

Physics 445/545

Electromagnetic Theory I

Fall, 2004

Lecture: MWF 9:05 - 9:55 am

Instructor: Harrison

Room: 396 Campbell Hall

Office: 308 CH

Textbook: Introduction to Electrodynamics  
(3<sup>rd</sup> edition) by David J. Griffiths

Hours: MTH 1:30 - 2:30

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Grading: Exam I (15%)

Exam II (20%)

Exam III (20%)

Homework (15%)

Project (5%)

Final Exam (25%)

Mon., Dec. 13, 8:00 - 10:30 am comprehensive

Graduate students enrolled in PH545 are assumed to have had more exposure to introductory physics concepts and are expected to utilize this in answering homework and exam questions. This expectation is reflected in the assignment of partial credit on exams and homework. When comparing scores on exams and homework with undergraduates enrolled in PH445, keep that difference in mind.

You may bring one (1) 5" x 8" notecard with formulas, equations, examples, etc for reference during each exam. Notecard **MUST** be turned in with the exam.

**Course Web Page:** <http://homework.phy.uab.edu/~harrison/phys445>

### Withdrawing From This Course:

Undergraduates may withdraw from a course and receive a grade of "W" up to and including October 20, 2004. After that date you may not withdraw. See the 2003-2004 Undergraduate Catalog (<http://main.uab.edu/show.asp?durki=58266>) for the full text of this policy.

### TOPICS:

**PH 445/545** - Vector Analysis, electrostatics, boundary value problems, dielectric properties of matter, magnetostatics, magnetic fields in matter

**PH 446/546** - Magnetic Induction, electrodynamics, conservation laws, electromagnetic waves, waveguides and propagation, radiation, special relativity, computational electromagnetics

### Project: (see handout for details)

You will work as a team on a problem of your own design. You may use any computational tool, but you may wish to use *Maxwell-SV* (Ansoft Corp.), *Student Quickfield* (Terra Analysis Corp), or the suite of programs, *TriComp Educational (TCE)* (Field Precision) which are software available at no cost on the internet, ([www.ansoft.com](http://www.ansoft.com), [www.quickfield.com](http://www.quickfield.com), and [www.fieldp.com](http://www.fieldp.com)). A written report will be turned in by all except one member of the team. That member will make an oral report (15min) on the last day of class in lieu of a written report. Time permitting, we will do a short in-class tutorial on the Maxwell-SV package.

**Syllabus:** The following syllabus is tentative. You are responsible for any changes which may be announced during the lecture period, such as changes in exam dates or chapters to be included on an exam.

### Syllabus

Week	Mon.	Wed.	Fri.	Assignments	CH	Due
Aug.22		1.1 - 1.2	1.2 - 1.3			
Aug.29	1.3 – 1.4	1.4 – 1.5	1.6; App. A-C			
Sep. 5	<b>NO CLASS</b>	2.1 – 2.2	2.2	5, 6*, 13, 14*, 19, 21*, 47	1	Sep. 8
Sep. 12	2.3 - 2.4	<b>Exam 1</b> (Ch.1 App. A-C)				
Sep. 19	2.4	2. 4- 2.5	2.5	1, 2*, 5, 6,12*,20,22*	2	Sep.22
Sep. 26	3.1	3.2	3.2 – 3.3	29*, 36, 39, 46*, 48	2	Sep.29
Oct. 3	3.3	3.3	3.3			
Oct. 10	3.3	3.3	3.4 (abstract due)	3*, 7, 9*, 15*, 18*	3	Oct. 13
Oct. 17	3.4	3.4	4.1– 4.2	21, 22*, 27*, 34*, 38*	3	Oct. 22
Oct. 24	4.2	4.2 – 4,3	<b>Exam 2</b> (Ch. 2-3)			
Oct. 31	4.3	4.3	4.4	2*, 4, 6, 10*, 18*	4	Nov. 3
Nov. 7	4.4	4.4 – 5.1	5.1 – 5.3	28, 31*, 32*, 40	4	Nov.10
Nov. 14	5.3	5.3 – 5.4	5.4, 6.1	1*, 6, 11*, 13, 15*	5	Nov.17
Nov. 21	6.1 – 6.3	<b>NO CLASS</b>		20*, 24*, 35, 46*	5	Nov.22
Nov. 28	<b>Exam 3</b> (Ch.4 - 5)	6.3 – 6.4	6.4	5, 8*, 12*, 15	6	Dec. 8
Dec. 5	Proj. Rep.; 6.4			16*, 23*, 25, 26*	6	Dec. 8
Dec.12	<b>FINEX</b> (Ch 1- 6)					

\* problems to be graded

Homework: Problem solutions due by 12 noon sharp on due date. Late penalty as follows:

*before noon on due date* + 1 **25% deduction (score \* 0.75)**

*before noon on due date* + 2 **75% deduction (score \* 0.25)**

*after noon on due date* + 2 **no credit**