Electricity and Magnetism (Phys 482)
Syllabus

Taner Edis

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1 How to Find Me

The best way to reach me is e-mail, *edis@truman.edu*. I usually respond within a few hours, even late at night.

My office is MG 3004, and my office hours are: Tuesdays 10:30–11:50 and 13:30-15:20, Wednesdays: 12:30–14:20, and Thursdays 10:30–11:50 and 14:30-15:20. If you want to see me then, come by my office.

I'm also available most times when I am not actually teaching or have another meeting scheduled: see my calendar (*edis.sites.truman.edu/schedule/*). We can also Zoom. Email me ahead of time to set up a time that is good for both of us; my Zoom meeting ID is `taneredis`.

I will post course-related notices and documents on the E&M web page. (*edis.sites.truman.edu/em/*).

2 Course Description

Electricity and magnetism is the best-developed classical field theory, allowing physicists to calculate electric and magnetic fields in a wide variety of circumstances. While E&M obviously has enormous practical applications, an introductory course such as this has a very large element of mathematics, including some heavy-duty vector calculus and various approximation techniques. This course will go deeper into both electricity and magnetism, building on what you have seen in your previous courses. As always, physics

demands plenty of math, but if you have a good understanding of what you learned in Mathematical Methods (Phys 382), that should be good enough.

3 Schedule

Class: Tuesday and Thursday 12:00–13:20, MG 3000.
Recitation: Thursday 13:30–14:20, MG 3000.

4 Course materials

Your textbook will be David J. Griffiths, *Introduction to Electrodynamics,* 5th edition. I am not going to follow every detail—I picked it as a textbook so that you can see a slightly different approach than what I will present in lectures. Between me and the book I hope you will find something that will work for you.

5 Homework and Recitations

Your homework assignments will determine 25% of your final grade. I will let you know about assigned problems at least one week in advance. I hope to get feedback from you about how long you are taking to do the assignments, and adapt as the semester progresses. Normally, the assignments will be due in a week, but feel free to ask me for an extension whenever you need one.

I do not mind you discussing the homework with one another as well as with me. I will give hints if you come by my office and ask. However, I expect you to turn in the results of your own efforts—not group solutions, and certainly not solutions directly taken from someone else. If I find assignments too similar to each other, especially if they make the same mistakes, you will have some explaining to do.

Before each homework set is due, we will also solve the recitation problems in class. I won't grade you on the recitations, though I will ask you to come up and solve them before the class. You don't have to get them right, and getting stuck is fine—I'll be there to help. The idea is to have me see you how you approach these things and help set you on the right path.

We will negotiate who gets which recitation problem during class.

Chapter	Recitation	Homework
1.	16, 38	39, 45, 49, 50, 63
2.	15, 34	17, 22, 29, 39, 44, 55
3.	26, 32	13, 17, 21, 27, 57
4.	none	10, 18
5.	23, 36	12, 32, 39, 44, 61
6.	7	8, 16
7.	56	36, 57
8.	15, 18	9, 19
9.	22, 31	17, 32, 37, 41

If you have the **4th edition**, here are the equivalent problem numbers:

Chapter	Recitation	Homework
1.	16, 38	39, 45, 49, 50, 63
2.	14, 33	16, 21, 28, 38, 43, 54
3.	24, 30	11, 15, 19, 25, 52
4.	none	10, 18
5.	23, 34	12, 30, 37, 41, 58
6.	7	8, 16
7.	53	35, 54
8.	13, 16	7, 17
9.	21, 30	17, 31, 35, 39

6 Exams

The default option is three take-home exams with somewhat lengthy questions, each determining 25% of your final grade. The third take-home exam will take place during finals week. If you prefer another arrangement, we can discuss alternatives. I'm flexible.

I expect you to work on all exams strictly alone, without *any* discussion with others inside and outside of class. I also expect you not to use online resources such as web sites and discussion groups

or AI to give you hints or solutions. ***In contrast, I encourage and expect you to discuss the questions with me.***

In other words, I expect your exam process to include a dialogue with me. Don't keep quiet; ask questions. Exams are not supposed to be an ordeal but an opportunity for you to learn physics.

7 Final grades

If you get less than 50% in your overall grade, you will certainly fail, and 90% or better will certainly be an A, but otherwise, I don't want to declare rigid boundaries such as "65%–77% is a C" and so forth. This is a small class and I will get to know how you do physics fairly well. What will matter most for your grade is my professional judgment about how well you come to understand the fundamentals of thermodynamics and statistical physics.

If you want to know how you are doing, or what sort of performance on the final you would need for an A, or have similar grade-related concerns, just ask me. I should be able to give you a fair estimate of where you stand.

8 Attendance Policy

You will need to be present in the classroom to do well. But I will not spend time keeping track of your attendance, and if you're not there, I will assume you have good reason to be absent. For example, if you are sick, please stay home! You don't need to tell me when you expect not to be present.

II expect you will do everything possible to turn your work in on time, and so avoid later hassle for both me and yourself. Nevertheless, you may find you have missed something. In this case, get in touch with me, and I will decide, on a case-by-case basis, how to make up what you have missed. I will typically assign you some appropriate extra work, have you take a make-up exam, or something similar.

9 Academic Integrity

I care about maintaining academic integrity, and I will apply all Truman policies concerning academic dishonesty. I expect you to be familiar with the Student Conduct Code.

Do not present something that is not your own work as your own, whether you get it from another student or online. You will have plenty of opportunity and time to consult me about anything you're not sure about, including during exams. I'm much more concerned with you learning how to think about physics than showing an ability to spit out correct answers on demand.

I don't care if you use Generative Artificial Intelligence while working on assignments. Be forewarned: you shouldn't blindly trust what the AI might spit out at you. My advice would be to refrain from using AI; assignment are low-stakes practice so that you get to learn some physics, after all.

I don't want you to use AI during exams; so-called AI is, after all, just a giant plagiarism machine. You are allowed to use online resources during exams, but using AI isn't much better than having a confederate feed you answers to questions during an exam. I can't control what you do during take-home exams, I will expect you to present me with your own work in the end.

10 Learning Objectives

By the end of the course, students should be able to:

- Solve undergraduate-level electrostatics and magnetostatics problems.
- Demonstrate mastery of common mathematical methods used in electricity and magnetism and most other areas of physics.
- Understand Maxwell's equations.
- Understand electrodynamics and magnetodynamics processes, including electromagnetic radiation, at least at an introductory problem-solving level.

11 Lawyer Avoidance

Some of the required small print.

Truman policy and federal regulations require that students demonstrate that they are academically engaged in the courses they take. You must meet this requirement within the first calendar week of the semester, beginning at 12:00 am on Monday, January 13 and ending 11:59 pm Saturday, January 18. Failure to do so, or to provide an explanation of an extenuating circumstance by that date and time will result in your removal from the course. Under certain circumstances, removal could impact your scholarship eligibility or financial aid. For the purposes of this class, establishing academic engagement requires, at a minimum, showing up at a lecture or lab.

The minimum investment of time by the average Truman student necessary to achieve the learning goals in this course are not less than one hour (50 minutes) of classroom instruction and a minimum of two hours of out of class student work each week per credit hour awarded or at least the equivalent of three hours (2:50) of laboratory work, internships, practica, and other academic work each week per credit hour awarded. This average time per week for an average student may have weekly variations. This class is worth 3 credit hours. Students will be expected to spend about 6 hours on coursework, which will consist of work on the current assignment due, extra problem solving, exam preparation, and take-home exams.

Education records are protected by the Family Education Right to Privacy Act (FERPA). As a result, course grades, assignments, advising records, etc. cannot be released to third parties without your permission. There are, however, several exceptions about which you should be aware. For example, education records can be disclosed to employees or offices at Truman who have an "educational need to know." These employees and offices may include your academic advisor, the Institutional Compliance Officer, the Registrar's Office, or Student Affairs depending on the type of information.

Behavior that persistently or flagrantly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be asked to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Conduct.