

PHYC50H

Electromagnetic Theory

University of Toronto
Physics Department
127 St. George Street
Toronto, Ontario M5S 1A5
Canada

COURSE DESCRIPTION:

Solving Poisson and Laplace equations via method of images and separation of variables, multipole expansion for electrostatics, atomic dipoles and polarizability, polarization in dielectrics, Ampere and Biot-Savart laws, multipole expansion in magnetostatics, magnetic dipoles, magnetization in matter, Maxwells equations in matter.

LECTURES:

Mondays 3pm-4pm in room BV361 and Wednesdays 10am-11am in room AC332.

TUTORIALS:

Tutorials are 50 minutes in duration, and will be held every Tuesday starting at 1710 from September 11th. Tutorials will be held in room HL008.

Tutorial attendance is expected. In addition to problem solving examples that will support the lecture material, tutorials will feature quizzes that contribute to the final grade.

TEXTBOOK: D. J. Griffiths, Introduction to Electrodynamics, 3rd Edition

E-Mail: I will only respond to e-mails sent from a recognized University of Toronto address. Please put PHYC50 in the subject line of any course-related e-mails. I will endeavour to reply as quickly as possible to your e-mails. However, I cannot promise that I will do so outside of normal working hours (Monday-Friday 9-5). Please include your name and student number in any communications. I will not respond to emails if I cannot tell who they are from. Please also note that I will NOT accept assignments via e-mail.

OFFICE HOURS:

I will be available to answer questions on a drop in basis on Wednesdays between

OCTOBER 22 and OCTOBER 24
Energy and Forces (4.4.4)
Multipole Expansion of the Magnetic Vector Potential (5.4.3)

OCTOBER 29 and OCTOBER 31
Torques and Forces on Magnetic Dipoles (6.1.1-6.1.2,6.1.4)
Bound Currents (6.2.1-6.2.3)

NOVEMBER 5 and NOVEMBER 7
Ampere's Law in Magnetized Materials (6.3.1-6.3.3)
Linear and non-Linear Media (6.4.1-6.4.2)

NOVEMBER 12 and NOVEMBER 14
Electromotive Force and Induction (7.1.1-7.2.3)
Inductance and Maxwell's Equations (7.2.3-7.3.6)

NOVEMBER 19 and NOVEMBER 21
Charge and Energy, Poynting's Theorem (8.1.1-8.1.2) Momentum,
Maxwell's Stress Tensor (8.1.2-8.2.2)

NOVEMBER 26 and NOVEMBER 28
Angular Momentum (8.2.3-8.2.4)
Additional Material and Review Problems

ASSESSMENT:

A COMPREHENSIVE FINAL EXAM (3 hrs): 50%

MIDTERM TEST (90 minutes): 22%

4 ASSIGNMENTS (tutorial and take home work): 16% in total

3 TUTORIAL PRACTICALS/QUIZZES: 12% in total

TESTS AND EXAM:

Both the midterm and final exam will draw from lecture and tutorial materials. This could include material presented in the lectures or tutorial material that is not covered in the text. The chapters from the text that support the lecture material presented each week are indicated in the schedule

NOTES:

Due dates and times will appear on the assignment handouts. Late assignments will be penalized by 50% per day. Assignments must be handed in at the tutorial on the day they are due. Assignments handed in after 5:12pm on the same day will be considered 1 day late. Anything received after 6pm the day after the tutorial is 2 days late and will not be accepted.

I expect that, in the course of doing your assignments, you will discuss them with your classmates at some level. This is fine, and a normal part of the study process. What you must not do, is copy another student's work. It is fine to discuss the problems, but when it comes to actually writing out your solutions you should do this by yourself. To copy answers from someone else is an academic offense. Plagiarism will not be tolerated. Students are expected to submit their own work for grading. Should you choose to disregard this advice, be aware that academic offenses will be turned over to the University for the determination of an appropriate penalty. I will not enjoy the process anymore than you so please