



COURSE OUTLINE : BIOL 125H

D Credit – Degree Applicable

COURSE ID 005084

Cyclical Review: April 2017

Revision: November 2021

COURSE DISCIPLINE : BIOL

COURSE NUMBER : 125H

COURSE TITLE (FULL) : Honors Marine Biology

COURSE TITLE (SHORT) : Honors Marine Biology

ACADEMIC SENATE DISCIPLINE: Biological Science

CATALOG DESCRIPTION

BIOL 125H 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. The Honors course will be enhanced in one or more of the following ways: 1) Students will complete a set of selected readings from science journals or books. Critical analysis of these readings is expected and students will be evaluated with extra questions during the regular examinations of the course. 2) Students will attend a field trip where they are expected to work in groups for the collection, analysis, and presentation of data. 3) Students will prepare a written and oral presentation on a specific topic that was not presented in the regular lecture.

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

	Subject	Number	Title	Description	Include
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"> • Steps of scientific methodology • Facts, hypotheses, laws, and theories • Falsifiability, parsimony, and peer review 	2	0	2
2	Marine Geography and Biological Oceanography <ul style="list-style-type: none"> • Distribution of water • Seafloor topography • Ocean basins and major secondary seas • Plate tectonics 	2	0	2
3	Chemical Oceanography <ul style="list-style-type: none"> • Properties of water • Salinity • Vertical profile of O₂ concentration • pH 	2	0	2
4	Physical Oceanography <ul style="list-style-type: none"> • Light penetration • Permanent and seasonal thermoclines • Pressure • Water circulation • Coriolis effect • Major surface currents • Upwelling • Conveyor Belt theory • El Niño Southern Oscillation 	3	0	3
5	Basic Biological Concepts <ul style="list-style-type: none"> • 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 	2	0	2



6	<p>Survey of Marine Biodiversity</p> <ul style="list-style-type: none"> • 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 	18	0	18
7	<p>Basic Principles of Ecology</p> <ul style="list-style-type: none"> • Food chains and webs • Trophic levels and transfer efficiency • The microbial loop • Biological zonation 	2	0	2



8	<ul style="list-style-type: none"> • Marine Ecosystems • 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 <i>Riftia</i> • Intertida • Causes and effects of tides • Tide schedules • Rocky intertidal and strategies for survival • Ecological succession • Soft bottom intertidal • 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 	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
				54

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;
- 3 critical analysis of out of class readings; evaluated with extra questions during the regular examinations of the course;
- 4 analysis and presentation of data collected during field trips;
- 5 written analysis and oral presentation on a specific topic that was not covered in lecture.

METHODS OF INSTRUCTION

- Lecture
- Laboratory
- Studio
- Discussion
- Multimedia
- Tutorial
- Independent Study
- Collaboratory Learning



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- Demonstration
- Field Activities (Trips)
- Guest Speakers
- Presentations

TEXTBOOKS

Title	Type	Publisher	Edition	Medium	Author	ISBN	Date
Marine Biology Outlines	Required	Glendale Community College			Gago, F. Javier		2019
Marine Biology	Supplemental	New York: McGraw-Hill	11		Castro, Peter	ISBN: 978-1259880032	2019