

# Physics 332: Intermediate Electricity and Magnetism Fall 2011

<b>Professor:</b>	Phone	Office	E-mail
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**Class meetings:** MWF 2:30-3:50 PM AHON 102

This is not a lecture course. Class time will be spent discussing, reviewing, and building on the assigned reading. Class participation and preparation are required. Frequent unexcused absences and tardiness may result in grade reduction. You are required to read the book before class and be prepared to discuss the reading, do the example problems, and fill in missing mathematical steps. This will count toward your participation grade.

## Goals:

After completing this course, students will be able to

- Solve long and difficult mathematical problems, including those using vector calculus
- Communicate difficult scientific concepts and derivations orally and in writing
- State and use Maxwell's equations in different coordinate systems and in differential and integral form (and go between)
- Calculate any of these if another is known: fields, potential, sources (charge and current)
- Calculate fields within matter
- Calculate energy, momentum, and angular momentum in a field
- Calculate an objects properties and predict it's behavior in different reference frames

**Text:** *Introduction to Electrodynamics* (3<sup>rd</sup> edition) by David Griffiths

This is generally regarded (and I strongly agree) to be the best undergraduate physics text in any class. It is very entertaining to read and the concepts are well explained. But, don't just read this textbook, pause often to think about what you've read to be certain you understand it. Try to work out the example problems before looking at the given solution. Since there will be no lecture, the book is your primary source of information.

We will cover chapters 2-8 and 12. Note that a lot of chapters 2, 4-6 are more detailed descriptions of what you learned in Unit E, so you should keep that book around, too.

**Prerequisites:** Physics 231-233, Calculus 1-3, Differential Equations, Calculus 4 (preferred)

**Office hours:** M W 11:00 AM – noon, F 1:30 – 2:30 PM

You are welcome and encouraged to meet with me at any time which is mutually agreeable, even if it is not during my official office hours. I'm normally in the office MWF 9 AM to 4 PM and my class schedule (so you know when I'm busy) is posted on my web page

[http://newton.uor.edu/facultyfolder/julie\\_rathbun/](http://newton.uor.edu/facultyfolder/julie_rathbun/). If you'd like to talk to me at some other time, please arrange a meeting via e-mail. If you have an immediate question and can't find me, send me an e-mail with a phone number where I can reach you and I'll call you as soon as I can.

## Exams:

The **final exam** will be **Friday, December 16<sup>th</sup> at 6 pm**. This time cannot be changed. This exam is

cumulative. There will also be two in-class exams on Friday, September 30<sup>th</sup>, and Friday, November 4<sup>th</sup>. Exams will be closed book and will contain both conceptual and quantitative problems. You may use a calculator for basic functions (addition, subtraction, multiplication, division, powers, exponentials, logarithms). You are on your honor not to use a calculator for advanced functions (including integration, differentiation, solving equations, unit conversions) or to store formulas or notes of any type in its memory.

### Assessment of your work:

The grading scheme and assessment schedule is also designed to encourage you to learn the most, by encouraging you to keep up with the material and testing you on what you learn. Final grades will be based on the following:

In-class Exams (15% each)	30%
Final Exam	25%
Homework	25%
In-class activities, prepared participation, quizzes	20%

### Homework:

Unless otherwise instructed, homework is due every **Wednesday at 10:30 am**. Physics is not a spectator sport! You will not learn to solve problems without regular practice, so homework is an essential part of this course. Homework will be collected approximately once a week. However, **DO NOT** wait until the last day to start it as you will not have enough time and have nowhere to go for help. I will list the problems assigned by day even though I will only grade them on Wednesday. You can expect to spend as many as 15-20 hours per week on homework (in **ADDITION** to reading the text). If you are spending more than this, please see me so that we can make sure you are spending your time efficiently. To receive full credit, homework must be legible and your logic must be easy to follow (this goes double for exams). Obtaining the correct answer does not guarantee full credit. If I can't figure out what you are trying to do, you will get no points, even if you show a correct answer. Furthermore, units should be shown in **ALL** calculations. (These go for exams, too.) A solution with no written explanation is never sufficient. The meanings of equations, and their symbols, should be provided. **No late homework will be accepted.**

### Collaboration, sources, and academic honesty:

You are encouraged to work with your classmates on homework sets. However, you must write up the solutions alone (two sets should not be identical). As in "real life", you should give credit to any sources (including the textbook) or people (including your classmates) you find helpful. Also, by citing specific sections or equations from the text, your homework sets will be more useful to you in the future. Examples of credits (adapted from a syllabus by Dr. Alan Middleton from Syracuse University):

- "The professor suggested that I try adding zero to both sides of the following equation. My classmate Don then suggested using the ideal gas law to replace zero with  $pV-nkT$ ."
- "The ideas for solving this problem came out of an extended discussion with Ilya and Jocelyn".
  - "The web page <http://klnw.entropy.gov/inexact.htm> has a useful discussion of entropy. I used the information on this page to help apply this next equation."

### Syllabus:

This syllabus is subject to change. The current, up-to-date version will be located on the class web site at [http://newton.uor.edu/facultyfolder/julie\\_rathbun/p332syll.pdf](http://newton.uor.edu/facultyfolder/julie_rathbun/p332syll.pdf).