

## PHYS 1372 - Spring 2019 Electromagnetic Theory

**Instructor:** Prof. X.L. Wu

**Office:** 219 OEH

**Phone:** (412) 624-0873

**E-mail:** [xlwu@pitt.edu](mailto: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"

### Goals and Objectives

We will explore the richness of the Maxwell's equations that you learned in Phys 1351 and apply them to a variety of problems. We will study electromagnetic waves and radiation theory, relate the radiation field to its sources, examine electromagnetism in the context of Einstein's theory of relativity, and discuss other interesting topics as time permits. This course will 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

It is expected that students are 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 perform multi-dimensional integrals, manipulate complex numbers in both Cartesian and polar coordinates, solve problems in Cartesian, cylindrical, and spherical coordinate systems, and solve boundary-value problems using special functions.

### Outcomes

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

1. solve simple problems involving electromagnetic waves and radiation.
2. making connection between 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 an in-class final exam (30%). I strongly advise the students to keep up with the weekly homework. It is a large part of the grade as well as give you the opportunity to practice for the exams.

## Homework

Problem sets will be assigned based on the material being covered either in class or by 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. 4
- Friday, Mar. 3

An unexcused absence will result in failure for the exam.

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

- Schedule to be announced

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.