POINT LOMA NAZARENE UNIVERSITY	**Biology Department** **BIO2011: Ecological & Evolutionary Systems** **Lecture (3) & Lab (1)** **4 Units**
Spring 2021	

The earth is the Lord's and everything in it.

-Psalms 24:1

Meeting days: Lecture: Mon., Wed., Fri. Lab: Thurs.	**Instructor title and name:** Dr. Walter Cho
Meeting times: Lecture: 1:30-2:25PM (PT) Lab section 1: Th., 8-11AM (PT) Lab section 2: Th., 1:30-4:30PM (PT) Lab section 3: Th., 5:30-8:30PM (PT)	**Phone:** 619-849-2398
Meeting location: Lecture on MW: via Zoom (link on Canvas) Lab: Rohr Science 40	**Email:** wcho@pointloma.edu
Final Exam: Mon., 6/7/2021, 1:30-4PM (PT)	**Office location and hours (remote or outdoor only):** Rohr Science 134; Zoom link on Canvas: Mon. & Fri., 12-1:30PM; Th., 11AM-12PM (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: An introduction to the principles of ecology, evolutionary biology and sustainability. Lecture and lab. Offered every semester.

This course provides an introduction to two major areas of study in biology: evolution and ecology. Evolution is the unifying theme for all of biology; it encompasses all subdisciplines, from development to medicine to conservation biology. Ecology, on the other hand, helps us to understand and sustain the delicate balance between the living and nonliving world.

The introduction to the study of evolutionary processes will include the basic mechanisms for evolution, the theory of natural selection, the basis of heredity and variation, population structure and genetics, and

mechanisms of speciation. Along with these topics we will explore the ways that questions about evolution are answered, and how some Christians reconcile their faith with their acceptance of evolution.

The introduction to the study of ecological systems will include an examination of both biotic (living) and abiotic (non-living) elements of the environment that influence the distribution and abundance of organisms. Population, community, and ecosystem level ecology are addressed, especially in light of man's influence on nature and nature's influence on man. We will then discuss how we can apply ecological principles to improve conservation of species and consider our responsibility to care for God's creation through sustainability.

Our hope is that you develop an appreciation for the complexity and beauty of living systems, and develop awe and respect for the Creator through study of His creation.

COURSE LEARNING OUTCOMES

On completing BIO2011 you will be able to:

- assess the status of modern evidence for the theory of biological evolution as an explanation for the diversity, commonalities, and ancestry of living organisms.
- articulate the relationship between scientific understandings of evolution and Christian concepts of creation.
- describe how interactions between organisms and their environment influence populations, communities, and ecosystems.
- articulate and defend a position on environmental stewardship drawing on both biological and world views
- design and conduct an independent investigation applying the processes and tools of scientific inquiry (both hypothesis testing and discovery science) to test biological hypotheses.
- prepare and analyze graphs drawing valid scientific conclusions.

FOUNDATIONAL EXPLORATIONS LEARNING OUTCOMES

Select questions on the final exam will be used to assess Foundational Explorations Learning Outcome 1d. Critical Thinking: Students will be able to examine, critique, and synthesize information in order to arrive at reasoned conclusions.

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

Required textbook:

- Brooker et al., "Principles of Biology," 3rd ed. (ISBN 9781260708325)

Required supplemental material:

- Book – "Origins", by Haarsma and Haarsma (ISBN 9781592555734)
- Access to a **computer with a camera**, and **reliable internet service**. Please email me ASAP if you have any technology challenges!! PLNU is committed to helping students have access to these materials.
- A **somewhat private learning space**. Please email me ASAP if you do not have access to such a space so that we can make a plan for your success.

COURSE CREDIT HOUR INFORMATION

In the interest of providing sufficient time to accomplish the stated Course Learning Outcomes, this class meets the PLNU credit hour policy for a 4 unit class delivered over 15 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework. For this course, students will spend an estimated 150 total hours meeting the course learning outcomes. The time estimations are provided in the Canvas modules.

ASSESSMENT AND GRADING

Your grade for this course will be based on five distinct evaluation tools: exams, online quizzes, homework assignments, laboratory experience, and special projects. Each is described in detail below.

1. **Quizzes (10%):** Quizzes will cover both the course content and the reading material. One goal of the quizzes is to hold students accountable for the assigned reading or online lectures. Most of the quizzes will be available on Canvas (online), others will be in class. You will be given fair notice and have an adequate window in which to complete the quiz. If taking the quiz online, no quizzes will be accepted after the time window has expired (so don't ask for an exception). For online quizzes, you will generally have about 20 minutes to complete the quiz, and you may not have discussions with other students.
2. **Outside reading/discussions/assignments/problem sets (15%):** There will be several different assignments that relate to the course material. All assignments will be listed on Canvas and you will be given fair notice as to when they are due.
3. **Science/Faith paper (5%):** There will also be a reflection project assigned during the semester related to the intersection between faith and science (details to come later).
4. **Writing Assignments (5%):** There will be 3 short writing assignments throughout the semester. These writing assignments are designed to deepen your understanding and comprehension of some of the major concepts in the course while also developing your ability to communicate scientific ideas to broad audiences in your own words.
5. **Three examinations (10% each) and a Final (15%):** Students are expected to take the exams on the days scheduled unless they have a written excuse cleared by the instructors no later than the Friday preceding the exam. If there is an approved conflict you will be expected to take the exam prior to the scheduled time. Missing an exam due to illness will require medical verification. Unexcused misses will result in a zero grade. You will have two weeks from the time exams are handed back to discuss possible corrections, after which the grade becomes permanent. Exams will cover all material assigned, including assigned chapters from "Origins." In addition to the material that will be covered in lecture, each exam will include questions from material assigned but not discussed directly in class. This is intended to begin developing the skills necessary for independent learning. Exams will be deployed using the Honorlock system in Canvas.
6. **Laboratory Grade (20%):** You are required to attend all lab sessions. Attendance, participation, and lab assignments will determine your lab grade for the semester.

Percentage breakdown		**Approximate grade breakdown**	
3 exams (10% each) and Final (15%)	45%	Percentage range	Letter grade earned*
Quizzes	10%	90-100%	A
Outside reading/discussions/assignments	15%	80-89%	B
Science/Faith paper	5%	70-79%	C
Writing Assignments	5%	60-69%	D
Laboratory experience	20%	≤ 59%	F
TOTAL	100%		

*Notes about grades:

1. Plusses and minuses (e.g., B+/A-) will be determined at the instructors' discretion. A major factor in this decision will be class participation.
2. Freshmen earning an F will be offered the opportunity to retake a course once, with the new grade completely replacing the F.*Notes about grades:

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. Incompletes will only be assigned in extremely unusual circumstances.
Deadlines will be strictly adhered to. Unless otherwise specified, typically 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

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 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 **synchronous** class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions (virtual or face-to-face), 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. In some courses, a portion of the credit hour content will be delivered **asynchronously** and attendance will be determined by submitting the assignments by the posted due dates. See Academic Policies in the Undergraduate Academic Catalog. If absences exceed these limits but are due to university excused health issues, an exception will be granted.

Asynchronous Attendance/Participation Definition

A day of attendance in asynchronous content is determined as contributing a substantive note, assignment, discussion, or submission by the posted due date. Failure to meet these standards will result in an absence for that day. Instructors will determine how many asynchronous attendance days are required each week.

Attendance of all lectures and lab sessions is required; roll will be taken regularly via Zoom to encourage compliance. Because lab sessions are longer, missing a lab counts as 2 absences. A total of three unexcused absences will be permissible. More than three absences will result in forfeiture of two percentage points per absence from your final grade unless documentation of a valid excuse is provided.

Typically, lectures on Monday and Wednesday will be synchronous class sessions over Zoom and Friday will be a mix of synchronous Zoom lectures and asynchronous activities. We will also be meeting face-to-face for labs on Thursdays for ~1.5 hours in Rohr Science 40.

Face masks and social distancing are required at all times.

PARTICIPATION AND COOPERATION

In an effort to create the best learning environment possible, all students will be assigned to work in a group – whether in lecture or lab. You may be surprised how much you can learn from one another, especially from people who you may not have chosen to work with. You are expected to show respect to your classmates and instructors by listening when others are speaking, refraining from discussing non-related issues during class, and not belittling the opinions of others, even when you disagree. Behavior intended to embarrass or ridicule others will not be tolerated and will have serious consequences. Likewise, gossip has no place in the Christian classroom.

In lab, you will be working in permanent pairs that will last all semester so that you can work cooperatively on lab assignments.

I hope that you will participate in class discussions through asking and answering questions.

Although you may discuss readings and lecture material among yourselves, I expect that you will each do your own work. Each assignment (in its entirety) must be written **in your own words**, and no electronic files should be exchanged. Another form of plagiarizing would be to copy and paste answers from a reading which involves using someone else's words as if they were your own. Much of the learning process involves articulating the answer in your own words, and bypassing this step will almost guarantee an inadequate understanding of the material. It is also plagiarism if you use old homework assignments, lab reports, exams, etc. (from previous BIO211/BIO2011 courses) to get ideas for how to complete current homework assignments, labs, and exams.

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 students have questions, a desire to meet with the chaplain or have prayer requests you can contact the Office of Spiritual Development

USE OF TECHNOLOGY

In order to be successful in the online environment, you'll need to meet the minimum technology and system requirements; please refer to the *Technology and System Requirements* information. Additionally, students are required to have headphone speakers compatible with their computer available to use. If a student is in need of technological resources please contact student-tech-request@pointloma.edu.

Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.

IMPORTANT DATES

Last day to add the class…….2/12/2021

Last day to drop the class…….…..……5/07/2021

Tentative exam dates

Exam 1……..…..3/25/2021

Exam 2……..……..4/22/2021

Exam 3…….……....5/20/2021

Final……..……6/07/2021, Monday, 1:30-4:00PM

Mental Health Days.……..…3/31/2021, 5/05/2021

TENTATIVE LAB SCHEDULE: **Note: This lab schedule is subject to change.

3/04 Ecosphere

3/11 Hiruna lab

3/18 Canyon Lab

3/25 EXAM 1

4/01 Developing Darwinian Explanations (EvoDots)

4/08 NO LAB (Intertidal Lab this week)

4/10 Intertidal Lab (Sat., 2:30-4:30PM)

4/15 Depicting evolutionary relationships (phylogenetic trees)

4/22 EXAM 2

4/29 Population Genetics (Hardy Weinberg)

5/06 *Lottia gigantea* Data, Part 1

5/13 *Lottia gigantea* Data, Part 2

5/20 EXAM 3

5/27 Examining the evidence for evolution through skeletons and skulls

6/03 Climate Change

TENTATIVE LECTURE SCHEDULE (Note: This schedule is subject to change – and most likely will)**

WK	Week of	Topic**	Chapters* in Brooker	Notes
1	**2/28/21**	What types of interspecies relationships occur in ecosystems?	44, 46, supp.	Writing a Conversation homework
2	**3/07/21**	What types of interspecies relationships occur in ecosystems?	44, 46	Read Origins chapters 2, 3, & 4; Bioaccumulation audio lecture
3	**3/14/21**	What types of interspecies relationships occur in ecosystems?	44, 47, suppl.	Read Origins chapters 2, 3, 4, 5, & 6; N cycling homework
4	**3/21/21**	What is biodiversity and how do we preserve it? What are genes, alleles, and chromosomes? How do we use natural selection to explain phenomena?	44, 47, supp.	**1st Exam – 3/25/21 in lab** Read Origins chapters 2- 8 Writing Assignment 1
5	**3/28/21**	How do populations grow? How does evolution occur?	19, 44	3/31/21: No class (Mental Health) Read Origins chapters 9 & 11 (not 10); Review of Cells & Genetics audio lecture
6	**4/04/21**	How does evolution occur?/What is the evidence for evolution?/How do new species arise?	19, 20, 44	Population Growth homework; Discussion Board; *Intertidal Lab on Sat., 4/10/21, 2:30-4:30PM
7	**4/11/21**	How do scientists depict evolutionary relationships?/How does geography influence how organisms evolve?/Are creation & evolution incompatible?	20, 21, suppl.	Reproductive Isolating Mechanisms audio lecture; Writing a Conversation 2; Discussion Board 2
8	**4/18/21**	What factors contribute to changes in gene frequencies within populations?	21	**2nd Exam – 4/22/21 in lab** Discussion Board 3; Mid-semester surveys;
9	**4/25/21**	What factors contribute to changes in gene frequencies within populations?/How do species interactions influence community stability?	19	Hardy Weinberg Problem set Writing Assignment 2
10	**5/02/21**	Why sex?	19, suppl.	5/5/21: No class (Mental Health) Crickets case study homework
11	**5/09/21**	Species interactions	43	Life history characteristics audio lecture
12	**5/16/21**	Species interactions What is radiometric dating?	43, 22, suppl.	**3rd Exam – 5/20/21 in lab** *Lottia* Research poster due
13	**5/23/21**	How are all animals related? Where did whales come from?	20, suppl.	*Lottia* Lab Report due; Faith/Science Paper
14	**5/30/21**	How does the physical and ecological environment affect organisms? What is the evidence for Global Climate Change?	46, 47, 20, supp.	Writing Assignment 3
15	**6/06/21**	Finals Week		**FINAL: 6/07/21, 1:30-4:00PM**