Department of Physics and Engineering

PHY 2054/L University Physics II and Lab (3 + 1 units)

Instructor: Dr. Michelle Chen
Phone: (619) 849-2960
Email: michellechen@pointloma.edu
Office Hours: MWF 12-1:30; T 1:30-2 in RS264

Class Meetings: MWF 7:25 AM – 8:20 AM (RS265)

Lab Meetings: RS 265
Section 1: R 7:25 AM - 9:55 AM
Section 2: R 10:30 AM - 1:00 PM

Final Exam: Friday, May 8th at 7:30 AM (RS265)

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.

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 Description

An analytic, calculus-based study of classical physics appropriate for science and engineering majors with an emphasis on electromagnetism, circuits, and optics. Lecture and laboratory.

Course Learning Outcomes

After completing this course, students can:

1. Translate the description of physics problems into the mathematical equations required to solve them using relevant physical principles.
2. Calculate solutions to physics problems once appropriate equations or techniques are identified.
3. Predict reasonable answers in appropriate problems, and assess the reasonableness of calculated answers
4. Explain the physical meaning of the parameters in introductory physics equations
5. Create and interpret graphical representations of physical quantities (electric fields, ray diagrams, etc.)
6. Demonstrate teamwork skills / ability to collaborate by working in groups on a laboratory experiment.
7. Demonstrate proficiency using introductory physics equipment in the lab setting (for example oscilloscopes, waveform generator, lasers)

Required Texts and Materials

Physics: D. C. Giancoli, *Physics for Scientists & Engineers with Modern Physics*, Volume 2, 5th ed. (Pearson, 2022); Scientific Calculator, Access to Expert TA.

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.

Assessment and Grading

The grade you earn in this course is based on the scale below. The points you receive during the course are weighted accordingly:

- **(2%) Preclass:** In preparation for each class meeting, there is a reading assignment. Class meetings are not a standard lecture format, making these reading assignments especially important. To complete the reading assignment, you must answer 2-3 short questions and submit them electronically by 10 pm the evening before class.
- **(20%) Lab:** Hands-on experience of topics from class meetings is the focus of the lab, along with a focus on technique and data analysis. Labs will be performed in small groups, but everyone is responsible for submitting their own results. Labs constitute 20% of your final grade. You must pass the lab portion of the class to pass the class.
- **(18%) Homework:** Homework will be completed through ExpertTA. This work is very important in building your skills at solving physics problems.
- **(40%) Exams:** Three exams will be given during the semester. Exams will include both multiple-choice or short answer conceptual questions, and problems to solve. Exams will be closed book, but a sheet of formulas will be provided. Partial credit will be given for

correct reasoning at any step of a problem, but only if it is communicated clearly enough for me to understand.

- **(20%) Final exam:** The final examination will be comprehensive on the material in the course.

Grading Scale

A	B	C	D	F
S ≥ 92 (A)	**90 > S ≥ 88** (B+)	**80 > S ≥ 78** (C+)	**70 > S ≥ 68** (D+)	**S < 60**
92 > S ≥ 91 (A–)	**88 > S ≥ 82** (B)	**78 > S ≥ 72** (C)	**68 > S ≥ 62** (D)	
	82 > S ≥ 80 (B–)	**72 > S ≥ 70** (C–)	**62 > S ≥ 60** (D–)	

Late Assignments

Preclass assignments earn half points if submitted late but before the start of class, after this they receive no credit. Homework problems not submitted on time will receive a deduction of 20% per day (note this is on a per problem basis, only the problem not turned in will receive this deduction). Typically labs will be submitted at the end of the lab period.

Exams and Missing Exam Policy

Examinations and the Final Examination will include problems and questions over material assigned in the text, explored in homework, as well as material presented in class. Distributed specific learning outcomes for the section, or for the entire class will provide a good means of study. A score of zero will be assigned for an examination that is missed without prior consent or a well-documented emergency beyond your control. If such an event arises, please ensure that you communicate with the professor as soon as possible so other arrangements can be made.

Final Exam

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.

Incomplete Grade Assignment

A grade of incomplete will only be assigned in extremely unusual circumstances. If you believe that your particular circumstances qualify be in clear communication with the professor as soon as you are able.

Artificial Intelligence (AI) Policy

You are allowed to use Large Language Models (like ChatGPT, NotebookLM, Claude, etc.) as a study tool, but not on any exams. Work that utilizes AI-based tools should be identified as such including the tool used. Specific use cases will be clarified in class.

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 619-849-2533). 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 allowed 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 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 accommodations.

Additional Course Information

Additional PLNU policies and practices that apply to this course can be found at this https://docs.google.com/document/d/11BgAANLOJ9tjt837d24EZ181ukM2qzHF/edit

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.

Tentative Course Calendar

(Subject to Updates)

Date	Topic	Reading	Lab (Thursday)
M 01/12/26	Introduction, Charge, Insulators and Conductors	21.1 - 21.3	
W 01/14/26	Induced Charge, Electroscope, Coulomb's Law, Electric Field	21.4 - 21.6	Electric Field Simulation
F 01/16/26	Electric Field, Filed Lines, Conductors, Charge Particle in E Field, Electric Dipole	21.7 - 21.11	
M 01/19/26	No Class: Martin Luther King Day		
W 01/21/26	Electric Flux, Gauss's Law	22.1 - 22.3	Oscilloscope
F 01/23/26	Electric Flux, Gauss's Law	22.1 - 22.3	
M 01/26/26	Electric Potential Energy, Electric Potential, Electric Field, Equipotential Surfaces	23.1 - 23.3, 23.5	
W 01/28/26	Electric Dipole Potential, E Determined from V, Electron Volt	23.4, 23.6 - 23.8	Equipotential Mapping
F 01/30/26	Electric Battery, Electric Current, Ohm's Law, Resistance, Resistivity	25.1 - 25.4	
M 02/02/26	Electric Power, Household Circuits, Alternating Current, Microscopic View of Current	25.5 - 25.8	
W 02/04/26	Catch Up		Ohmic/Non-Ohmic

F 02/06/26	**Test 1**		
M 02/09/26	EMF, Terminal Voltage, Resistors/EMF in Series/Parallel, Ammeters & Voltmeters	26.1-2, 26.6-7	
W 02/11/26	Kirchhoff's Rules; Series and Parallel EMF, Battery Changing, Electric Hazards	26.3 - 26.4	Circuits & Resistance
F 02/13/26	Capacitance	24.1 - 24.2	
M 02/16/26	RC Circuits	26.5 - 26.5	
W 02/18/26	Capacitors in Series and Parallel, Electric Energy Storage	24.3 - 24.4	RC Circuits
F 02/20/26	Dielectrics	24.5 - 24.5	
M 02/23/26	Magnets and Magnetic Fields, E Currents from B Fields, Force on Current in B Field	27.1 - 27.4	
W 02/25/26	Torque on Current Loop, Motors, Hall Effect, Mass Spectrometer	27.5 - 27.9, 29.4	Magnetic Field
F 02/27/26	B Filed from Straight Wire, Force between Two Parrallel Wires, Ampere and Coulomb	28.1 - 28.3	
M 03/02/26	Ampere's Law, Magnetic Field of Solenoid and Toroid	28.4 - 28.5	
W 03/04/26	Catch Up		**Test 2 in Lab**
F 03/06/26	Biot-Savart Law, Ferromagnetism	28.6 - 28.7	
M 03/09/26	**No Class (Spring Break)**		
W 03/11/26	**No Class (Spring Break)**		No Lab
F 03/13/26	**No Class (Spring Break)**		
M 03/16/26	Induced EMF, Faraday's Law of Induction, Lenz's Law	29.1 - 29.3	
W 03/18/26	Electric Generators, Transformers, Power Transmission, Change B-Flux Produces E	29.4, 29.6 - 29.7	Electric Motor
F 03/20/26	Reflection and Refraction, Image by Plane and Spherical Mirrors	32.1 - 32.4	
M 03/23/26	Snell's Law, Visible Spectrum and Dispersion, Total Internal Reflection	32.5 - 32.7	
W 03/25/26	Thin Lenses, Ray Tracing, Thin Lens Equation, Magnification, Combination of Lenses	33.1 - 33.3	Lenses

F 03/27/26	Cameras, Human Eye, Telescope, Compound Microscope	33.5 - 33.9	
M 03/30/26	**No Class (Research Meeting)**		
W 04/01/26	**No Class (Research Meeting)**		No Lab
F 04/03/26	**No Class (Easter)**		
M 04/06/26	**No Class (Easter)**		
W 04/08/26	Polarization	35.11 - 35.11	Polarization
F 04/10/26	Huygen's Principle, Diffraction and Refraction	34.1 - 34.2	
M 04/13/26	Interference - Young's Double Slit, Interference in Thin Films	34.3, 34.5	
W 04/15/26	Single Slit, Double Slit, Diffraction Grating	35.1, 35.3, 35.7	Interference
F 04/17/26	Ampere's Law, Gauss's Law for Magnetism, Maxwell's Equations, EM Waves	31.1-31.5	
M 04/20/26	EM Wave and Spectrum, Speed of Light, Energy in EM Waves, Radiation	31.6 - 31.10	
W 04/22/26	Catch Up		**Test 3 in Lab**
F 04/24/26	Catch Up		
M 04/27/26	Catch Up		
W 04/29/26	Catch Up		No Lab
F 05/01/26	Catch Up		
M 05/04/26			
W 05/06/26			
F 05/08/26	**Final Exam: 7:30 - 10:00 am (RS265)**		