

## BIOL125 : Marine Biology

### General Information

Author:	<ul style="list-style-type: none"><li>Karoline Rostamiani</li></ul>
Course Code (CB01) :	BIOL125
Course Title (CB02) :	Marine Biology
Department:	BIOL
Proposal Start:	Spring 2024
TOP Code (CB03) :	(0401.00) Biology, General
CIP Code:	(26.0101) Biology/Biological Sciences, General.
SAM Code (CB09) :	Non-Occupational
Distance Education Approved:	Yes
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000310335
Curriculum Committee Approval Date:	11/08/2023
Board of Trustees Approval Date:	12/19/2023
Last Cyclical Review Date:	11/08/2023
Course Description and Course Note:	BIOL 125 is a general survey of the ecosystems and diversity of life in the marine environment. The course includes an introduction to the sciences of geological, chemical and physical oceanography as the basis to understand the environment where marine organisms exist. A comparative approach is used to study the physiological and anatomical adaptations of the different marine organisms to their environment. This course compares the ecology of the major marine ecosystems including: the epipelagic, deep sea, hydrothermal vents, intertidal, estuaries, coral reefs and polar. Major aspects of evolutionary, cell and molecular theory are addressed throughout the course.
Justification:	Mandatory Revision
Academic Career:	<ul style="list-style-type: none"><li>Credit</li></ul>
Author:	<ul style="list-style-type: none"><li>Karoline Rostamiani</li></ul>

### Academic Senate Discipline

Primary Discipline:	<ul style="list-style-type: none"><li>Biological Sciences</li></ul>
Alternate Discipline:	No value
Alternate Discipline:	No value

## Course Development

### Basic Skill Status (CB08)

Course is not a basic skills course.

Allow Students to Gain Credit by Exam/Challenge

### Course Special Class Status (CB13)

Course is not a special class.

### Pre-Collegiate Level (CB21)

Not applicable.

### Grading Basis

- Grade with Pass / No-Pass Option

### Course Support Course Status (CB26)

Course is not a support course

## Transferability & Gen. Ed. Options

### General Education Status (CB25)

Not Applicable

### Transferability

Transferable to both UC and CSU

### Transferability Status

Approved

IGETC Area	Area	Status	Approval Date	Comparable Course
5B-Biological Science	Biological Science	Approved	09/09/1991	No Comparable Course defined.

CSU GE-Breadth Area	Area	Status	Approval Date	Comparable Course
B2-Life Science	Life Science	Approved	No value	No Comparable Course defined.

## Units and Hours

### Summary

<b>Minimum Credit Units (CB07)</b>	3
<b>Maximum Credit Units (CB06)</b>	3
<b>Total Course In-Class (Contact) Hours</b>	54
<b>Total Course Out-of-Class Hours</b>	108
<b>Total Student Learning Hours</b>	162

### Credit / Non-Credit Options

#### Course Type (CB04)

Credit - Degree Applicable

#### Noncredit Course Category (CB22)

Credit Course.

#### Noncredit Special Characteristics

No Value

#### Course Classification Code (CB11)

Credit Course.

#### Funding Agency Category (CB23)

Not Applicable.

Cooperative Work Experience  
 Education Status (CB10)

Variable Credit Course

### Weekly Student Hours

	In Class	Out of Class
Lecture Hours	3	6
Laboratory Hours	0	0
Studio Hours	0	0

### Course Student Hours

**Course Duration (Weeks)** 18

**Hours per unit divisor** 0

#### Course In-Class (Contact) Hours

Lecture 54

Laboratory 0

Studio 0

**Total** 54

#### Course Out-of-Class Hours

Lecture 108

Laboratory 0

Studio 0

**Total** 108

### Time Commitment Notes for Students

No value

### Pre-requisites, Co-requisites, Anti-requisites and Advisories

#### Advisory

ESL151 - Reading And Composition V

##### Objectives

- Read and critically analyze various academic readings.
- Summarize readings.
- Revise writing to eliminate errors in syntax, and grammatical constructions.
- Employ basic library research techniques.

OR

#### Advisory

ENGL101 - Introduction to College Reading and Composition

##### Objectives

- Read, analyze, and evaluate a variety of primarily non-fiction readings for content, context, and rhetorical merit with consideration of tone, audience, and purpose.
- Apply a variety of rhetorical strategies in writing unified, well-organized essays directed by a well-reasoned thesis statement with persuasive support.
- Proofread and edit essays for presentation so they exhibit no disruptive errors in English grammar, usage, or punctuation.

## Entry Standards

### Entry Standards

Read, analyze, and evaluate contemporary articles and stories for the comprehension of difficult content and the identification of main ideas and (topic-based) evidence.

Write a summary of a contemporary article or story with correct citation techniques.

Write compositions (e.g., summaries and argumentative essays) that are easy to read and follow, though some errors in grammar, mechanics, spelling, or diction may exist.

Proofread and edit essays for content, language, citation, and formatting problems.

## Specifications

### Methods of Instruction

Methods of Instruction                      Lecture

Methods of Instruction                      Discussion

Methods of Instruction                      Multimedia

Methods of Instruction                      Field Activities (Trips)

### Out of Class Assignments

- Reading assignments
- Practice lessons/quizzes online
- Fieldtrip handouts (e.g. Natural History Museum Taxonomy and Systematics)

Methods of Evaluation	Rationale
Exam/Quiz/Test	Midterms plus a final examination, each consisting of multiple choice, true/false, short answers and diagrams, and an essay question
Exam/Quiz/Test	Preparatory quizzes consisting of short answers, diagrams, multiple choice, true/false, and match questions

Textbook Rationale
No Value

Textbooks				
Author	Title	Publisher	Date	ISBN
Castro, Peter	Marine Biology	New York: McGraw-Hill	2024	978-126072192

Other Instructional Materials (i.e. OER, handouts)	
Description	Marine Biology Outlines
Author	Gago, F. Javier
Citation	No value
Online Resource(s)	

Materials Fee
No value

Learning Outcomes and Objectives
<b>Course Objectives</b>
Explain concepts in general biology using examples from the marine environment.
Identify the basic geological, chemical, and physical characteristics of the marine environment.
Describe some of the potential adaptations that allow organisms to survive and reproduce in the marine environment.
Identify the major phylogenetic groups of marine organisms and describe some of the evolutionary trends within them.
Compare and contrast the major marine ecosystems.

Identify the problems caused by human impact on the marine environment and its resources.

## SLOs

**Explain the ecological characteristics of the major marine ecosystems and the impact that humans have had on them.**

Expected Outcome Performance: 70.0

<i>ILOs</i> Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
	Communicate clearly, ethically, and creatively; listen actively and engage respectfully with others; consider situational, cultural, and personal contexts within or across multiple modes of communication.
<i>BIOL</i> Core PLOs	Prepare for a career in Biology by completing the AS degree in Biological Science (or AS-T in Biology) and/or being accepted for transfer to a 4-year university program in biology or a related field.
<i>ILOs</i> General Education	apply reasoning to evaluate hypotheses and theories examine causality or associations between or among variables of the natural world

**Identify and compare anatomical and physiological traits of major phylogenetic groups of marine organisms, and their evolutionary strategies for survival and reproduction.**

Expected Outcome Performance: 70.0

<i>ILOs</i> Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
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## Additional SLO Information

**Does this proposal include revisions that might improve student attainment of course learning outcomes?**

No

**Is this proposal submitted in response to learning outcomes assessment data?**

No

**If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.**

No Value

**SLO Evidence**

No Value

# Course Content

## Lecture Content

### Introduction to Scientific Methodology (2 hours)

- Steps of scientific methodology
- Facts, hypotheses, laws, and theories
- Falsifiability, parsimony, and peer review

### Marine Geography and Biological Oceanography (2 hours)

- Distribution of water
- Seafloor topography
- Ocean basins and major secondary seas
- Plate tectonics

### Chemical Oceanography (2 hours)

- Properties of water
- Salinity
- Vertical profile of O<sub>2</sub> concentration
- pH

### Physical Oceanography (3 hours)

- Light penetration
- Permanent and seasonal thermoclines
- Pressure
- Water circulation
- Coriolis effect
- Major surface currents
- Upwelling
- Conveyor Belt theory
- El Niño Southern Oscillation

### Basic Biological Concepts (2 hours)

- Cell types
- Nucleic acids and their role in phenotype and inheritance
- Photosynthesis and cell respiration
- Evolutionary theory and systematics
- Natural selection as one of the mechanisms leading to organic evolution
- Binomial nomenclature and hierarchical classification
- Domains of life

### Survey of Marine Biodiversity (18 hours)

- Viruses
- Prokaryotes (Bacteria and Archaea)
- Dinoflagellata
- Bacillariophyta and Phaeophyceae
- Plantae
- Rhodophyta & Chlorophyta
- Angiospermae: Mangroves and Sea Grasses
- Fungi: Lichens
- Invertebrate Animals
- Porifera
- Cnidaria
- Mollusca
- Arthropoda
- Echinodermata
- Invertebrate Chordates
- Craniate Animals
- Cyclostomata
- Chondrichthyes
- Bony Fishes
- Reptilia (including birds)
- Mammalia

### Basic Principles of Ecology (2 hours)

- Food chains and webs
- Trophic levels and transfer efficiency
- The microbial loop
- Biological zonation

**Marine Ecosystems (18 hours)**

- Epipelagic
- Primary productivity
- Mechanisms of flotation
- Anatomy and physiology of swimming
- Deep Sea
- Mesopelagic, bathyal, abyssal, and hadal regions
- Vertical migrations
- Bioluminescence
- Vision
- Food availability
- Reproduction
- Deep-diving in marine mammals
- Deep-sea benthos
- Hydrothermal Vents
- Formation and characteristics
- Chemosynthesis and food web
- Anatomy and physiology of symbiosis in Riftia
- Intertidal
- Causes and effects of tides
- Tide schedules
- Rocky intertidal and strategies for survival
- Ecological succession
- Soft bottom intertida
- Estuaries
- Characteristics and type
- Osmoregulatory mechanisms
- Life history strategies: anadromy and catadromy
- Coral Reefs
- Characteristics and distribution
- Nutrition and reproduction
- Reef types
- Polar Regions
- Comparison of physical and biological aspects of Arctic and Antarctic regions
- Evolution of icefishes

**Human Impact in the Marine Environment (5 hours)**

- Pollution
- Oil
- Case study: DDT
- Case study: Minamata Disease
- Global warming
- Fisheries
- Major fishing areas
- Maximum sustainable yield and regulation
- Case study: The California Sardine
- Current problems
- Impact on Biodiversity
- Extinction and introduced species

**Total hours: 54**