Point Loma Nazarene University

Department of Physics and Engineering
PHY2054: University Physics II and Lab (3 + 1 units)
MWF 7:25-8:20 LA101; T 10:00-11:45 or R 7:25-9:10 RS265
Spring 2022: January 11-April 29

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Instructor (Lab Section 2): Jon Viducich, PE
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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

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)

8. apply fundamental concepts/laws in physics by setting up and using laboratory equipment safely and efficiently and planning and carrying out experimental procedures.
9. demonstrate the ability to apply knowledge/skills to real world settings by identifying possible sources of error and implementing techniques that enhance precision.

Required Texts and Materials

Physics for Scientists & Engineering by Giancoli, 4th edition . Basic scientific calculator. Access to Mastering Physics

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:

(5%) Preclass Each class day there will a few questions to answer electronically. These will typically be due by 10 pm the evening before class. Your responses to the preclass questions are graded on the following scale: 3=demonstrates reading/thinking; 2=room for improvement, 1=looks pretty last second, 0=unsatisfactory.

(20%) Lab Lab meetings will provide you the opportunity for hands-on experience of topics from class meetings, improve lab technique, and data analysis. Labs will be preformed in small groups, but each individual is responsible for submitting his or her own results. You must pass the lab portion of class to pass the class.

(20%) Homework problems will be completed through the Mastering Physics. Through the semester, to improve your understanding to topics you will be completing various homework assignments. It may be helpful to work together, but make sure that your work is your own.

(35%) Exams (4): Four exams will be given during in-semester on February 2, February 25, March 28, and April 22. 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 to you to use during your exam. 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. For problems that call for a solution or explanation, no credit will be given for an answer alone; the method or reasoning must also be shown.

(20%) Final exam: The final exam is Wednesday, May 4 at 7:30-10:00 am. The final examination will be comprehensive with an emphasis on the final material in the course.

A	B	C	D	F
A 92-100	B+ 87-89	C+ 77-79	D+ 67-69	F Less than 59
A- 90-91	B 83-86	C 73-76	D 63-66	
	B- 80-82	C- 70-72	D- 60-62	

Exams
Examinations and the Final Examination will include problems and questions over material assigned in the text, readings and handouts, as well as material presented in class. No examination shall be missed without prior consent or a well-documented emergency beyond your control. A score of zero will be assigned for an examination that is missed without prior consent or a well-documented emergency beyond your control.

Final Exam
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. No requests for early examinations will be approved. 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.

Incompletes and Late Assignments
Each hour late a homework assignment is submitted will reduce the points you receive by 5 percent. (Note that MasteringPhysics automatically reduces your points only for the problems you have not submitted) After 5 days, an assignment will no longer be accepted for evaluation. Incompletes will only be assigned in extremely unusual circumstances.

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.

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 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.

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 Attendance and Participation Policy

Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day. Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in 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. See Academic Policies site. in the Undergraduate Academic Catalog. If absences exceed these limits but are due to university excused health issues, an exception will be granted.

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.

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.

Topics and Assignments at a glance:

Date	Topic	Reading	Hmk Due	Week's Lab

1/11	Introductions			(no lab)
1/12	Static Charge and Coulomb's Law	21-1 to 21-5		
1/14	The Electric Field	21-6 to 21-9		
1/17	Martin Luther King Jr. Day			Electric Field Simulations
1/19	Motion in a field and Dipoles	21-10 to 21-11		
1/21	Gauss's Law 1	22-1 to 22-3	Hmk 1 (21)	
1/24	Gauss's Law 2	22-1 to 22-3		Electric Potential Map
1/26	Electric Potential 1	23-1 to 23-3	Hmk 2 (22)	
1/28	Electric Potential 2	23-4 to 23-8		
1/31	Wrap-Up			Oscilloscope
2/02	Exam #1 (Chapter 21-24)		Hmk 3(23)	
2/04	Capacitors 1	24-1 to 24-2		
2/07	Capacitors 2	24-3 to 24-5		Ohms Law
2/09	Ohm's Law	25-1 to 25-4	Hmk 4(24)	
2/11	Power and Current	25-5 to 25-10		
2/14	Circuits and Kirchohoff's Rules	26-1 to 26-3	Hmk 5(25)	Basic Circuits
2/16	RC circuits	26-4 to 26-6		
2/18	Magnetism 1	27-1 to 27-3	Hmk 6 (26)	
2/21	Magnetism 2	27-4 to 27-8		RC circuits
2/23	Wrap-Up and Review			
2/25	Exam #2 (Chapter 25-27)		Hmk 7(27)	
2/28	Ampere's Law 1	28.1-28.3		Magnetic Field of Slinky
3/02	Ampere's Law 2	28.4-28.5		
3/04	Biot-Savart Law	28.6-28.9		
3/7	Spring Break			(no lab)
3/9	Spring Break			
3/11	Spring Break			
3/14	Induction and Faraday's Law 1	29.1-29.3	Hmk 8(28)	Motor

3/16	Induction and Faraday's Law 2	29.4-29.7		
3/18	Inductance	30.1-30.3	Hmk 9(29)	
3/21	LR and LRC circuits	30.4-30.6		RLC circuit
3/23	LRC with AC	30.7-30.10		
3/25	Wrap-Up and Review		Hmk 10(30)	
3/28	Exam #3 (Chapter 28-30)			Speed of Light
3/30	EM waves I	31.1-31.5		
4/01	EM waves II	31.6-31.10		
4/04	Ray Model of light: Reflection	32.1-32.3	Hmk 11(31)	Optics
4/06	Ray Model of light: Refraction	32.4-32.7		
4/08	Thin lenses	33.1-32.2	Hmk12(32)	
4/11	Thin lenses and optical instruments	33.3-33.6		(no lab)
4/13	Optical instruments	33.7-33.10		
4/15	Easter			
4/18	Easter			Thin Lens
4/20	Wrap up and Review		Hmk 13(33)	
4/22	Exam #4 (Chapter 31-33)			
4/25	Wave Nature of Light	34.1-34.3; 34.5		Double slit
4/27	Diffraction and Polarization I	35.1; 35.4-35.8		
4/29	Diffraction and Polarization II	35.10-35.11; 35.13		