



Biology Department/School of Social and Natural Sciences

**BIO4073: Experimental Marine Ecology
Lecture (3) & Lab (1)**

4 Units
Spring 2024

LECTURE: BIO4073-1 (MWF 11:00 am – 11:55 am)

Meeting location (Rohr Science 40)

LAB: BIO4073L-1 (W 2:45 pm – 6:15 pm)

Meeting location (Rohr Science 40)

Final Exam: Monday, 5/03/2024, 10:30am – 1:00 pm

“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

INFORMATION	SPECIFICS FOR THE COURSE
Instructor title and name:	Dr. Walter Cho
Phone:	619-849-2398
Email:	wcho@pointloma.edu
Office location and hours:	Rohr Science 134; Mon. & Fri., 8:30-9:30AM; Tues., 9:30-11:30AM; & 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:

A field-oriented course that explores aspects of marine ecology within the context of coastal communities, including ecological relationships within the marine environment, factors influencing community structure, and biogeography. A central component of the course will be an independent project with experimental design. Lecture, lab, and fieldwork. Prerequisite: BIO 2011

Welcome to BIO4073! In this course we are going to study the ecology of marine coastal communities and apply the concepts covered in this course in an independent research project. We will study the history of the field of marine ecology, including a review of some of the key experiments in the field. We will then briefly review the physical context of the ocean and then study the concepts of dispersal, connectivity, biogeography, and biodiversity in the context of marine ecology. We will learn and practice experimental protocols to study multiple marine habitats and employ them in an independent research project focused on the dynamics of marine communities. Students will be involved in all steps of this research project including a comprehensive literature review, experimental design, sample collection, sample processing, and data analysis. The project will culminate in a final presentation of the results and conclusions..

Program and Course Learning Outcomes

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

1. ... describe several major ecological processes that influence marine population dynamics and marine community structure, including current hypotheses regarding relationships between marine organisms and their environment, intra- and interspecific interactions, and biotic and abiotic factors that structure marine communities.
2. ... identify and apply several metrics that can be used to describe populations and communities in nature.
3. ... develop a working knowledge of relevant research literature.
4. ... design and conduct an original research project.
5. ... develop experience with experimental techniques in marine ecology.
6. ... organize, statistically analyze, and interpret field data and communicate your interpretations in written and oral form.

Required Texts and Recommended Study Resources

Required textbook:

- B Kaiser, M.J., et al. 2020. Marine ecology: processes, systems, and impacts. Oxford University Press, New York, NY.
- A lab notebook that is used solely for the work in this course. These lab notebooks will be collected periodically to be assessed.
- Additional reading and articles as assigned for class discussions and posted on the course site.

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

Your grade for this course will be based on several categories, described in detail below.

A. Lecture:

The lectures will follow the TENTATIVE Schedule attached at the end of the 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 and activities. Keep up with the course material and do not be afraid to ask questions.

B. Exams:

There will be 2 exams (15% of final grade each). Each exam is objective and will be open-book, take-home exams. You may use your textbook and primary or secondary literature to help answer the questions, but you CANNOT discuss the questions or your answers with anyone else. You must answer the questions on your own. They will also require you to use your research skills for finding appropriate peer-reviewed resources, synthesizing information, and writing a cogent statement on a focused topic.

TENTATIVE dates for the exams are: Exam #1 – week of February 10, 2020; Exam #2 – week of March 30, 2020.

Dates are subject to change depending on progression through required course material.

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

C. Lab/Field Participation & Assignments:

We will be conducting an independent research project studying the dynamics of marine communities. This will involve a mix of field and lab work which will be assessed through a combination of field reports and reviewing a lab notebook that is to be maintained by each student for their work in this course. Because each lab is critical for the completion of the project, attendance at scheduled lab activities and full completion of lab reports is mandatory and will constitute 25% of your grade.

NOTE: The schedule of lab activities is TENTATIVE, as adjustments may need to be made depending on the results of each lab.

D. Independent Project Lab Report:

You will be expected to write a final lab report worth 15% of the final course grade. The term paper will be a formal lab report of your independent research project. This lab report will include all the sections of a traditional lab report including: an abstract, an introduction, a materials and methods section, a results section, a discussion section, and a bibliography.

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.

REQUIRED COMPONENTS:

1. You must submit an outline of your independent research project, including potential sample locations, methods, and analyses as part of the 2nd take home exam.
2. FINAL DRAFT OF YOUR TERM PAPER DUE: FRI, May 1, 2020.
 - a. NOTE: References (both parenthetical in the text and at the end of your term paper/bibliography) should follow a standard format following a citation guide that will be provided.
 - b. Your final project lab report will be graded along the following criteria: your outlines, prompt submission of required components, content and thoroughness of the topic discussed, proper grammar, exhibited knowledge of supporting literature, etc. A grading rubric will be given to you before the final submission date.
 - c. The term paper should be 6-8 pages in length (not including references), double-spaced and with a 12 pt font.
 - d. You are expected to use/cite at least 4 references in the preparation of the paper and these must be listed on the last page of the term paper following a standard citation format. All 4 references must be from peer-reviewed sources.

E. Final Presentation:

You will need to provide a cogent summary of your term paper and its conclusions. You will be graded on the content (preparation, introduction, organization summary, use of sources and appropriateness) and the quality (voice quality and volume, visual aid usage, ease of delivery, body language, dress and professionalism) of your presentation and is worth 10% of your grade. A PowerPoint presentation is strongly encouraged, but is not the only option for your talk. Try not to read your paper or formulate your presentation as an oral duplicate of your

paper. Rather, you should highlight the important themes/points/ issues/questions that you'd like your audience to really know and discuss. The presentation should be about 15 minutes long, with an additional 5 minutes for questions.

F. Quizzes/Assignments/Participation:

Class attendance/participation is a very important part of learning. Along with class assignments and quizzes, they will count for 20% of your final grade.

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

Percentage breakdown

2 exams (15% each)	30%
Lab Notebook/Field Participation & Reports	25%
Independent Project Lab Report	15%
Final Presentation	10%
<u>Quizzes/Assignments/Participation</u>	<u>20%</u>
TOTAL	100%

Final Examination Policy

Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the [Traditional Undergraduate Records: Final Exam Schedules](#) site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

Content Warning

I acknowledge that each of you comes to PLNU with your own unique life experiences. This contributes to the way you perceive various types of information. In BIO4073/BIO4073L, all of the class content, including that which may be intellectually or emotionally challenging, has been intentionally curated to achieve the learning goals for this course. The decision to include such material is not taken lightly. These topics include issues related to evolution, climate change, and environmental stewardship. If you encounter a topic that is intellectually challenging for you, it can manifest in feelings of discomfort and upset. In response, I encourage you to come talk to me or your friends or family about it. Class topics are discussed for the sole purpose of expanding your intellectual engagement in the area of biology, and I will support you throughout your learning in this course.

Trigger Warning

I acknowledge that each of you comes to PLNU with your own unique life experiences. This contributes to the way you perceive several types of information. In BIO4073/BIO4073L, we will cover a variety of topics, some of which you may find triggering. These topics include issues related to evolution, climate change, and environmental stewardship. Each time this topic appears in a reading or unit, it is marked on the syllabus. The experience of being triggered versus intellectually challenged are different. The main difference is that an individual must have experienced trauma to experience being triggered, whereas an intellectual challenge has nothing to do with trauma. If you are a trauma survivor and encounter a topic in this class that is triggering for you, you may feel overwhelmed or panicked and find it difficult to concentrate. In response, I encourage you to take the necessary steps for your emotional safety. This may include leaving class while the topic is discussed or talking to a therapist at the Counseling Center. Should you choose to sit out on discussion of a certain topic, know that you are still responsible for the material; but we can discuss if there

are other methods for accessing that material, and for assessing your learning on that material. Class topics are discussed for the sole purpose of expanding your intellectual engagement in the area of biology, and I will support you throughout your learning in this course.

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 in 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.

Spiritual Care

Please be aware PLNU strives to be a place where you 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 have prayer requests you can contact your professor or the [Office of Spiritual 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.

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.

Artificial Intelligence (AI) Policy

Use of Artificial Intelligence (AI) tools (e.g. ChatGPT, iA Writer, Marmot, Botowski) is not permitted, and use of these tools will be treated as plagiarism.

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.

Language and Belonging

Point Loma Nazarene University faculty are committed to helping create a safe and hospitable learning environment for all students. As Christian scholars we are keenly aware of the power of language and believe in treating others with dignity. As such, it is important that our language be equitable, inclusive, and prejudice free. Inclusive/Bias-free language is the standard outlined by all major academic style guides, including MLA, APA, and Chicago, and it is the expected norm in university-level work. Good writing and speaking do not use unsubstantiated or irrelevant generalizations about personal qualities such as age, disability, economic class, ethnicity, marital status, parentage, political or religious beliefs, race, gender, sex, or sexual orientation. Inclusive language also avoids using stereotypes or terminology that demeans persons or groups based on age, disability, class, ethnicity, gender, race, language, or national origin. Respectful use of language is particularly important when referring to those outside of the religious and lifestyle commitments of those in the PLNU community. By working toward precision and clarity of language, we mark ourselves as serious and respectful scholars, and we model the Christ-like quality of hospitality.

You may report an incident(s) using the [Bias Incident Reporting Form](#).

Sexual Misconduct and Discrimination

In support of a safe learning environment, 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 accommodations and resources 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, faculty and staff are 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 withdrawal date or, after that date, receive an “F” grade.

Class participation/attendance is a very important part of learning. Be responsible and show up for class.

Make-ups for any missed assignments or activities will only be given if a legitimate excuse is given prior to the absence. The format of this make-up will be at the instructor’s discretion.

Missed exams, with a documented excuse, must be made up within one week of the date on which they are given.

Loma Writing Center

The Loma Writing Center exists to help all members of the PLNU community cultivate transferable writing skills to engage their academic, professional, personal, and spiritual communities. We work toward this goal by conducting one-on-one consultation sessions, supporting writing education across the PLNU community, and participating in ongoing writing center research.

Getting feedback from the Loma Writing Center while you’re in the process of working on an assignment is a great way to improve the quality of your writing and develop as a writer. You are encouraged to talk with a trained writing consultant about getting started on an assignment, organizing your ideas, finding and citing sources, revising, editing for grammar and polishing final drafts, and more. For information about how to make in-person or online appointments, see [Loma Writing Center webpage](#) or visit the Loma Writer Center on the first floor of the Ryan Library, room 221.

BIO 4073 Spring 2024 TENTATIVE Schedule (Underlining indicates reading)

Week	Week	MONDAY Lecture	WEDNESDAY Lecture	FRIDAY Lecture	WEDNESDAY Lab
1	1/07	Intro to BIO4073; History of Marine Ecology	History of Marine Ecology 2	<u>Suppl. reading;</u> Review of Chemical Oceanography 1	Barnacle settlement experiment set-up (-1.5'@2:59PM)
2	1/14	Martin Luther King Jr. Day - No class	<u>Suppl. reading;</u> Review of Chemical Oceanography 2	<u>Suppl. reading;</u> Marine Geology 1	Plankton Tow lab (+3.3'@1:42PM)
3	1/21	<u>Suppl. reading;</u> Marine Geology 2	<u>Suppl. reading;</u> Physical Oceanography 1	<u>Suppl. reading;</u> Physical Oceanography 2	Barnacle expt. Check1 /Intertidal Lab (-1.0'@3:03PM)
4	1/28	<u>Suppl. reading;</u> Physical Oceanography 3	<u>Text Chapter 1;</u> Patterns in the Marine Environment 1	<u>Text Chapter 1;</u> Patterns in the Marine Environment 2	Meiofauna lab (+3.4'@11:37AM)
5	2/04	<u>Text Chapter 1;</u> Patterns in the Marine Environment 3	<u>Text Chapter 1;</u> Patterns in the Marine Environment 4	<u>Text Chapter 2;</u> Primary Production 1	Barnacle expt. Check2 (-1.3'@2:04PM)
6	2/11	<u>Text Chapter 2;</u> Primary Production 2	EXAM #1	<u>Text Chapter 2;</u> Primary Production 3	No Lab – EXAM #1
7	2/18	<u>Text Chapter 2;</u> Primary Production 4	<u>Text Chapter 3;</u> Marine Microbial Secondary Production 1	<u>Text Chapter 3;</u> Marine Microbial Secondary Production 2	Dog Beach lab (-0.8'@2:16PM)
8	2/25	<u>Text Chapter 3;</u> Marine Microbial Secondary Production 3	<u>Text Chapter 4;</u> Secondary Production 1	<u>Text Chapter 4;</u> Secondary Production 2	Literature Review (+0.9'@4:39PM)
9	3/03	Spring Break – No class	Spring Break – No class	Spring Break – No class	No Lab
10	3/10	<u>Text Chapter 5;</u> Estuaries 1	<u>Text Chapter 5;</u> Estuaries 2	<u>Text Chapter 5;</u> Estuaries 3	Barnacle expt. Analytical Methods
11	3/17	<u>Text Chapter 5;</u> Estuaries 4	<u>Text Chapter 6;</u> Rocky & Sandy Shores 1	<u>Text Chapter 6;</u> Rocky & Sandy Shores 2	Barnacle expt. Check3 (-0.3'@2:15PM)
12	3/24	<u>Text Chapter 6;</u> Rocky & Sandy Shores 3	EXAM #2	Easter Recess – No Class	No Lab – EXAM #2
13	3/31	Easter Recess – No Class	<u>Text Chapter 7;</u> Pelagic Ecosystems 1	<u>Text Chapter 7;</u> Pelagic Ecosystems 2	OPEN LAB (-0.4'@12:39PM)
14	4/7	<u>Text Chapter 9;</u> The Deep Sea 1	<u>Text Chapter 9;</u> The Deep Sea 2	<u>Text Chapter 9;</u> The Deep Sea 3	OPEN LAB (+1.0'@4:39PM)
15	4/14	<u>Text Chapter 17;</u> Climate Change 1	<u>Text Chapter 17;</u> Climate Change 2	<u>Text Chapter 17;</u> Climate Change 3	OPEN LAB (+0.1'@12:52PM)
16	4/21	Independent Project open work period	Independent Project open work period	Independent Project open work period	OPEN LAB (+1.3'@3:36PM)
17	4/28	FINAL EXAM (Student Presentations) (10:30AM-1:00PM)			