I. GENERAL COURSE INFORMATION

Subject and Number: Biology 18
Descriptive Title: Marine Biology Laboratory
Course Disciplines: Biological Sciences
Division: Natural Sciences

Catalog Description:
This is an introductory marine biology laboratory course designed to complement the marine biology lecture course. The laboratory course will explore the animals and plants living in the ocean and their structure and adaptations for a marine environment. Local species will be identified and classified and local aquariums will be visited.

Conditions of Enrollment:
Prerequisite: Biology 17 with a minimum grade of C or Concurrent Enrollment

Recommended Preparation: English 1 or eligibility for English 1A or qualification by appropriate assessment

Course Length:	**X Full Term**	**Other (Specify number of weeks):**
Hours Lecture:	**0 hours per week**	**TBA**
Hours Laboratory:	**3.00 hours per week**	**TBA**
Course Units:	**1.00**	

Grading Method: Letter
Credit Status: Associate Degree Credit

Transfer CSU: X Effective Date: 1/20/1998
Transfer UC: X Effective Date: Fall 1998

General Education:

El Camino College:
1 – Natural Sciences
Term: Fall 1998 Other:

CSU GE:
B2 - Life Science
Term: Other:
B3 - Laboratory Sciences
Term: Fall 1999 Other:

IGETC:
5B - Biological Science, Lab only
Term: Other: Approved

II. OUTCOMES AND OBJECTIVES

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

1. The student will understand and apply principles of the scientific method; recognizing an idea based on reproducible evidence.
2. The student will be able to use the compound and dissecting microscope to observe cells and microorganisms.
3. The student will demonstrate how the principles of energy flow exist in relationships observed between autotrophs and heterotrophs in ecosystems.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at http://www.elcamino.edu/academics/slo/.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below)

1. Name major parts and describe general functions of the compound and dissecting microscopes used in the lab and develop and exhibit manipulative skills in their use and care.
2. Discuss the unique properties of water and salt water.
3. Name and discuss several anatomical structures and physiological functions of selected marine organisms and their role in adaptation for marine life.
4. Explain the general concepts of classification and evolutionary trends of plants and animals of the ocean.
5. Demonstrate the ability to use a dichotomous key to identify selected specimens.
6. Name specific examples of major taxonomic groups, plants and animals in our local waters. The major taxonomic groups students will be responsible for include: Porifera, Cnidaria, Mollusca, Arthropoda, Echinodermata, Osteichthyes, Chondrichthyes, Mammalia

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lab	3.4	I	Introduction to Microscopes A. Compound 1. Pre-made slides 2. Wet mounts B. Dissecting
Lab	3.4	II	pH, Salinity, dissolved oxygen A. pH strips B. pH meter C. salinity concentration
Lab	7.8	III	Taxonomic Classification A. History and overview B. Binomial scientific name C. Dichotomous Key

Lab	3.4	IV	Phytoplankton, zooplankton A. Unicellular Photosynthetic Algae B. Colonial/Multicellullar Algae C. Unicellular Zooplankton D. Multicellular Developmental Phase Zooplankton
Lab	3.4	V	Marine Algae, photosynthetic pigments A. Division Recognition of Algae B. Pigment Description C. Pigment Separation Techniques
Lab	3.4	VI	Porifera, Cnidaria A. Spicules B. Sponge Frame Works in 3 Classes C. Cnidaria Diploblastic Radial Body D. Variation in Lifecycle of 3 Classes
Lab	3.4	VII	Mollusca A. Form and Function B. 5 Classes of Mollusca
Lab	3.4	VIII	Arthropoda A. Form and Function B. 5 Subphyla of Arthropoda
Lab	4.8	IX	Echinodermata A. Form and Function 1. Endoskeleton 2. Water Vascular System B. 5 Subphyla of Echinodermata
Lab	3.4	X	Jawless and Cartilaginous Fish A. Agnatha/Myxini 1. Lamprey 2. Hagfish B. Chondrichtyes 1. Placoid Scales 2. Articulating Lower Jaw 3. Sharks 4. Skates 5. Rays
Lab	7.4	XI	Bony Fish A. Ray fin B. Lobe Fin C. Scale Types 1. Ganoid 2. Ctenoid 3. Cycloid
Lab	3.4	XII	Marine mammals A. Herbivores 1. Sirenia B. Omnivores/Carnivores 1. Cetacea 2. Carnivora

Lab	3.4	XIII	Marine birds A. Shore Birds B. Pelagic C. Flightless
Total Lecture Hours		0	
Total Laboratory Hours		54	
Total Hours		54	

IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION:

Problem solving demonstrations (computational or non-computational)

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

Fish Lab Exercise: Using the preserved fish or the live fish in the marine aquarium, determine the family and scientific name of 5 "unknown" fish. These local Southern California marine fish may be keyed out using the Guide to Coastal Marine Fishes of California or other dichotomous keys. 2. Classification Exercise: Eight to 10 "unknown" invertebrate animals are provided. You must pick 6 animals to key. Start by using the key to phyla provided. After you have determined the phylum pick one of the several keys and guides to the marine fauna of Southern California for reference and determine the class, order, family, genus and species of each of the organisms.

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

1. Determine the pH of sea water and fresh water using 50 ml. samples of each and testing with pH paper strips or a pH meter. Add one drop of HCI into each beaker and again test for pH. Repeat 10 times graphing the changing pH. Which sample changes pH more rapidly with the addition of the acid?

2. On a field trip to the intertidal region at low tide you will determine the identity of marine organisms through the four tide zones. Place a line of cord going through the tide zones 1 through 4. Identify several organisms in each zone using a field guide. Describe how organisms' adaptations allow them to live in each of the zones of the tidal area.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Objective Exams
Quizzes
Laboratory reports
Field work
Class Demonstration
Homework Problems
Multiple Choice
Completion
Matching Items
True/False
Other (specify):

Laboratory keying out or identifying local species of algae, plants, and marine animals; specimen dissections; demonstration of understanding of energy flow from autotrophs to heterotrophs

V. INSTRUCTIONAL METHODS

Demonstration
Field trips
Guest Speakers
Internet Presentation/Resources
Laboratory Keying
Multimedia presentations

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS

Course is lab only - minimum required hours satisfied by scheduled lab time and estimated student hours outside of class per week is zero.

Estimated Independent Study Hours per Week: 0

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

Virginia Cass-Dudley; Gordon Dudley; James Sumich. Laboratory and Field Investigations in Marine Life. 11th ed. Jones and Bartlett Publisher, 2018.

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

In selected journals, field guides and keys to local species.
For example:
Marine Life of Southern California 2nd Edition by Donald Reish, Kendall/Hunt, Publisher

D. OTHER REQUIRED MATERIALS

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification
Course Prerequisite Biology-17	Concurrent enrollment or prior completion of Bio 17 with a minimum grade of “C”

B. Requisite Skills

Requisite Skills
Able to classify ocean specimens by use of taxonomic dichotomous keys. BIOL 17 - Explain the general concepts of classification and evolutionary trends of plants and animals of the ocean.
Able to identify cellular structure of a variety of ocean specimens. BIOL 17 - Name and discuss several anatomical structures and physiological functions of selected marine organisms and their role in adaptation to marine life.

Able to determine salinity of ocean water specimens. BIOL 17 - Discuss the unique properties of water and how it is affected by salt. Describe animal and plant adaptations to salt water.
Student must be enrolled or have passed Biology 17, Marine Biology, with a Minimum grade of C.

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification
Non-Course Recommended Preparation English 1 or eligibility for English 1A or qualification by appropriate assessment.	Students' chance of success in Marine Biology Laboratory is directly related to their ability to read the laboratory manual with comprehension. Students in this course need to have reading skills to understand and interpret information in college-level textbooks. The reading skills developed in English 1 will greatly enhance their chance for understanding the reading material and successfully completing this course.

D. Recommended Skills

Recommended Skills
A student needs to have good reading skills to understand and interpret information provided in their textbooks. ENGL 1 - Summarize, analyze, and synthesize college-level texts. Employ basic study skills and reading strategies to explain at the literal level the content of a text.

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact

Course created by Jeanne Bellemin on 10/01/1997.

BOARD APPROVAL DATE: 01/20/1998

LAST BOARD APPROVAL DATE: 01/21/2020

Last Reviewed and/or Revised by: Bryan Carey **Date: 10/31/2019**