PHYS 685 – Electromagnetic Theory

- Location: Innovation Hall, room 330
- Day and Time: Wednesday from 4:30 – 7:10 pm
- Office Hours: Wednesday from 3:00 – 4:00 pm
- Discord URL: See email
- Instructor: Bob Weigel
- Email: rweigel@gmu.edu
- Office: 259 Planetary Hall
- Course URL: http://rweigel.github.io/phys685/

1 Syllabus

1.1 Course Material

All course information is posted on this page, and this page is updated throughout the semester. I do not use Blackboard for this course.

1.2 Office Hours

My official office hours are Wednesday from 3:00-4:00 pm.

I will also generally be in my office on the days of class from 11 am – 3 pm. *Feel free to stop in without an appointment.* If I leave for an extended period of time during these unofficial office hours, I'll put a note on my door stating when I will return. I can also meet at other times – just send me an email with suggested days and times, and we'll work something out.

Please do feel free to meet me outside of class. The jump in the difficulty of this class from the typical undergraduate E&M course is large, and I recognize and expect that many students may need help in catching up.

1.3 Discord

I have sent an invite to a Discord server for this course. You should have received an email on Saturday, January 22nd.

If you have a question that is relevant to other students, please post it to Discord. Your questions can be about anything and don't need to be only about homework problems. I encourage you to attempt to answer other students' questions.

1.4 Format

- Weekly homework problems turned in at the start of class
- ~60 minutes of lecture
- ~70 minutes of students working on in-class problems at the whiteboard
- ~30 minutes going over solutions

In-class work may be unfamiliar to you. I do this for two reasons: (1) I find that after about 60 minutes of lecturing, the retention rate approaches zero, especially for a class at the end of a day; (2) I have found this format to work better for concept retention.

The in-class problems are extensions of lecture topics, and many of the homework problems are extensions of the in-class problems or previous homework problems. I encourage you to review past homework and lecture notes before starting a homework assignment.

1.5 Grading

The course grade is based on the following weighting.

- Homeworks: 20% (Weekly)
- Midterm: 40% (in–class; 90 minutes)
- Final: 40% (in–class; 165 minutes)

The final exam is comprehensive, so if your final exam score is higher than your midterm score, your final exam average is 80% of your grade. That is, your final exam score replaces your midterm score if this improves your final grade.

1.6 Topics

The topics include those covered in Chapters 1-5 of Jackson (also covered in Chapters 2-6 of Griffiths). In my class notes, I'll mention the sections of Jackson that will not be covered.

1.7 Textbook

The textbook for this course is Classical Electrodynamics 3rd Edition by J.D. Jackson.

I will reference both Jackson and Introduction to Electrodynamics 4th Edition by D.J. Griffiths.

Another useful graduate-level textbook is Zangwill.

Jackson provides brief reviews of mathematical topics that usually require a review of a more detailed treatment in a mathematical physics textbook. He typically references these at the end of each chapter, and the reader is expected to use these references for review. Other books that may be used as a reference are Arfken, Weber, and Harris, and Hassani.

A somewhat important part of this course is becoming familiar with related mathematical physics and E&M books and literature and using them as–needed for additional background on the topics covered in Jackson. In many respects, Jackson is more of a high-level reference to important topics in E&M – as an example, consider his 1-page description of Gauss' law (Ch 1.3) and then refer back to how this topic was covered in your undergraduate E&M course.

On homework assignments, I'll sometimes link to references that may be useful for background reading if the topic is something that is not well–covered in Jackson or Griffiths.

1.8 Important Dates

See also https://registrar.gmu.edu/calendars/spring_2022-1/

- Exam I: March 23rd
- No Class: Wednesday, March 16th (Spring Recess)
- Last Day of Class: Wednesday, May 4th
- Final Exam: Wednesday, May 11th from 4:30 – 7:10 pm in the regular classroom. (Based on Final Exam Schedule).

1.9 University Policy

University Policies: http://universitypolicy.gmu.edu/

1.10 Disability Accommodations

If you have a learning disability or other condition that may affect academic performance, please: a) make sure documentation is on file with Office of Disability Services (http://ods.gmu.edu) to determine the accommodations you need; and b) talk with me to discuss your accommodation needs.

1.11 Counseling and Student Support

- Counseling and Psychological Services provides confidential psychological services, including 24/7 crisis intervention and consultation to faculty and staff: http://caps.gmu.edu/
- Student Support helps students negotiate life situations by connecting them with appropriate on- and off-campus resources http://studentsupport.gmu.edu/referral-form/