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Administration

Syllabus

Physics 312 - Spring 2016
Electromagnetism Syllabus

Professor

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Office Hours

My regular office hours are Monday 1:30 - 2:50, , Wednesday, 9:00 - 9:50, and Friday, 11:00 - 11:50. Please note that I am also available whenever my office door is open. My current class schedule is posted on my office door.

Text

- *Introduction to Electrodynamics* (4th edition), by D. Griffiths

Course Content

In this course we will study at a more advanced level, both conceptually and mathematically, several topics in electromagnetism that you already encountered in Physics 112, with applications in both Physics 211 and Physics 212. I advise you to frequently consult your Physics 112 text for a more elementary reminder of much of the material we will cover. We will start the semester with a review of concepts and techniques from your multivariant calculus course, and it would be useful to also have this textbook handy. At some colleges our textbook used for a two-semester course. Naturally, we are not going to be able to cover everything. I have chosen some essential topics - and others toward the end of the course that are closer to my own professional interests.

After reviewing Coulomb's law of electrostatics we will discuss the conceptually significant notion of electric field. We will see that there are mathematical advantages in working with fields, but we will also learn to appreciate fields as a new kind of matter. For many purposes in electrostatics it is even more useful to introduce the notion of electric potential (voltage) assigned to locations in space. We will see that given the voltage, the electric field is determined. In fact, we will devote a considerable amount of time to learning how to compute the electric potential given a static distribution of electric charge, first applying a powerful separation of variable technique, and then learning a very approximation known as the multipole expansion. After a brief look at static magnetic fields we will address Faraday's law of electromagnetic induction. James Clerk Maxwell noticed a mathematical anomaly in the set of laws we will have studied up to this point. His correction completed the full set of partial differential equations that govern all classical electromagnetic phenomena. These equations are therefore fittingly called the Maxwell equations. We will see that they predict the generation and propagation of electromagnetic radiation. The final weeks of the course will be devoted to the study of the generation and propagation of electromagnetic waves, thermal radiation, and the London equations of superconductivity.

Attendance and Participation

Attendance in class is required. Class participation will be taken into account in computing the final grade. A tentative reading schedule is attached.

Academic Integrity

You are expected to abide by the college academic integrity policy which is outlined in the *Environment*, the student handbook.The following activities constitute a not necessarily exhaustive list of offenses which are in violation of the college's Academic Integrity Policy:

    Turning in work done by someone else.
    Working on an assignment with others when the instructor asked for individual work.

Receiving unpermitted help on an assignment.
Writing or providing a paper for another student.
Getting Q/A from someone who has taken test.
In a course requiring computer work, copying a friend's program rather than doing your own.
Helping someone else cheat on a test.
Falsifying lab or research data.
Fabricating or falsifying a bibliography.
Copying from another student during a test or examination without his or her knowing it.
Copying from another student during a test with his or her knowledge.
Copying a few sentences of material from a written source without footnoting them in a paper.
Turning in a paper either purchased or plagiarized, in large part, from a term paper "mill" or website.
Copying a few sentences of material from an Internet source without footnoting them in a paper.
Using unpermitted crib notes (cheat sheets) during a test.
Copying material almost work for word from any written source and turning it in as your own work.
Altering graded test and submitting it for additional credit.
Turning in a paper copied from another student.
Using a false excuse to obtain extension on due date.
Hiding or damaging library/course material.
Cheating on a test in any other way
Cheating on a written assignment in any other way.

These general policies apply unless explicit written instructions to the contrary are distributed by the instructor. You must become famili
the requirements set out in this syllabus. If there is ever a question about the appropriateness of an action, ask the instructor for clarifica

Homework

Problems will be assigned each Monday. They will not be collected or graded, but I want you to keep your solutions together in a well-
organized form of your choice. I will on occasion ask to see these solutions. They should be completed by Friday of the week following t
week they were assigned. Each Friday you will be asked in class to solve a problem related to the assignment that is due on that date. Y
will be graded on both your preparation and performance. If you encounter difficulties in your homework you are strongly encouraged to
and discuss with me whatever is troubling you. Please do not wait until the last minute to come by my office to see me. I will place probl
solutions on Moodle after our Friday class.

Examinations

There will be an in-class midterm exam, and also a comprehensive final examination. The midterm exam is scheduled for Monday, March

Grading

The final grade will be computed as follows:

Mid-term exam	25%
Homework-based in-class problem solving	30 %
Class Participation	20%
Final Examination	25%