

PHY 355 Electromagnetic Theory

Syllabus

Instructor: **Sheng-Chiang (John) Lee**

SEB 244, 478-301-2599

Office Hours: by appointments

Pre-requisite: PHY 162, MAT 293 and MAT 330

Textbook: Introduction to Electrodynamics, David J. Griffiths, Third Edition

Course Description:

This is an intermediate course in the theory of electricity and magnetism, for junior or senior level students. Because of the prerequisites, students are assumed to know some basic physics that operates with vector calculus as applied to simple differential equations. We will study electric and magnetic systems by looking at static fields in vacuum and in matters. After discussing the effects of time-dependent fields, we will develop Maxwell's Equations. Once students are familiar enough with the applications of Maxwell's equation, we will attempt to study practical systems, such as electromagnetic waves, and wave-guides.

Objectives:

After taking this course, you should be able to

- Calculate various electrodynamic quantities (i.e. electric potentials and fields, magnetic fields, etc.) for given charge/current distributions or simple boundary conditions.
- Understand and quantitatively estimate the effect of matter on electric and magnetic fields.
- Understand and apply Maxwell's equation to simple cases.
- Understand how time-varying fields result in electromagnetic waves.

Grading Methods:

Grading Scale:

Score:	90+	85~89	80~84	75~79	70~74	60~69	59-
Grade:	A	B+	B	C+	C	D	F

Grading Components:

	Homework	Exams (2 tests + 1 comprehensive final)
Weight	30%	$2 \times \text{Tests (20\%)} + 1 \times \text{Final (30\%)} = 70\%$

Homework:

You will be given roughly weekly homework assignments from the textbook. They are due in one week. Late homework will suffer 5% penalty per day, and will NOT be accepted after one week unless students are legitimately excused.

Special Note: Since Mathematica® will be available in the physics department, you are welcome to use it for your homework. It makes typing equations and documenting your work much easier. It may also visualize your results and advance your appreciation of physics. However, unless permitted by the instructor, you should NOT use Mathematica® to help you solve equations/differential equations, perform vector analyses, and so on. **YOU** should have the ability to perform analytical calculations by hands.

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Tests/Final:

There will be two midterm tests and one comprehensive final exam. Tentatively, the midterms will focus on electrostatics and magnetostatics respectively. The exact coverage may vary according to the class progress. The final exam will cover all the materials discussed in the semester, but put more emphasis on Maxwell's equations and the applications.

Important Dates:

Last Day for Course Withdrawal: 3/26!!!!

Class Policies:

Attendance Policy: Attendance is not mandatory. However, students with more than an occasional absence usually perform poorly in the class.

Class Etiquette: You are expected to conduct yourself in a respectful manner to your fellow classmates and the instructor. The instructor may ask you to leave the classroom/lab if your behavior is disturbing to the instructor or other students.

Honor Code: You are bound by the Mercer honor code. The College's academic misconduct policy will be followed. All work, for which a grade is received, must be the **original** work of the **student** without aid or assistance of another party, or any printed and or electronic data/information. Academic misconduct cases will be referred to the honor council and the student will automatically receive a grade of incomplete (IC) pending a ruling by the honor council.

Cell Phone and Pager Usage: Out of courtesy for all those participating in the learning experience, all cell phones and pagers must be **kept in your pocket/backpack with power/ringer off** before entering any classroom, lab, or formal academic or performance event. Warning will be given for the first-time violation. One semester credit will be taken for each following violation up to three times. If a student keeps violating the policy, one may be asked to leave the room by the instructor.

Documented Disability Statement: Students with a documented disability should inform the instructor at the close of the first class meeting. The instructor will refer you to the office of Student Support Services (SSS) for consultation regarding evaluation, documentation of your disability, and recommendations for accommodation, if needed. Students will receive from SSS the *Faculty Accommodation Form*. On this form SSS will identify reasonable accommodations for this class. The form must be given to the course instructor for signature and then returned to SSS.

To take full advantage of disability services, it is recommended that students contact the Office of Student Support Services, immediately. The office is located on the third floor of the Connell Student Center.