

Physics 3320 - Electricity and Magnetism II

Fall 2007

General Course Information

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- TA/Grader: Yue Cao (yue.cao-1@colorado.edu).
- Class meets in DUAN G2B60, MWF 1:00-1:50.
- Problem sets are issued on Monday or Wednesday, and are due on Wednesday of the following week at the **beginning** of class. The folder will be closed after the lecture begins.
- No late problem sets will be accepted. This is for practical, not punitive reasons; the problem set solutions will be published on the due date. If you have an emergency please let me know, and I will excuse a set.
- I encourage students to work together on problem sets. However, you must generate solutions by yourself; simple copies of answers will not be accepted. Be warned that if you are collaborating too much and not learning on your own, you may find that your problem set scores outpace your understanding of the material. This tends to result in very unpleasant surprises when exams come around.
- Grading:
 - Problem Sets: 33%
 - Midterm 1: 17%
 - Midterm 2: 17%
 - Final: 33%
- Exam dates (tentative): Midterm 1: Tuesday, October 2 evening; Midterm 2: Tuesday, November 6 evening. Please let me know if you have major conflicts with these dates; if not, they will be finalized in the next two weeks. Final exam will be December 17, 1:30–4:00pm.
- Class Web Site: <http://www.colorado.edu/physics/phys3320>. Site will contain announcements, lecture notes, problem sets, and solutions.
- Office hours:
 - Prof. Zimmerman: Duane F-435, Tuesdays 10:00-11:45 AM. Other times by appointment.
 - Yue Cao: Monday 3-4pm, DUAN C123 (inner office).

- Student-led discussion session: Mondays at 5pm, Gamow Tower 11th floor Commons Room¹. I have booked this room weekly, so that students have a place for discussing the topics in this course. You should organize the discussion yourselves, and I will show up for part of the hour to answer questions in an informal recitation environment.
- **Required** textbook: M. Heald and J. Marion, *Classical Electromagnetic Radiation*, 3rd edition, Prentice-Hall, 1999.
- Other Recommended Books (on reserve in the library):
 - D. Griffiths, *Introduction to Electrodynamics*, 3rd edition, Prentice-Hall, 1999. This should be extremely familiar from last semester. MKS units.
 - E. Purcell, *Electricity and Magnetism*, 2nd ed., McGraw-Hill, 1985. This is possibly the best book ever written for learning E&M. It was originally written in the 1960s for honors-level freshman courses, but its treatment of the material is nearly as sophisticated as Griffiths'. I use it as a reference all the time. Gaussian units.
 - Reitz, Milford, Christy, *Foundations of Electromagnetic Theory*, many editions (earlier ones by Reitz and Milford only). An alternative textbook at a similar level to Griffiths. MKS units
 - J. D. Jackson, *Classical Electrodynamics*, any edition. Higher-level than H&M, and very heavy on the math. This book so universal in first-year graduate courses that the course is usually just called “Jackson” rather than “E&M”. If you’re going to graduate school, you might as well buy it now and save two years’ book price inflation. Gaussian units (except for early chapters of 3rd edition).
- Material to be covered: This course will cover, at minimum, H&M Chapters 4 – 9, 11, and 14. Selected material in Chapter 10 will be covered as time permits.
 1. Recap of last semester’s key concepts
 2. Electrodynamics
 - Induction
 - Maxwell’s Equations
 - Potentials and gauge transformations
 - Energy and the Poynting vector
 - Stress tensor and electromagnetic Lagrangian
 3. Electromagnetic waves and radiation
 - Plane waves and polarization
 - Radiation pressure
 - Waves in conductors and dielectrics
 - Waveguides

¹EXCEPTIONS: On September 17 and November 5, the session will be held in the 11th floor Reading Room instead.

- Retarded potentials and fields
 - Radiation by an accelerated particle
 - Antennas
 - Coherence and interference
4. Special relativity
- Lorentz transformations
 - Four-vectors
 - The field tensor
 - The Lagrangian formulation

Other policies set by the University

Disability issues: If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, and <http://www.colorado.edu/disabilityservices>.

Religious observances: Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See full details at http://www.colorado.edu/policies/fac_relig.html. Please contact me if you will miss a lecture or laboratory session due to a religious observance to arrange an appropriate remedy.

Classroom behavior: Students and faculty each have responsibility for maintaining an appropriate learning environment. Students who fail to adhere to such behavioral standards may be subject to discipline. Faculty have the professional responsibility to treat all students with understanding, dignity and respect, to guide classroom discussion and to set reasonable limits on the manner in which they and their students express opinions. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or pronoun (unless you wish to be called "Professor"). Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See polices at <http://www.colorado.edu/policies/classbehavior.html> and http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code.

Honor code: All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html> and <http://www.colorado.edu/academics/honorcode>.

Discrimination & sexual harassment: The University of Colorado at Boulder policy on Discrimination and Harassment <http://www.colorado.edu/policies/discrimination.html>, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships applies to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>.