

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

ACADEMIC SENATE

GENERAL EDUCATION COMMITTEE

REPORT TO

THE ACADEMIC SENATE

GE-115-156

BIO 3130 – Marine Biology (GE Area B5)

General Education Committee

Date: 07/20/2016

Executive Committee
Received and Forwarded

Date: 08/17/2016

Academic Senate

Date: 08/31/2016
First Reading

09/28/2016
Second Reading

BACKGROUND:

This is a revised course for the semester calendar.

RESOURCES CONSULTED:

Faculty
Department Chairs
Associate Deans
Deans
Office of Academic Programs

DISCUSSION:

The GE Committee reviewed the ECO for this course and found it to satisfy the GE Student Learning Outcomes and other requirements for GE Area B5.

RECOMMENDATION:

The GE Committee recommends approval of GE-115-156, BIO 3130 – Marine Biology for GE Area B5.

BIO - 3130 - Marine Biology

C. Course - New General Education* Updated

General Catalog Information

College/Department Biological Sciences	
Semester Subject Area BIO	Semester Catalog Number 3130
Quarter Subject Area BIO	Quarter Catalog Number 330
Course Title Marine Biology	
Units* (3)	
C/S Classification* C-01 (Large Lecture)	
<p>To view C/S Classification Long Description click: http://www.cpp.edu/~academic-programs/scheduling/Documents/Curriculum%20Guide/Appendix C CS Classification.pdf</p>	
Component* Lecture	
Instruction Mode* Face-to-Face Hybrid w/Asynchronous Component Web-Assisted	
Grading Basis* Graded Only	
Repeat Basis* May be taken only once	
If it may be taken multiple times, limit on number of enrollments	1
Cross Listed Course Subject Area and Catalog Nbr (if offered with another department)	

Dual Listed Course Subject Area and Catalog number (If offered as lower/upper division or ugrd/grad)

Choose appropriate type (s) of course(s)*

- Major Course
- Service Course
- GE Course
- None of the above

General Education Area / Subarea* B5

To view the General Education SubArea definitions, click <http://www.cpp.edu/~academic-programs/scheduling/Documents/Ch.3-GeneralEducationProposals.pdf>.

I. Catalog Description

Catalog Description

An overview of the marine physical environment and the organisms that inhabit it. Emphasis on the interconnections between the ecology of the oceans and the rest of the biosphere, including human activities.

II. Required Coursework and Background

Prerequisite(s)

Completion of lower division GE requirements in GE subareas A1, A2, A3, B1, B2 (in biology), B3, B4.

Corequisite(s)

Pre or Corequisite (s)

Concurrent

III. Expected Outcomes

List the knowledge, skills, or abilities which students should On successful completion of this course, students will be able to:

**possess upon
completing the
course.***

1. Describe the main groups of marine organisms.
2. Analyze the biotic and abiotic factors limiting the distribution and abundance of marine organisms.
3. Explain the main types of marine ecosystems and environments.
4. Explain the importance of the marine environment to humans and the human impacts on the oceans.

**If this is a course
for the major,
describe how
these outcomes
relate to the
mission, goals and
objectives of the
major program.**

**Explain how the course meets the description of the GE SubArea(s).
Please select appropriate outcomes according to the GE Area/SLO mapping.**

Marine Biology is an integrative field that borrows from several disciplines, including physical oceanography, biological systematics, ecology, anthropology, chemistry and geology. This course integrates knowledge from all these disciplines in an attempt to provide students with a broad understanding of the basic functioning of the oceanic biotas. Additionally, this course investigates the connections and interactions between the marine environment and human activities and provides students with critical thinking tools to explore the consequences of their daily actions in the ocean environment. Instructional methods will include lectures that may be provided on-line and classroom discussions. In preparation for classroom discussions the students will read a pre-assigned peer-reviewed paper on a topic related to marine biology ahead of time and will be quizzed on the contents of the paper. Then, a team of students will present the topic to the rest of the class in more depth and engage the rest of the class in discussion. Topics will include controversial/current topics such as whaling, overfishing, ocean acidification, climate change, invasive species, etc.

The major focus of a synthesis course is to integrate and focus fundamental concepts and issues. Each course in this category shall:

- Include readings from original primary/historical sources, as opposed to only secondary sources.

This course includes peer-reviewed papers that the students are expected to read before each classroom discussion. Students will be encouraged to read historic literature related to marine science, the human impacts on the ocean and the history of discovery and exploration. For example recommended books will include *Moby-Dick* (by Herman Melville), *The Log of the Sea of Cortez* (by John Steinbeck) and *The Voyage of the Beagle* (by Charles Darwin). Students who integrate analysis from such books in their presentations or essays will receive extra credit.

- Promote original and critical thinking in writing and/or discussion.

Students work in small groups to analyze and present to the rest of the class controversial/current topics in marine science.

- Focus attention on understanding the interrelationships among the disciplines and their applications.

This course provides students with information that explores the importance of physical oceanography, biological systematics, ecology, anthropology, chemistry and geology to understand the distribution and abundance of marine organisms.

- Examine ideas and issues covered in this area in deeper and/or broader more integrative ways.

Student-led classroom discussions will allow students to explore certain topics in more detail and engage the rest of the class in a discussion on the broader impacts of those issues.

- Encourage synthetic-creative thinking in order to identify problems, understand broader implications and construct original ideas.

See SLO 1d

- Identify and evaluate assumptions and limitations of ideas and models.

Critical evaluation of primary literature will allow students to analyze the ideas and models provide them, and these analyses will be discussed in class.

- Develop written and oral communication skills appropriate for an upper division course.

See section IX

- Provide student work for assessment of the student's understanding of the required educational objectives in this subarea or in this course.

See section IX

- The relationship between science, technology, and civilization

This course will have a strong emphasis in understanding the interactions between human activities and the marine environment. This will be achieved at different levels but

primarily through the discussion of current topics that involve the connections between human activities, marine organisms and the entire biosphere.

- The effect science and technology have on culture and human values.

Through concrete case studies, particularly during the classroom discussions, this course will analyze the connection between cultural traditions/values and marine conservation. Examples of such topics are whaling and shark fining. The course will explore both how technology has changed those activities and how those activities have changed the ecology and abundance of marine organisms.

- The application and generalization of basic scientific or quantitative knowledge from the foundational courses to real world or practical problems

Please see first paragraph

Describe how these outcomes relate to the associated GE Learning Outcomes listed below.*

la) Write effectively for various audiences.

In two written assignments, one in the middle of the semester and one at the end of the semester, students will demonstrate effective writing for various audiences. Students will receive input after the first written assignment.

lb) Speak effectively for various audiences.

Students will use spoken words during group presentations and discussions.

lc) Find, evaluate, use and share information effectively and ethically.

The students will be asked to obtain additional information to supplement the peer-reviewed papers provided for the classroom discussions. The instructor will discuss ethic ways to obtain and present data including a discussion of plagiarism.

ld) Construct arguments based on sound evidence and reasoning to support an opinion or conclusion.

Pre-selected peer-reviewed papers have will be provided to the students in order to analyze specific problems. During the classroom presentations/discussion the students will analyze the broader implications of those problems. Groups of students will present arguments to the rest of the class and will be evaluated on their ability to provide sound evidence and reasoning to support an opinion or conclusion.

le) Apply and communicate quantitative arguments using equations and graphical representations of data.

The peer-reviewed papers contain graphs and equations that the student teams will need to analyze and present to the rest of the class.

Ila) Apply scientific methods and models to draw quantitative and qualitative conclusions about the physical and natural world.

Students will apply scientific principles to interpret and analyze the peer-reviewed papers provided in order to present them to the rest of the class.

IId) Integrate concepts, examples, and theories from more than one discipline to identify problems, construct original ideas, and draw conclusions.

Marine Biology is an integrative field that borrows from several disciplines, including physical oceanography, biological systematics, ecology, anthropology, chemistry and geology. This course integrates knowledge from all these disciplines in an attempt to provide students with a broad understanding of the basic functioning of the oceanic biotas.

General Education Outcomes*

Ia. Write effectively for various audiences

Ib. Speak effectively to various audiences.

Ic. Find, evaluate, use, and share information effectively and ethically.

Id. Construct arguments based on sound evidence and reasoning to support an opinion or conclusion.

Ie. Apply and communicate quantitative arguments using equations and graphical representations of data.

IIa. Apply scientific methods and models to draw quantitative and qualitative conclusions about the physical and natural world.

IId. Integrate concepts, examples, and theories from more than one discipline to identify problems, construct original ideas, and draw conclusions.

To view the mapping, click <https://www.cpp.edu/~academic-programs/Documents/GE%20SLO%20Mapping.pdf>

IV. Instructional Materials

Provide bibliography that includes texts that may be used as the primary source for instruction, and other appropriate reference materials to be used in instruction. The reference list should be current, arranged alphabetically by author and the materials should be listed in accepted bibliographic form.

Instructional Materials*

Texts may vary with instructor and over time. Examples of possible texts include:

- Castro, P. & Huber, M.E. (2013). *Marine Biology*, 9th Ed. New York, NY: McGraw-Hill.
- Levinton, J. (2009). *Marine Biology: Function, Biodiversity, Ecology*, 3rd Ed. Oxford, U.K.: Oxford University Press.
- Karleskint, G., Jr., Turner, R., & Small, J.W., Jr. (2010). *Introduction to Marine Biology*. Belmont, CA: Cengage Learning.

Lecture notes and current peer-reviewed papers on the diverse topics will also be made available on Blackboard by the instructor*.

Faculty are encouraged to make all materials accessible. Indicate with an asterisk those items that have had accessibility (ATI/Section 508) reviewed. For more information, <http://www.cpp.edu/~accessibility>

V. Minimum Student Material

List any materials, supplies, equipment, etc., which students must provide, such as notebooks, computers, internet access, special clothing or uniforms, safety equipment, lockers, sports equipment, etc. Note that materials that require the assessment of a fee may not be included unless the fee has been approved according to University procedures.

Minimum Student Material*	Computer
	Internet service
	e-mail
	MS Office
	printer

VI. Minimum College Facilities

List the university facilities/equipment that will be required in order to offer this class, such as gymnastic equipment, special classroom, technological equipment, laboratories, etc.

Minimum College Facilities*	External Support
	Library Services
	Information Technology (IT) Services
	Classroom Management System (e.g. BB)
	copier

lecture room with seating for 100 students
smart classroom (computer/projector)
overhead screen
white board/dry erase markers

VII. Course Outline

Describe specifically what will be included in the course content. This should not be a repetition of the course description but an expansion that provides information on specific material to be included in the class, e.g. lecture topics, skills to be taught, etc. This should not be a week-by-week guide unless all instructors are expected to follow that schedule.

Course Outline*

1. Introduction to Marine Biology

- History of marine science and methods
- Physical oceanography

2. Marine Biodiversity

- The living ocean
- The origin of marine life

- Marine organisms
- California marine organisms

3. Marine Ecosystems and Environments

- Living between the tides
- Estuaries
- The Continental Shelf
- Coral reefs
- Plankton and nekton
- Deep sea
- Special environments

4. The oceans and humans

- Resources of the sea
- Human impacts

VIII. Instructional Methods

Describe the type(s) of method(s) that are required or recommended for the instruction of this course (lectures, demonstrations, etc.). Include any method that is essential to the course, such as the use of particular tools or software.

Instructional Methods*

lecture

problem-solving
discussion
small group activities
assigned readings (textbook, journals, etc.)
outlining (readings, papers, activities, etc.)
project (by individual, group, and/or class)

IX. Evaluation of Outcomes

Describe the methods to be used to evaluate students' learning, i.e. written exams, term papers, projects, participation, quizzes, attendance, etc.*

Written Exams- The exams will be a combination of multiple choice and short answer questions. The exams (midterms and final) will require students to apply the knowledge gained in class to explain real world phenomena. The lectures will include the basic content that students will be tested on. Understanding of those materials is required to pass the course. The exams will specifically be used to assess GE SLO 2a and 2d by including questions designed to draw quantitative and qualitative conclusions about the marine realm. Also, questions will be used to test the ability of the students to integrate concepts and theories from more than one discipline (marine chemistry, geology, biological systematics, ecology and physical oceanography) to identify problems, construct original ideas, and draw conclusions.

Oral Presentations - Classroom discussions will take place once a week. In preparation for the classroom discussions the students will read a pre-assigned peer-reviewed paper on a topic related to marine biology ahead of time and will

be quizzed on the contents of the paper. Then, a team of students will present the topic to the rest of the class in more depth and engage the rest of the class in discussion. Topics will include controversial/current issues such as whaling, overfishing, ocean acidification, climate change, invasive species.

Quizzes – The quizzes are designed to demonstrate the level of understanding of the peer-reviewed papers provided to the students. The questions will specifically address parts of the paper including the application of scientific methodologies as well as the conclusions of the papers on the topics covered. Because many of the papers selected deal with broad issues that integrate concepts and theories from more than one discipline (for example ocean acidification, global climate change, invasive species) the questions will help to address the students' ability to identify problems and draw conclusions from these broad topics. The quizzes will also be use to test the students level of understanding of the importance of the marine environment to humans and the human impacts on the oceans, since all the topics covered in the papers address directly or indirectly the human impact on the marine environment and the benefits of the oceans to human daily lives.

Written Assignments – See explanation of 'Meaningful writing Assignment' below.

Describe the meaningful writing assignments to be included.*

This course will contain two written assignments, one in the middle of the semester and one at the end of the semester. For the first assignment the students will select a topic related to marine science and will use one or more peer-reviewed papers to write a brief essay. This essay will be written in the style of a popular scientific magazine, such as Discovery Magazine, Scientific American, or National Geographic Magazine. The students will be asked to convey information from the selected paper in a way that is clear, straightforward, and easy to understand for someone who does not have a background in science. At the same time all the information provided has to be

accurate and the students will have to comprehensively cover the main conclusions of the research paper. This first assignment will be graded using the following criteria:

1. Originality: it is not just a summary of other people's work but includes some original and creative thinking.
2. Organization: it flows in a well organized and logic way
3. Presentation: follows the guidelines above.
4. Relevance: it is relevant to materials discussed in class.
5. Accuracy: the materials presented are based on evidence or reliable information.

After the students receive input from the first assignment they will write a second essay further exploring the same topic and peer-reviewed papers. This second assignment will be written in the same style, but the students can further explore the topic in more detail and will have to explain why this topic is interesting and important using their own words, and discuss the conclusions using their own knowledge obtained in class.

<p>Discuss how these methods may be used to address the course and program outcomes, as appropriate. Include or attach a matrix to align the evaluation</p>	Methods of Assessment			
	Course Student	Written Exams	Oral Presentations	Quizzes

methods to the outcomes.*

Learning Outcomes				
Describe the main groups of marine organisms	X			X
Analyze the factors limiting their distribution and abundance of marine organisms				X
Explain the main types of marine ecosystems and environments	X	X		X
Explain the importance of the marine environment to humans and the human impacts on the oceans	X	X	X	X

If this is a general education course, discuss how these methods may be used to address the associated GE Learning Outcomes listed below. Include or attach a matrix to align the evaluation methods to the outcomes.*

	Methods of Assessment			
GE SLO	Written Exams	Oral Presentations	Quizzes	Written Assignment
1a				X
1b		X		
1c		X		X
1d		X		X
2a	X	X	X	X
2d	X	X	X	X