

ELECTRICITY AND MAGNETISM II

Physics 213

Spring 2013

SYLLABUS

This is the “*electrodynamics*” part of the two-part E&M series. The first part of the series was primarily concerned with static charges and steady-state currents, and the static fields and potentials they create. When discussing magnetostatics (to be completed), we also considered time-dependent currents, since these revealed the very important relationship that exists between electric and magnetic fields. In the second part of the series, we will be concerned initially with the fields themselves, particularly time-dependent potentials and fields, and their manifestations in the form of electromagnetic waves. This will allow us to lay out the foundations for geometrical and physical optics. We will then examine the origin of these waves, i.e. how moving charges and changing currents produce electromagnetic waves (radiation). Finally, the last part of the course will examine special relativity, which is an essential aspect of a complete theory of electrodynamics, because of the reciprocal relationship between changing magnetic fields and changing electric fields.

Therefore, the second part of the E&M course has three parts:

A- ELECTRODYNAMICS

Maxwell's Equations

Conservation Laws (Energy and Momentum)

Electromagnetic Waves

B- RADIATION

Moving charges and changing currents

Time-dependent fields and potentials

Emission of Radiation

C- SPECIAL RELATIVITY

BOOK

D.J. Griffiths Introduction to Electrodynamics 4th edition, Prentice Hall (1999)

You may also consult R.K.Wangness, Electromagnetic Fields 2nd edition, John Wiley (1986)

GRADING

Homework 20%

Midterm 25%

4 Quizzes 20%

Final 35%

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Please note that class attendance is mandatory

Accommodations for Students with Disabilities: 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 C212 (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.