PLNU forward

Biology Department

BIO667: Marine Biology

3 Units

"Praise the Lord from the earth, you great sea creatures and all ocean depths,"
– Psalm 148:7

Summer 2016

Meeting days: M, T, W, Th	**Instructor title and name:** Dr. Walter Cho & Prof. Kerri Sevenbergen
Meeting times: 1PM-5:30PM	**Phone:** x2398, x2603
Meeting location: Lecture: Latter 02 Lab: Sator 117	**E-mail:** waltercho@pointloma.edu, kerrisevenbergen@pointloma.edu
Office locations: RS 106, 103	**Office hours:** by appointment

PLNU Mission

To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

COURSE DESCRIPTION

From the course catalog:

Concepts in marine biology, including the ecology, function, and adaptations of marine organisms, are addressed from the perspective of teaching for conceptual understanding. Lecture and field-oriented lab.

Welcome to BIO667! In this course we are going to study one of God's amazing creations, the oceans and the organisms within it. This course will provide an overview of the four main disciplines of oceanography: geological, chemical, physical, and biological oceanography. The ocean is a complex environment and we will start the course with an overview of the marine environment, examining the geological context of the oceans, the properties of seawater and the dynamic nature of the marine environment including waves, tides, and currents. We will then discuss specific marine habitats and the organisms that live in them, focusing on the biological adaptations and ecological functions of marine organisms in their specific habitat. This course will involve a combination of lecture, labs/field trips, writing, and a discussion of published literature relevant to the field. Upon completion of this course, you will have a greater understanding of the ocean environment and its inhabitants, as well as a greater appreciation for the beauty and wonder of God's Creation around us.

COURSE LEARNING OUTCOMES

IDEA Center – Course Goals:

1) Gaining factual knowledge
2) Learning fundamental principles, generalizations, or theories
3) Learning to apply course material
11) Learning to analyze and critically evaluate ideas, arguments, and points of view

- You will be able to analyze, evaluate, and apply the model of Plate Tectonics to the study of geological features of ocean basins. (1,2,3)
- You will be able to evaluate the effects of temperature, pressure, and salinity on the density, layering, and dynamics of the oceans. (1,2)
- You will be able to integrate and evaluate the general circulation of the atmosphere and oceans and describe the origin and effects of waves, tides, and ocean currents. (1,2,3)
- You will be able to classify marine life based upon distinguishing characteristics and adaptations of multiple categories, including major taxonomic groups, major categories of aquatic life (plankton, nekton, benthos), and major biogeographic and habitat/depth patterns related to the physical characteristics of the ocean. (1,2)
- You will be able to describe the major marine community types, including their dominant habitat, community structure, and ecological characteristics. (1,2)
- You will be able to discuss current and potential anthropogenic impacts upon marine ecosystems and demonstrate informed judgments about the effects of human activities on the marine environment. (3,11)
- You will have a greater appreciation for the beauty and wonder of God's Creation and your place in it.
- You will discuss major concepts and theories relevant to the study of marine biology. (1,2)
- You will be able to articulate the persistent challenges faced by marine biologists. (11)
- You will demonstrate both an ability to perform, and an understanding of, experimental methods and data analysis used in the study of marine biology. (1, 3)
- You will analyze representative research papers in marine biology. (3, 11)

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

There are no required textbooks for the course. Assigned reading assignments will be provided either in class or on Canvas.

Supplemental reading:

Multiple references that may be helpful have been placed on reserve in the library including:

- Garrison, T. S. (2012) *Oceanography: An Invitation to Marine Science*. 8th Ed. Cengage Learning, Belmont: 640 pp.
- Levinton, J. S. (2014) *Marine biology: function, biodiversity, ecology*. 4th Ed. Oxford University Press, New York: 576 pp.
- Pechenik, J. A. (2010) *Biology of the Invertebrates.* 6th Ed. McGraw-Hill, New York: 606 pp.

- Kardong, K. (2012) *Vertebrates: Comparative Anatomy, Function & Evolution*. 6th Ed. McGraw-Hill, New York: 794 pp.
- Thomas, D.N. (2002) *Seaweeds*. 1st Ed. Smithsonian Institution Press and Natural History Museum, London. 96 pp.
- Dawes, C.J. (1998) Marine Botany. 2nd Ed. John Wiley & Sons, New York. 480 pp.

ASSESSMENT AND GRADING

Grades will be based upon a straight percentage of the total possible points available in this course and will include the following requirements:

Approximate Grading Scale:

93-100 = A	90-92 = A-	88-89 = B+	83-87 = B	80-82 = B-	78-79 = C+
73-77 = C	70-72 = C-	68-69 = D+	63-67 = D	60-62 = D-	00-59 = F

Course Requirements:	**% Value of Final Grade:**
EXAMS:	
Exam #1	15%
Exam #2	15%
Exam #3	15%
LAB/FIELD PARTICIPATION & REPORTS	20%
ASSIGNMENTS	20%
PRESENTATION	5%
ATTENDANCE/PARTICIPATION	10%
TOTAL	**100%**

Course Requirements in Detail:

A. Lecture:

The lectures will follow the tentative "Schedule of Activities" attached to your syllabus. Due to limitation in time, lectures will cover important key concepts but will not cover all of the information important for this course. You will need to read the assigned supplemental reading to be best prepared for class and to participate in discussions. Keep up with the course material and do not be afraid to ask questions.

B. Exams:

There will be 3 exams (15% final grade each). You are allowed to use any text resources you deem appropriate and your course notes; however, you are expected to work on the exam on your own.

Each exam will only cover material since the previous exam; however, fundamental concepts introduced early on will need to be remembered to address concepts throughout the course.

All materials in the class are potential test topics. This includes lectures, assigned reading assignments, lab information, any handouts or additional reading assignments you might receive, and in-class discussions on relevant topics or questions of interest.

C. Lab/Field Participation & Assignments:

The field trips and labs have been designed to expose the students to as many possible different aspects and potential interests of marine science in general and biological oceanography in particular. Because of the opportunity for exciting & significant scientific discovery and observation during these trips, attendance at scheduled lab activities and full completion of lab assignments are mandatory and will constitute 20% of your grade. Absences must be excused ahead of time and unexcused absences for labs will count significantly against this portion of your final grade as lab makeup work will not be accepted when an excused absence is not given/recognized. A good portion of the "laboratory" component of this class will take place in the field where direct observations of phenomena can be made. Please see the tentative schedule for labs below.

NOTE: The weather may impact what we can do in the field. Expect to get wet and muddy! So wear appropriate clothing and foot wear. Flexibility and adaptability is an important part of marine research and something we all may experience this semester.

D. Assignments & Presentation:

Assignments will be given throughout the course. These will focus on the reading and lecture materials and are worth 20% of your final grade. You will also be researching and giving a presentation on marine vertebrate adaptations, which will be worth 5% of your grade.

E. Class Attendance/Participation:

Class attendance /participation is a very important part of learning and will count for 10% of your final grade. Be responsible and show up for class.

You are responsible for notifying the instructor of any known excused absence at least one week before the date of that absence.

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned under extremely unusual circumstances.

Regular assignments turned in late will be graded as follows: 5% reduction per day up to 3 days late; more than 3 days late = no credit.

FINAL EXAMINATION POLICY

Successful completion of this class requires taking the final examination **on its scheduled day**. No requests for early examinations or alternative days will be approved.

SPIRITUAL CARE

PLNU strives to be a place where you grow as whole persons. To this end we provide resources for our graduate students to encounter God and grow in their Christian faith. At the Mission Valley campus we have an onsite chaplain, Rev. Nancy Pitts who is available during class break times across the week. If students have questions, a desire to meet with Rev Pitts or prayer requests you can contact her directly at gradchaplainmissionvalley@pointloma.edu. In addition there are resources for your Christian faith journey available at http://www.pointloma.edu/experience/faith/graduate-student-spiritual-life.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See Academic Policies in the Graduate and Professional Studies Catalog for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

If you have a diagnosed disability, please contact Jean Moncada in the Center for Student Success (CSS) within the first two weeks of class to demonstrate need and to register for accommodation by phone at (619) 563-2849 or by e-mail at jmoncada@pointloma.edu. Ask your academic advisor or program director for any additional accommodation information.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See Academic Policies in the Graduate and Professional Studies Catalog for additional detail.

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TENTATIVE COURSE SCHEDULE

DATE PRESENTED	CLASS TOPIC
7/11/16 (M)	Marine Geology; hydrothermal vent communities
7/12/16 (T)	Chemical Oceanography; Ocean Acidification
7/13/16 (W)	Physical Oceanography – Atmospheric & Oceanic Circulation; Climate change impacts
7/14/16 (TH)	Physical Oceanography – Waves & Tides; Tsunamis
7/15-16/16	**EXAM 1**
7/18/16 (M)	Benthic Habitats/The Deep Sea
7/19/16 (T)	Pelagic Habitats/Productivity
7/20/16 (W)	Algae I
7/21/16 (TH)	Algae II
7/22-23/16	**EXAM 2**
7/25/16 (M)	Invertebrates I
7/26/16 (T)	Invertebrates II
7/27/16 (W)	Vertebrates I
7/28/16 (TH)	Vertebrates II
7/29-7/30/16	**EXAM 3**