studies primarily on the embryonic development of vertebrate organisms, although development patterns of some of the invertebrate and even non-animal groups will be visited as well. Pathways and mechanisms of development will be explored at the molecular, cellular, tissue, and organismal levels from pre-fertilization through the complete development of the embryo. The interaction of evolution and development will also be considered. Graduate students will have to write an extensive research paper and perform an oral presentation on that paper.

Prerequisite(s): BIOL 1406 and BIOL 1407

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5445 Herpetology 4 Credits

Department: College of Arts and Sciences

Natural history, taxonomy and ecology of amphibians and reptiles. Required field trip.

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5450 Mammalogy 4 Credits

Department: College of Arts and Sciences

Natural history, taxonomy and ecology of mammals. Required field trip.

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5452 Tropical Marine biology 4 Credits

Department: College of Arts and Sciences

This is a two part course, combining traditional lecture with practical field experience. the lecture portion will examine the basic principles of marine biology as they apply to tropical waters. Special emphasis will be given to the tropical ocean and coastal ecosystems of seagrass beds, mangals and coral reefs. the practical experience takes the form of a two-week field trip to Belize where students will get to examine these systems firsthand as well as interact with native cultures.

Prerequisite(s): BIOL 1406 and BIOL 1407

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5455 Marine Biology 4 Credits

Department: College of Arts and Sciences

A graduate level field study and identification of area species; current research. Required field trips.

Prerequisite(s): BIOL 3460 or BIOL 4450

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5460 Ecology 4 Credits

Department: College of Arts and Sciences

A graduate level quantitative approach to both field and experimental studies. Interrelationships of organisms and their environment.

Prerequisite(s): BIOL 1406 and BIOL 1407

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5475 Cell Biology 4 Credits

Department: College of Arts and Sciences

A graduate level study of structural and physiological functions of cells at the biochemical and molecular level. Laboratory emphasis on structure and function of mammalian cells and tissues.

Prerequisite(s): CHEM 3411 and BIOL 1407

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5480 Aquatic Entomology 4 Credits

Department: College of Arts and Sciences

Biology morphology, life history and classification of aquatic insects. Field trips and personal collection required.

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS

BIOL 5490 Comparative Physiology 4 Credits

Department: College of Arts and Sciences

Fundamental physiological processes in animals from the Phylogenetic viewpoint.

Prerequisite(s): MATH 2312 and CHEM 3411 and CHEM 3412 and (BIOL 3460 or BIOL 4440)

Restriction(s):

Undergraduate level students may **not** enroll.

Grade Mode(s): Standard Letter, Registrar do not use FN, Registrar do not use FS