

BIO 27 Course Outline as of Summer 2019**CATALOG INFORMATION**

Dept and Nbr: BIO 27

Title: BIOLOGY MARINE MAMMALS

Full Title: Biology of Marine Mammals

Last Reviewed: 4/8/2019

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	6	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

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:

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:**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:

Recommended:

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 2016	
CSU GE:	Transfer Area		Effective:	Inactive:
	B2	Life Science	Fall 2016	
IGETC:	Transfer Area		Effective:	Inactive:
	5B	Biological Sciences	Fall 2016	
CSU Transfer:	Transferable	Effective:	Fall 2016	Inactive:
UC Transfer:	Transferable	Effective:	Fall 2016	Inactive:

CID:

Certificate/Major Applicable:

Major Applicable Course

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

1. Apply the scientific method to the investigation and evaluation of biological phenomenon in marine mammals.
2. Synthesize knowledge of evolutionary mechanisms, trends, and history with patterns of biodiversity in marine mammals.
3. Integrate basic principles of anatomy, physiology, genetics, ecology, and adaptation as they apply to marine mammals.

Objectives:

At the conclusion of this course, the student should 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 uses of the sensory systems of different marine mammal groups.
8. Compare and contrast the various feeding mechanisms of marine mammals as they relate to social structure, physiology and morphology.
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 and analyze the effectiveness of current 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. Techniques used with marine mammals

II. The Marine Mammals

- 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

Assignment:

1. Reading scientific papers, handouts, and text assignments (10-20 pages per week)
2. Written homework and problems (5-10)
3. Research paper (8-10 pages)
4. Quizzes (2-10), including photo-based animal identification, exams (2-4), comprehensive final exam

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, research paper

Writing
20 - 50%

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

Homework problems

Problem solving
10 - 30%

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.

Quizzes, exams, final exam

Exams
40 - 70%

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

Participation: class discussion

Other Category
0 - 10%

Representative Textbooks and Materials:

An Introduction To Marine Mammal Biology And Conservation. Parsons, ECM. Jones and Bartlett. 2012 (classic)

Return To The Sea: The Life and Evolutionary Times of Marine Mammals. Berta, Annalisa and Sumich, James. University of California Press. 2012 (classic)