

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.

PLNU Foundational Education 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

PLNU catalog description: *An exploration of assorted topics in human biology as they intersect with bioethical and sustainability issues of current interest in society. Topics include human physiology, health, reproduction, genetics, and ecology. Course examines the underlying scientific basis of specific examples and how they relate to everyday life. Course approach emphasizes the process of science, critical thinking, active learning, social relevancy, and building connections between case studies and general concepts of biology. Offered every year. Lecture 3 units, Lab 1 unit*

Note: BIO 1001L Human Biology & Bioethics Lab is a co-requisite for BIO 1001. Students enrolled in BIO 1001 must be enrolled in BIO 1001L, and vice versa. If BIO 1001 is dropped, BIO 1001L must also be dropped. Your grade for BIO 1001 and BIO 1001L will be calculated together, and the same final grade will be entered for both courses.

Lecture sessions will consist of brief 15-20 minute lectures interspersed with in-class activities to give you a chance to think about, and to apply what you are learning. This course is one of the components of the Foundational Education program at Point Loma Nazarene University. BIO 1001 is required for Social Work majors.

Lecture and Lab Schedule

Lecture sessions will be on Mondays, Wednesdays, & Fridays from 12:15-1:10 PM in Latter Hall 102 (Anderson)

Lab Section 1 will be on Tuesdays from 8:00AM – 10:30 AM in Rohr Science 40 (Niethammer)

Lab Section 2 will be on Tuesdays from 1:30PM – 4:00 PM in Rohr Science 40 (Anderson)

Instructor information:

Dianne Anderson, Ph.D. PLNU Rohr Science Bldg. Room 146 619-849-2705 DianneAnderson@pointloma.edu

Office Hours: Mondays, Wednesdays and Fridays from 1:30-3:00 PM or by appointment

Jennifer Niethammer, M.S. (Tuesday morning lab) jnietham@pointloma.edu

Office and Office Hours: 30 minutes after lab in the lab room

Required books for the course

The Story of Life: Great Discoveries in Biology (2019) by Sean B. Carroll (ISBN-13: 978-0393631562)

Origins: Christian perspectives on Creation, Evol., & Intelligent Design (2011) by D. Haarsma (ISBN -978-1-59255-573-4)

Online resource (available at no charge)

Open Textbook Library *Concepts of Biology* textbook:

<https://open.umn.edu/opentextbooks/textbooks/concepts-of-biology>

Important dates Last day to add: Sept. 9, 2022 Last day to drop: November 4, 2022

Course Learning Outcomes (See Core Competencies and Concepts at end of syllabus for more info)

After successful completion of this course, you will be able to:

1. Apply the following core concepts in biology to explain a variety of biological examples:
 - a. Cells, organs/tissues, and ecosystems are interconnected, interacting, and regulated.
 - b. Basic units of structure define the function of cells, organs/tissues, organisms and ecosystems.
 - c. Energy and matter are transformed within cells, organisms and ecosystems.
 - d. Information is stored, transferred, and expressed in cells, organs/tissues and organisms.
 - e. The diversity of life has changed and continues to change over time (evolved and is evolving) by processes of the environment acting on variation, as well as other types of genetic change, to change populations.
2. Use the processes and tools of scientific inquiry (both hypothesis testing and discovery science) to test biological hypotheses and to skeptically evaluate scientific information.
3. Identify major stakeholders, then determine their motivation, as well as the likely position each stakeholder would hold given a bioethical issue.
4. Prepare and/or analyze graphs to interpret data and to draw valid conclusions to demonstrate critical thinking.*
5. Design and conduct at least one independent investigation as a demonstration of critical thinking.*
6. Recognize biology as a problem-solving science based on past and continuing experimentation, and evaluate biology’s role and impact on society in terms of meeting major societal challenges.

**Selected questions from the Test of Scientific Literacy Skills (TOSLS) will be included on the final exam to assess Foundational Education Learning Outcome 1d. Critical Thinking: Students will be able to examine, critique, and synthesize information in order to arrive at reasoned conclusions.*

Grading

Assignment or assessment	Description	Points possible
4 lecture exams (100 pts. each)	Combination of multiple choice and short essay	400
Final exam (includes assessment of FELO)	Multiple choice (partly comprehensive)	125
13 Lab activities	Pre-lab questions, in-lab graphs, drawings, answers to questions, etc.	130 (10 pts each week)
Various small activities	A variety of small activities will be done alone or with a partner or a team	approx. 100
1 lab report	Materials/methods, results, and conclusions	25
“Biology in my Life” assignment	Asking and answering a question relevant to the course	10
6 Spiritual practices/ Biology reflections	Thoughts on Shared meals, Sabbath, Silence, Solitude, Simplicity	30
	Total points	Approx. 920

Grades will be given on the basis of earned points as a percentage of total points possible. ALL points earned in the lecture and lab will be combined as basis for the final course grade, and this same grade will be entered for both.

- | | | |
|---|-----|--|
| A | 90% | |
| B | 80% | A “+” will be assigned to the upper 2% in each range (except |
| C | 70% | for A+ which can’t be used), and a “-” will be assigned to |
| D | 60% | the lowest 2% in each range. |
| F | 50% | Examples: 91% = A- 69% = D+ |

Students are expected to take the exams on the days scheduled unless they have an excuse cleared by me 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. If something unexpected happens, we will make appropriate arrangements at that time. Makeup exams may not be the same as the original and will generally be more difficult in nature. Un-excused 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. **The final exam will be taken according to the official PLNU final exam schedule and will not be changed (see detailed schedule for date and time).**

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: up to 1 day late = 50% reduction, more than 1 day late = no credit. Incompletes will only be assigned in extremely unusual circumstances.

Tutorial Center

The PLNU Tutorial Center is available free of charge for all current, undergraduate PLNU students. It offers tutoring for most subjects, as well as for general help with paper editing, study skills, etc. The Tutorial Services is located on the south end of Bond Academic Center, next to the Academic Support Center, or available online. Tutoring is available by appointment only, and appointments must be made at least one day in advance. Appointments may be arranged in person at the Tutorial Center, over the phone at (619) 849-2593, or via email at TutorialServices@pointloma.edu

Participation and cooperation

In an effort to create the best learning environment possible, all students should work in groups when asked to do so—whether in the lab or lecture. I may assign groups, and I will shuffle the groups several times during the semester. You may be surprised how much you can learn from one another, especially from people who you may not have chosen to work with in lab.

If classes are held in person, phones must be muted or on vibrate during class. Only in cases of emergency should you leave class to take a phone call, unless the lab is on a break. **Texting should be extremely limited or non-existent – it really CAN wait until a break.** NO food or drinks are allowed in the lab rooms.

Attending lab is mandatory and you will not be able to make up labs that are missed, unless you can attend the other lab section on the same day. In most cases, you will not be able to receive points for turning in assignments from a lab that you missed. In some cases, I will approve an excuse, and you will be able to earn points for a missed lab if you turn in the lab assignment on time. Please make all attempts to attend the other lab section if you can't attend your own section. If you complete all 14 labs, one counts as extra credit.

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 3-unit lecture class and 1-unit lab 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 BIO 1001. For this course, students will spend an estimated 112.5 total hours meeting the course learning outcomes for the lecture course, and 37.5 hours for the lab course. This means that course assignments and studying should take approximately 10 hours per week as detailed in the Canvas modules.

Emphasis on spiritual disciplines

Living a meaningful Christian life involves intentionally doing things that improve with walk with God, and that may also have positive effects on your mental and physical health. In this course, you will learn about and practice the disciplines of silence, solitude, simplicity, sharing meals and observing the Sabbath, then write reflections. Note: there are many other disciplines that Christians may practice other than these, but these blend with BIO 1001 well! 😊

Use of laptops in class

I discourage use of laptops/tablets/iPads in the lecture sessions **UNLESS** you feel strongly that you take your best notes via computer or want to access the Powerpoint slides during class, and you feel that it will not be distracting to yourself or others around you. I may call on students using computers more often than other students during class, just to make sure that you are on task. If computer use becomes a problem for some students, everyone will lose the privilege. In contrast, I will sometimes ask you to bring your laptop to lecture or lab, generally one per pair of students, so that you can look up information, work on lab reports, etc.

BIO 1001 Fall 2022 Schedule

The detailed content and assignments are be posted on Canvas.

Week	Lecture Topic(s) MWF	Lab topic (Tues.)
1	Intro to course and the process of science	No lab
2	Ecology (populations, communities) and biomimicry	Populations
3	Ecology (ecosystems, biomes) and biomimicry	Communities
4	Exam #1 - Ecology and process of science Cells & Molecules (biochemistry) and bioethics	Molecules & cells
5	Cells & Molecules (cells, enzymes, metabolism) and bioethics	Enzymes
6	Exam #2 - Cells & Molecules Genetics (DNA synthesis, genetic variation, mitosis, meiosis) and bioethics	Cell division and differentiation
7	Genetics (classical genetics, molecular genetics) and bioethics	Meiosis
8	Genetics (biotechnology, genetic analysis, genetic modification) and bioethics	Structure & function
9	Exam #3 - Genetics & Populations change over time (natural selection)	Natural selection: variation
10	Populations change over time (origins, evidence for change)	Natural selection: skin color
11	Populations change over time (other mechanisms of change, biodiversity)	Skulls
12	Exam #4 - Populations change & Human physiology (homeostasis, digestive system) and bioethics	Human Physiology
13	Human physiology (digestive system) and bioethics THANKSGIVING BREAK W, Th F	Tidepool lab in Dec.
14	Human Physiology (respiratory, cardiovascular and urinary systems) and bioethics	Fetal pig dissection
15	Human Physiology (immune, endocrine, nervous, and reproductive systems) and bioethics	San Diego Zoo
	Final exam – Friday, December 16, 2022 from 10:30 AM-1:00 PM	

The final exam schedule is posted on the PLNU website. No requests for early examinations or alternative days will be approved, so please make all travel plans with this in mind.

GENERAL PLNU POLICIES

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.

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, and receive the appropriate grade for their work and participation.

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](#)

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

BIO1001 Core Concepts and Conceptual Threads

Core Concepts (as identified by Vision & Change, 2011 and informed by NGSS) “STEMS”		Examples of questions or tasks used to assess understanding of core concepts					Ecology	Molecules and Cells	Genetics	Change in populations	Human Physiology
S - Living systems at all levels are interconnected, interacting, and regulated.		Analyze a system (cell, organism, or ecosystem) to predict a possible response to a particular change. Analyze a system (cell, organism, or ecosystem) to determine how abiotic and biotic components interact.					X	X		X	X
T - Information is stored, transferred , and expressed at the cell, organ and system level.		Explain how information is transferred from DNA to RNA to proteins. Explain how information is transferred from either cell to cell, or from one generation to the next. Trace information flows from stimulus to response.						X	X	X	X
E - The diversity of life has changed and continues to change over time (evolved and is evolving).		Use the theory of natural selection to explain how certain characteristics of species likely changed over time. Describe the evidence for populations changing over time.					X	X	X	X	X
M - Matter and energy are transformed within cells, organisms and ecosystems.		Trace energy in various forms as it flows through a system. Trace matter (C, N, or O) in various forms as it cycles through a system.					X	X			X
S - The structure of a molecule, organelle, cell, organ, or body part, etc. often relates to the function of that particular structure.		Analyze a structure (molecule, organelle, cell, organ, organ system, or organism) to predict or to describe its function. Analyze the relationship of the surface area-to-volume ratio of a structure (organelle, cell, organ, or organism) to its function.					X	X	X	X	X
Conceptual Threads		Examples of topics									
Food	Food chains, sustainable farming, molecules in food, what can you afford to care about, spices, variety in traits (apple tasting), GE crops, food varieties, probiotics in food					X	X	X	X	X	
Corn seedlings	Abiotic factors, growth/development, chlorophyll, metabolism, dominant & recessive traits, GE corn					X	X	X			
Vaccines	Vaccine testing, types of vaccines, how vaccines stimulate immunity						X	X		X	
In-vitro fertilization	Sperm cells, embryo growth/development, IVF embryo selection, increasing rates of infertility, hormone treatments						X	X	X	X	

BIO1001 Core Competencies

Core competencies in science (as identified by Vision & Change, 2011 and informed by NGSS)	Sample of questions/tasks used for formative assessment (in-class activities) and summative assessment (quizzes and exams) Science Skills (SS) indicated below	Lab report	Lab activities & In-class activities
Ability to understand the relationship between science and society	<ul style="list-style-type: none"> Analyze bioethical case studies to identify stakeholders and their motivation. Identify ways that biological information and techniques can address major societal challenges. Given a source of information/conclusions, determine if the source is credible. (SS #1) 		X
Ability to use quantitative reasoning	<ul style="list-style-type: none"> Given a graph or table, state a valid conclusion. (SS #2) Given a set of data, create an appropriate graph, table, or model to summarize the data. (SS #3) 	X	X
Ability to develop and/or use modeling and simulation	<ul style="list-style-type: none"> Given a set of data, create an appropriate graph, table, or model to summarize the data. (SS #3) Given a hypothesis, use a simulation to test it. (SS #5) 	X	X
Ability to apply the processes of science	<ul style="list-style-type: none"> Given an experimental design, carry out the experiment to collect the data. (SS #4) Given a hypothesis, design an experiment to test it. (SS #5) Make observations, then generate a testable hypothesis. (SS #6) 	X	X
Ability to tap into the interdisciplinary nature of science	<ul style="list-style-type: none"> Use information and processes from chemistry, statistics, and various sub-disciplines to solve problems in biology. 		X