Biology Department

Point Loma Nazarene University

BIO4073: Experimental Marine Ecology

3 Units

"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

Spring 2020

Meeting days: Lecture: Mon., Wed., & Fri. Lab: Wednesday	**Instructor title and name:** Dr. Walter W. Cho
Meeting times: Lecture: 1:30PM-2:25PM Lab: 2:45PM-6:15PM	**Phone:** x2398
Meeting location: Lecture: Taylor 105 Lab: Sator 108	**E-mail:** wcho@pointloma.edu
Final Exam: Friday, 5/8/20, 1:30PM-4PM	**Office location and hours:** Rohr Science 134 Mon. 2:30-3:30PM, Thurs. 10AM-12PM, by appt.

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.

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.

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

- Bertness, M.D., B.R. Silliman, J.F. Bruno and J.J. Stachowicz (eds.) 2013. Marine community ecology and conservation. Sinauer Associates, Inc., Sunderland, MA.
- 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

Course Requirements:	**% Value of Final Grade:**
EXAMS:	
Exam #1	15%
Exam #2	15%
LAB NOTEBOOK/FIELD PARTICIPATION & REPORTS	25%
INDEPENDENT PROJECT LAB REPORT	15%
FINAL PRESENTATION	10%
QUIZZES/ASSIGNMENTS/PARTICIPATION	20%
TOTAL	**100%**

Course Requirements in Detail:

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. It is recommended that you visit the Tutorial Center on the south side of the Bond Academic Center (stusdts1@pointloma.edu) if you need or would like assistance in writing this paper. The Tutorial Center is a very useful resource.
    c. 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.
    d. The term paper should be 6-8 pages in length (not including references), double-spaced and with a 12 pt font.
    e. 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. Fancy-looking but inappropriate or ill-prepared presentations will not receive high marks. 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*.*

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.

FINAL EXAMINATION POLICY

Successful completion of this class requires taking the final examination **on its scheduled day, Friday, May 8, 1:30-4PM**. The final examination schedule is posted on the Class Schedules site. No requests for early examinations or alternative days will be approved.

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

While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning

needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

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 Undergraduate Academic Catalog.

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

Students are responsible for notifying the instructor of any known excused absence at least one week before the date of that absence. Three or more unexcused absences from class can result in a significant reduction of the student's final grade.

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.

BIO 4073 Spring 2020 TENTATIVE Schedule (Underlining indicates reading)

Week	MONDAY Lecture	WEDNESDAY Lecture	FRIDAY Lecture	Lab
1/13	(Meet on Tuesday) Intro to BIO4073	History of Marine Ecology; Text Chapter 1	History of Marine Ecology	No Lab (-1.4'@4:08PM)
1/20	**Martin Luther King Jr. Day - No class**	Key Paper Discussion	Physical Context; Text Chapter 2	Barnacle settlement experiment set-up (-1.1'@2:17PM)
1/27	Physical Context	Physical Context	Physical Context	Literature Review
2/3	Physical Context	*EXTENDED LAB*	Physical Context	Sousa Disturbance study; Barnacle expt. check (-0.5'@1:11PM)
2/10	Rocky Intertidal Text Chapter 9	Rocky Intertidal **EXAM #1**	**EXAM #1**	**No Lab – EXAM #1**
2/17	Rocky Intertidal	*EXTENDED LAB*	Rocky Intertidal	Rocky Intertidal lab; Barnacle expt. check (-0.8'@1:38PM)
2/24	Rocky Intertidal	*EXTENDED LAB*	Pelagic Communities Text Chapter 15	Plankton Tow lab (+0.3'@4:40PM)
3/2	Pelagic Communities	Pelagic Communities	Pelagic Communities	Barnacle expt. check (0.0'@12:02PM)
3/9	**Spring Break – No class**	**Spring Break – No class**	**Spring Break – No class**	**No Lab**
3/16	Pelagic Communities	*EXTENDED LAB*	Pelagic Communities	Dog Beach lab (-0.3'@1:23PM)
3/23	Soft-Sediment Comm. Text Chapter 10	*EXTENDED LAB*	Soft-Sediment Comm.	Meiofauna lab (+0.4'@4:33PM)
3/30	Soft-Sediment Comm.	Soft-Sediment Comm. **EXAM #2**	**EXAM #2**	**No Lab – EXAM #2**
4/6	Deep-sea Hydrothermal Vent Communities Text Chapter 17	Deep-sea Hydrothermal Vent Communities	**Easter Recess – No Class**	Barnacle expt. check (-0.2'@4:08PM)
4/13	**Easter Recess – No Class**	Deep-sea Hydrothermal Vent Communities	Deep-sea Hydrothermal Vent Communities	**OPEN LAB** (+0.1'@11:48AM)
4/20	Deep-sea Hydrothermal Vent Communities	Deep-sea Hydrothermal Vent Communities	Deep-sea Hydrothermal Vent Communities	**OPEN LAB** (+0.7'@3:29PM)
4/27	Independent Project open work period	Independent Project open work period	Independent Project open work period	**OPEN LAB** (+0.2'@9:12AM) (+3.0'@5:15PM)
5/4			**FINAL EXAM (Student Presentations) (1:30PM-4:00PM)**	