



Biology Department

**BIO3033 (BIO6067-1/6090L Grad): Marine Biology
Lecture (3) & Lab (1)**

4 Units

Spring 2023

“Here is the sea, great and wide, which teems with creatures innumerable, living things both small and great. There go the ships, and Leviathan, which you formed to play in it. These all look to you, to give them their food in due season.”

– Psalm 104:25-27

Meeting days: Lecture: Mon., Wed., Fri. Lab: Mon.	Instructor title and name: Dr. Walter Cho
Meeting times: Lecture: 11-11:55AM (PT) Lab section 1: Mon., 2:45-6:15PM (PT)	Phone: 619-849-2398
Meeting location: Lecture: Rohr Science 40 Lab: Rohr Science 40	Email: wcho@pointloma.edu
Final Exam: Wed., 5/03/2023, 10:30AM-1PM (PT)	Office location and hours (remote or outdoor only): Rohr Science 134; Mon., Wed. & Fri., 8:30-9:30AM; Tues., 8:30-11:30AM- (PT); & 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 is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Foundational Explorations Mission

PLNU provides a foundational course of study in the liberal arts informed by the life, death, and resurrection of Jesus Christ. In keeping with the Wesleyan tradition, the curriculum equips students with a broad range of knowledge and skills within and across disciplines to enrich major study, lifelong learning, and vocational service as Christ-like participants in the world’s diverse societies and culture.

COURSE DESCRIPTION

From the course catalog: The study of life in the oceans, including the ecology, structure, function and adaptations of marine organisms to their environment. Lecture, lab and fieldwork.

Prerequisite(s): BIO 2011.

Welcome to BIO3033! In this course we are going to study one part of God’s amazing creations, the oceans and the organisms within it. The ocean is a complex environment and we will start the course with a brief overview of the marine environment, examining the properties of seawater and the dynamic nature of the oceans 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. We will end with a discussion of human impacts on the marine environment. 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

Upon completion of the course, you will be able to...

- ... define and explain the fundamental marine habitats and marine organisms.
- ... 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.
- ... identify the major anatomical and physiological adaptations of marine organisms to the physical, chemical, and geological conditions of marine environments.
- ... describe and interpret patterns of marine primary and secondary production, including energy flow in marine food webs, trophic structure, and the microbial loop.
- ... describe the interactions of marine organisms through processes such as growth, reproduction, competition, predation, and varied symbioses and understand how these behaviors and processes are influenced by the physical environment.
- ... describe the major marine community types, including their dominant habitat, community structure, and ecological characteristics.
- ... discuss current and potential anthropogenic impacts upon marine ecosystems and demonstrate informed judgments about the effects of human activities on the marine environment.

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

Levinton, J. S. (2021) *Marine biology: function, biodiversity, ecology*. 6th Ed. Oxford University Press, New York: 608 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	10%
Exam #2	10%
Exam #3	10%
Final Exam	20%

LAB/FIELD PARTICIPATION & REPORTS	20%
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TERM PAPER	10%
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<u>ASSIGNMENTS/QUIZZES/ATTENDANCE/PARTICIPATION</u>	<u>20%</u>
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TOTAL	100%
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Course Requirements in Detail:

A. Lecture:

The lectures will follow the tentative “TENTATIVE Schedule” 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 appropriate chapters before the lecture to be best prepared for lecture and to participate in classroom discussions. Keep up with the course material and do not be afraid to ask questions.

B. Exams:

There will be 3 exams (10% final grade each) and a Final Exam (20% of final grade). Each exam is objective and can consist of multiple-choice, matching, short answer and true/false type questions. There will also be some application questions including synthesis and analysis of important concepts as well as essay/discussion questions. 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. The Final Exam will be comprehensive, covering topics from the 4th Unit of the course as well as the first 3 Units.

All materials in the class are potential test topics. This includes lecture materials from the required textbook (text, illustrations), lab information, any handouts or additional reading assignments you might receive, and in-class discussions on relevant topics or questions of interest.

TENTATIVE dates for the exams are: Exam #1 – February 6, 2023 [M]; Exam #2 – March 20, 2023 [M]; Exam #3 – April 17, 2023 [M]; FINAL EXAM – May 3, 2023 [WED, 10:30AM–1PM (PT)]. Except for the final exam, dates are subject to change depending on progression through required course material.

NOTE: See above for make-up policy for exams.

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 biology. Because of the opportunity for exciting & significant scientific discovery and observation during these trips, attendance at scheduled lab activities and full completion of lab reports is mandatory and will constitute 25% 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. Flexibility and adaptability is an important part of marine research and something we all may experience this semester.

D. Term Paper:

You will be expected to write a term paper worth 10% of the final course grade. This will be in the form of a *review paper* where you will summarize and synthesize multiple peer-reviewed articles about a research topic of your choice focused on a particular marine organism or habitat.

Writing is a vital skill that you will use in whatever field you enter in the future. This is an opportunity to practice and improve that skill while learning about something that is important and interesting to you.

REQUIRED COMPONENTS:

1. You must decide upon your topic for the term paper and get instructor approval by **FRI, March 24, 2023.**

- At the time you are seeking approval for the paper, you will submit a short summary of your paper topic (1 paragraph) and a list of at least 2 preliminary peer-reviewed sources, with justification of how the sources are relevant.

2. FINAL DRAFT OF YOUR TERM PAPER DUE: **FRI, April 28, 2023.**

- Your term paper will be graded along the following criteria: your outline, prompt submission of required components, content and thoroughness of the topic discussed, proper grammar, exhibited knowledge of supporting literature. A grading rubric will be given to you before the final submission date.

- The term paper should be 6-8 pages in length (not including references), double-spaced and with a 12 pt font.

- You are expected to use/cite at least 4 references in the preparation of the paper and these must be listed in the bibliography using consistent scientific style citation format. All 4 references must be from peer-reviewed sources.

- More information about the paper will be provided later in the semester.

E. Class Assignments/Quizzes/Attendance/Participation:

Class assignments and quizzes may be given throughout the course. These will focus on the reading and lecture materials. In addition, class attendance /participation is a very important part of learning and these 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.

F. Research Paper (for graduate credit)

Graduate students taking this course for credit will require an additional research paper related to course material.

REQUIRED COMPONENTS:

- The paper should be 1800-2000 words in length and do one of the following:
 - Describes a connection between a topic addressed in the course and the student's career goal.
 - Describes a connection between a topic addressed in the course and a topic in another course that the student has taken in the program.
 - Delves deeper into a topic that was introduced in the course, but is of special interest to the student.
- The paper will be due by the end of the regular semester. It should be written in APA format, with at least 5 references, including 3 journal articles (original research or review articles). There should be at

least one in-text citation for each reference in this format (Author, Date) and a complete list of references at the end of the paper.

- Submit the paper via e-mail no later than one week after the end of finals week to Dr. Anderson as a Word document (not a pdf). The professor of the course will be asked to read the paper and to provide an overall impression of quality, while the MS in General Biology program director will do the detailed assessment. The paper will be assessed on a pass/fail basis, with the focus on the quality and clarity of the writing, the successful incorporation of relevant references, and the quality of the biological content. If a paper is determined to be “failing”, the student will be asked to revise and resubmit the paper.

SPIRITUAL CARE

PLNU strives to be a place where students grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

If you have questions, a desire to meet with the chaplain, or if you have prayer requests, you can contact the [Office of Student Life and Formation](#).

STATE AUTHORIZATION

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student’s responsibility to notify the institution of any change in his or her physical location. Refer to the map on [State Authorization](#) to view which states allow online (distance education) outside of California.

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. **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.**

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](#) for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student’s

eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan (“AP”) to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student’s responsibility to make the first contact with the EAC.

SEXUAL MISCONDUCT AND DISCRIMINATION

Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. If you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that help and support are available through the Title IX Office at pointloma.edu/Title-IX. Please be aware that under Title IX of the Education Amendments of 1972, it is required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at counselingservices@pointloma.edu or find a list of campus pastors at pointloma.edu/title-ix

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of 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.

BIO 3033 Spring 2021 TENTATIVE Schedule (Underlining indicates reading)				
Week (SUN)	MONDAY Lecture	WEDNESDAY Lecture	FRIDAY Lecture	Lab
1/8	(Meet on Tuesday) Intro to BIO3033 <u>Text Chapter 1</u>	Oceanic Environment 1 <u>Text Chapter 2</u>	Oceanic Environment 2	No Lab
1/15	Martin Luther King Jr. Day - No class	Oceanic Environment 3	Chemical & Physical Environment 1 <u>Text Chapter 5</u>	No Lab
1/22	Chemical & Physical Environment 2	Chemical & Physical Environment 3	Chemical & Physical Environment 4	Intertidal Lab (-1.5'@4:44PM)
1/29	Life in Fluids <u>Text Chapter 6</u>	Reproduction, Dispersal, Migration 1 <u>Text Chapter 7</u>	Reproduction, Dispersal, Migration 3	Reynolds Number Lab
2/5	Reproduction, Dispersal, Migration 4	Plankton 1 <u>Text Chapter 8</u>	Plankton 2	EXAM #1
2/12	Plankton 3	Plankton 4	Plankton 5	Plankton Lab
2/19	Plankton 6	Invertebrates 1 <u>Text Chapter 14</u>	Invertebrates 2	Literature Review Lab
2/26	Invertebrates 3	Invertebrates 4	Invertebrates 5	Dissections (Molluscs)
3/5	Spring Break – No class	Spring Break – No class	Spring Break – No class	No Lab
3/12	Invertebrates 6	Invertebrates 7	Invertebrates 8	Dissections (Echinoderms)
3/19	Fishes 1 <u>Text Chapter 9</u>	Fishes 2 Marine Mammals 3	Reptiles & Birds 1 <u>Text Chapter 9</u> Term Paper Outline DUE	EXAM #2
3/26	Reptiles & Birds 2	Marine Mammals 1 <u>Text Chapter 9</u>	Marine Mammals 2	Dissections (Annelids, Arthropods)
4/2	Marine Mammals 3	Marine Mammals 4	Easter Recess – No Class	Dissections (Fish)
4/9	Easter Recess – No Class	Marine Mammals 5	Algae & Plants <u>Text Chapter 13</u>	No Lab
4/16	Benthic Habitats 1 <u>Text Chapter 15</u>	Benthic Habitats 2	Tidelands 1 <u>Text Chapter 16</u>	EXAM #3
4/23	Tidelands 2	Coral Reefs 1 <u>Text Chapter 17</u>	Coral Reefs 2 Term Paper DUE	Seal Observation Lab
4/30		FINAL EXAM (10:30AM-1PM)		FINAL EXAM