

University of Kentucky
PHY 611 – Electromagnetic Theory I
Fall 2012 Semester

Lectures	MWF, 10:00 a.m. – 10:50 a.m., 183 Chemistry-Physics Building
Instructor	Prof. Brad Plaster, 281 Chemistry-Physics Building Email: brad.plaster@uky.edu
Office Hours	Anytime my office door is open (email for a specific appointment)
Course Webpage	http://www.pa.uky.edu/~plaster/phy611/
Required Textbook	J. D. Jackson, <i>Classical Electrodynamics</i> (Third Edition)

Overview

PHY 611 develops a mathematically rigorous graduate-level introduction to the principles of classical electromagnetism, and is the first semester of the department's two-semester core course requirement in electromagnetic theory. The basic principles of electromagnetism, including electrostatics, boundary-value problems, magnetostatics, macroscopic media, and Maxwell's equations, are developed in rigorous detail. Theory will be presented in the lectures, and problem solving techniques will be explored in the problem sets. The mathematical concepts and techniques that are developed in this course will be of significant use to those pursuing research in both theoretical and experimental physics.

The official prerequisites for PHY 611 are PHY 416 and MA 214. These are equivalent to an advanced undergraduate-level course in electromagnetism (such as at the level of Griffiths) and a working knowledge of vector calculus and differential equations. Students who are unsure if their undergraduate coursework is sufficient for PHY 611 are encouraged to speak with the instructor and/or the department's Director of Graduate Studies.

Lecture Schedule

A detailed topic-by-topic lecture schedule (including relevant reading assignments in the textbook) will be maintained on the course webpage, with the specific lecture topics posted approximately one week in advance. A rough outline of the course will be as follows, with relevant chapters from the textbook noted:

- Mathematics Review [first lecture]
- Chapter 1: Introduction to Electrostatics [2 weeks]
- Chapters 2–3: Boundary-Value Problems in Electrostatics [5 weeks]
- Chapter 4: Multipoles, Macroscopic Media, Dielectrics [1 weeks]
- Chapter 5: Magnetostatics [3 weeks]
- Chapter 6: Maxwell's Equations, Macroscopic Electromagnetism [2 weeks]

Problem Sets

A total of six or seven problem sets will be assigned and due on an approximate bi-weekly basis. **The key to success in this course will be to work through, and understand, the material in the problem sets.** The detailed schedule of due dates will be posted on the course webpage. These will all be due on the specified date prior to the start of lecture (i.e., at 10:00 a.m.). Late problem sets will only be accepted under *extremely* extenuating circumstances. [Note that "I have too much other work" will not constitute an extremely extenuating circumstance.] Any such requests for an extension must be submitted to the instructor via email at least 72 hours in advance of the due date/time. No credit will be given for late problem sets without an approved extension.

Indeed, progress in physics research generally proceeds via collaboration. Thus, while you are

encouraged to discuss the problem sets with your fellow students, the solutions you submit must constitute your own independent approach to the problem solution. That is, you should understand your solutions in sufficient detail such that you would be able to present and explain your solutions to the entire class at the blackboard. **Note that this is a graduate-level core course, and we should hold ourselves to a high standard. Rote copying of others' solutions is simply not acceptable (nor will you learn anything by copying others' solutions). Any such type of cheating is a serious academic offense and will not be tolerated. Those found to be in violation of the academic code are subject to punishment in accordance with Sections 6.3 and 6.4 of the University Senate Rules.**

Every attempt will be made to return graded problem sets within one week of their due date. Note that in the event of a large class enrollment, the problems that are graded may be determined by a random number generator. The solutions to each problem set will be posted on the course webpage after their respective due date/time (except in the event an extension has been granted to one or more students).

Exams

A midterm exam will be given the evening of Wednesday, October 17 from 6:00 p.m. – 9:00 p.m., or at some other mutually-agreed-upon date and time. The midterm exam will cover all of the material presented in the previous lectures. The Registrar has nominally scheduled the final exam for Monday, December 10 at 8:00 a.m. Again, the final exam can be rescheduled to some other mutually-agreed-upon date and time; a possibility is Sunday, December 9 from 12:00 p.m. – 6:00 p.m. The final exam will be comprehensive.

Students will be permitted to consult the required textbook (i.e., Jackson) during the exams, but will not be permitted to consult any other books, notes, etc. during the exams.

Grading Policy

The final grade will be based on the problem sets [30%], the midterm exam [30%], and the final exam [40%]. Those with final grades of 85.00% and higher will be assigned a final letter grade of an 'A', 70.00%–84.99% a 'B', 50.00%–69.99% a 'C', and 0.00%–49.99% an 'E'. **However, you must receive at least a 'C' on the final exam in order to be assigned a final letter grade of 'C' or higher.**

Course Evaluation

Course evaluations are an important component of the Department of Physics and Astronomy's instructional program. An online course evaluation system was developed to allow each student ample time to evaluate each component of the course and instructor, thus providing the Department with meaningful numerical scores and detailed commentary while minimizing the loss of classroom instructional time. The evaluation window dates for the Fall 2012 semester will be from November 14 – December 5. Detailed instructions for accessing the evaluation system during this evaluation window will be provided later in the semester. When you access the evaluation system, you will need to enter your student ID number to login to the system, which will allow the Department to monitor who has completed the course evaluations. However, after you login, you will be assigned a random number so that all of your comments and scores will be transmitted anonymously.

Classroom and Learning Accommodations

Any student with a disability who is enrolled in this course and requires classroom or exam accommodations should contact the Disability Resource Center, 257-2754, Room 2 Alumni Gym, as soon as possible, and then notify the instructor.