

Physics 421 Electricity and Magnetism I
General Information, Spring 2018
January 21, 2018

Subject matter: Electrostatics, magnetostatics, Maxwell's equations, dynamics of charged particles, multipole fields

Instructor: H. Daniel Ou-Yang, professor of physics
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General Plan: The class meets three times per week for 50 minutes each, in Lewis Lab 311, 11:10 to noon, Monday, Wednesday, and Friday.

Textbook: Modern Electrodynamics, Andrew Zangwill, Cambridge University Press. We will cover selected topics from Chapters 1 – 14.

Other books that are useful for the course:

“*Classical Electrodynamics*,” John David Jackson, 3rd Ed. John Wiley & Sons, 1999.

“Introduction to Electrodynamics,” David Griffiths, 4th Ed.

Goals for the course:

The students are expected to learn the physical concept and necessary mathematical tools to solve problems in the following topics:

- 1) Coulomb's law, Gauss's law, E field and electrostatic forces
- 2) Electric potential to determine E field and vice versa
- 3) Laplace equation, Green's theorem and boundary value problems
- 4) Electric field and polarization in polarizable materials
- 5) Biot-Savart law and vector potential of problems of magnetostatics
- 6) Ampere's law and Faraday's laws
- 7) Magnetic field and polarization in magnetic materials
- 8) Maxwell's equations, Lorentz force and conservation of charges
- 9) Potentials, and gauge transformation

Grading:

Homework and classroom participation 20%

Hour Exam I: 20%, Hour Exam II: 20%, Final Exam: 40%

Homework: The objective of the homework assignments, roughly once per week, is to learn how to think, formulate and solve the problems with methods you learn from the textbook, lectures, and class discussions. Solutions to the homework will be provided soon after the due

date. The homework will be graded mostly on the effort rather than on the right answers. Students are encouraged to work with each other on homework assignments. You are also welcome to come to see me if you need help. However, use of solution sets from previous years is considered an act of cheating, both for the current students and for the students who provided the solution sets.

Exams: All exams will be in class (no take home exams). Copying from papers of other students, collaborating on exams, and use of notes or references that are not explicitly permitted, are obvious forms of cheating that will be dealt with by referral to the Discipline Committee. Phones of any kind are not permitted in the exam room and anyone found with a phone during the exam period (either within or outside the exam room) will be given a grade of zero on the exam. Any student found at any location outside the exam room during the exam (except the restroom), without explicit permission, will also receive a grade of zero for that exam.

Notes and Equation Sheet: The exams will be closed-book. The information on the inner pages of the front and back covers of the book, as well as equation sheets compiled by the students, will be provided at the exam. NO self-prepared of any kind are permitted during the exam.

Makeup Exams: No make-up exams for hour test or final exams are given under any circumstance. If an hour exam is missed for a legitimate reason, the corresponding portion of the final exam that covers the same course materials will be counted as the missed exam. It will be an incomplete if a final exam is missed.

Attendance Policy: Attendance to the lectures is highly recommended.

Office Hours: Office hours can be arranged with the instructor in person or by email in advance.

Disability: If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, University Center 212 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

The Office of Academic Support Services in the Dean of Students office addresses requests for accommodations for learning and/or physical disabilities for undergraduate and graduate students. Cheryl Ashcroft, Assistant Dean of Students may be reached at 84152 or caa4@lehigh.edu. For more information, I encourage you to visit the web site at: <http://www.lehigh.edu/%7Einacsup/disabilities/>

Lehigh University is committed to diversity, inclusion and engagement [<http://www.lehigh.edu/diversity>]. That commitment is captured in [The Principles of Our Equitable Community](#). The Principles have been endorsed across Lehigh and by the Board of Trustees.

Statement on Academic Integrity/Code of Conduct: This is a graduate class that I assume graduate students are honest and understand what is expected. However, a couple of specific comments might be necessary.

Homework: I consider homework assignments to be more important for learning than for grading. Therefore, I grade the homework mostly on effort rather than simply looking for right answers. I encourage students to work with each other on homework assignments. You are also welcome to come see me if you need help. However, use of solution sets from previous years is considered an act of cheating, both for the current student and for the previous year student who provided the solution sets.

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