BIO 26 Course Outline as of Summer 2004

CATALOG INFORMATION

Dept and Nbr: BIO 26 Title: BIOL 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	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 the marine mammals, including whales, dolphins, pinnipeds, otters, manatees and dugongs.

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Schedule of Classes Information:
Description: Intro to the biology, natural history, evolution, behavior, anatomy, physiology and population ecology of marine mammals. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 100 or ESL 100
Limits on Enrollment:
Transfer Credit: CSU;UC.

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:	Transferable	Effective:	Fall 1984	Inactive:	Fall 2017
UC Transfer:	Transferable	Effective:	Fall 2003	Inactive:	Fall 2017

CID:

Certificate/Major Applicable:
Not Certificate/Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon 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 within the class.
2. Summarize the key features of the marine environment and assess how these features impact marine mammals and their predators and prey, including concepts of population ecology and biogeography.
3. Compare and contrast primary and secondary production levels in major areas of the ocean and explain how this impacts the distribution, population size, and migration patterns of marine mammals.
4. Demonstrate an understanding of classification and systematics and apply these concepts to marine mammals.
5. Synthesize the concepts of mechanisms of evolution, 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 upon, 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 the different types 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:

LECTURE MATERIAL:
1. Marine Mammals - The Group
   a. Mammalian characteristics
   b. Taxonomy, systematics, general characteristics and evolution
      1. Cetacea
      2. Sirenia
      3. "Pinnipeds"
      4. Sea otters
2. The Marine Environment
   a. Pressure
   b. Light and temperature
   c. Density and stratification
   d. Stability and turnover
   e. Upwelling and ENSO events
3. Marine Ecology
   a. Primary and secondary production distribution patterns and causes
   b. Food chains, food webs, and trophic hierarchies
4. Evolution of Marine Mammals
   a. Basic genetics including DNA structure, mutations, and heredity
   b. Mechanisms of evolution including natural selection and genetic drift
   c. Speciation
5. Homeostasis and Adaptations for Living in the Marine Environment
   a. Functional morphology adaptations
   b. Thermoregulation
   c. Osmoregulation
   d. Diving and swimming
6. 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
7. 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
8. Reproduction, Development and Behavior of Marine Mammals

a. Mating systems
b. Physiological and behavioral adaptations for gestation, nursing, and weaning
c. Development of offspring

9. Population Biology
   a. Distributions
   b. Population growth and limiting factors
10. Conservation of Marine Mammals
   a. Hunting of all 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

LABORATORY MATERIAL:

1. Characteristics of the Class Mammalia
2. Principles of Taxonomy and Systematics
3. Major Groups of California Marine Mammals
   a. Cetaceans
   b. "Pinnipeds"
   c. Sea otters
4. Adaptations for a Marine Existence
   a. Morphology
   b. Thermoregulatory
   c. Osmoregulatory
   d. Locomotor
5. Communication and Social Structure
6. Mating Systems and Care of Young
7. Feeding Methods and Structure
8. Population Ecology: Techniques and Methods of Analysis
9. Field Observation Techniques and Field Notes

Assignment:

1. Reading scientific papers, handouts, and text assignments (5-10 pages per week).
2. Written term paper (6-10 double-spaced pages).
3. Participation in field work.
4. Written field reports and field notebooks.
5. Multiple choice and essay exams.
6. Quizzes including identification quiz for local marine mammals.

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.

Term paper (5-10 dbl-spcd) & field rpts/notebooks	Writing 30 - 50%

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

Field work	Problem solving 5 - 20%

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

None	Skill Demonstrations 0 - 0%

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

Multiple choice, Matching items, Essay & Animal ID (Field or photo based)	Exams 40 - 60%

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

None	Other Category 0 - 0%

Representative Textbooks and Materials:
GUIDE TO MARINE MAMMALS OF THE WORLD, by R. Reeves, B. Stewart, P. Clapham, J. Powell, Alfred A. Knopf, Inc., Publishers, 2002.
MARINE MAMMAL BIOLOGY: AN EVOLUTIONARY APPROACH, A. Rus Hoelzel (Editor),
Blackwell Publishers, 2002.
THE PINNIPEDS: SEALS, SEA LIONS, AND WALRUSES, by M. Riedman, University of California Press, 1990.