

PHYS 1372 - Spring 2016 Electromagnetic Theory

Instructor: Prof. X.-L. Wu

Office: 219 OEH

Phone: (412) 624-0873

E-mail: xlwu@pitt.edu

Class times: MWF 10:00-10:50, 105 Allen Hall

Office hours: W 11:00-12:00 and F 11:00-12:00

Textbooks: David J. Griffiths, "Introduction to Electrodynamics" (Chapters 8-12)

References: Purcell and Morin, "Electricity and Magnetism"
Heald and Marion, "Classical Electromagnetic Radiation"

Course Goals and Objectives

We will explore the richness of the Maxwell's equations obtained in Phys 1351 and apply them to a variety of problems. We will deal with electromagnetic waves and radiation theory, relate the radiation field to its sources, examine electromagnetism in the context of Einstein's theory of relativity and other topics as time permits. This course will thus serve as a bridge between a traditional upper-level undergraduate course in E&M and one that you will take as a first-year graduate student.

Prerequisites

Upon entering this course students must be proficient with the material covered in Phys 1351 (e.g. Griffiths chapters 1-7). They should also have taken Math 240, and either Math 250 or both 280 and 290. In particular, students are expected to calculate multi-dimensional integrals, manipulate complex numbers in both Cartesian and polar coordinates, solve problems in Cartesian, cylindrical, and spherical coordinate systems, and use special functions to solve boundary-value problems.

Outcomes

By successful completing this course, a student should be able to:

1. Solve problems involving electromagnetic waves and radiation.
2. Describe the connection between the study of electromagnetism and optics.
3. Show how electricity and magnetism are connected through special relativity.

Assignments and Grading

Grades will be based on Homework (30%), two in-class midterm exams (20% each), and a final exam (30%). I strongly advise you to keep up with the weekly homework. It is a large component of the grade, as well as giving you practice for the exams.

Homework

Problem sets will be assigned based on the material being covered either in class or the readings. They will be due on **Monday** in class, a week after its assignment. Late homework assignments will be docked 10% for every day they are late. No credit will be given after the solutions are distributed. Students are encouraged to study together, but simply copying someone else's work is discouraged.

Exams

Two in-class exams will be given. They are tentatively scheduled on

- Friday, Feb. 5
- Friday, Mar. 4

An unexcused absence will result in failure for the exam.

A cumulative final exam will be given at the end of the term.

- Monday, April 25, 2:00-3:50 PM

These are close-book exams. However, the students are welcome to prepare their own formula sheets, which are limited to one single-sided page for the first midterm, two single-sided pages for the second midterm, and three single-sided pages for the final.

Course Policies

Academic Integrity

Students in this course will be expected to comply with University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

Disabilities

If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and the Disability Resources and Services no later than the 2nd week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call 648-7890 (Voice or TTD) to schedule an appointment. The Office is located in 216 William Pitt Union.