

# PHYS 685: Classical Electrodynamics I

## Lectures

Place: Innovation Hall, room 209

Time: Monday 7:20 – 10:00 pm

Lecture notes on the web at [www.physics.gmu.edu/~joe/PHYS685.html](http://www.physics.gmu.edu/~joe/PHYS685.html)

## Instructor

Joe Weingartner (call me Joe)

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Office hours: Monday 4:00 – 6:00 or by appointment

## Course Text

Classical Electrodynamics, Third Ed., J.D. Jackson (Wiley)

## Recommended Supplemental Text

Introduction to Electrodynamics (2nd or 3rd ed), D. J. Griffiths (Prentice Hall)

## Evaluation

- Homework (50%). You are encouraged to discuss the problems with one another, but the detailed solution that you submit must be your own, independent work. Homework will be due each class (except on days when there is an exam) and is due at the start of class. Late homework will not be accepted. Some of the homework problems will be taken from Jackson. There are several resources (e.g., web pages) where you can find detailed solutions of Jackson problems. You may not use these resources as you work on your solution, but you may use them to check your work. Note that even the best resources contain errors! Unless explicitly stated, you may not use computer programs like Mathematica. When a problem asks you to “show” something, this should be interpreted as “derive” rather than “verify”. The point value of each problem is indicated in brackets. Tentatively, the total number of points for the semester is 815.
- 2 in-class exams (15% each). Tentatively scheduled for Sep 29 and Nov 10.
- Final exam (20%). This will be held on Dec. 15, 7:30–10:15, in the same room as class.

## Course Plan

Selected material from chapters 1 through 6 of Jackson, including:

1.1 through 1.11

2.1 through 2.10

3.1 through 3.3, 3.5 through 3.10

4.1 through 4.4, 4.7

5.1 through 5.12, 5.15 through 5.18

6.1 through 6.4, 6.7

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## Recommended Study Strategy

For each topic, lecture notes will be available on the course web site in pdf format. Before class, print out the notes and read the indicated sections in Jackson. At this point, you do not need to master the material in Jackson, but familiarity with it will help you to keep up with the lecture.

During the lectures, structure your own note taking around the printed course notes. The pace will be too quick for you to write down everything on your own. Focus on writing down clarifications and extra detail not contained in the printed notes.

Only part of the class time will be devoted to lectures. We will also spend a lot of time working sample problems and going over homework problems. Here, the pace will be much slower than in lectures, and you should plan to take detailed notes. Brief solutions will be distributed.

After class, carefully review your lecture notes and the worked problems. Reread the relevant sections of Jackson, this time making sure that you have mastered the material. Make note of anything you don't understand and ask me about it at my office or at the next class.

The homework assignments will be challenging. For many problems, you will probably need to make multiple attempts in order to achieve the full solution. For this reason, it is critical that you start working on the problem set shortly after it is assigned. Allow yourself plenty of time to seek help, both from me and from your classmates. I suggest that you form study groups and meet regularly to discuss the problems. But make sure that you've put in serious effort before meeting with your classmates!