**Point Loma Nazarene University**

**Department of Physics and Engineering**

**PHY 1054/L General Physics II and Lab (3 + 1 units)**

**MWF: 7:25-8:20 (Latter Hall 1); Lab T 7:25 am; 12:30 pm (RS 265)**

**Spring 2023: January 10 - April 28**

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Instructors: Dr. Paul D. Schmelzenbach / Lab: Dr. Michelle Chen

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Office hours: TR 9-10; MWF 8:30-10:00 (RS258); or Appointment as needed (also via zoom)

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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.

**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.

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**Course Description:** As a continuation of CSC 1043, this course deals with more advanced computing constructs and ideas, reinforced in weekly labs. Topics include object-oriented design, inheritance, polymorphism, exception handling, and recursion, along with more

intentional development and debugging strategies. Linked lists are introduced as a viable option for implementing basic ADT's. Students gain experience in the design of graphical user interfaces, event driven programming, and larger programming projects.

Also offered as EGR 1054.

**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. gather and interpret data in a lab setting

**Foundational Explorations 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.

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**Required texts and Recommended Study Resources:** Physics: Principles and Applications, 7th edition by Giancoli; Scientific Calculator; Electronic 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**:

- 2% Preclass Assignments - 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: 2=demonstrates reading/thinking; 1=room for improvement, 0=unsatisfactory.

- 18% Homework Assignments - Homework assignments will be completed through Expert TA.
- 20% Lab Activities
- 40% Exams (4)
- 20% Final Exam

Final Grades will be based on the following:

| 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 | |

**Late Assignments and Exam Policy:** 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.

Preclass assignments cannot earn points if submitted late. Homework problems not submitted on time will receive a 20% deduction per day. Typically labs will be submitted at the end of the lab period.

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**Spiritual Care:** PLNU strives to be a place where students 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 if you have prayer requests, you can contact the Office of Student Life and Formation.

**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.

**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.

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**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.

**Incompletes:** 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.

**Sexual Misconduct and Discrimination:** Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. 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 help and support are available through the Title IX Office at pointloma.edu/Title-IX. Please be aware that under Title IX of the Education Amendments of 1972, it is 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 at counselingservices@pointloma.edu or find a list of campus pastors at pointloma.edu/title-ix

**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 Meeting Schedule:**

| Date | Topic | Reading |
|---|---|---|
| 1/10 | Introductions | |
| 1/11 | Intro to Charge and Coulomb's Law | 16.1-16.6 |
| 1/13 | Coulomb's Law and the E field | 16.6-16.8 |
| 1/18 | The Electric Field II | 16.9; 16.12 |
| 1/20 | Electric Potential | 17.1-17.5 |
| 1/23 | V; Capacitance | 17.7-17.10 |
| 1/25 | Electric Currents I | 18.1-18.4 |
| 1/27 | Electric Currents II: Power and AC | 18.5-18.7 |
| 1/30 | Exam 1: Chapters 16-18 | |
| 2/1 | Circuits I | 19.1-19.3 |
| 2/3 | Circuits II | 19.3-19.4 |
| 2/6 | Circuits III | 19.5-19.8 |
| 2/8 | Magnetic Fields and Forces I | 20.1-20.4 |
| 2/10 | Magnetic Fields and forces II | 20.5-20.10 |
| 2/13 | Induction | 21.1-21.4 |
| 2/15 | EMF, Generators, and Transformers | 21.5-21.7 |
| 2/17 | Wrap up and Practice | |
| 2/20 | Exam 2: Chapters 19-21 | |
| 2/22 | EM waves | 22.1-22.7 |
| 2/24 | Geometric Optics: Mirrors | 23.1-23.3 |
| 2/27 | Geometric Optics: Lenses | 23.4-23.8 |
| 3/1 | Dispersion and Interference | 24.1; 24.3-24.4 |

| Date | Topic | Reading |
|---|---|---|
| 3/3 | Diffraction Gratings | 24.5-24.7 |
| 3/13 | Thin Film, Polarization, atmosphere | 24.8, 10, 12 |
| 3/15 | Cameras, Eyes, and Magnifiers | 25.1-25.3 |
| 3/17 | Optical Instruments | 25.4-25.9 |
| 3/20 | Wrap-up and Review | |
| 3/22 | Exam 3: Chapters 22-25 | |
| 3/24 | Relativity Part 1 | 26.1-26.4 |
| 3/27 | Relativity Part 2 | 26.5-26.11 |
| 3/29 | Early Quantum Theory | 27.1-27.4 |
| 3/31 | Waves and Particles | 27.6-27.10 |
| 4/3 | Spectra and Bohr Model | 27.11-27.13 |
| 4/5 | QM and Uncertainty | 28.1-28.6 |
| 4/12 | QM; Uncertainty | 28.6-28.8 |
| 4/14 | Lasers and Wrap-up | 28.10-11 |
| 4/17 | Exam 4: Chapters 26-28 | |
| 4/19 | Radioactivity and decay I | 30.1-30.7 |
| 4/21 | Radioactivity and decay II | 30.8-30.11 |
| 4/24 | Fission and Fusion | 31.1-31.3 |
| 4/26 | Effects and Uses of Radiation | 31.4-31.5; 31.9 |
| 4/28 | Wrap-up and Review | |
| 5/5 | Final Exam: Friday at 7:30 am | |