



School of STEM: Department of Biology

BIO 4063 – Learning and Teaching in Science

3 units
Spring 2025

Tuesdays, 1:00 – 4:00pm
Ryan Learning Center – Room 104
Final Exam: Thursday, 5/8 @ 1:30pm

INFORMATION	SPECIFICS FOR THE COURSE
Instructor title and name:	Dr. Jen Lineback
Phone:	619-849-2974
Email:	jenlineback@pointloma.edu
Office location and hours:	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.

Course Description

Students study learning theories within the context of science. Students engage in meaningful reflections of their own learning experiences, while considering future opportunities they may have in helping others learn. While dimensions of effective science teaching practices are studied, the course is designed to appeal to all students of science, regardless of their specific career interests. Instruction is aligned to the state-adopted Science Common Core Standards (7-12) and the Next Generation English Language Development Standards, and relevance to college course teaching is incorporated. Research on modifications for diverse learners and learners with exceptionalities is included. [AC1] Equivalent to [EDU 4034](#) (undergraduate level) or [EDU 6024](#) (graduate level). PLNU students who complete [BIO 4063](#) are exempt from taking [EDU 4034](#) or [EDU 6024](#) for their preliminary single subject credential.

Prerequisite(s): [BIO 2010](#) or GE-BIO and at least Sophomore standing.

Course Learning Outcomes

1. Students will be able to characterize and exemplify dimensions of effective science learning and teaching.
2. Students will be able to critically analyze scientific instruction.
3. Students will describe elements of successful scientific communication.
4. Students will be able to plan, present, and reflect upon a scientific lesson that includes scientific concepts, principles, and practices.

Required Texts and Recommended Study Resources

Students are responsible for having the required course textbooks prior to the first day of class.

- Windschitl, M., Thompson, J., & Braaten, M. (2018). *Ambitious science teaching*. Cambridge, MA: Harvard, Education Press.
- Heath, C. & Heath, D. (2007). *Why some ideas survive and others die: Made to Stick*. New York: Random House.

All supplemental materials posted on this course site (including articles, book excerpts, or other documents) are provided for your personal academic use. These materials may be protected by copyright law and should not be duplicated or distributed without permission of the copyright owner.

Assessment and Grading

Grades will be based on the following:

Grade Scale Based on Percentages

A	B	C	D	F
A 93-100	B+ 87-89	C+ 77-79	D+ 67-69	F Less than 59
A- 90-92	B 83-86	C 73-76	D 63-66	
	B- 80-82	C- 70-72	D- 60-62	

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 BIO 4063, all 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. 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 scientific learning and teaching, 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 BIO 4063, we will cover a variety of topics, some of which you may find triggering. 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 scientific learning and teaching, 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 posted dates/times on Canvas. Incompletes will only be assigned in extremely unusual circumstances.

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 Recording Notification

In order to enhance the learning experience, please be advised that this course may be recorded by the professor for educational purposes, and access to these recordings will be limited to enrolled students and authorized personnel.

Note that all recordings are subject to copyright protection. Any unauthorized distribution or publication of these recordings without written approval from the University (refer to the Dean) is strictly prohibited.

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. For all student appeals, faculty and students should follow the procedures outlined in the University Catalog. See [Academic Policies](#) for definitions of kinds of academic dishonesty and for further policy information.

Artificial Intelligence (AI) Policy

You are allowed to use Artificial Intelligence (AI) tools (e.g., ChatGPT, Gemini Pro 1.5, GrammarlyGo, Perplexity, etc) to generate ideas, but you are not allowed to use AI tools to generate content (text, video, audio, images) that will end up in any work submitted to be graded for this course. The instructor will provide you with specific instructions as to when/how you may utilize AI tools for specific assignments. If you have any doubts about using AI, please gain permission from the instructor.

PLNU Academic Accommodations Policy

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities in accordance with the Americans with Disabilities Act (ADA). 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 work with the student to create an Accommodation Plan (AP) that outlines allowed accommodations. The EAC makes accommodations available to professors at the student's request.

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. Accommodations are not retroactive so clarifying with the professor at the outset is one of the best ways to promote positive academic outcomes.

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. Students cannot assume that because they had accommodations in the past, their eligibility at PLNU is automatic. All determinations at PLNU must go through the EAC process. This is to protect the privacy of students with disabilities who may not want to disclose this information and are not asking for any special accommodations.

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.

If you (or someone you know) have experienced a bias incident regarding language, you can find more information on reporting and resources at www.pointloma.edu/bias.

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.

If you (or someone you know) have experienced other forms of discrimination or bias, you can find more information on reporting and resources at www.pointloma.edu/bias

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.

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.

- Appointment Calendar: <https://plnu.mywconline.com/>
- Website: <https://www.pointloma.edu/centers-institutes/loma-writing-center>
- Email: writingcenter@pointloma.edu

Assignments At-A-Glance

The following suggested timeline shows the main themes, readings, topics, activities, and assignments that may be planned for each class session. The schedule is subject to modifications at the discretion of the professor to meet the needs of the class.

Session/ Date:	Theme & Topics:	Reading:	What is due this week?
Week 1 1/14	How People Learn	NRC (2005): Ch. 1 Llewellyn (2005): Ch. 4	DB #1 WA #1
Week 2 1/21	Argumentation in Science Introduction to the NGSS	AST: Ch. 11 Framework: Ch. 2 Osmosis and Diffusion Lab Activity	DB #2 WA #2
Week 3 1/28	Talking in Science	AST: Ch. 4	DB #3 WA #3
Week 4 2/4	Assessments in Science: Part 1	Britton (2011)	WA #4 Interview Analysis
Week 5 2/11	What does it mean to DO science? Lesson Planning: Part 1	AST: Ch. 5	WA #5 Classroom Observation
Week 6 2/18	Lesson Planning: Part 2	AST: Ch. 2	DB #6 WA #6
Week 7 2/25	Reading in Science	AST: Ch. 8	DB #7 WA #7
Week 8 3/4	Writing in Science	Rocknow (2008)	Mid-term evaluation WA #8
SPRING BREAK – March 9-15			
Week 9 3/18	Scientific Identity	Supplemental Material	WA #9 Tech Preparations
Week 10 3/25	Technology use Tech presentations (IN CLASS)	MTS: Ch. 1	DB #10 – What Sticks? Tech Reflection
Week 11 4/1	Science Communication: Part 1	MTS: Assigned Chapter	DB #11 WA #11

Session/ Date:	Theme & Topics:	Reading:	What is due this week?
Week 12 4/8	Science Communication: Part 2	MTS: As appropriate	DB# 12 WA #12
Week 13 4/15	Lab Safety Assessments: Part 2	AST: Ch. 6 Science Safety Handbook	DB #13 – Lesson Plan Ideas WA #13
Week 14 4/22	The Scientific Method: Pros and Pitfalls	Tang & Coffey (2008) Ford (2006)	DB #14 Lesson Plan Progress Report
Week 15 4/29	Peer Review Session	NONE	Formal Lesson Plan
Week 16 5/8	Final Exam: Thursday, 5/8 @ 1:30pm Lesson Plan Presentations – Lesson Plan Reflections		

*AST = Windschitl, M., Thompson, J., & Braaten, M. (2018). *Ambitious science teaching*. Cambridge, MA: Harvard, Education Press.

*MTS = Heath, C. & Heath, D. (2007). *Why some ideas survive and others die: Made to Stick*. New York: Random House.

Lomabooks Instructions for Students:

This course is part of our course material delivery program, **LomaBooks**. The bookstore will provide each student with a convenient package containing all required physical materials; all digitally delivered materials will be integrated into Canvas.

You should have received an email from the bookstore confirming the list of materials that will be provided for each of your courses and asking you to select how you would like to receive any printed components (in-store pick up or home delivery). If you have not done so already, please confirm your fulfillment preference so the bookstore can prepare your materials.

For more information about **LomaBooks**, please go: [HERE](#)