MARINE SCIENCE (MRSC)

MRSC A100 **3 Units (54 lecture hours)**
Oceanography
Advisory: ENGL A098 or ESL A099.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC.

An orientation to the marine sciences, including considerations of physical and chemical properties of the sea, the sea-air interface, the biology of the sea, the geology of the ocean basins, the sea as a physical, chemical, biological, and recreational resource and the obligation of mankind to control further contamination of the environment. This course may also be offered online.

MRSC A100H **3 Units (54 lecture hours)**
Oceanography Honors
Advisory: ENGL A099 or ESL A099.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC.

An orientation to the marine sciences, including considerations of physical and chemical properties of the sea, the sea-air interface, the biology of the sea, the geology of the ocean basins, the sea as a physical, chemical, biological, and recreational resource and the obligation of mankind to control further contamination of the environment. This course may also be offered online.

MRSC A100L **1 Unit (54 lab hours)**
Oceanography Laboratory
Prerequisite(s): MRSC A100 or MRSC A100H or concurrent enrollment.

Advisory: ENGL A098 or ESL A099.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC.

An orientation to marine science research process, techniques, and equipment. Investigations of physical and chemical properties of the sea, the air/sea interface, biological taxonomy, and classification, study of longitude, latitude, other navigational elements, ocean basin geography, and geology study. Evaluation of the sea as a physical, chemical, biological, and recreational resource. Includes at least three class field trips.

MRSC A100M **1 Unit (54 lab hours)**
Oceanography Laboratory Honors
Prerequisite(s): MRSC A100 or MRSC A100H or concurrent enrollment.

Advisory: ENGL A098 or ESL A199.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC.

An orientation to marine science research process, techniques, equipment, institutions, and training/education centers. Investigations of physical and chemical properties of the sea, conditions of the air/sea/land interface, review of biological taxonomy and classification, study of longitude, latitude, ocean basin geography, and geology. Evaluation of the sea as a physical, chemical, biological, and recreational resource. Analysis of human efforts to control pollution, manage fisheries, and monitor the ocean world. Includes at least 3 class field trips. If student drops from MRSC A100, the student, on their own initiative, must also drop Marine Science A100M.

MRSC A119 **3 Units (36 lecture hours; 54 lab hours)**
Ocean Conservation and Community Science
Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU.

This course focuses on the intersection of conservation, community science and aquaria. Students will learn about animal rescue, technologies for breeding animals for release into the wild, community science and monitoring, habitat restoration, and impact of climate change on coastal resilience. Students will explore the role aquaria can play in communicating the importance of marine conservation, climate science and establishing community science programs. This course is a collaborative effort with Orange Coast College and local aquaria with all meetings held offsite in specialized facilities. Graded or Pass/No Pass option.

MRSC A120 **2 Units (27 lecture hours; 27 lab hours)**
Marine Aquarium Science
Advisory: MRSC A100 or MRSC A100H.

Grading Mode: Standard Letter
Transfer Credit: CSU.

Introduces students to the science involved in aquarium keeping and provides experience working in a small public aquarium, under the supervision of the instructor and designated student aquarium managers. Students will learn basics of animal husbandry, disease control, aquarium water chemistry, methods of filtration, feeding, and aquarium maintenance.

MRSC A121 **1 Unit (9 lecture hours; 27 lab hours)**
Marine Intertidal Ecology
Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU.

Marine intertidal habitats are among the most dynamic, diverse and accessible of all marine ecosystems. They typically exhibit a high species abundance and diversity, and consist of many species that display remarkable adaptations for living in a constantly-changing environment. This class is a field-methods based course that is intended for both marine science majors and non-major students interested in learning more about local intertidal communities. Graded or Pass/No Pass option. Same as ESEC A121 and ECOL A121. Students completing MRSC A121 may not receive credit for ESEC A121 or ECOL A121.

MRSC A124 **1 Unit (9 lecture hours; 27 lab hours)**
Ecology of the Gray Whale
Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU.

Gray whales are unique among cetaceans in their migrations, feeding strategy, and their history of interactions with humans. This course highlights the gray whale's evolution, anatomy and physiology, and ecology. It consists of a lecture component and field excursions that provides an opportunity to view these whales in the wild. The course may also be offered as a study abroad class that includes a multi-day field excursion that provides an opportunity to view these whales in close proximity in at least one of their calving lagoons in Baja California, Mexico. Field trip required. Graded or Pass/No Pass option. Same as ESEC A124 and ECOL A124. Students completing MRSC A124 may not receive credit for ESEC A124 or ECOL A124.

MRSC A125 **1 Unit (9 lecture hours; 27 lab hours)**
Field Studies in Gray Whale Ecology
Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU.

Though Gray Whale populations are not endangered, there are still many issues that involve these magnificent whales. This course highlights advanced topics regarding gray whale biology, distribution, ecology, as well as topics regarding human interactions and their current status. The course consists of a lecture component and field excursions that provides an opportunity to view these whales in the wild. The course may also be offered as a study abroad class that includes a multi-day field excursion that provides an opportunity to view these whales in close proximity in at least one of their calving lagoons in Baja California, Mexico. Field trip required. Graded or Pass/No Pass option.

MRSC A130 **2 Units (18 lecture hours; 54 lab hours)**
Husbandry of Aquatic Organisms
Prerequisite(s): MRSC A120 or concurrent enrollment.

Advisory: MRSC A180 and MRSC A180L.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This course focuses on the husbandry of various aquatic organisms in an aquarium setting. Students will learn how to properly care for a diverse assemblage of freshwater and marine fish, invertebrates, algae, and aquatic plants. Course content will focus on common organisms' natural history, nutrition, growth, reproduction, transportation, acclimation, disease diagnosis and treatment, and community planning. Students will be required to demonstrate proper aquatic animal husbandry skills, help care for a living collection of organisms, and perform critical evaluations of procedures in the OCC Public Aquarium. Field trips to local aquariums or to collect organisms may be required to demonstrate particular concepts.

MRSC A135 **2 Units (18 lecture hours; 54 lab hours)**
Aquarium Water Quality
Prerequisite(s): MRSC A120 or concurrent enrollment.

Grading Mode: Standard Letter
Transfer Credit: CSU.

An understanding of basic water quality is fundamental to the ability to properly care for marine organisms in an aquarium setting. This course focuses on the chemical processes and equipment that influence aquarium water quality parameters. Students will be required to evaluate aquarium water parameters as well as identify and demonstrate various methods of influencing those parameters. Course content will emphasize work experience in the OCC Aquarium and successful completion of the course may qualify students to take a national aquarium water quality technician certification exam.

MRSC A140 **2 Units (18 lecture hours; 54 lab hours)**
Aquarium Life Support Operation and Maintenance
Prerequisite(s): MRSC A120.

Advisory: MRSC A135, MRSC A180 and MRSC A180L.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This course focuses on life support operation and maintenance of aquarium water recirculation systems using a diversity of biological, mechanical, and chemical filtration equipment. Students will learn the principal designs, components, standard operating procedures, and preventative and emergency maintenance for an array of aquarium system types. Course content will emphasize the understanding and proper use of various types of life support and water transportation equipment, and how each component functions to disinfect or manipulate water quality and system characteristics. Students will be required to demonstrate proper equipment operation and maintenance protocols, identify appropriate equipment that can be used to treat hypothetical issues, apply their knowledge to help care for a living collection of organisms, and perform critical evaluations of life support procedures in the OCC Aquarium. Course content will emphasize work experience in the OCC Aquarium and successful completion of the course may qualify students to take a national aquarium life support operator certification exam.

MRSC A180 **3 Units (54 lecture hours)**
Marine Biology
Advisory: MRSC A100 or MRSC A100H; and ENGL A098 or ESL A099.

Grading Mode: Standard Letter
Transfer Credit: CSU; UC.

The life of the world's oceans, including principles of cell biology as it relates to the marine situation, energy flow through living systems, the evolution of marine life, the taxonomy and classification of marine plants and animals, an overview of marine habitats, and their organisms, intertidal zonation, plankton biology, marine mammals, pollution and its relations to marine biology, and discussion of currently applicable topics. This course may also be offered online.

MRSC A180L **1 Unit (54 lab hours)**
Marine Biology Lab
Prerequisite(s): MRSC A180 or concurrent enrollment.

Advisory: ENGL A098 or ESL A099.

Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU; UC.

An exploration of the principles of marine biology using, whenever possible, living organisms in natural surroundings. Included will be plankton biology, the taxonomy and habits of common eastern Pacific Ocean marine plants and animals, aspects of intertidal zonation, analysis of fouling communities, and field trips to sea to observe marine birds and mammals. Graded or Pass/No Pass option.

MRSC A185 **3 Units (54 lecture hours)**
Coastal Oceanography
Prerequisite(s): MRSC A100 or MRSC A100H.

Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU; UC.

Study of the physical, chemical, geological, and biological oceanography of the coastal ocean of southern California and northeast Pacific Ocean. This course may also be taught online. Graded or Pass/No Pass option.

MRSC A185L **1 Unit (54 lab hours)**
Coastal Oceanography Lab
Prerequisite(s): MRSC A100; and MRSC A185 or concurrent enrollment.

Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU; UC.

Scientific laboratory and field investigations of physical, geological, and chemical oceanography related to the Southern California coastal ocean. Graded or Pass/No Pass option. This course may be taught online.

MRSC A187 **3 Units (54 lecture hours)**
Marine Mammals
Advisory: ENGL A099 or ESL A099.

Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU; UC.

Explores the natural history, ecology, population dynamics, evolutionary history, communications, energetics, migrations, intelligence, and conservation of marine mammals – including: whales, dolphins, seals, sea lions, walrus, sea cows, sea otters, and polar bears. Graded or Pass/No Pass option.

MRSC A188 **1 Unit (9 lecture hours; 27 lab hours)**
Marine Mammal Field Studies
Advisory: MRSC A187.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This course offers students the opportunity to survey the ecology, behavior, and life history of various marine mammal groups in a field based setting. In-class meetings will orient students to the specific marine mammal group and the field site that they will explore. The course includes a multi-day field excursion to various locales of ecological interest and may involve camping in primitive wilderness environments. Topics include evolution, human interaction, biology, ecology, life history and conservation of marine mammals. Specific content will vary depending on region and marine mammal life present.

MRSC A190 3 Units (32 lecture hours; 66 lab hours)
Marine Research and Monitoring Techniques
Prerequisite(s): MRSC A100 or MRSC A100H and MRSC A100L or MRSC A100M or MRSC A180L.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This course is designed to illustrate some of the lab and field methods that marine scientists use to research physical and biological processes as well as the structure of marine monitoring programs to aid in marine resource management.

MRSC A195 3 Units (54 lecture hours)
Marine Policy and Conservation
Advisory: MRSC A100 or A100H.

Grading Mode: Standard Letter
Transfer Credit: CSU: UC.

The world ocean is a complicated system with many current challenges. Addressing these challenges requires an interdisciplinary knowledge of not only marine science but also how ocean policy is made. Combining knowledge from ocean leaders in science and policy, students will learn about how scientists and researchers work within the policy making framework to address ocean related matters. Students will learn current ocean policy issues to substantiate the complexity of ocean-related decision making at the state, national, and international level. This course is designed to give students a basic understanding of how marine resources are managed and what laws, processes, and groups are involved in ocean conservation.

MRSC A199 0.5-3 Units (9-36 lecture hours; 0-54 lab hours)
Special Topics in Marine Science
Grading Mode: Standard Letter
Transfer Credit: CSU.

This course is designed for students wishing to explore some aspect of marine science in greater depth. It may involve a combination of lecture, independent study, lab work, or field trips.

MRSC A220 2 Units (108 lab hours)
Practical Experience in Aquarium Science and Management 1
Prerequisite(s): MRSC A120.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This course introduces students to the complexity involved in working in, and actively managing a functioning public aquarium as a student aquarium manager. Students will gain hands-on experience planning, designing and maintaining exhibits in the OCC Public Aquarium. They will be responsible for helping to educate and mentor students in the marine aquarium science course and giving tours to visitors. Course content will introduce more advanced aquarium equipment and technology and the student will take an active role in identifying potential issues, evaluating possible solutions, and implementing resolutions based on an understanding of aquarium science. All prospective students will be required to perform a facility safety and proficiency demonstration to enroll in this course.

MRSC A221 2 Units (108 lab hours)
Practical Experience in Aquarium Science and Management 2
Prerequisite(s): MRSC A220.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This course will expand and develop student skill sets as a student aquarium manager and mentor. Student managers will apply their experience and knowledge of marine aquarium science and take additional responsibility in aquarium planning, maintenance and coordination of the aquarium. Students will learn about a variety of topics ranging from water chemistry to animal husbandry in greater scientific detail and take greater levels of responsibility in actively managing the aquarium facilities.

MRSC A222 2 Units (108 lab hours)
Practical Experience in Aquarium Science and Management 3
Prerequisite(s): MRSC A221.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This course introduces students to the responsibility and understanding involved in being a senior student aquarium manager. Students will take an active role in researching species interactions and husbandry, and focus on identifying potential issues that they must then proactively address. They will also be responsible for not only mentoring aquarium science students, but also newer aquarium managers to help train them proper procedures and techniques based on the best available scientific knowledge.

MRSC A223 2 Units (108 lab hours)
Practical Experience in Aquarium Science and Management 4
Prerequisite(s): MRSC A222.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This course is the last class in the aquarium science and management series and focuses on preparing aquarium managers to take on leadership roles in off-campus businesses and organizations involved in aquarium science. Students will broaden their understanding of increasingly-complex aquarium science husbandry techniques and will be responsible for helping the course instructor to plan and implement longer-term facility and educational goals. Constructively mentoring junior aquarium managers and the development of leadership and communication skills will be a central focus of this course.

MRSC A287 1 Unit (9 lecture hours; 27 lab hours)
Introduction to Marine Mammal Rescue and Rehabilitation
Advisory: MRSC A187.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This course offers students the opportunity to survey marine mammal conservation through animal rescue, rehabilitation and re-sightings in a hands-on, field-based setting. In-class meetings will orient students to how and why marine mammals are rescued and rehabilitated. Additionally, it provides an understanding as to how those efforts fit in the big picture by learning what these sentinels of the sea are indicating about the health of the ocean.

MRSC A288 1 Unit (9 lecture hours; 27 lab hours)
Survey of Marine Mammal Research and Techniques
Advisory: MRSC A187.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This class provides students with an experiential survey of various types of marine mammal research. Students will explore marine mammal science conducted both in situ (natural habitat) and ex situ (zoological facilities) including: population counts, photo identification, acoustic and behavioral studies, wild animal health assessments and other research on human impacts on the marine environment. Students will get the opportunity to survey a wide scope of marine mammal research.