BIO 26 Course Outline as of Fall 2017

CATALOG INFORMATION

Dept and Nbr: BIO 26 Title: BIOLOGY MARINE MAMMALS
Full Title: Biology of Marine Mammals
Last Reviewed: 11/26/2012

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	3.00	17.5	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 210.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	BIO 60

Catalog Description:
Introduction to the biology, natural history, evolution, behavior, anatomy, physiology and population ecology of marine mammals, including whales, dolphins, pinnipeds, otters, manatees and dugongs.

Prerequisites/Corequisites:
Completion of ENGL 100 or higher (V8) OR Course Completion of ENGL 102 OR Course Completion of EMLS 100 (or ESL 100) OR Qualifying Test Score of 125 in ENGL

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Introduction to the biology, natural history, evolution, behavior, anatomy, physiology and population ecology of marine mammals, including whales, dolphins, pinnipeds, otters, manatees and dugongs. (Grade or P/NP)
Prerequisites/Corequisites: Completion of ENGL 100 or higher (V8) OR Course Completion of ENGL 102 OR Course Completion of EMLS 100 (or ESL 100) OR Qualifying Test Score of

125 in ENGL
Recommended:
Limits on Enrollment:
Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	C	Natural Sciences	Fall 1984	Fall 2017
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B2	Life Science	Fall 1987	Fall 2017
	B3	Laboratory Activity		
	B2	Life Science	Fall 1984	Fall 1987
IGETC:	**Transfer Area**		Effective:	Inactive:

CSU Transfer: Effective: Inactive:

UC Transfer: Effective: Inactive:

CID:

Certificate/Major Applicable:
Major Applicable Course

COURSE CONTENT

Outcomes and Objectives:
Upon successful completion of this course, the student will be able to:
1. Describe the features of the class mammalia and compare and contrast the characteristics of the orders and families of marine mammals.
2. Summarize key physical features of the marine environment including light, temperature, pressure, and nutrient distribution.
3. Compare and contrast primary and secondary production levels in major areas of the ocean and explain how these impact the distribution, population size, and migration patterns of marine mammals.
4. Explain systematics and cladistics, and apply these concepts to marine mammals.
5. Synthesize the concepts of evolutionary mechanisms, adaptation, and speciation, and apply these concepts to marine mammal evolution.
6. Explain mammalian homeostasis and energetics and the anatomical, physiological, and behavioral adaptations made by marine mammals for life in the sea.
7. Compare and contrast capabilities and functions of the sensory systems (sight, smell, touch, taste, and sound), for different marine mammal groups and their use in communication, social organization, orientation, and feeding.
8. Compare and contrast the various feeding mechanisms of marine mammals and analyze how these differences impact, and are impacted by, the social structure and physiological and morphological adaptations of marine mammals.
9. Compare and contrast the mating and social systems of marine mammals and analyze the role of habitat and evolution in shaping these systems.
10. Summarize past and present threats to marine mammal populations including hunting, pollution, habitat and prey loss and describe and analyze the effectiveness of current national and

international laws regulating marine mammal populations.
11. Recognize and describe the marine mammal species found along the California coast and describe their ecology, natural history, and world population status.

Topics and Scope:

I. Science as a Process
  A. Scientific method
  B. Technique used with marine mammals
II. Marine Mammals- The Group
  A. Mammalian characteristics
  B. Taxonomy, systematics, general characteristics and evolution
    1. Cetacea
    2. Sirenia
    3. Pinnipeds
    4. Sea otters
III. The Marine Environment
  A. Pressure
  B. Light and temperature
  C. Density and stratification
  D. Stability and turnover
  E. Upwelling and El Nino Southern Oscillating (ENSO) events
IV. Marine Ecology
  A. Primary and secondary production distribution patterns and causes
  B. Food chains, food webs, and trophic hierarchies
V. Evolution of Marine Mammals
  A. Basic genetics including DNA structure, mutations, and heredity
  B. Mechanisms of evolution including natural selection, sexual selection, gene flow and genetic drift
  C. Speciation
VI. Homeostasis and Adaptations For Living in the Marine Environment
  A. Functional morphology
  B. Thermoregulation
  C. Osmoregulation
  D. Diving physiology
VII. Sensory Systems and Communication Between Marine Mammals
  A. Vision in air and water
  B. Sound and hearing in air and water
  C. Taste and smell in air and water
  D. Tactile abilities and communication
  E. Communication within and between species
VIII. Food and Feeding Habits of Marine Mammals
  A. Food and the distribution of marine mammals
  B. Feeding mechanisms
  C. Ecology and evolution of body size
  D. Impact of marine mammal feeding on various marine habitats including a discussion of keystone predators
  E. Migration
IX. Reproduction, Development and Behavior of Marine Mammals
  A. Mating systems
  B. Physiological and behavioral adaptations for gestation, nursing, and weaning
  C. Development of offspring

X. Population Biology
  A. Distributions
  B. Population growth and limiting factors
XI. Interactions With Humans
  A. Hunting of marine mammal species, past and present
  B. Pollution and biological magnification
  C. Habitat loss
  D. National and international regulations
  E. Marine mammals in captivity: research, entertainment, and military uses
  F. Conservation efforts
XII.Laboratory Material
  A. Characteristics of the class mammalia
  B. Principles of taxonomy and systematics
  C. Major groups of California marine mammals
    1. Cetaceans
    2. Pinnipeds
    3. Sea otters
  D. Adaptations for a marine existence
    1. Morphology
    2. Thermoregulatory
    3. Osmoregulatory
    4. Locomotor
  E. Communication and social structure
  F. Mating systems and care of young
  G. Feeding methods and structures
  H. Field observation techniques and field notes

Assignment:

Assignments may include:
1. Reading scientific papers, handouts, and text assignments (10 - 20 pages per week)
2. Research paper (8-10 pages), written field reports and field notebooks.
3. Lecture exams (2-4), 1 comprehensive final exam, quizzes including identification quiz for local marine mammals
4. Participation in fieldwork including observations, recording and analyzing data, participation in class discussions and/or group presentations

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Written homework including analysis of readings, research paper (8-10 pages) that shows topic coverage and critical analysis, field reports or notebooks	Writing 20 - 50%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, field work: analyzing data	Problem solving 10 - 30%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Animal identification (field or photo based), field work (data recording)	Skill Demonstrations 0 - 20%

Exams: All forms of formal testing, other than skill performance exams.

Essay, short answer, multiple choice, matching items, animal ID (field or photo based)	Exams 40 - 70%

Other: Includes any assessment tools that do not logically fit into the above categories.

Participation: class discussion and presentations	Other Category 0 - 10%

Representative Textbooks and Materials:
An Introduction To Marine Mammal Biology And Conservation, 1st edition, E.C.M. Parsons, Jones and Bartlett, 2012
Return To The Sea: The Life and Evolutionary Times of Marine Mammals, 1st edition, A. Berta, J. L. Sumich and C. Buell, University of California Press, 2012
Instructor prepared materials: lab manual