

PH 2301 Electromagnetic Fields I:

SYLLABUS

Lecturer

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Constructive suggestions and comments are encouraged and always welcomed. There will be only limited number of set office hours: Tu: 6-8pm, W: 11-1pm, F: 3-5pm. Students who wish to meet for additional help are asked to arrange a meeting by email. Please, do not hesitate to come with your questions. Remember, these questions help me to gauge your level of understanding.

Textbook

The text for PH 2301 is Introduction to Electrodynamics, 3rd Edition, by D. J. Griffiths (Prentice Hall). The library has other books on E&M that may be of use in this course. It is often useful to read about a subject from more than one source.

Other possible sources with careful development of vector calculus for physics are Foundations of Electromagnetic Theory, 4th Edition, by Reitz, Milford, and Christy and Electromagnetism, by G. Pollack and D. Stump. On the other hand, The Feynman Lectures on Physics Vol. 2 by Feynman is particularly good for conveying a physical picture.

About the course

PH 2301: Electromagnetic Fields is a course that covers, essentially, four equations - Maxwell's eq-ns. Moreover, it concentrates on the simpler vacuum versions of these eq-ns. The goal in this course is not only to learn the physics behind Maxwell's equations but also to gain the skills necessary for their application. Mathematically these equations require a solid knowledge of the vector analysis, differential and integral calculus. Therefore, the mantra for this course will be "practice, practice, and again practice". However, one can not succeed in learning natural electromagnetic phenomena by simply mastering the math of Maxwell's eq-ns. One also needs a physics intuition. The words of famous Dirac can be quoted here: "I consider that I have understood the meaning of an equation if I can see the general form of the solution without actually solving this equation". I hope to help you develop physics intuition in using the language of "del operator" while dealing with field theories.

Study Guides and Procedures

Study Guides will be available each week. They include study hints, comments on the subject, suggested problems, and the homework assignment. There will be some skipping around in the text, and there may be discussion of topics that aren't in the text. To be sure you are studying the intended material, you are should read the entire study guide.

Certain mathematical facts should be known by all. In particular, it is assumed that you know trigonometric functions, basic trigonometric relations and derivatives of basic functions.

Homework

Homework will be due in lecture on the dates indicated on the schedule.

Your homework assignments should be readable; they are the means by which you communicate with your reader (the grader!). There will be five regular homework assignments one per Study Guide worth 25 points each. At the end of the term you will be given a Summary HW (worth of 50 points) covering the cumulative material from the entire course.

Quizzes

There will be **five in-class quizzes** (a quiz per Study Guide) worth of 15 points each. In addition to making up 13% of your final grade quizzes is a crucial part of the educational process since they are designed to help you in the exam preparation. You will have 15-20 minutes to complete each quiz. Three of the quizzes are open book/notes quizzes while quizzes #3 and #5 have closed - book format. For the closed-book quizzes you are responsible for providing yourself with all necessary formulas. You are allowed to prepare your own cheat-sheets (up to 2 sheets of paper).

Examinations

There will be two exams. The First Exam will test you on the material of Study Guides #1,2,3 and is worth of 150 points. The Final Exam will be cumulative (covering the material of Study Guides #1 through #6) and is worth of 200 points (33% of your grade!!!). The Exams will take place during the regular lecture period (see schedule), on the following dates:

Exam #1 (Electrostatics)

Friday, 5 April 2002

Exam #2 (Electrostatics and Magnetostatics)

Tuesday, 30 April 2002

The Exams will have closed-book format. No formulas will be provided to you. You are responsible for providing yourself with necessary formulas. You may bring to the Exams up to 2 sheets of paper with any information written on it.

Grade Assignments

In assigning grades at the end of the term, your final score will be derived at as follows:

Examination 1	150	(25%)
Examination 2	200	(33%)
Quizzes (5 x 15 points)	75	(13%)
Homeworks (5 x 25 points)	125	(21%)
Summary HW	50	(8%)
Total:	600	(100%)