

MARB - MARINE BIOLOGY (MARB)

MARB 101 Succeeding in Science

Credits 3. 2 Lecture Hours. 2 Lab Hours. An orientation of the biological sciences including the nature of science, functions of scientists, and a better understanding of the fundamentals of science; hands-on experiences that provide opportunities to work with faculty, graduate and other undergraduate students.

MARB 214 Evolutionary Biology

Credits 3. 3 Lecture Hours. Conceptual examination of evolutionary theory; not a survey of specific organismal evolutions; evidence for the abiotic origin; discussion of micro-evolutionary (including drift and natural selection) and macro-evolutionary (including evolutionary trends) mechanisms; application of these concepts to human evolution. **Prerequisites:** BIOL 111.

MARB 215 Marine Zoology

Credits 4. 3 Lecture Hours. 3 Lab Hours. The study of multicellular animal life and the traits, adaptations, and ecology of major metazoan groups, emphasizing patterns of evolutionary change. Includes laboratory dissections and exploration of preserved displays to reinforce lecture material and provide supplemental information to the topics discussed in lecture. **Prerequisite:** BIOL 111.

MARB 285 Directed Studies

Credits 1 to 4. 1 to 4 Other Hours. Special topics and problems in field and/or laboratory work suited to analysis by individuals or small groups concerning aspects of marine biology. Usually requires a report describing techniques and results. Only 3 credit hours may be used in the degree plan curriculum. **Prerequisites:** 2.25 GPR, Approval of instructor.

MARB 289 Special Topics in Marine Biology

Credits 1 to 4. 1 to 4 Lecture Hours. Study of selected topics in an identified area of marine biology. **Prerequisite:** Approval of instructor.

MARB 300 Scientific Methods in Marine Biology

Credits 2. 1 Lecture Hour. 3 Lab Hours. An introduction to field, laboratory and analytical methods, equipment and instruments; field portion includes making proper observations, sampling techniques, and data recording; laboratory portion includes sample analysis methods, use of instruments, introduction to data analysis including elementary statistics, introduction to scientific literature and report writing style. **Prerequisites:** BIOL 112; junior or senior classification or approval of instructor.

MARB 301 Genetics

Credits 4. 3 Lecture Hours. 3 Lab Hours. Fundamental principles of genetics; physical basis of Mendelian inheritance; expression and interaction of genes, linkage, sex linkage, biochemical nature of genetic material, and mutation. **Prerequisite:** BIOL 111.

MARB 302 The Sea World Experience

Credits 3. 2 Lecture Hours. 3 Lab Hours. Exploration of marine organisms, survey topics in vertebrate marine biology and the role that aquatic oriented parks play in education, research and conservation; hands-on experiences by participating in aspects of maintaining aquatic organisms in captivity including animal care and nutrition, physiology, behavior, animal training and water quality; exposure to marine organismal taxonomy, natural history, anatomy and ecology. **Prerequisites:** BIOL 111 with a grade of C or better; GPA greater than 2.00.

MARB 303 Biostatistics

Credits 4. 3 Lecture Hours. 3 Lab Hours. Descriptive statistics, data visualization, probability and probability distribution, parameter estimation, and testing of hypotheses, analysis of variance, correlation and regression, parametric and non-parametric techniques with emphasis on methods applied to biological investigations. **Prerequisite:** MATH 142, MATH 147 or MATH 151.

MARB 310 Introduction to Cell Biology

Credits 4. 3 Lecture Hours. 3 Lab Hours. Cell physiology, the regulation of gene expression, protein structure and function, the aggregation of cells to form tissues, neurons and current paradigms in cell biology. **Prerequisites:** MARB 215 or BIOL 112; CHEM 227.

MARB 311 Ichthyology

Credits 4. 3 Lecture Hours. 3 Lab Hours. Freshwater and marine fishes. Subject will be mainly systematic, but evolution, ecology, life history, and economics of more important species will be treated. **Prerequisite:** BIOL 112 or MARB 215.

MARB 315 Natural History of Vertebrates

Credits 4. 3 Lecture Hours. 3 Lab Hours. Natural history of fishes, amphibians, reptiles, birds, and mammals, with emphasis on coastal Texas vertebrates. **Prerequisite:** BIOL 112 or MARB 215.

MARB 320 Fisheries Techniques

Credits 4. 3 Lecture Hours. 3 Lab Hours. Theory and techniques in fisheries biology and ecology; experience with fisheries equipment and techniques provided in both field and laboratory; practical sampling design, collection and interpretation of data from estuarine, coastal and offshore environments. **Prerequisite:** MARB 311.

MARB 335 Fish Physiology

Credits 3. 3 Lecture Hours. Study of the basic physiology of fishes; examination of fish cardiovascular, renal, digestive, locomotor, reproductive, and central and peripheral nervous systems; discussion of physiological adaptations enhancing survival in a water medium. **Prerequisite:** MARB 215 or BIOL 112; junior or senior classification, or approval of instructor.

MARB 360 Marine Conservation Biology

Credits 4. 3 Lecture Hours. 3 Lab Hours. Lectures and laboratories cover the major principles of conservation biology; a new synthetic field that applies concepts of ecology, systematics and evolution, biogeology, genetics, behavioral sciences, and social sciences to the conservation of marine fisheries resources. Lab exercises include morphometric and genetic variation, GIS, molecular systematics and phylogenetic inference. **Prerequisite:** Junior or senior classification or approval of instructor.

MARB 400 Biology of Marine Mammals

Credits 4. 3 Lecture Hours. 3 Lab Hours. A broad-spectrum course on the taxonomy, evolution, morphology, behavior, and ecology of marine mammals, including sirenians, carnivores, baleen and toothed whales and dolphins. **Prerequisite:** MARB 315.

MARB 401 Physiological Ecology of Marine Mammals

Credits 3. 3 Lecture Hours. 0 Lab Hours. Anatomy, taxonomy, phylogeny and physiological adaptations of marine mammals. **Prerequisite:** MARB 315 or approval of instructor.

MARB 403 Cetacean Behavior and Behavioral Ecology

Credits 3. 3 Lecture Hours. Up to date descriptions of Cetacean behavior and ecology. **Prerequisite:** MARB 315 or approval of instructor.

MARB 405 Marine Parasitology

Credits 3. 3 Lecture Hours. Fundamentals of parasitology, with emphasis on marine applications; survey of major parasites of marine animals and the diseases they cause, especially in ecologically and commercially-important host species. **Prerequisite:** MARB 215 or BIOL 112; junior or senior classification, or approval of instructor.

MARB 406 Life in Extreme Environments

Credits 3. 3 Lecture Hours. Key metabolic and physiological innovations of extremophile organisms; topics include the molecular biology, biochemistry and physiology of organisms living in extreme environments. **Prerequisites:** MARB 315; CHEM 228; junior or senior classification or approval of instructor.

MARB 407 Research and Conservation in Greece-Dolphins, Fisheries and Cultural Heritage

Credits 4. 3 Lecture Hours. 3 Lab Hours. Lectures, readings and labs on the ecology and behavior of the vertebrate fauna of Greece; laboratory hands-on experience of the marine environment from boats, readings, videos, interpretation and select major peer-review scientific papers and books. **Prerequisites:** Junior or senior classification; MARB 315 or approval of instructor.

MARB 408 Marine Botany

Credits 4. 3 Lecture Hours. 3 Lab Hours. Morphology, systematics, ecology, and biochemistry of representative algae, fungi and submarine grasses. **Prerequisites:** BIOL 112 or MARB 215; junior or senior classification, or approval of instructor.

MARB 410 Animal Behavior

Credits 3. 3 Lecture Hours. Examination of ethological concepts; discussion of the development, genetics, physiology and evolution of animal behavior patterns involved in reproduction, territoriality, aggression, communication, population dispersion, sociality and sociobiology of invertebrates and vertebrates. **Prerequisite:** MARB 215 or BIOL 112.

MARB 411 Elasmobranch Ecology

Credits 3. 3 Lecture Hours. Investigation of the ecological processes that shape the life histories and behaviors of sharks, skates and rays, including an introduction to methods used to study elasmobranchs and their applications to conservation and management. **Prerequisite:** MARB 311 or MARB 315; or approval of instructor.

MARB 414 Toxicology

Credits 4. 3 Lecture Hours. 3 Lab Hours. History and scope of toxicology as it applies to mammals; where possible, marine species will be used for examples and assigned papers. **Prerequisites:** MARB 215 or BIOL 112; CHEM 227 and CHEM 228.

MARB 420 Comparative Animal Physiology

Credits 4. 3 Lecture Hours. 3 Lab Hours. Principles of animal physiology are examined using invertebrate and vertebrate model systems; includes osmoregulation in marine versus freshwater versus terrestrial organisms, excretion, fluid circulation, nervous system structure and function, muscle activity, sensory neurobiology and endocrine mediation. **Prerequisites:** BIOL 112 or MARB 215; CHEM 227 and MARB 310.

MARB 421 Community Ecology in the Tropics

Credits 3. 2 Lecture Hours. 3 Lab Hours. Field-based exploration of the connections between producers and consumers in tropical marine ecosystems, including coral reefs, seagrass meadows, and mangrove forests; immersive understanding of symbiotic relationships that shape ecological communities, including mutualism, predation, and competition, with an emphasis on nearshore ecosystems in the tropics. **Prerequisites:** MARB 215; swim test completion; concurrent enrollment in MARB 422.

MARB 422 Tropical Marine Botany

Credits 3. 2 Lecture Hours. 3 Lab Hours. A field-based course exploring the connections between primary producers and organisms that utilize the marine environment; observation, identification, and counting of organisms in tropical marine environments including phytoplankton in coastal waters, coral reefs, seagrass meadows, and mangrove forests. **Prerequisites:** MARB 215; concurrent enrollment in MARB 421; completion of swim test.

MARB 423 Mariculture

Credits 4. 3 Lecture Hours. 3 Lab Hours. Study of factors determining the success of efforts to cultivate estuarine and marine species of economic importance. Mariculture practices used worldwide in the production of algae, mollusks, crustaceans, and fishes will be discussed. **Prerequisite:** Junior or senior classification or approval of instructor.

MARB 425 Marine Ecology

Credits 4. 3 Lecture Hours. 3 Lab Hours. Relationship between various marine environments and their inhabitants; intra- and interspecific relationships between organisms; structure and function among marine communities. Laboratory emphasis is placed on study of living material and natural habitats in the Gulf of Mexico. **Prerequisites:** MARB 315; senior classification or approval of instructor.

MARB 426 Aquatic Animal Nutrition

Credits 3. 3 Lecture Hours. Chemistry, digestion, absorption and intermediary metabolism of nutrient classes with special emphasis on their relationship to warmwater fish nutrition. Determination of nutrient requirements, feed evaluation, feed processing, ration formulation and feeding practices. **Prerequisites:** CHEM 227; junior or senior classification or approval of instructor.

MARB 430 Coastal Plant Ecology

Credits 4. 3 Lecture Hours. 3 Lab Hours. Study of the identification, distribution, production, and ecological importance of estuarine, coastal marsh, and dune vascular plants; the interaction of plants with their abiotic and biotic environments; and techniques of vegetation management and evaluation. **Prerequisite:** BIOL 111; junior or senior classification or approval of instructor.

MARB 433 Applied Bioinformatics

Credits 4. 3 Lecture Hours. 3 Lab Hours. Fundamental concepts and methods in bioinformatics using sequence analysis and practical applications; includes biological databases, sequence and structure alignments, structural bioinformatics, gene prediction and genome analysis; emphasis on understanding and application of these concepts. **Prerequisite:** MARB 301.

MARB 435 Marine Invertebrate Zoology

Credits 4. 3 Lecture Hours. 3 Lab Hours. General biology of marine invertebrate animals; morphology, evolution, and systematics; studies of local fauna in laboratory. **Prerequisite:** BIOL 112 or MARB 215.

MARB 437 Pathology of Marine Animals

Credits 3. 3 Lecture Hours. Examination of changes or loss of physiological function as related to common diseases, viral, bacterial, parasitic, or injury; mechanisms of disease in cells, tissues and organ systems of marine vertebrates; emphasis on marine mammals; fishes and marine reptiles and birds; clinical manifestations, diagnostics and treatments. **Prerequisite:** MARB 315.

MARB 438 Coastal Ornithology

Credits 3. 2 Lecture Hours. 3 Lab Hours. Coastal Ornithology. Field and laboratory studies on the identification, classification, distribution and ecology of birds with special emphasis on birds of the Texas Gulf Coast. Classroom lectures to include anatomy, physiology, behavior and migration. Field trips required. **Prerequisites:** MARB 315. Junior or senior classification or approval of instructor.

MARB 445 Marine Fisheries Management

Credits 3. 3 Lecture Hours. Basic knowledge from marine ichthyology, biology of fishes and biological oceanography related to applied aspects of marine fisheries sciences; emphasis placed on management techniques applicable to tidal-influenced inland water, estuaries, and oceans. **Prerequisite:** Junior or senior classification, or approval of instructor.

MARB 460 Fisheries Population Dynamics

Credits 4. 3 Lecture Hours. 3 Lab Hours. Principles and concepts of population dynamics related to fish; methods of estimating abundance, mortality, recruitment and sustainable harvest levels; introduction to models for population analysis with emphasis on stock assessments and quantitative fisheries; basic computer programming to explore population behavior and interactions. **Prerequisites:** MATH 142, MATH 147, or MATH 151; MARB 311 or approval of instructor.

MARB 484 Undergraduate Internship

Credits 0 to 9. 0 to 9 Other Hours. Supervised study in a research or teaching laboratory remote from TAMUG. Student involvement is to consist of real-life learning or marine biological research, teaching, management, or a combination of these. **Prerequisite:** Junior or senior classification or approval of instructor.

MARB 485 Directed Studies

Credits 1 to 6. 1 to 3 Other Hours. Per Semester. Special topics and problems in field and/or laboratory work suited to analysis by individuals or small groups concerning aspects of marine biology. Usually requires a report describing techniques and results. Only 3 credit hours may be used in the degree plan curriculum. **Prerequisites:** 2.25 GPR. Curriculum sophomore, junior or senior classification or approval of instructor.

MARB 489 Special Topics in Marine Biology

Credits 1 to 4. 1 to 4 Lecture Hours. Study of selected topics in an identified area of marine biology. **Prerequisite:** Junior or senior classification or approval of instructor.

MARB 491 Research in Marine Biology

Credits 0 to 4. 0 to 4 Other Hours. Research conducted under the direction of faculty member in Marine Biology. Please see academic advisor in department. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. May be repeated for credit. **Prerequisites:** Junior or senior classification and approval of instructor.