



**COURSE OUTLINE : BIOL 125**

**D Credit – Degree Applicable**

**COURSE ID 005083**

**Cyclical Review: April 2017**

**Revision: November 2021**

**COURSE DISCIPLINE :** BIOL  
**COURSE NUMBER :** 125  
**COURSE TITLE (FULL) :** Marine Biology  
**COURSE TITLE (SHORT) :** Marine Biology  
**ACADEMIC SENATE DISCIPLINE:** Biological Science

**CATALOG DESCRIPTION**

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.

Total Lecture Units:3.00

Total Laboratory Units: 0.00

**Total Course Units: 3.00**

Total Lecture Hours:54.00

Total Laboratory Hours: 0.00

Total Laboratory Hours To Be Arranged: 0.00

**Total Contact Hours: 54.00**

**Total Out-of-Class Hours: 108.00**

Recommended Preparation: ENGL 100 or ESL 151.



**ENTRY STANDARDS**

	<b>Subject</b>	<b>Number</b>	<b>Title</b>	<b>Description</b>	<b>Include</b>
1	ENGL	100	Writing Workshop	read, analyze, and evaluate contemporary articles and stories for the comprehension of difficult content and the identification of main ideas and (topic-based) evidence;	Yes
2	ENGL	100	Writing Workshop	write a summary of a contemporary article or story with correct citation techniques;	Yes
3	ENGL	100	Writing Workshop	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;	Yes
4	ENGL	100	Writing Workshop	proofread and edit essays for content, language, citation, and formatting problems.	Yes
5	ESL	151	Reading and Composition V	Read and critically analyze various academic readings;	Yes
6	ESL	151	Reading and Composition V	summarize readings;	Yes
7	ESL	151	Reading and Composition V	revise writing to eliminate errors in syntax, and grammatical constructions;	Yes
8	ESL	151	Reading and Composition V	employ basic library research techniques;	Yes

**EXIT STANDARDS**

- 1 explain concepts in general biology using examples from the marine environment;
- 2 identify the basic geological, chemical, and physical characteristics of the marine environment; describe some the potential adaptations that allow organisms to survive and reproduce in the marine environment;
- 3 identify the major phylogenetic groups of marine organisms and describe some of the evolutionary trends within them;
- 4 compare and contrast the major marine ecosystems;
- 6 identify the problems caused by human impact on the marine environment and its resources.

**STUDENT LEARNING OUTCOMES**

- 1 identify and compare some of the anatomical and physiological characteristics among the major phylogenetic groups of marine organisms and the evolution of strategies that help them to survive and reproduce in the marine environment;
- 2 explain some of the ecological characteristics of the major marine ecosystems and the impact that humans have had on them.



**COURSE CONTENT WITH INSTRUCTIONAL HOURS**

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	Description	Lecture	Lab	Total Hours
1	Introduction to Scientific Methodology <ul style="list-style-type: none"> <li>• Steps of scientific methodology</li> <li>• Facts, hypotheses, laws, and theories</li> <li>• Falsifiability, parsimony, and peer review</li> </ul>	2	0	2
2	Marine Geography and Biological Oceanography <ul style="list-style-type: none"> <li>• Distribution of water</li> <li>• Seafloor topography</li> <li>• Ocean basins and major secondary seas</li> <li>• Plate tectonics</li> </ul>	2	0	2
3	Chemical Oceanography <ul style="list-style-type: none"> <li>• Properties of water</li> <li>• Salinity</li> <li>• Vertical profile of O<sub>2</sub> concentration</li> <li>• pH</li> </ul>	2	0	2
4	Physical Oceanography <ul style="list-style-type: none"> <li>• Light penetration</li> <li>• Permanent and seasonal thermoclines</li> <li>• Pressure</li> <li>• Water circulation</li> <li>• Coriolis effect</li> <li>• Major surface currents</li> <li>• Upwelling</li> <li>• Conveyor Belt theory</li> <li>• El Niño Southern Oscillation</li> </ul>	3	0	3
5	Basic Biological Concepts <ul style="list-style-type: none"> <li>• Cell types</li> <li>• Nucleic acids and their role in phenotype and inheritance</li> <li>• Photosynthesis and cell respiration</li> <li>• Evolutionary theory and systematics</li> <li>• Natural selection as one of the mechanisms leading to organic evolution</li> <li>• Binomial nomenclature and hierarchical classification</li> <li>• Domains of life</li> </ul>	2	0	2



6	<p>Survey of Marine Biodiversity</p> <ul style="list-style-type: none"> <li>• Viruses</li> <li>• Prokaryotes (Bacteria and Archaea)</li> <li>• Dinoflagellata</li> <li>• Bacillariophyta and Phaeophyceae</li> <li>• Plantae</li> <li>• Rhodophyta &amp; Chlorophyta</li> <li>• Angiospermae: Mangroves and Sea Grasses</li> <li>• Fungi: Lichens</li> <li>• Invertebrate Animals</li> <li>• Porifera</li> <li>• Cnidaria</li> <li>• Mollusca</li> <li>• Arthropoda</li> <li>• Echinodermata</li> <li>• Invertebrate Chordates</li> <li>• Craniate Animals</li> <li>• Cyclostomata</li> <li>• Chondrichthyes</li> <li>• Bony Fishes</li> <li>• Reptilia (including birds)</li> <li>• Mammalia</li> </ul>	18	0	18
7	<p>Basic Principles of Ecology</p> <ul style="list-style-type: none"> <li>• Food chains and webs</li> <li>• Trophic levels and transfer efficiency</li> <li>• The microbial loop</li> <li>• Biological zonation</li> </ul>	2	0	2



8	<p>Marine Ecosystems</p> <ul style="list-style-type: none"> <li>• Epipelagic</li> <li>• Primary productivity</li> <li>• Mechanisms of flotation</li> <li>• Anatomy and physiology of swimming</li> <li>• Deep Sea</li> <li>• Mesopelagic, bathyal, abyssal, and hadal regions</li> <li>• Vertical migrations</li> <li>• Bioluminescence</li> <li>• Vision</li> <li>• Food availability</li> <li>• Reproduction</li> <li>• Deep-diving in marine mammals</li> <li>• Deep-sea benthos</li> <li>• Hydrothermal Vents</li> <li>• Formation and characteristics</li> <li>• Chemosynthesis and food web</li> <li>• Anatomy and physiology of symbiosis in <i>Riftia</i></li> <li>• Intertidal</li> <li>• Causes and effects of tides</li> <li>• Tide schedules</li> <li>• Rocky intertidal and strategies for survival</li> <li>• Ecological succession</li> <li>• Soft bottom intertida</li> <li>• Estuaries</li> <li>• Characteristics and type</li> <li>• Osmoregulatory mechanisms</li> <li>• Life history strategies: anadromy and catadromy</li> <li>• Coral Reefs</li> <li>• Characteristics and distribution</li> <li>• Nutrition and reproduction</li> <li>• Reef types</li> <li>• Polar Regions</li> <li>• Comparison of physical and biological aspects of Arctic and Antarctic regions</li> <li>• Evolution of icefishes</li> </ul>	18	0	18
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9	Human Impact in the Marine Environment • 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	5	0	5
				<b>54</b>

**OUT OF CLASS ASSIGNMENTS**

- 1 reading assignments;
- 2 practice lessons/quizzes online;
- 3 fieldtrip handouts (e.g. Natural History Museum Taxonomy and Systematics).

**METHODS OF EVALUATION**

- 1 Midterms plus a final examination, each consisting of multiple choice, true/false, short answers and diagrams, and an essay question.
- 2 Preparatory quizzes consisting of short answers, diagrams, multiple choice, true/false, and match questions

**METHODS OF INSTRUCTION**

- Lecture
- Laboratory
- Studio
- Discussion
- Multimedia
- Tutorial
- Independent Study
- Collaboratory Learning
- Demonstration
- Field Activities (Trips)
- Guest Speakers
- Presentations



**TEXTBOOKS**

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<b>Title</b>	<b>Type</b>	<b>Publisher</b>	<b>Edition</b>	<b>Medium</b>	<b>Author</b>	<b>IBSN</b>	<b>Date</b>
Marine Biology Outlines	Required	Glendale Communi tyCollege			Gago, F. Javier		2019
Marine Biology	Supplemental	New York: McGraw- Hill	11		Castro, Peter	ISBN: 978- 125988003 2	2019