Point Loma Nazarene University
Department of Physics and Engineering
EGR3083/PHY3083: Electricity and Magnetism II (3 units)
TR 12:30-1:45 RS365
Spring 2022: January 11-April 29

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Office hours: MWF 10:00-12:30 or Appointment as needed 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.

Course Description: Electrodynamics with an emphasis on application of Maxwell's equations particularly to electromagnetic radiation.

Course Learning Outcomes:

After completing the course, the student should be able to

1. Translate a physical description of a junior-level E&M problem to a math equation necessary to solve it.
2. explain the physical meaning of the mathematical formulation
3. articulate the big ideas from each section
4. justify and explain your thinking and approach to a problem or physical situation in written or oral form
5. when appropriate for a given problem you should be able to predict your expectations of a problem (such as the direction of a field or dependence on distance) and in all cases evaluate the reasonableness of a solution.
6. be able to sketch the physical parameters of a system (such as the E or B field)
7. apply computational techniques to help in solving E&M problems
8. correctly apply problem solving techniques such as approximations, symmetries, integration and superposition

Required Texts and Materials: Introduction to Electrodynamics by David Griffiths, 4th edition.

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 3 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. 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.

(10%) Quizzes Most weeks there will a quiz that will provide a check of your understanding. The lowest quiz score will be dropped

(30%) Homework Homework is exceedingly important for developing an understanding of the course material, not to mention building skills in complex physical and mathematical problem solving. Remember that it is not just a "correct" solution that itself that is the true goal, it is the process to the solution that will develop your skill as a physicist or engineer. I encourage you to work together on the homework sets, but you must participate in the process of obtaining the solution to each problem. The guideline is that you should have no trouble explaining or repeating work that you turn in.

(30%) Exams (3): Exams will follow chapter 7/8, chapter 9, chapter 10/11.

(25%) Final exam: The final examination will be comprehensive with an emphasis on the last section (chapter 12) that only appears on the final exam.

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 day late a homework assignment submitted will reduce the points you receive by 10 percent. 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
1/13	Integrals Revisited		
1/18	EMF	7.1	
1/20	Induction	7.2	Hmk 1
1/25	Induction/Maxwell Equations	7.3	
1/27	Maxwell's Equations 2	7.3	Hmk 2
2/01	Charge and Poynting Vector	8.1	
2/03	Maxwell Stress tensor	8.2	Hmk 3
2/08	Conservation and Momenum	8.3	
2/10	Exam #1		Hmk 4

2/15	1-D Waves	9.1	
2/17	EM waves in a vacuum	9.2	Hmk 5
2/22	EM waves in matter	9.3	
2/24	EM waves in matter	9.3	Hmk 6
3/01	Absorption and Dispersion	9.4	
3/03	Guided Waves	9.5	Hmk 7
3/15	Wrap up Waves	9.5	
3/17	Exam #2		Hmk 8
3/22	Gauge Transformations	10.1	
3/24	Retarded Potentials	10.2	Hmk 9
3/29	Lienard-Wiechert Potentials	10.3	
3/31	Electric Dipole	11.1	Hmk 10
4/05	Magnetic Dipe	11.1	
4/07	Point Charges	11.2	
4/12	Exam #3		Hmk 11
4/14	Easter Break		
4/19	Special Relativity	12.1	
4/21	Lorentz Transorms	12.1	Hmk 12
4/26	Relativisitic Mechanics	12.2	
4/28	Relativistic Electrodynamics	12.3	
5/05	Final Exam at 1:30 on Thursday		Hmk 13