

PHYS 382 – Electricity and Magnetism II, Winter Quarter 2005

Instructor: Dr. David Laman

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Office hours: M 2-3; Tu 2-4; Th 2-4; F 11-12, and by appointment

Course Description

This course is the second of three parts of the electricity and magnetism sequence (PHYS 381-3) for physics majors. The PHYS 381-3 sequence is designed to provide the minimum knowledge of electricity and magnetism that B.S. physics majors should have when they graduate. The major topics to be covered in PHYS 382 include the electrostatics of polarizable media, vacuum magnetostatics, and magnetostatics in matter. All of the electrostatic concepts used in PHYS 381 will be revisited during the sections on polarizable media.

Course Objectives

The successful student will be able to:

- Apply the concepts of electrostatics covered in PHYS 381 to systems containing polarizable media
- Apply the Lorentz force to situations involving moving charges
- Apply the Biot-Savart Law to different current configurations
- Discuss the physical significance of Ampere's Law and apply it to different current configurations
- Discuss the physical significance of the magnetic vector potential and choice of gauge
- Apply magnetostatic boundary conditions
- Apply all the above magnetostatic concepts to systems containing permanent and non-permanent magnetic materials

Text: *Introduction to Electrodynamics* by David J. Griffiths, chapters 4-6.

Course grading will be based on: 2 exams (mid-term/final): 20% x 2 = 40%
Homework: 40%
In-class exercises: 20%

Guaranteed minimum letter grades: 94-100: A; 90-93: A-; 86-89: B+; 83-85: B; 80-82: B-; 76-79%: C+; 73-75: C; 70-72: C-; 60-69%: D.

Homework: Homework accounts for 40% of your grade. You are encouraged to work together on the homework and to seek my help when you run into difficulty. Remember, however, that you will not be able to work together or seek my help on exams, and as such you should do your best to work as much of the homework on your own as is possible. I highly recommend that you seriously attempt the homework assignments on your own before you get together with other members of the class to work on them. Homework will be assigned every Thursday and will be due by 4 PM the following Tuesday. Each assignment will typically consist of one or two significant problems. No late homework assignments will be accepted except in well-documented extenuating circumstances.

In class exercises: We will frequently work on in-class exercises, some of which will be worth 20% of your grade. All of the in-class exercises will be handed in for grading, however, I will not grade every exercise and I will randomly decide which ones to grade. You will have until the beginning of class on the next day to hand in the completed exercise. As with the homework assignments, you are encouraged to work together on the in-class exercises. No in-class exercises will be accepted after the beginning of class on the next day except in well-documented extenuating circumstances.

Tentative Class Schedule

Monday	Tuesday	Wednesday	Thursday
	4 Jan start ch. 4 text: 4.1,2,3,4,	5 Jan continue ch. 4	6 Jan continue ch. 4
10 Jan continue ch. 4	11 Jan continue ch. 4	12 Jan continue ch. 4	13 Jan continue ch. 4
17 Jan MLK Birthday	18 Jan continue ch. 4	19 Jan continue ch. 4	20 Jan continue ch. 4
24 Jan continue ch. 4	25 Jan continue ch. 4	26 Jan continue ch. 4	27 Jan continue ch. 4
31 Jan finish ch. 4	1 Feb start ch. 5 text: 5.1,2,3,4	2 Feb continue ch. 5	3 Feb exam 1
7 Feb continue ch. 5	8 Feb continue ch. 5	9 Feb continue ch. 5	10 Feb continue ch. 5
14 Feb continue ch. 5	11 Feb continue ch. 5	12 Feb continue ch. 5	13 Feb continue ch. 5
21 Feb Prez Day	22 Feb finish ch. 5	23 Feb start ch. 6 text: 6.1,2,3,4	24 Feb continue ch. 6
28 Feb continue ch. 6	1 Mar continue ch. 6	2 Mar continue ch. 6	3 Mar continue ch. 6
7 Mar continue ch. 6	8 Mar continue ch. 6	9 Mar continue ch. 6	10 Mar finish ch. 6