

Point Loma Nazarene University  
Department of Physics and Engineering  
PSC 1014 - Physical Science For Teachers  
4 Units  
Fall 2023

Class Time/Location: MWF 1:30-2:35 PM, Taylor Hall 106

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Office hours: RS 258 Tues & Thurs: 9-10am, 12:30-2pm. Other times available by appointment.	Office hours: MW: Taylor Hall 106 4:00 PM - 5:30 PM and by zoom appointment

## COURSE DESCRIPTION

PSC 1014 - Physical Science for Teachers (4)

An introductory survey of selected principles in physics and chemistry with a discussion of related societal and environmental issues. This course focuses on topics necessary for the California multiple subject teaching credential (K-8). This class is highly interactive and will make use of many hands-on activities. Meets a Foundational Explorations requirement; does not count toward the Chemistry or Physics major.

*Pre or Corequisite: MTH 1013 or equivalent.*

## COURSE LEARNING OUTCOMES

1. Explain observations of the natural world in terms of chemistry and physics,

2. Translate the description of problems into the equations required to solve them using relevant physical principles,
3. Find solutions to problems once appropriate equations or techniques are identified,
4. Create and interpret graphical representations of quantities,
5. Recognize appropriate teaching techniques to convey scientific ideas and practices,
6. Develop content expertise in the “Physical Science Disciplinary Core Ideas” described in the Next Generation Science Standards

## FE COURSE LEARNING OUTCOMES

This course is one of the components of the Foundational Experience program at Point Loma Nazarene University, through which students will acquire knowledge of human cultures and the physical and natural world while developing skills and habits that foster life-long learning. Specifically, this course supports this [broader context](#) in developing FELO 1e. Quantitative Reasoning: Students will be able to solve problems that are quantitative in nature. Assessment of this learning outcome will be demonstrated on the final exam embedded in questions typical of introductory physics.

## REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

- *Physical Science* by Bill W. Tillery. 13th Ed. (previous editions are acceptable)
- A scientific calculator

NOTE: Students are responsible to have the required textbooks prior to the first day of class. Students are also encouraged to begin reading the books in preparation for the class as soon as possible.

## 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. Specific details about how the class meets the credit hour requirements can be provided upon request.

## ATTENDANCE 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, receive an "F" grade.

## ASSESSMENT AND GRADING

### Graded Components

- **(10%) Homework:** Hand-written homework is submitted at the beginning of class. Late submissions will not be accepted for credit, however the lowest homework score will be dropped.
- **(20%) Quizzes:** Quizzes will allow you an opportunity to practice material learned in class. Quizzes cannot be made-up, however, the lowest quiz grade will be dropped. Optionally, students can earn back 1/4 of the lost points by submitting properly corrected answers at the beginning of the subsequent class meeting.
- **(15%) Presentation:** Students will present physical science concepts targeted at K-8 grade levels in groups. One presentation will focus on physics while another will be on chemistry.
- **(25%) Midterms and (30%) Final Examinations:** Each quad will have a midterm and a final exam. These will include problems and questions over material assigned in the text, readings and handouts, as well as material presented in class. A score of zero will be assigned for an examination that is missed without prior consent or a well-documented emergency beyond your control. The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

Grading Distribution	Percent
Homework	10
Quizzes	20
Presentations (1 physics + 1 chemistry)	15
Midterm Exams (1 physics + 1 chemistry)	25
Final Exams (1 physics + 1 chemistry)	30
Total	100

## GRADING SCALE

Grades are based on the number of points accumulated throughout the course with the following exception. Approximate minimum percentages required to obtain a given grade are:

Standard Grade Scale Based on Percentages					
	A	B	C	D	F
+		86.5- 89.5	76.5-79.5	66.5-69.5	
	91.5 -100	81.5-86.5	72.5-76.5	62.5 -66.5	0-59.5
-	89.5-91.5	79.5-81.5	69.5-72.5	59.5-62.5	

## LATE ASSIGNMENTS

Late assignments will not be accepted for credit.

## **FINAL EXAM 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.

## **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 [ADC Academic and General Policies](#)[Links to an external site.](#) 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](mailto: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, receive the appropriate grade for their work and participation.

## **CLASS ENROLLMENT**

It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

## **PLNU 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 Links to an external site.](#)

## PLNU MISSION

To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

## FOUNDATIONAL EXPLORATIONS MISSION

PLNU provides a foundational course of study in the liberal arts informed by the life, death, and resurrection of Jesus Christ. In keeping with the Wesleyan tradition, the curriculum equips students with a broad range of knowledge and skills within and across disciplines to enrich major study, lifelong learning, and vocational service as Christ-like participants in the world's diverse societies and culture.

## DEPARTMENT MISSION

The Physics and Engineering Department at PLNU provides strong programs of study in the fields of Physics and Engineering. Our students are well prepared for graduate studies and careers in scientific and engineering fields. We emphasize a collaborative learning environment which allows students to thrive academically, build personal confidence, and develop interpersonal skills. We provide a Christian environment for students to learn values and judgment, and pursue integration of modern scientific knowledge and Christian faith.

Course Calendar:

Date	Topic	Reading	Hmk	Quiz
8/28	Introduction to Science	None		
8/30	Quantitative Properties and Measurements	1.1-1.7		

Date	Topic	Reading	Hmk	Quiz
9/1	Describing and Measuring Motion	2.1-2.4	Hmk 1	
9/6	Compound Motion and Newton's Laws	2.5-2.6		
9/8	Momentum, Forces, and Gravity	2.7-2.9		Quiz 1
9/11	Work, Power, and Forms of Energy	3.1-3.3	Hmk 2	
9/13	Energy Sources: Present and Future	3.4-3.5		
9/15	Molecular Theory and Temperature	4.1-4.3	Hmk 3	Quiz 2
9/18	Phase Changes and Thermodynamics	4.4-4.5		
9/20	Wrap-up and Review for Test	none	Hmk 4	
9/22	Physics Test 1 (Midterm)	none		
9/25	Forces, Vibrations, and Types of Waves	5.1-5.3		
9/27	Sound Waves and Wave Energy	5.4-5.6		
9/29	Electron Theory, Electric Forces and Current	6.1-6.3	Hmk 5	Quiz 3
10/2	Magnetism and Circuit Connections	6.4-6.6		
10/4	Light Sources and Interactions	7.1-7.3	Hmk 6	
10/6	Wave-Particle Duality and Relativity	7.4-7.5		Quiz 4
10/9	Wrap-up and Review for Test	none	Hmk 7	

Date	Topic	Reading	Hmk	Quiz
10/11	Physics Test 2 (Final)	none		
10/13	Student Presentations - Day 1	none		
10/16	Student Presentations - Day 2	none		
10/18	Introduction	8.1-2		
10/23	Atoms and Periodic Properties	8.2-3		
10/25	Atoms and Periodic Properties	8.4-6		
10/27	Chemical Bonds	9.1	Hmk 8	
10/30	Chemical Bonds	9.2-3		Quiz 5
11/1	Chemical Bonds	9.4-5		
11/3	Chemical Reactions	10.1	Hmk 9	
11/6	Chemical Reactions	10.2-3		
11/8	Chemical Reactions	10.4		Quiz 6
11/10	Water and Solutions	11.1	Hmk 10	
11/13	Water and Solutions	11.2-3		
11/15	Water and Solutions	11.4		
11/17	Chemistry Midterm			

Date	Topic	Reading	Hmk	Quiz
11/20	Organic Chemistry	12.1-2	Hmk 11	
11/27	Organic Chemistry	12.3-4		Quiz 7
11/29	Organic Chemistry	12.5		
12/1	Nuclear Chemistry	13.1-2	Hmk 12	
12/4	Nuclear Chemistry	13.3-5		Quiz 8
12/6	Presentations		Hmk 13	
12/8	Presentations			
12/11	Chemistry Final			