

# FAST TRACK BIOLOGY, BS TO BIOLOGY, MS

## Program Description

The university allows the opportunity for high-achieving students to count a select number of graduate credits toward their undergraduate degree and thereby obtain a graduate degree at an accelerated pace. Students interested in the Fast Track in Biology must meet the following application criteria:

- Currently seeking a BS in Biology at A&M-Corpus Christi.
- Minimum of a 3.0 GPA (with 3.4 GPA in math and science courses) in the last 60 SCH at the time of Fast Track application.
- Classified as a Senior with successful completion of at least 90 SCH, including

Code	Title	Hours
BIOL 1406	Biology I	4
BIOL 1407	Biology II	4
BIOL 2371	Principles of Evolution	3
BIOL 2416	Genetics	4
BIOL 2421	Microbiology	4
BIOL 3428	Principles of Ecology	4
CHEM 1411	General Chemistry I	4
CHEM 1212		
MATH 2413	Calculus I	4
Select one of the following:		
UNIV 1101	First-Year Seminar I	
& UNIV 1102	and First-Year Seminar II	
BIMS 2200	Professional Skills	

Students accepted into the Fast Track program will be given permission to enroll in up to six hours of prescribed graduate courses during their last semester of undergraduate studies. The hours for these graduate courses will “double-count” toward both the (120-hour) undergraduate and (36-hour) graduate programs. The BS and MS degrees will be awarded sequentially (i.e., upon completion of each degree) and not simultaneously. Students will be allowed to continue enrollment in the graduate program upon successful completion of the 120-hour undergraduate degree.

## Admissions Requirements

Applicants must provide the following at the time of application:

- A completed application form. Application fees are waived for Fast Track applicants.
- Official transcripts of all college and university coursework.
- A faculty member must be willing to serve as the chair of the applicant’s Graduate Advisory Committee and the applicant must include a summary of discussions with faculty members in their essay. Students must contact potential advisors prior to and during the application process to discuss research opportunities in faculty member labs.
- An essay (not more than 1000 words) describing educational and career goals and interests as they relate to program faculty.

- Applicants who do not have a faculty member willing to serve as their committee chair at the time of the transition from BS to MS cannot remain in the program.
- Official GRE scores by the time the student is reclassified to MS.

No criterion is weighted more heavily than any other criterion.

Applications received or completed after the deadline for admission during one semester may be considered for admission in the following semester at the applicant’s request. Applicants will be notified of the outcome of their application by email.

## Academic Preparation

A degree candidate who lacks adequate academic preparation may be required by his or her Graduate Advisory Committee to complete undergraduate course work prior to the completion of the MS degree. Such course work (4000-sequence or lower) will be regarded as foundation or prerequisite work and will not count as credit towards the total required for completion of the degree.

## Fast Track Curriculum in the Senior Year

During their last semester of undergraduate studies, BS Biology students accepted into the Fast Track will take up to six hours of approved graduate courses. The hours for these graduate courses will “double-count” toward both the (120-hour) undergraduate and (36-hour) graduate programs.

See the Graduate Catalog for a complete description of the degree requirements for the MS in Biology.

## Courses

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

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

A NON-MAJORS SCIENCE COURSE IN WHICH STUDENTS WILL LEARN BASIC BIOLOGICAL PRINCIPLES, IDENTIFY THE RELEVANCE OF SCIENCE IN EVERYDAY LIFE, AND WILL UNDERSTAND THE SCIENTIFIC METHOD. HANDS-ON LAB ACTIVITIES WILL REINFORCE COURSE CONCEPTS. THIS COURSE DOES NOT SUBSTITUTE FOR BIOL 1406 - BIOLOGY I OR BIOL 1407 - BIOLOGY II FOR SCIENCE MAJORS.

**Co-requisite:** SMTE 0091.

**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.

**Prerequisite:** (MATH 1314, 1316, 2305, 2413, minimum score of 21 in 'ACT Math' or minimum score of 550 in 'SAT Math').

**Co-requisite:** SMTE 0091.

**TCCNS:** BIOL 1406

### BIOL 1407 Biology II

#### 4 Semester Credit Hours (4 Lecture 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.

**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.

**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.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 2401 Anatomy and Physiology I****4 Semester Credit Hours (4 Lecture Hours)**

STRUCTURE AND FUNCTION OF THE HUMAN BODY EMPHASIZING BIOLOGICAL CHEMISTRY, CELL BIOLOGY, TISSUES, AND THE INTEGUMENTARY, SKELETAL, MUSCULAR, AND NERVOUS SYSTEMS. NOT RECOMMENDED FOR MAJORS IN THE COLLEGE OF SCIENCE AND ENGINEERING. 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 HIS OR HER CAREER TRACK AND OBTAIN APPROVAL FOR A SUBSTITUTION FROM HIS OR HER 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 (4 Lecture Hours)**

STRUCTURE AND FUNCTION OF THE HUMAN BODY EMPHASIZING BLOOD, GROWTH, DEVELOPMENT, GENETICS, AND THE ENDOCRINE, DIGESTIVE, RESPIRATORY, CARDIOVASCULAR, LYMPHATIC, IMMUNE AND UROGENITAL SYSTEMS. NOT RECOMMENDED FOR MAJORS IN THE COLLEGE OF SCIENCE AND ENGINEERING. TO COUNT THIS COURSE TOWARD A MAJOR IN THE DEPARTMENT OF LIFE SCIENCES, A STUDENT MUST DEMONSTRATE THAT IS IS REQUIRED BY PROFESSIONAL SCHOOLS IN HIS OR HER CAREER TRACK AND OBTAIN APPROVAL FOR A SUBSTITUTION FROM HIS OR HER FACULTY 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.

**Prerequisite:** BIOL 1406 and 1407.

**TCCNS:** BIOL 2416

**BIOL 2420 Principles of Microbiology****4 Semester Credit Hours (4 Lecture 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.

**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.

**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 FOCUS ON ANATOMICAL FEATURES, PHYSIOLOGICAL ADAPTATIONS, CLASSIFICATION, AND LIFE CYCLES.

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

**Co-requisite:** SMTE 0091.

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

EXAMINES THE DIETARY REQUIREMENTS OF BOTH COMPANION ANIMALS AND LIVESTOCK. INCLUDES THE ANATOMY, PHYSIOLOGY AND BIOCHEMISTRY OF THE GASTROINTESTINAL SYSTEM, NUTRIENT PROCUREMENT AND USE, FEED ADDITIVES, GROWTH STIMULANTS, METABOLIC DISEASES, AND DIET THERAPY. 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.

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

Emphasis on 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 during Spring semester of odd-numbered years

**Prerequisite:** BIOL 2200 or BIMS 2200 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. CROSS LISTED WITH BIMS 3403.

**Prerequisite:** BIOL 2416 and 2421.

**Co-requisite:** SMTE 0092.

**BIOL 3410 Cell Biology****4 Semester Credit Hours (4 Lecture 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.

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

**Co-requisite:** SMTE 0092.

**BIOL 3413 Invertebrate Zoology****4 Semester Credit Hours (3 Lecture Hours, 1 Lab Hour)**

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.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

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

STRUCTURE, LIFE HISTORY, AND EVOLUTION OF THE VERTEBRATES WITH SPECIAL EMPHASIS ON THE PHYLOGENY AND ECOLOGICAL RELATIONSHIPS OF THE CLASSES. LABORATORY WILL INVOLVE FIELD TRIPS AND SURVEY COLLECTIONS.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 3425 Functional Anatomy****4 Semester Credit Hours (4 Lecture Hours)**

GENERAL TRENDS IN MORPHOLOGICAL DEVELOPMENT AND ADAPTATION AS DEMONSTRATED BY THE ANATOMY AND EMBRYOLOGY OF LIVING AND EXTINCT CHORDATES. 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 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\*).

\* May be taken concurrently.

**Co-requisite:** SMTE 0091.

**BIOL 3430 Physiology****4 Semester Credit Hours (4 Lecture 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. 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.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

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

STRUCTURE, PHYSIOLOGY, LIFE CYCLES, AND ECONOMIC IMPACT OF PLANTS. FACTORS INFLUENCING DIVERSITY, SUCCESSION AND ECOLOGICAL DISTRIBUTION OF PLANTS.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4100 RESEARCH ETHICS AND PROFESSIONALISM****1 Semester Credit Hour (1 Lecture Hour)**

A COURSE DESIGNED TO ENHANCE THE PROFESSIONALISM OF UNDERGRADUATE RESEARCHERS. THIS COURSE DISCUSSES THE CODIFIED ASPECTS OF RESEARCH ETHICS, INCLUDING FABRICATION, FALSIFICATION AND PLAGIARISM OF DATA; ASSIGNING AUTHORSHIP, SUBMITTING MANUSCRIPTS TO MORE THAN ONE JOURNAL AND MANAGEMENT OF LAB TEAMS. IT ALSO ADDRESSES CAREERS IN SCIENCE, RESUME WRITING, PRODUCING THE SUCCESSFUL APPLICATION AND INTERVIEWING SKILLS.

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

STUDIES 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.

**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, COARAL BLEACHING, OVER-FISHING AND THE EFFECTIVENESS AND DESIGN OF MARINE PROTECTED AREAS.

**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.

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

**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 SPRING EVEN YEARS.

**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.

**Prerequisite:** BIMS 4323.

**BIOL 4312 Mariculture Techniques****3 Semester Credit Hours (2 Lecture Hours, 2 Lab Hours)**

THE STUDY AND HANDS-ON 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 IN FALL OF ODD-NUMBERED YEARS.

**Prerequisite:** BIOL 4370.

**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

**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 SPRING ODD YEARS.

**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 SPRING EVEN YEARS.

**Prerequisite:** BIOL 1407.

**BIOL 4329 Fisheries Techniques****3 Semester Credit Hours (2 Lecture Hours, 3 Lab Hours)**

THIS CLASS IS DESIGNED TO PROVIDE PRACTICAL EXPERIENCE IN THE THEORY AND APPLICATION OF TRADITIONAL AND MODERN FISHERIES SAMPLING AND ANALYTICAL TECHNIQUES USED IN FISHERIES SCIENCE AND MANAGEMENT. THIS IS A HANDS-ON FIELD- AND LABORATORY-BASED COURSE THAT WILL DEVELOP SKILLS THAT ARE MOST COMMONLY USED BY FISHERIES BIOLOGISTS AND TECHNICIANS. OFFERED IN FALL OF EVEN-NUMBERED YEARS.

**Prerequisite:** BIOL 4328.

**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 4335 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.

**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.

**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.

**Prerequisite:** BIOL 2416 and 3410 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. OFFERED FALL EVERY YEAR.

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

COURSE WILL INCLUDE EXPERIMENTAL DESIGN, LITERATURE REVIEW OF A RESEARCH TOPIC AND LABORATORY WORK ON THE RESEARCH TOPIC.

**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.

**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.

**Co-requisite:** SMTE 0091.

**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.

**Prerequisite:** BIOL 1407.

**BIOL 4371 Population Genetics****3 Semester Credit Hours (3 Lecture Hours)**

AN INTRODUCTION TO EVOLUTIONARY PROCESSES AND THEIR GENETIC BASIS, THIS COURSE FOCUSES ON THEORETICAL AND EXPERIMENTAL APPROACHES TO THE STUDY OF POPULATION GENETICS, QUANTITATIVE GENETICS, EVOLUTIONARY ECOLOGY, AND MOLECULAR EVOLUTION. OFFERED FALL ODD YEARS.

**Prerequisite:** BIOL 2416 and MATH 2413.

**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)**

3-6 sem. hrs. 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

**BIOL 4405 Limnology****4 Semester Credit Hours (4 Lecture Hours)**

THE STUDY OF THE FUNCTIONAL RELATIONSHIPS AND PRODUCTIVITY OF AQUATIC COMMUNITIES AS THEY ARE AFFECTED BY THEIR PHYSICAL, CHEMICAL, AND BIOTIC ENVIRONMENT. THE INFLUENCE OF MAN'S ACTIVITIES ON THESE SYSTEMS WILL BE THE FOCUS OF THE COURSE.

**Prerequisite:** BIOL 3428.

**Co-requisite:** SMTE 0091.

**BIOL 4406 Immunology****4 Semester Credit Hours (4 Lecture 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. CROSS LISTED WITH BIMS 4406.

**Prerequisite:** BIOL 2421.

**Co-requisite:** SMTE 0092.

**BIOL 4408 Microbial Diversity and Ecology****4 Semester Credit Hours (4 Lecture 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.

**Prerequisite:** (BIOL 2421 or 4328).

**Co-requisite:** SMTE 0092.

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

SYSTEMATICS AND ECOLOGY OF MAMMALS.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4411 Animal Behavior****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

AN UNDERSTANDING OF WHY ANIMALS BEHAVE IN THE MANNER THEY DO, THROUGH EXAMINATION OF BOTH INVERTEBRATE AND VERTEBRATE SPECIES.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4413 Entomology****4 Semester Credit Hours (4 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. OFFERED SPRING EVEN YEARS.

**Prerequisite:** BIOL 3413.

**Co-requisite:** SMTE 0091.

**BIOL 4417 Field Biology****4 Semester Credit Hours (1 Lecture Hour, 6 Lab Hours)**

FIELD BIOLOGY IS A HANDS-ON COURSE DESIGNED TO TEACH STUDENTS KEY CONCEPTS BY IMMERSING THEM IN NATURE. TOPICS INCLUDE ADAPTATIONS OF PLANTS AND ANIMALS IN DIFFERENT HABITATS, FOOD WEB INTERACTIONS, AND HOW BIOTIC AND ABIOTIC FORCES INTERACT TO STRUCTURE NATURAL COMMUNITIES INCLUDING SPATIAL AND TEMPORAL VARIATION IN COMMUNITIES.

**Prerequisite:** BIOL 3428.

**Co-requisite:** SMTE 0091.

**BIOL 4422 Plant Taxonomy****4 Semester Credit Hours (4 Lecture Hours)**

PRINCIPLES AND PRACTICE IN THE CLASSIFICATION OF FLOWERING PLANTS. FIELD TRIPS ARE REQUIRED. OFFERED SPRING EVEN YEARS.

**Prerequisite:** BIOL 1407.

**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.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4429 Marine Botany**

**4 Semester Credit Hours (4 Lecture Hours)**

THE ECOLOGY OF MARINE PLANTS WITH EMPHASIS ON IDENTIFICATION, LIFE HISTORIES, AND ENVIRONMENTAL FACTORS OF DISTRIBUTION.

**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. OFFERED IN SPRING OF ODD-NUMBERED YEARS.

**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.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4433 Parasitology**

**4 Semester Credit Hours (4 Lecture Hours)**

AN INTRODUCTION TO PARASITOLOGY WITH EMPHASIS ON INTERNAL PARASITES AND APPROPRIATE REFERENCES TO HUMAN ENDOPARASITES AND PARASITES OF VETERINARY IMPORTANCE.

**Prerequisite:** BIOL 2421.

**Co-requisite:** SMTE 0092.

**BIOL 4435 Biological Microtechniques**

**4 Semester Credit Hours (4 Lecture Hours)**

THEORY AND TECHNIQUES OF PROCESSING SPECIMENS FOR HISTOCHEMISTRY AND MICROSCOPIC EXAMINATION. LABORATORY INCLUDES PREPARATION OF TISSUES AND SMALL SPECIMENS FOR ANALYSIS AND DISPLAY.

**Prerequisite:** BIOL 1407 and CHEM 3411.

**Co-requisite:** SMTE 0092.

**BIOL 4442 Herpetology**

**4 Semester Credit Hours (4 Lecture Hours)**

SYSTEMATICS, ECOLOGY, AND BEHAVIOR OF AMPHIBIANS AND REPTILES. OFFERED SPRING ODD YEARS.

**Prerequisite:** BIOL 1407.

**Co-requisite:** SMTE 0091.

**BIOL 4444 Estuarine Organisms**

**4 Semester Credit Hours (4 Lecture Hours)**

SYSTEMATICS, DISTRIBUTION, AND ECOLOGY OF ESTUARINE MACROFAUNA AND MACROFLORA. WEEKEND FIELD TRIPS AND INDIVIDUAL STUDY REQUIRED.

**Prerequisite:** BIOL 3413.

**Co-requisite:** SMTE 0091.

**BIOL 4446 Tropical Ecosystems & Conservation**

**4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

SURVEY OF THE ECOLOGY AND CONSERVATION ISSUES OF THE MAJOR ECOSYSTEMS IN THE TROPICS AND FIELD TECHNIQUES USED TO STUDY TROPICAL FOREST ECOLOGY. OFFERED FALL ODD YEARS.

**Prerequisite:** BIOL 3428.

**Co-requisite:** SMTE 0091.

**BIOL 4452 Ecology and Evolution of Fishes**

**4 Semester Credit Hours (3 Lecture Hours, 4 Lab Hours)**

THIS COURSE COVERS ASPECTS OF FISH ECOLOGY FROM INDIVIDUAL, POPULATION, COMMUNITY, AND ECOSYSTEM LEVELS. WE DISCUSS THE ROLE OF THE ENVIRONMENT ON FISH PHYSIOLOGY AND BEHAVIOR, FOOD-WEB DYNAMICS, COMMUNITY ASSEMBLY AND DIVERSITY, ECOSYSTEM INTERACTIONS, AND ANTHROPOGENIC IMPACTS ON FISHES WITH A FOCUS ON CONSERVATION.

**Prerequisite:** BIOL 4432.

**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.

**BIOL 4590 Selected Topics**

**5 Semester Credit Hours (5 Lecture Hours)**

VARIABLE CONTENT. MAY BE REPEATED FOR CREDIT.

**BIOL 4598 Biology Internship**

**2-6 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**

**3-9 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.

**Co-requisite:** SMTE 0091.

**BIOL 5102 Graduate Defense Seminar**

**1 Semester Credit Hour**

PRESENTATION OF RESEARCH CONDUCTED FOR MS DEGREE. SHOULD BE TAKEN THE LAST SEMESTER OF RESIDENT GRADUATE STUDY. OPEN ONLY TO MS THESIS AND NON-THESIS DEGREE CANDIDATES IN BIOLOGY. STUDENTS CAN ENROLL IN ANY SEMESTER WITH THE APPROVAL OF THEIR GRADUATE ADVISORY COMMITTEE CHAIR.

**BIOL 5301 CORAL REEF SYSTEMS**

**3 Semester Credit Hours (3 Lecture Hours)**

**BIOL 5304 Virology**

**3 Semester Credit Hours (3 Lecture Hours)**

SURVEY OF BACTERIOPHAGES AND MAJOR PATHOGENIC PLANT AND ANIMAL VIRUSES INCLUDING BALTIMORE CLASSIFICATION, VIRAL REPLICATION, AND EMERGING VIRAL DISEASES. EMPHASIS ON ANALYSIS AND REVIEW OF PRIMARY LITERATURE ON VIRUSES.

**Prerequisite:** BIOL 2416, 2421 and CHEM 3412.

**BIOL 5308 Biogeography****3 Semester Credit Hours (3 Lecture Hours)**

SELECTED READING, DISCUSSION AND PROJECTS CONCERNING THE GEOGRAPHIC DISTRIBUTION OF PLANTS AND ANIMALS. OFFERED IN SPRING EVEN YEARS.

**Prerequisite:** BIOL 3428 and 3414.

**BIOL 5309 Systematics****3 Semester Credit Hours (3 Lecture Hours)**

THEORIES, METHODS, MOLECULAR AND EVOLUTIONARY BASIS OF SYSTEMATIC BIOLOGY; AND RULES AND RELATIONSHIPS OF NOMENCLATURE USED IN CLASSIFICATION.

**BIOL 5310 PHYSIOLOGICAL ADAPTATIONS IN ANIMALS****3 Semester Credit Hours (3 Lecture Hours)**

A STUDY OF THE PHYSIOLOGICAL ADAPTATIONS OF ANIMALS TO THEIR ENVIRONMENT, INCLUDING OSMOREGULATORY AND TEMPERATURE REGULATORY MECHANISMS.

**Prerequisite:** BIOL 3430.

**BIOL 5311 Cellular Bases of Behavior****3 Semester Credit Hours (3 Lecture Hours)**

USING VERTEBRATE AND INVERTEBRATE ANIMAL MODELS, THIS GRADUATE-LEVEL COURSE EXPLORES HOW BEHAVIORS EMERGE FROM THE ACTIVITY OF NEURAL CIRCUITS AND HOW EXPERIENCE MODULATES THESE CIRCUITS.

**BIOL 5319 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.

**BIOL 5322 Molecular Genetics****3 Semester Credit Hours (3 Lecture Hours)**

IN-DEPTH STUDY OF THE MOLECULAR BASIS OF GENETIC INTERACTIONS; FOCUS ON MOLECULAR MECHANISMS OF MUTATION, SUPPRESSION AND RECOMBINATION.

**Prerequisite:** CHEM 3412, BIOL 2416 and 3403.

**BIOL 5329 Plant Adaptations****3 Semester Credit Hours (3 Lecture Hours)**

EMPHASIS ON LIVING GYMNOSPERMS AND ANGIOSPERMS AND THEIR ADAPTIVE SIGNIFICANCE.

**BIOL 5334 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.

**BIOL 5335 Aquatic Microbiology****3 Semester Credit Hours (3 Lecture Hours)**

TYPES AND DISTRIBUTION OF MICROORGANISMS IN AQUATIC ENVIRONMENTS. INTERACTIONS WITH OTHER ORGANISMS. ROLE IN NUTRIENT CYCLING, DEGRADATION OF ORGANIC SUBSTANCES, POLLUTION, WATER PURIFICATION.

**Prerequisite:** BIOL 2421.

**Co-requisite:** SMTE 0092.

**BIOL 5340 GENOMICS, PROTEOMICS AND BIOINFORMATICS****3 Semester Credit Hours (3 Lecture Hours)**

INTEGRATIVE BIOLOGICAL STUDY USING GENOME-WIDE APPROACHES AND BIOINFORMATICS. THE "-OMICS" TECHNOLOGIES (GENOMICS, PROTEOMICS, METABOLOMICS, ETC) WILL BE REVIEWED.

APPLICATIONS TO UNDERSTANDING BIOLOGICAL FUNCTION IN VARIOUS BIOLOGICAL DISCIPLINES WILL BE EMPHASIZED. OFFERED DURING FALL. CROSS LISTED WITH MARB 6342.

**Prerequisite:** BIOL 2416 and 3410 or CHEM 4301.

**BIOL 5355 Public Aquarium and Animal Care Operations****3 Semester Credit Hours (3 Lecture Hours)**

THIS COURSE EXAMINES THE UNIQUE REQUIREMENTS NEEDED FOR AQUARIUMS AND ZOOS TO BALANCE ANIMAL CARE AND HEALTH WITH PUBLIC DISPLAY FOR GENERAL EDUCATION AND CONSERVATION RESEARCH.

**Co-requisite:** SMTE 0091.

**BIOL 5371 EVOLUTIONARY GENETICS****3 Semester Credit Hours (3 Lecture Hours)**

An advanced introduction to evolutionary processes and their genetic basis, focusing on theoretical and experimental approaches to the study of population genetics, phylogeography, coalescence theory, evolutionary ecology, and molecular evolution.

**BIOL 5392 Thesis Proposal****3 Semester Credit Hours**

THESIS TRACK STUDENTS MUST COMPLETE A PROPOSAL FOR THEIR THESIS PROJECT. A PROPOSAL IS CONSIDERED COMPLETE WHEN IT IS APPROVED AND SIGNED BY ALL MEMBERS OF THE STUDENT'S GRADUATE ADVISORY COMMITTEE. OPEN ONLY TO THESIS TRACK STUDENTS IN THE MS BIOLOGY PROGRAM. QUALIFIED STUDENTS CAN ENROLL IN ANY SEMESTER WITH THE APPROVAL OF THEIR GRADUATE ADVISORY COMMITTEE CHAIR.

**BIOL 5393 Thesis Research****3 Semester Credit Hours**

IMPLEMENTATION OF THE THESIS PROPOSAL, AND THE PRODUCTION OF A ROUGH DRAFT OF THE THESIS SUBMITTED FOR INITIAL EDITING AND COMMENT. A COURSE SECTION WILL BE CREATED FOR THE STUDENT TO ENROLL. STUDENTS CAN ENROLL IN ANY SEMESTER WITH THE APPROVAL OF THEIR GRADUATE ADVISORY COMMITTEE CHAIR.

**Prerequisite:** BIOL 5392.

**BIOL 5394 Thesis Submission****3 Semester Credit Hours**

THE FINAL DRAFT OF THE THESIS IS COMPLETED, APPROVED BY THE GRADUATE ADVISORY COMMITTEE, AND IS READIED FOR DISTRIBUTION. STUDENTS CAN ENROLL IN ANY SEMESTER WITH THE APPROVAL OF THEIR GRADUATE ADVISORY COMMITTEE CHAIR.

**Prerequisite:** (BIOL 5392 and 5393).

**BIOL 5396 Directed Independent Study****1-3 Semester Credit Hours (1-3 Lecture Hours)**

STUDY IN AREAS OF CURRENT INTEREST. CREDIT IS NOT GIVEN FOR RESEARCH ON THE THESIS PROJECT. A TOTAL OF SIX SEMESTER HOURS OF DIRECTED INDEPENDENT STUDY MAY BE COUNTED TOWARD THE MS DEGREE.

**BIOL 5397 Directed Research****3 Semester Credit Hours**

FOR STUDENTS IN THE MS BIOLOGY PROFESSIONAL TRACK. FIELD, LABORATORY, AND/OR LIBRARY RESEARCH THAT RESULTS IN THE PRODUCTION OF THE PROFESSIONAL PAPER, ITS APPROVAL BY THE GRADUATE ADVISORY COMMITTEE, AND ITS FINAL SUBMISSION. STUDENTS CAN ENROLL IN ANY SEMESTER WITH THE APPROVAL OF THEIR GRADUATE ADVISORY COMMITTEE CHAIR. THIS COURSE MUST BE SUCCESSFULLY COMPLETED FOR THE PROFESSIONAL TRACK STUDENT TO COMPLETE THE MS DEGREE.

**BIOL 5406 Immunology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

AN IN-DEPTH STUDY OF IMMUNOLOGY. EMPHASIZES FUNCTION AND INTERACTION OF SPECIFIC CELLS, CYTOKINES, LYMPHOKINES, ANTIBODIES AND MOLECULES THAT ARE THE ESSENTIAL COMPONENTS OF THE IMMUNE SYSTEM. THE COURSE INCLUDES UP-TO-DATE COVERAGE OF BOTH INNATE AND ADAPTIVE IMMUNITY, AND THE IMMUNE SYSTEM IN HEALTH AND DISEASE.

**Prerequisite:** BIOL 2421.

**Co-requisite:** SMTE 0092.

**BIOL 5408 Microbial Ecology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

RELATIONSHIPS BETWEEN MICROORGANISMS AND THEIR BIOTIC AND ABIOTIC ENVIRONMENTS. ROLE OF MICROORGANISMS IN BIOGEOCHEMICAL CYCLING. METHODOLOGY IN MICROBIAL ECOLOGY. BIOTECHNOLOGICAL ASPECTS.

**Co-requisite:** SMTE 0092.

**BIOL 5410 Mammalogy****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

THE COURSE IS DESIGNED FOR GRADUATE STUDENTS IN BIOLOGY WANTING TO ACQUIRE A MORE DETAILED WORKING KNOWLEDGE AND APPRECIATION OF MAMMALIAN DIVERSITY IN STRUCTURE, FUNCTION, ETHOLOGY, AND ECOLOGY. KNOWLEDGE AND SKILLS ACQUIRED IN THIS COURSE WILL BE USEFUL TO FIELD AND LABORATORY STUDIES IN ECOLOGY, EVOLUTION, ANIMAL BEHAVIOR, BIOGEOGRAPHY, WILDLIFE MANAGEMENT, AND RELATED DISCIPLINES.

**Co-requisite:** SMTE 0091.

**BIOL 5411 Ethology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

ADAPTIVE ASPECTS OF ANIMAL BEHAVIOR.

**Co-requisite:** SMTE 0091.

**BIOL 5412 ECOLOGY OF FRESH WATERS****4 Semester Credit Hours (4 Lecture Hours)**

Ecological relationships and productivity of freshwater communities, including rivers, lakes and wetlands. Focus is on interactions of the physical, chemical and biotic environment and influence of human activities on systems.

**Co-requisite:** SMTE 0091.

**BIOL 5414 Growth and Development****4 Semester Credit Hours (4 Lecture Hours)**

SPECIAL TOPICS INVOLVING GROWTH AND DEVELOPMENT IN PLANTS AND ANIMALS.

**Co-requisite:** SMTE 0092.

**BIOL 5415 Biology of Estuarine Organisms****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

SYSTEMATICS, DISTRIBUTION, AND ECOLOGY OF ESTUARINE MACROFAUNA AND MACROFLORA. WEEKEND FIELD TRIPS AND INDIVIDUAL STUDY REQUIRED.

**Prerequisite:** BIOL 3413.

**Co-requisite:** SMTE 0091.

**BIOL 5417 Field Biology****4 Semester Credit Hours (1 Lecture Hour, 6 Lab Hours)**

FIELD BIOLOGY IS A HANDS-ON COURSE DESIGNED TO TEACH STUDENTS KEY CONCEPTS BY IMMERSING THEM IN NATURE. TOPICS INCLUDE ADAPTATIONS OF PLANTS AND ANIMALS IN DIFFERENT HABITATS, FOOD WEB INTERACTIONS, AND HOW BIOTIC AND ABIOTIC FORCES INTERACT TO STRUCTURE NATURAL COMMUNITIES INCLUDING SPATIAL AND TEMPORAL VARIATION IN COMMUNITIES.

**Prerequisite:** BIOL 3428.

**Co-requisite:** SMTE 0091.

**BIOL 5420 Application of Molecular Techniques****4 Semester Credit Hours (4 Lecture Hours)**

APPLICATION OF DNA-RNA TECHNOLOGY TO SELECTED SCIENTIFIC PROBLEMS. EMPHASIS ON CURRENT RESEARCH TECHNIQUES.

**Prerequisite:** BIOL 3403 and CHEM 3411.

**Co-requisite:** SMTE 0092.

**BIOL 5422 Plant Taxonomy****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

EXPERIMENTAL AND ANALYTICAL APPROACHES TO PLANT VARIATION AND EVOLUTION, BREEDING SYSTEMS, CYTO- AND MOLECULAR GENETICS, HYBRIDIZATION AND PHYLOGENY. THE COURSE WILL PRESENT A FOUNDATIONAL APPROACH TO THE METHODS, RESEARCH AND TERMINOLOGY OF PLANT SYSTEMATICS AND SUMMARIZE INFORMATION ON THE MOST RECENT KNOWLEDGE OF EVOLUTIONARY RELATIONSHIPS AS WELL AS PRACTICAL INFORMATION VITAL TO FIELD WORK.

**Co-requisite:** SMTE 0091.

**BIOL 5425 Ornithology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

THE COURSE IS DESIGNED FOR GRADUATE STUDENTS IN BIOLOGY WANTING TO ACQUIRE A MORE DETAILED WORKING KNOWLEDGE AND APPRECIATION OF AVIAN DIVERSITY IN STRUCTURE, FUNCTION, ETHOLOGY, AND ECOLOGY. KNOWLEDGE AND SKILLS ACQUIRED IN THIS COURSE WILL BE USEFUL TO FIELD AND LABORATORY STUDIES IN ECOLOGY, EVOLUTION, ANIMAL BEHAVIOR, BIOGEOGRAPHY, WILDLIFE MANAGEMENT, AND RELATED DISCIPLINES.

**Co-requisite:** SMTE 0091.

**BIOL 5426 AVIAN BIOLOGY****4 Semester Credit Hours (4 Lecture Hours)**

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**Co-requisite:** SMTE 0091.

**BIOL 5427 COASTAL ECOLOGY OF TEXAS****4 Semester Credit Hours (4 Lecture Hours)**

Study of the ecology and environmental issues of the Texas coast. Includes field trips along the entire Texas coastline.

**Co-requisite:** SMTE 0091.



**BIOL 5428 FISHERIES BIOLOGY****4 Semester Credit Hours (4 Lecture Hours)**

Advanced study of theory and techniques in fisheries science including behavior of fisheries populations and applications to resource management with emphasis in tidal-influenced waters. Includes readings in the current literature and a research project. The laboratory will emphasize practical sampling design and data interpretation.

**BIOL 5429 Marine Botany****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

MARINE PLANTS ARE A DIVERSE GROUP THAT INCLUDES UNICELLULAR ALGAE, SEAWEEEDS, SEAGRASSES, SALT MARSHES, AND MANGROVE FORESTS. THE GOAL IS TO PRESENT TAXONOMIC, PHYSIOLOGICAL, CHEMICAL, AND ECOLOGICAL ASPECTS OF MARINE PLANTS, THEIR ADAPTATIONS, AND HOW ABIOTIC AND BIOTIC FACTORS INTERACT IN THEIR COMMUNITIES. THE USE OF RECENT JOURNALS AND ORIGINAL SCIENTIFIC RESEARCH WILL ALLOW THE STUDENT TO EVALUATE ANTHROPOGENIC EFFECTS TO THESE COMMUNITIES AND DEVELOP METHODS OF RESTORATION AND MANAGEMENT.

**Co-requisite:** SMTE 0091.

**BIOL 5430 Marine Plankton****4 Semester Credit Hours (4 Lecture Hours)**

INVESTIGATION OF THE SYSTEMATICS, DISTRIBUTION, AND ECOLOGY OF MARINE PLANKTON. CROSS LISTED WITH MARB 6430.

**Co-requisite:** SMTE 0091.

**BIOL 5431 Phycology****4 Semester Credit Hours (4 Lecture Hours)**

STUDY OF THE MAJOR GROUPS OF FRESHWATER AND MARINE ALGAE; MORPHOLOGY, ECOLOGY, SYSTEMATICS, LIFE CYCLES, AND PHYSIOLOGY. LABORATORIES EMPHASIZE COLLECTION, IDENTIFICATION, AND CULTURING TECHNIQUES.

**Co-requisite:** SMTE 0092.

**BIOL 5432 Ichthyology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

THE STUDY OF FISH ENCOMPASSING SPECIES DIVERSITY, NATURAL HISTORY, AND EVOLUTIONARY AND ECOLOGICAL RELATIONSHIPS OF FISHES. THIS COURSE WILL CONSIST OF FOUR MAJOR PARTS: (1) EVOLUTION, (2) SYSTEMATICS, (3) BIOLOGY, AND (4) ECOLOGY OF FISH. LABORATORY IDENTIFICATION OF MARINE AND FRESHWATER FISHES FROM THE UNIVERSITY ARCHIVES AND COLLECTED DURING FIELD EXCURSIONS.

**Co-requisite:** SMTE 0091.

**BIOL 5435 Biological Microtechniques****4 Semester Credit Hours (2 Lecture Hours, 4 Lab Hours)**

THE THEORY AND PRACTICE OF USING HISTOCHEMICAL AND MICROSCOPIC TECHNIQUES TO PREPARE TISSUES AND SMALL SPECIMENS FOR RESEARCH ANALYSIS.

**Prerequisite:** CHEM 3411.

**Co-requisite:** SMTE 0092.

**BIOL 5436 Marine Ecological Processes****4 Semester Credit Hours (4 Lecture Hours)**

ADVANCED STUDIES IN STRUCTURE AND HABITATS OF MARINE ENVIRONMENTS. EMPHASIS ON FACTORS INFLUENCING DISTRIBUTION OF MARINE ORGANISMS, INCLUDING FIELD TRIPS TO AREAS ALONG THE TEXAS COAST.

**Prerequisite:** BIOL 3428.

**Co-requisite:** SMTE 0091.

**BIOL 5437 ECOLOGY OF MARINE PLANTS****4 Semester Credit Hours (4 Lecture Hours)**

**Co-requisite:** SMTE 0091.

**BIOL 5442 Herpetology****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

A GLOBAL PERSPECTIVE AND CURRENT RESEARCH TOPICS ON THE BIOLOGY OF AMPHIBIANS AND REPTILES. OFFERED IN SPRING ODD YEARS.

**Co-requisite:** SMTE 0091.

**BIOL 5446 Tropical Ecology and Conservation****4 Semester Credit Hours (4 Lecture Hours, 3 Lab Hours)**

THIS IS AN OVERVIEW COURSE IN MAJOR ECOSYSTEMS IN BOTH THE NEW AND OLD WORLD TROPICS, THE ECOLOGICAL PRINCIPLES AT WORK IN THESE SYSTEMS, AND THE CURRENT THREATS AND CONSERVATION APPROACHES BEING USED. IT WILL BE A HYBRID COURSE INCLUDING LECTURES AND JOURNAL READINGS/DISCUSSION (SEMINAR-STYLE). OFFERED FALL ODD YEARS.

**Prerequisite:** BIOL 3428.

**BIOL 5452 Ecology and Evolution of Fishes****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

THIS COURSE COVERS ASPECTS OF FISH ECOLOGY FROM INDIVIDUAL, POPULATION, COMMUNITY, AND ECOSYSTEM LEVELS. WE DISCUSS THE ROLE OF THE ENVIRONMENT ON FISH PHYSIOLOGY AND BEHAVIOR, FOOD-WEB DYNAMICS, COMMUNITY ASSEMBLY AND DIVERSITY, ECOSYSTEM INTERACTIONS, AND ANTHROPOGENIC IMPACTS ON FISHES WITH A FOCUS ON CONSERVATION.

**Co-requisite:** SMTE 0091.

**BIOL 5590 Special Topics****5 Semester Credit Hours (5 Lecture Hours)**

AN ADVANCED STUDY OF A BIOLOGICAL TOPIC. MAY BE REPEATED WITH FULL CREDIT IN ANOTHER AREA OF BIOLOGY. TOPICS VARY BY SEMESTER.

**BIOL 5609 Field and Sampling Techniques****3-6 Semester Credit Hours (3 Lecture Hours, 6 Lab Hours)**

EXPERIENCE IN FIELD STUDIES, ORGANIZING FIELD NOTES, COLLECTING AND METHODS OF PRESERVING ORGANISMS FOR TEACHING AND MUSEUM PURPOSES. THE COURSE INCLUDES FIELD ECOLOGICAL SAMPLING METHODS, ENVIRONMENTAL DATA COLLECTION, SAFETY, LOGISTICS, AND PROPER SCIENTIFIC EQUIPMENT OPERATION.

**Co-requisite:** SMTE 0091.

**BIOL 5940 Project Research****1-9 Semester Credit Hours (1-9 Lecture Hours)**

RESEARCH RELATED TO THE MS PROJECT. OPEN ONLY TO DEGREE CANDIDATES IN BIOLOGY WITH CONSENT OF THE GRADUATE ADVISOR. THIS COURSE MAY BE REPEATED AS NEEDED BUT A MAXIMUM OF 4 HOURS CAN BE APPLIED TO THE MS DEGREE IN BIOLOGY. COURSE IS TAKEN AS CREDIT/NON-CREDIT. STUDENTS CAN ENROLL IN ANY SEMESTER WITH THE APPROVAL OF THEIR GRADUATE ADVISORY COMMITTEE CHAIR.

**BIOL 6371 EVOLUTIONARY GENETICS****3 Semester Credit Hours (3 Lecture Hours)**

**BIOL 6446 TROPICAL ECOLOGY&CONSERVATION**

**4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

TROPICAL ECOLOGY AND CONSERVATION Ecological processes and conservation issues in the tropics. Laboratory focuses on field techniques used to study tropical forest ecology. Principals of Ecology (BIOL 3428) or equivalent, or permission of instructor. SMTE 0091 is a co-requisite for this course. Documented completion of this safety training is required early in the semester for continued participation in this course.

**Co-requisite:** SMTE 0091.