



Department of Biology
BIO2010 Cell Biology and Biochemistry

Lecture (3 units) + Lab (1 unit)

FALL 2026

Meeting days/times: MWF 12:15 – 1:10 pm

Meeting location: Taylor 106

Final Exam: Monday, Dec 14th, 10:30am – 1:00 pm

INFORMATION	SPECIFICS FOR THE COURSE
Instructor title and name:	Dr. Saira Justin
Instructor contact information:	Email: sjustin@pointloma.edu Phone: (619) 849-3036
Office location and hours:	Monday 1:30 pm – 2:30 pm Tuesday 11:30 am – 12:30 pm Wednesday 2:10 pm – 2:40 pm or by appointment (via email) Rohr Science 188

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 cultures.

COURSE DESCRIPTION

An introduction to the principles of cell biology, molecular biology, and biochemistry. Topics include the chemical basis of life, basic membrane functions and membrane transport, basic metabolic pathways including cellular respiration and photosynthesis, cell division, and expression of the genetic material. Lecture and lab. Offered every semester.

Program and Course Learning Outcomes

The overarching goal of this course is to prepare students for subsequent in-depth coursework in Biology, Biology-Chemistry, and health sciences.

Students will be able to ...

1. Understand basic principles of the inner function of cells, including how cells obtain and use energy through cellular respiration and/or photosynthesis, how membranes regulate cellular composition, how cells organize and communicate within a multicellular organism, and how genetic material is copied and converted to phenotypic information. (Program learning outcome #1)
2. Apply content to various scenarios to describe how a cell would react under changing environmental conditions, and relate problems associated with malfunctions in various important cellular processes. (Program learning outcome #1)
3. Evaluate current bioethical issues from an understanding of science and our moral responsibilities as Christians. (Program learning outcome #3)
4. Utilize skills and techniques critical to experimentation in a cell and molecular biology laboratory setting. (Program learning outcome #1)
5. Design scientific experiments with appropriate controls and analyze scientific data, demonstrating knowledge of the purpose, experimental method, data, and basic statistical interpretation. (Program learning outcome #1)

General Education Learning Outcomes

1. Students will demonstrate critical thinking skills related to scientific methods, data analysis, and conclusions (GELO 1d; *Select questions on the final exam will be used to assess GELO 1d. Critical Thinking: Students will be able to examine, critique, and synthesize information to arrive at reasoned conclusions*). <https://assessment.pointloma.edu/academic-assessment/general-education/assessment-plan/>
2. Signature assignment will involve a student-designed lab and a formally written lab report summarizing the findings made in the lab.

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

1. Campbell (Authors: Urry, Cain, Wasserman, Minorsky); **Biology in Focus, 4th Edition**; Copyright 2026. Pearson. Note: The e-text that comes with Mastering (below) is fine.
2. Students will also need access to the online learning platform “**Mastering Biology**”.
 - Packages can be purchased through the PLNU bookstore or directly from Pearson.
 - You **MUST** have Mastering (it comes with the e-text, but if you purchase the text alone, print or e-text, it doesn’t automatically come with the Mastering online learning)

3. **iClicker** for attendance and class participation: We will use iClicker for attendance and class participation throughout the course. The polling system will be used in multiple classes, so you only need to purchase one iClicker for the semester. You will use it to respond to questions and participate in polls during lectures.
4. **Lab Manual** purchased through the campus bookstore or directly through Cognella (orders@cognella.com);

Important Notes: Biology, Biology-Chemistry, and Environmental Science majors (and pre-health students) will use this text for 2 - 3 different courses and should purchase Mastering Biology with e-text 24-month access or purchase Mastering access with a loose-leaf text that you can use in future semesters.

Applied health, dietetics, and Chemistry majors will likely only need this text for one semester and can purchase the 18-week access.

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

Point breakdown (tentative; may be altered slightly)

3 midterm exams + 1 final exam	55%
Mastering Biology assignments and other homework	10%
Peer teaching assignments / Team Learning activities	10%
Laboratory grade	20%
Class attendance and participation	05%
TOTAL	100%

Approximate Grade Breakdown

Lecture and lab grades are integrated for the final grade. Grades will be based on the following:

Sample Standard 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	

**Note: A minimum grade of C in this course is required to advance to Genetics.
(A grade of C - or lower is not acceptable for advancement to Genetics).**

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 [Class 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.

DETAILED INFORMATION ABOUT EVALUATIONS & ASSESSMENTS

While BIO2010 can be taken as a course that meets the General Education requirement for science, and is a requirement for the applied health sciences, it is most commonly the first biology course for students with declared majors in Biology or Biology-Chemistry. The content and concepts introduced in this course are foundational to virtually all subsequent courses in the program; it is essential that you maximize retention of the content and concepts beyond the exams.

Exams: There will be 3 midterms (100 pts each) and a final exam (150 pts). Each exam will consist of multiple-choice, short-answer questions, and/or calculation problems, etc. All of science is cumulative, such that scientific knowledge must build and expand upon previous knowledge. The same is true when learning science; you must remember and apply everything you have previously learned to fully understand and apply new material. Thus, although the focus of each midterm will be on recent material, each should be thought of as a cumulative exam. *The final exam will cover approximately 50% new content and 50% cumulative material covering the entire semester.*

If you have a conflict with an exam date/time, you must let the instructor know well in advance. Makeup exams will be at the discretion of the instructor. The final exam must be taken at the scheduled place and time.

Homework: Homework, including the Mastering Biology assignments, will be assigned periodically throughout the semester. There will occasionally be extra practice assignments designed to help you study key concepts and practice aspects learned in class. These are assigned sparingly, and they are designed to guide learning and help studying rather than be busy work.

Mastering Biology Assignments 10 x (10 pts each): Your textbook comes with excellent, individualized learning tools to help you master the material.

- To hold students accountable for the assigned reading, Mastering Biology assignments are based on the assigned reading that we have not yet covered in class (pre-class assignments). You will be expected to complete the **chapter reading** and a short **pre-class assignment** (~30 minutes) prior to the start of that week's chapter. This will help you be prepared to participate in class and to learn together as we address the more difficult parts of the chapter and work together in class to practice the learning objectives. Many of these contain short videos to view before answering questions. You are strongly encouraged to carefully watch all videos, taking notes along the way.
- After we have completed each chapter together, you will be assigned a more comprehensive set of questions designed to help you practice thinking about and

applying what you have learned. There are summative homework assignments (~ 1-2 hrs) to be completed once we have finished a chapter, also administered through Pearson's Mastering Biology (**post-class assignments**).

Peer Teaching: Teaching is a great way to learn. On some days, we will break into peer groups, where one student in the group will teach the others a particular topic. Topics are listed in the tentative course schedule. **The teaching student will be required to turn in their outline/handout of the topic (also to be provided to each group member).** Points are awarded according to the degree of preparedness, student evaluations, and the quality of the study guide/outline. **You are allowed to swap weeks with another student in your group, assuming you both agree, but you must inform me of the swap ahead of time.**

Class Attendance & Participation: Class attendance and participation will be based on iClicker participation, attitude, and preparation/contribution in group activities. I require iClickers and have questions throughout the course that are answered during the lecture. **Generally, I am looking for thought and participation, not whether or not you answered the question correctly. Everyone must have their own iClicker account, and it must be registered with your name and student ID number.** Bring your iClicker to class each day. Available in the bookstore or online: <http://www.iclicker.com/Products/iclicker2/>

Team Activities: Teamwork helps you learn and retain the material, particularly for higher-order applications. On some days, we will do Team Activities. Each student is highly encouraged to participate.

Reading Guides (Extra Credit): The textbook is a very helpful resource for you, and we want to encourage you to read before coming to class and to read the textbook in a manner that helps you understand the major content and concepts, be able to explain key figures, and prepare/study for the exams. We encourage you to use and fill out the reading guide when you are reading the text before class, and then go back after to revise, expand, and fix any areas. You can think of this as a study guide to be used before and after class. The learning objectives at the back of each reading guide can be considered a pseudo-study guide. ***If you complete all of the reading guides for a given exam and submit (with obvious effort and completeness), you will be awarded 5 extra credit points applied directly to the exam grade.***

Laboratory Experience: An essential part of any science curriculum is hands-on experience in the lab. The BIO2010 lab is designed to expose the student to some of the essential tools of the scientist in a safe, controlled environment. Please see the separate lab syllabus for details.

INCOMPLETES AND LATE ASSIGNMENTS

All assignments must be submitted by the beginning of the class session on the day they are due, including all assignments posted on Canvas. **Late work will receive a 10% deduction per day, up to one week late.** Incompletes will only be assigned in extremely unusual circumstances.

TIPS FOR READING A TEXTBOOK

- Keep the big picture in mind. Before reading, look at chapter organization. Read the subheadings and get a feel for the breadth and arrangement of topics covered.
- Go over the figures and special topics sections very closely. Be sure you can explain the “take-home message” and main ideas of each. These are critical to understanding biology and should not be considered “pages to skip”.
- Highlight words, phrases, and statements you know you will want to find again.
- Write comments to yourself that will help you study the material later.
- When you’ve finished a chapter, sometime before the exam, create a study guide that outlines the contents. This can then serve as a checklist for future studying.
- Your book has online materials that are very useful to help you learn: animations, videos, practice tests, and quizzes, etc. Use these online resources.

GENERAL COURSE CONCERNS*

If you have a concern related to the content or structure of this course, please bring your concern(s) to me (the instructor) in a timely manner, so that we have the opportunity to discuss your thoughts and work together toward a solution.

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 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.

ARTIFICIAL INTELLIGENCE (AI) POLICY

You are allowed to use Artificial Intelligence (AI) tools (e.g., ChatGPT, Gemini Pro 1.5, Grammarly, Perplexity, etc.) to generate ideas, but you are not allowed to use AI tools to generate content (text, video, audio, images). Any work that will end up submitted to be graded for this course must be edited, understood, and ultimately generated by you. If you have any doubts about using AI, please gain permission from the instructor. Any work submitted as your own that is AI-generated without substantial input, revisions, understanding, and critical thinking of your own will result in a conversation with the instructor followed by the possibility of lost credit for that work and further university disciplinary action.

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, [by email](#) or phone at 619-849-2533. 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.

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. Walk-ins are welcome, but we recommend making an appointment in advance. For information about how to make in-person or online appointments, see [the Loma Writing Center webpage](#) or visit the Loma Writing Center on the first floor of the Ryan Library, room 221.

- [Appointment Calendar](#)
- [Website](#)
- [Email](#)

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 PLNU 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 pickup or home delivery). If you have not done so already, please confirm your fulfillment preference so the bookstore can prepare your [LomaBooks](#) materials.

PLNU RECORDING NOTIFICATION

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.

SPIRITUAL CARE

Please be aware that 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 the [Office of Spiritual Development](#).

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](#).

LANGUAGE AND BELONGING

PLNU 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](#). 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](#).

TENTATIVE CLASS SCHEDULE

Week	Day	Topic (tentative)	Textbook Reference
Week 1 Aug 31 - Sep 4	Introduction to Mastering due Wednesday night		
	Mon	Syllabus and course introduction	Course Intro
	Wed	Biology as a scientific discipline: Scientific method	1.1 and 1.3
	Fri	Biology as a scientific discipline: Data statistics	1.1 and 1.3
Week 2 Sep 7 - 11	Chapter 2 reading, pre-class assignment due Tues night Chapter 1 & 2 review assignment due Friday night		
	Mon	Day off; Labor Day	
	Wed	Chemical basis of life	2.1 – 2.3 2.4 – 2.5
	Fri	Chemical basis of life	2.1 – 2.3 2.4 – 2.5
Week 3 Sep 14 - 18	Chapter 3 reading and pre-class assignment due by Monday night		
	Mon	Macromolecules: Carbohydrates	3.1 – 3.3
	Wed	Macromolecules: Lipids	3.4
	Fri	Peer Teaching #1. Copy of handout due on CANVAS before class.	
Week 4 Sep 21 - 25	Chapter 3 review assignment due Wednesday night Chapter 4 reading and pre-class activity due by Friday night.		
	Mon	Macromolecules: Proteins	3.5
	Wed	Macromolecules: Nucleic acids	3.6
	Fri	Cell structure & function	4.1 – 4.5
Week 5 Sep 28 – Oct 2	Chapter 4 review due Monday night.		
	Mon	Cell structure & function	4.6 – 4.8
	Wed	EXAM 1; CH 1 - 4	
	Fri	Peer Teaching #2. Copy of handout due on CANVAS before class. Team activity. Review of exam 1.	
Week 6 Oct 5 – 9	Chapter 5 reading and pre-class assignment due Monday night. Ch. 5b reading and pre-class activity due Friday night		
	Mon	Cell membrane: Structure & characteristics	5.1 – 5.2
	Wed	Cell membrane: Membrane Transport	5.3 – 5.5

	Fri	Cell communication: Modes of cell signaling - threshold and ligands/receptors	5.6
Week 7 Oct 12 - 16	Ch 6 reading and pre-class activity due Wednesday night. Chapter 5 and 5b review due Friday night		
	Mon	Cell communication: Signaling cascades and secondary messengers	5.6
	Wed	Metabolism: Endergonic vs. exergonic reactions.	6.1 – 6.2
	Fri	ATP and enzymes	6.3 – 6.5
Week 8 Oct 19 - 23	Chapter 7 reading and pre-class activity due by Monday midnight Chapter 6 review assignment due Wednesday midnight		
	Mon	Cellular respiration: Redox reactions and glycolysis	7.1 – 7.2 +
	Wed	Cellular respiration: Citric acid cycle + oxidative phosphorylation	7.3 – 7.4
	Fri	Day off; Fall Break	
Week 9 Oct 26 - 30	Chapter 7 review assignment due Monday midnight		
	Mon	Cellular Respiration: Fermentation and Anaerobic Respiration	7.5 – 7.6
	Wed	EXAM 2; CH 5 – 7 + cumulative material	
	Fri	Peer Teaching #3. Copy of handout due on CANVAS before class. Team activity. Review EXAM 2 results.	
Week 10 Nov 2 - 6	Chapter 8 pre-class activity due by Monday midnight Chapter 8 review assignment due Friday midnight		
	Mon	Photosynthesis: Light reactions (linear and cyclic electron flow)	8.1 – 8.2
	Wed	Photosynthesis: Calvin cycle and generating sugars	8.3 – 8.4
	Fri	DNA replication: DNA structure review & intro to semi-conservative replication	13.2
Week 11 Nov 9-13	Chapter 13 reading and pre-class activity due by Monday midnight Chapter 13 review assignment due Wednesday midnight		
	Mon	DNA Replication: DNA polymerase and bidirectional synthesis	13.2
	Wed	DNA Coiling and Chromosome Structure	13.3
	Fri	EXAM 3; CH 8, 13 + cumulative material	
	Chapter 14 reading and pre-class due Monday midnight		
	Mon	Gene Expression: Overview + Transcription	14.1 – 14.2

Week 12 Nov 16 -20	Wed	Gene Expression: RNA processing + Translation	14.3-14.4
	Fri	Gene Expression: Translation + Mutations	14.4 – 14.5
Week 13 Nov 23 - 27	Chapter 14 review assignment due Wednesday midnight		
	Mon	Peer Teaching #4. Copy of handout due on CANVAS before class. Review Exam 3 results.	
	Wed	Thanksgiving recess: No class	
	Fri	Thanksgiving recess: No class	
Week 14 Nov 30 – Dec 4	Chapters 9 and 10 reading and pre-class activity due by Monday midnight Chapters 9 and 10 review assignment due Friday midnight		
	Mon	Cell Cycle: Chromosomes and karyotyping	9.1 + 9.2
	Wed	Cell Cycle: Mitosis and cancer, overview of the cell cycle and CDKS	9.2 + 9.3
	Fri	Meiosis	10.1 – 10.4
Week 15 Dec 7 - 11	Chapter 11 reading and pre-class activity due by Monday midnight Chapter 11 review assignment due Friday midnight.		
	Mon	Genetics: Introduction to Mendelian genetics and Punnett squares	11.1 – 11.2
	Wed	Genetics: Relating genetic inheritance to events in meiosis	11.4
	Fri	Genetics: Non-Mendelian inheritance (X-linked inheritance)	11.3
Final Exam BIO2010 cumulative, Monday, Dec 14 th , 10:30am – 1:00 pm			