PLNU Biology Department

BIO 6033 History & Philosophy of Science (3 units)

Fall 2026

Class format, meeting location and time:
Synchronous zoom sessions on Mondays from 6:00-8:00 PM every other week – see schedule below for exact dates. (Note: The first class meeting on August 31 will be from 7:00-8:00PM)

Instructor #1
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Instructor #2
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Join office hours using this link: https://pointloma.zoom.us/j/2096515906

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

This course involves discussion of seminal works in the history and philosophy of science to explore both historical ways of thinking and philosophical ways of thinking. From this perspective, the course explores current interest in the nature of science as an integral part of the study of science. Synchronous online delivery.

COURSE LEARNING OUTCOMES

1. Compare and contrast the differences in scientific thought and processes before and after the scientific revolution.
2. Describe the impact of technological innovations on scientific discovery throughout history.
3. Analyze significant readings in the history and philosophy of science to identify key points.
4. Explain how the nature of science has changed over time and describe how this is important.
5. Distinguish between science and faith/religion and discuss the potential compatibility of the two domains. (PLO#4)*
6. Trace the development of scientific ideas in various subject areas, and in various parts of the world.
7. Distinguish between research in biology and research in history of biology in terms of purpose, methods, and types of evidence.

**PLO#4 is assessed in this course using the following Signature assignment:*

a. *In a 200-300 word essay, distinguish between* the types of questions science can answer and the types of questions faith/religion can answer.
b. *In a 200-300 word essay, discuss the potential compatibility of these two domains within the context of explanations for the diversity of life on earth.*

You will have several opportunities during this course to think about and to discuss the relationship between science and faith, as well as how this relationship impacts your everyday life, work, and relationships. Students in the class come from a variety of faith backgrounds and experiences, so we will spend time discussing why and how these issues are important in a respectful and hospitable manner. There is so much that we can learn from each

other. Our hope and prayer is that as you explore these ideas, you might closely examine and reflect on your own beliefs and practices.

Course credit hour information
It is expected that the completion of the reading, participation in discussions (online and in person), and writing required for this course will take approximately 112 hours (or approximately 7.5 hours per week), therefore, this class meets the PLNU credit hour policy for a 3-unit class.

Course readings
The readings for the course will come in three forms: books you purchase, readings available on Canvas, and readings that will be accessed through other websites.

Books to purchase for the course:

- Kuhn, Thomas, *The Structure of Scientific Revolutions*, 1962 (any edition is fine)
- DeWitt, Richard, *Worldviews: An Introduction to the History and Philosophy of Science*, 3rd Edition, 2018, John Wiley & Sons. ISBN 978-1119118893
- Mukherjee, Siddhartha, *The Song of the Cell: An Exploration of Medicine and the New Human*, 2022, Scribner

Book loaned by professor:
M.L. Gabriel & S. Fogel (Eds.), *Great Experiments in Biology*. 1955. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. No ISBN, out of print but used copies are available. Copies will be loaned to students since they can be difficult to find or are very expensive. If enough copies can't be located, a link to a digital version will be provided.

Course Requirements and Grading
Readings: You are expected to read the required texts in accordance with the course schedule, as well as every post on the Discussion Board (DB) during the week for which that DB is assigned.

Homework and discussion board assignments: Since we will only meet by zoom once every other week, an ongoing, engaged conversation in the discussion board area is critical to the success of our time together. You will receive up to 10 points each week for either DB participation or participation during the zoom session – this requires that your camera must be on, your internet connection is strong, and your audio is working. You are allowed one week of non-participation for illness/family issues, etc.

Each discussion board post to the original DB prompt(s) should be a minimum of 150 words in length and should providence evidence of (1) comprehension of some relevant portion of the reading material and (2) critical engagement with the material. Most weeks, you will not be able to see other students' posts until you respond to the original prompt. Depending on the week, sometimes there will be specific discussion board prompts, and sometimes you will be encouraged to take the reflection into any relevant area that you find interesting.

In addition, you are expected to post responses to at least three other students' reflections on the reading every week. Each response should show comprehension of the reading material and should engage the other student's reflection in a thoughtful and substantive manner. Discussion may continue past the due date if sufficient interest is ongoing. The minimum requirement is three responses per week.

Summative assessments for the course: Students (either in pairs or alone depending on the size of the class) will prepare and present two 10-minute presentations that trace the development of scientific thought on two different topics. The first presentation will be on a topic relevant to the History of Medicine, and the second will be on the historical development of thought in one area of biology or chemistry. Details about these presentations are available within the appropriate module. Each presentation is worth 50 points.

Near the end of the course, students will be expected to complete a final project that encompasses and draws on much of the material in the course. There are four options for the final; these choices are described in the Final Project module. Students are expected to provide a citation page with full bibliographic information for their sources as well as appropriate in-text citations within the body of the paper. Essays without appropriate grammar,

structure, formatting, and citation, will receive a lowered grade. This assignment serves as the final exam for the course.

Graded assignments:

Written assignments	10 points/week x 12 weeks = 120 points
Discussion Board posts/Zoom Class discussions	10 points/week x 12 weeks = 150 points
Presentations	50 points each x 2 = 100 points
Final project/exam	50 points
Misc. small assignments	35 points
Total for course	**455 points**

Letter grades will be assigned as follows:
A- (90-91), A (92-100)
B- (80-81), B (82-87), B+ (88-89)
C- (70-71), C (72-77), C+ (78-79)
D- (60-61), D (62-67), D+ (68-69)
F Below 60

Note: There is often an assumption that something is wrong when a student receives less than a perfect score for an assignment. A perfect score is quite unusual, especially on large assignments, and means that there were no errors, and no suggestions for improvement could even be made. This is rarely the case.

Incompletes and Late Assignments

Assignments submitted within 24-hours of the due date will earn up to half credit. Assignments submitted later than 24 hours may not earn credit. With respect to final project and the presentations, we will deal with extreme circumstances beyond the control of the student(s) on a case-by-case basis. In such cases, and depending on the circumstances, there may be a significant reduction in grade. Incomplete grades will only be assigned under extremely unusual circumstances.

Important dates: Last day to add/drop: Sept. 11, 2026 Last day to withdraw with a "W": Nov. 6, 2026

Inclusive language policy
The use of inclusive language is now prevalent, even expected, throughout most sectors of our society (e.g., academia, government, business, religious organizations). Further, inclusive language is very often a more accurate and fairer representation of the intended meaning of a person's communicative content. As such, everyone is expected to make use of inclusive language in all written work. The avoidance of such use in a given project will result in a lowering of the grade for that project. In addition, everyone is expected to make use of inclusive language during classroom discussions.

Discrimination/harassment policy
Discrimination or harassment related to race, gender, ethnicity, sexual identity or orientation, differences in ability, religious choice, or any other type of behavior that dehumanizes human beings or dismisses difference, is not conducive to a good learning environment and is harmful to human vitality and healthy community. These behaviors will not be tolerated. We encourage all students to be open to any honest, respectful, and tactful discussion of issues that might arise in the context of our learning.

Fall 2026 History & Philosophy course schedule -

All details regarding readings and assignments can be found in the Canvas modules for each week.

Since the in-person meetings are all on Mondays and will be spent discussing the readings/assignments completed in the previous week, this will be our typical weekly schedule:

1. Tuesdays are the start of the week – begin new assignments
2. Written assignments will normally be due by 6:00PM on Mondays.
3. Zoom discussions will be held Mondays every other week
4. Weeks with no in-person meeting will have discussion board assignments twice during the week:
    a. First DB (if assigned) posts will be due by midnight on Saturdays.
    b. second DB posts (if assigned) will normally be due by 6:00 on Mondays.

Week/Date	Date/time of Zoom meetings	Topics
1 – Aug. 31	**Zoom session 7:00-8:00PM (modified time)**	Introduction to course, professors and students Structure of the course Intro to philosophy of science Ancient scientific contributions from around the world
2 – Sept. 7		Philosophy of Science: Aristotle to Kepler
3 – Sept. 14	**Zoom session 6:00-8:00 PM**	**The difference between faith/religion and science** **Panel discussion: Biblical scholar, philosopher, historian, scientist**
4 – Sept. 21		Philosophy of Science: Galileo to Newton
5 – Sept. 28	**Zoom session 6:00-8:00 PM**	The very large and the very small
6 – Oct. 5		History of Medicine
7 – Oct. 12	**Zoom session 6:00-8:00 PM**	History of Medicine presentations
8 – Oct. 19		History of Biology: Photosynthesis
9 – Oct. 26	**Zoom session 6:00-8:00 PM**	History of Biology: Darwin
10 – Nov. 2		History of Biology: Genetics and Evolution
11 – Nov. 9	**Zoom session 6:00-8:00 PM**	History of Biology: Molecular Biology
12 – Nov. 16		History of Biology research
13 – Nov. 23 Thanksgiving wk.	**Zoom session 6:00-8:00 PM**	History of Biology presentations
14 - Nov. 30		Philosophy of Science: Popper and Kuhn
15 – Dec. 7	**Zoom session 6:00-8:00 PM**	Philosophy of Science: The Structure of Scientific Revolutions (SSR) Signature assignment for PLO #4 Final project topics
16 – Dec. 14		Final project due

GENERAL PLNU POLICIES

PLNU Spiritual Care

PLNU strives to be a place where you grow as a whole person. To this end, we provide resources for our Graduate and Accelerated Undergraduate students to encounter God and grow in their Christian faith. We have onsite chaplains at our different campuses who may be available during class break times across the week. If you have questions or a desire to meet or share any prayer requests with our chaplains, you can find them at the Chaplain's Page via myPLNU.

In addition, the Mission Valley and Balboa campuses have a prayer chapel for use as a space set apart for quiet reflection and prayer.

Student Success

The Center for Student Success supports our Graduate and Professional Studies students throughout their academic journey. We provide student services such as academic advising and planning, resource workshops, and connect students to career services, writing support, tutorial services, and wellness resources. The Center itself is located on the first floor of the Mission Valley Campus. If you have any questions about how to access resources at PLNU, please start by reaching out to the Center for Student Success by email or by phone at 619-563-2850. Please visit myPLNU Student Success for more details. If you are in the School of Education, please contact SOE Advising.

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 distance education outside 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. Please consult the Academic Honesty Policy in the University Catalog for definitions of kinds of academic dishonesty and for further policy information.

During the first week of class, you will be asked to submit an Academic Honesty Verification Statement. Submitting the statement is a requirement of this course. By submitting the Academic Honesty Verification Statement, you will be verifying all assignments completed in this course were completed by you. Carefully review the Academic Honesty Statement below.

Statement: "In submitting this form, I am verifying all the assignments in this course will be completed by me and will be my own work."

PLNU Academic Behavior Policy⊛

Both faculty and students at Point Loma Nazarene University have the right to expect a safe and ordered environment for learning. Students are expected to take the initiative to learn and conduct themselves in a mature and civil manner in the classroom environment. Any student behavior that is disruptive or threatening is a serious affront to Point Loma Nazarene University as a learning community. Students who fail to adhere to these behavioral standards may be subject to disciplinary action, including removal from class or further university sanctions. For a full definition of disruptive behavior, response procedures, and the appeal process, please consult the Academic Behavior Policy in the University Catalog.

PLNU Artificial Intelligence (AI) Policy⊛

You are allowed to use Artificial Intelligence (AI) tools (e.g., ChatGPT, Gemini Pro, GrammarlyGo, Perplexity, etc.) to generate ideas, as a learning tool, or in some cases generate portions of work you will submit. I will specify in individual assignments what constitutes appropriate use of AI for that assignment. Please use this Purdue resource to guide your citations when using AI.

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 on the PL campus, the first floor of the Balboa campus, and the second floor of the Mission Valley campus. For all students, including the Bakersfield campus, virtual appointments are available. You can reach the Educational Access Center (EAC) by email or phone at 619-849-2533. Students can access both requests for and evidence of disability through the Accommodate link off the main page of OneLogin. 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 approved accommodations. Professors are able to view a student's approved accommodations through Accommodate.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their approved accommodations in that particular course. Accommodations are not retroactive; as such, 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-related need should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. In accordance with ADA, accommodations cannot constitute a fundamental alteration to course outcomes; therefore, planning ahead is vital in establishing appropriate accommodations for equal access to this course. 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 eligibility 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 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) has experienced other forms of discrimination, you can find more information on reporting and resources via the Nondiscrimination and Anti-harassment Policy.

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. 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 or consult the list of campus pastors.

If you (or someone you know) has experienced other forms of discrimination or bias, you can find more information on reporting and resources via the Nondiscrimination and Anti-harassment Policy.

PLNU Course Modality Definitions*

1. **Online Courses: These are courses with class meetings where all instruction and interaction are fully online.**
   a. **Synchronous Courses: At least one class meeting takes place at a designated time.**
   b. **Asynchronous Courses: All class meetings are asynchronous.**
2. **Hybrid Courses: These are courses with class meetings that take place both in the classroom and online synchronously and/or asynchronously.**
3. **In-Person Courses: These are courses that meet in person with the instructor and students in a physical classroom setting. With approval by the area dean, this may include up to 25% of qualified class interactions through a Learning Management System (such as Canvas).**

PLNU Attendance and Participation Policy⊛

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. Therefore, regular attendance and participation in each course are minimal requirements.

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.

Students who anticipate being absent for an entire week of a course should contact the instructor in advance for approval and make arrangements to complete the required coursework and/or alternative assignments assigned at the discretion of the instructor. Acceptance of late work is at the discretion of the instructor and does not waive attendance requirements.

Refer to Academic Policies for additional detail.

Synchronous Attendance/Participation Definition

For synchronous courses that have specific scheduled meeting times (including in-person, hybrid, and synchronous online courses), absences are counted from the first official meeting of the class, regardless of the date of the student's enrollment. For courses with specific attendance requirements, those requirements are outlined in the course syllabus.

Use of Technology⊛

In order to be successful in the online or hybrid 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, microphone, or webcams compatible with their computer available to use.

Please note that any course with online proctored exams requires a computer with a camera (tablets are not compatible nor allowable) to complete exams online.

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

GPS Academic Resources

PLNU offers the following free academic resources virtually for Graduate Professional Studies (GPS) Students. Visit myPLNU through the links below for more information.

- **The GPS Writing Center offers:**
  - **Zoom Writers Workshops offered each quad on a variety of helpful topics.**
  - **One-to-one appointments with the Writing Coach**
  - **Microlearning YouTube Video Library for helpful tips anytime**
  - **Research Help Guide to help you start your research.**
  - **The physical office is located on the third floor of the Mission Valley Regional Center off the student lounge.**
- **Academic Writing Resources Course: Found on your Canvas Dashboard, this course is non-credit with 24/7 access, no time limits, and self-paced content. Watch a quick video run-through and take time now to explore!**
- **Grammarly: Students have unlimited FREE access to Grammarly for Education, a trusted tool designed to help enhance writing skills by providing real-time feedback, identifying areas for improvement, and providing suggestions. Grammarly's Generative AI is NOT available with our student accounts.**
- **Tutoring: Students have access to 24/7 live or scheduled subject tutoring through Tutor.com, including a Paper Drop-Off Service with feedback within 12 hours.**

We are here to support you! Contact the GPS Writing Center any time.