# MRSC A180: MARINE BIOLOGY

| Item | Value |
|---|---|
| Curriculum Committee Approval Date | 02/09/2022 |
| Top Code | 040100 - Biology, General |
| Units | 3 Total Units |
| Hours | 54 Total Hours (Lecture Hours 54) |
| Total Outside of Class Hours | 0 |
| Course Credit Status | Credit: Degree Applicable (D) |
| Material Fee | No |
| Basic Skills | Not Basic Skills (N) |
| Repeatable | No |
| Grading Policy | Standard Letter (S) |
| Associate Arts Local General Education (GE) | • OC Physical/Biological Sci - AA (OB) |
| Associate Science Local General Education (GE) | • OCC Physical/Biological Sci-AS (OSB) |
| California General Education Transfer Curriculum (Cal-GETC) | • Cal-GETC 5B Biological Sciences (5B) |
| Intersegmental General Education Transfer Curriculum (IGETC) | • IGETC 5B Biological Sciences (5B) |
| California State University General Education Breadth (CSU GE-Breadth) | • CSU B2 Life Science (B2) |

## Course Description

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. ADVISORY: MRSC A100 or MRSC A100H; and ENGL A098 or ESL A099. Transfer Credit: CSU; UC.

## Course Level Student Learning Outcome(s)

1. Identify how various organisms interact with other species and their environment, and how community dynamics can shift when populations change.
2. Identify how the physical and geological characteristics of the ocean and ocean basins influence adaptations of marine life.
3. Recognize the amount of biodiversity that the ocean supports and understand the evolutionary relationships and characteristics of the various categories of organisms found in the sea.
4. Identify and discuss the effect of anthropogenic actions on marine life.
5. Describe the characteristics of plankton and microbes and identify the role they play in marine communities.

## Course Objectives

- 1. Describe cell biology and energetics of cells.
- 2. Discuss taxonomy and classification and relate it to the evolution of marine animals and plants.
- 3. List the most unusual elements of the So. Cal. Marine Ecosystem.
- 4. Identify major marine habitats, their characteristics, and at least some of their inhabitants.
- 5. Identify and describe at least two current topics in So. Cal. marine biology.
- 6. Demonstrate critical thinking, concerning marine pollution, by writing a comprehensive essay identifying sources of marine pollution in So. Cal., how they get to the ocean, what is their fate upon arrival at the ocean, and how do some of them effect marine animals.
- 7. Interpret the ecological factors that make up a marine food web.
- 8. Categorize the most important limiting factors in a marine ecosystem.

## Lecture Content

The ocean as a habitat what does it take to survive: pressure, lack of light, cold temperature evolution of the marine habitat specific characteristics of the So. Calif. Marine Habitat Patterns of Association Taxonomy and Classification of marine organisms General characteristics of the evolution of life and specific examples of marine life evolution Nutrient cycling in the ocean environment Phytoplankton and marine plants photosynthesis and primary productivity – methods of measurement chemosynthesis and the hydrothermal vents marine plant seasonality and growth patterns Field trip to the Long Beach Aquarium and intense study of specific species of marine invertebrates crabs of the high north pacific ocean comparison of three species of crabs the horseshoe crab – a tropical wonder and an ancient form of sealife Microbial Heterotrophs Invertebrates sizes and types of zooplankton meroplankton vs holoplankton the largest of all plankton – ocean sunfish, giant jellyfish primary consumers and the food chain Marine Vertebrates characteristics of fish and sharks the few marine reptiles  true marine birds and the ultimate evolution of avian life marine mammals – the most highly adapted of all mammals on earth\ Estuaries and Temperate Coastal Seas comparison and contrast the vital role that estuaries play in marine ecology specific characteristics of California coastal temperate ocean – the Kelp Forest marine pollution in southern California  Tropical and subtropical shallow seas everything is bound up on the reef the c oral – the primary producer of the reef coral bleaching 1990 – 2005 – a disaster in the making tourism and coral reef damage Open Oceans life without limits and without range the migrations of the great fish – swordfish and the pacific oceanic seabirds and their contribution to island ecosystems The Deep Sea floor miles down without sun, horrific pressure, and no primary production from above miles of mud – the great abyssal plain – unique creatures never-the-less revisit to the hydrothermal vents of the ocean ridge system and chemosynthesis focus on the giant tube worms Field trip to the Bolsa Chica Ecological Reserve and Interpretive center History of Bolsa Chica Steps in the Restoration of the Bolsa Chica Marine Birds and mammals in Polar Seas the most unique adaptations great migrations above and below the surface the penguins – quintessential animals of the southern ocean Harvesting Living Marine Resources fishing and crabbing and the effect on natural populations mariculture – seafarming habitat restoration – e.g. the So. Cal. Kelp Forest the story of the Red Abalone

## Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)

## Instructional Techniques

Weekly lectures, field trips, power point presentations, hands-on examination of live marine animals and plants from the O.C.C. Public Aquarium, short in-class internet based research assignments, viewing of marine biology videos, reading assignments from textbook, individual guest speakers, and sharing with the student the instructors own research experiences.

## Reading Assignments

Reading from assigned textbook and other ancillary materials. 58 hours

## Writing Assignments

Summarization and application of current events are due weekly. Exams will include a minimum of two critical thinking essays/brief response questions concerning elements of marine biology. Student will prepare and present a written scientific library based research report on a marine organism of their choice. 20 hours

## Out-of-class Assignments

Research current event to discuss in class, as well as for term research projects. 30 hours

## Demonstration of Critical Thinking

Weekly quizzes over reading assignments and lectures, semester literature research report and oral presentation, three midterm exams that include multiple choice, true and false, matching, and at least two critical thinking essays.

## Required Writing, Problem Solving, Skills Demonstration

Each of three midterms will include a minimum of two critical thinking essays concerning elements of marine biology. Student will prepare and present a written scientific library based research report on a marine organism of their choice.

## Eligible Disciplines

Biological sciences: Masters degree in any biological science OR bachelors degree in any biological science AND masters degree in biochemistry, biophysics, or marine science OR the equivalent. Masters degree required.

## Textbooks Resources

1. Required Castro P., Huber M.. Marine Biology, 11 ed. New York: McGraw Hill, 2019