

Physics 350 Electromagnetic Theory
Spring 2002

Instructor: Dr. Dennis C. Henry
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Textbook: Electromagnetic Fields (Second Ed.) by R. K. Wangsness, Wiley (1986)

Course Description

Classical electromagnetism will be studied through Maxwell's Equations and their applications to physical systems. Topics include electrostatics, boundary value problems, electromagnetics, and E-M waves, all using the language of vector calculus. Prerequisites: Applied Mathematics for Physics and Engineering (PHY-230), Classical Physics III (PHY-240), and Mechanics (PHY-300).

Course Policy and Evaluation

- Lecture and recitation:** The class will meet four times a week for lecture, recitation, homework review, and exams. Students will be expected to read the assigned text sections before coming to class, and will be held responsible for informing themselves of all announcements and assignments made in the classroom and via e-mail. Short "pop quizzes" over the assigned readings may be used to encourage and reward class preparation. Regular attendance at all class meetings is expected. Students must advise the instructor in writing during the first week of class of any scheduled athletic, music, or other college activities that will require their absence during the semester. Such written notice does not imply a waiver of course requirements or an agreement to reschedule exams or due dates for other assignments.
- Homework:** Problems will be assigned on approximately a weekly basis. Problems will be graded and returned to the student. Late homework will be accepted at the discretion of the instructor, with some reduction in credit.
- Exams:** There will be four one-hour exams and a final exam. There will be no separate mid-term exam. The hour exam with the lowest score will be dropped from the calculation of the final grade. Permission to take an exam at other than the announced time to accommodate college activities will be at the discretion of the instructor. Requests to reschedule or make up exams for non-emergency personal reasons will be declined. Do not make advance travel commitments with the expectation that such requests will be granted. Emergency situations will be handled on a case-by-case basis.
- Evaluation:**

Hour exams	55%	(lowest exam dropped)
Final exam	25%	
Homework	20%	

Assignment of the final letter grade will also take into account the instructor's subjective evaluation of the student's attendance, class preparation and participation, thoroughness, and pattern and quality of independent work.

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5. **Incompletes/Academic Honesty Policy:** Refer to the Academic Information and Policies section of the *Academic Bulletin*. A grade of incomplete will only be given when course requirements are not completed due to circumstances beyond the control of the student.

When you submit any work for grading in this course, you are affirming that you are the sole author of that work, and that any input or insight from others is clearly attributed. Do not turn in solutions to problems unless you can verify and support each part of those solutions, whether they are correct or not. Any significant collaborations with other students on homework problems must be noted on the papers of each collaborator.

6. **Approximate Course and Exam Coverage:**

Chapter 1 Review of Vector Analysis
Supplement and Exercises in Cartesian Tensors

Chapter 2 Coulomb's Law
Chapter 3 The Electric Field

FIRST HOUR EXAM

Chapter 4 Gauss' Law
Chapter 5 The Scalar Potential
Chapter 6 Conductors in Electrostatic Fields

Chapter 7 Electrostatic Energy
Chapter 8 Electric Multipoles

SECOND HOUR EXAM

Chapter 9 Boundary Conditions at a Surface of Discontinuity
Chapter 10 Electrostatics in the Presence of Matter
Chapter 11 Special Methods in Electrostatics

Chapter 12 Electric Currents

THIRD HOUR EXAM

Chapter 13 Ampère's Law
Chapter 14 The Magnetic Induction
Chapter 15 The Integral form of Ampère's Law

Chapter 16 The Vector Potential
Chapter 17 Faraday's Law of Induction

FOURTH HOUR EXAM

Chapter 21 Maxwell's Equations
Chapter 24 Plane Waves
Chapter 20 Magnetism in the Presence of Matter

Other topics as time permits

COMPREHENSIVE FINAL EXAM

7. **Office Hours:** A schedule of office hours is posted outside my office, and on the faculty web schedules. I will make every effort to be in the office or nearby during these times for individual assistance and advising. I may have to reschedule some office hours for unavoidable meetings and other college commitments. At other times, if I'm in the office and the door is open, you should feel free to stop in. If I can't help you then, I'll suggest some later time. **Don't wait until the last minute to ask for help!** "By then it is usually too late." I can sometimes respond within a few hours to brief e-mail questions, but there is no guarantee about my response time. Students or advisees with personal emergencies should feel free to contact me by any means necessary, including my home phone (931-2784).