Calculus for Physics II (Phys 191)
Syllabus

Taner Edis

Fall 2025

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 and Thursdays: 12:00–14:50; Wednesdays: 12:30–13:20 and 15:30–16:20. 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`.

The Calculus for Physics II page (*edis.sites.truman.edu/calc-phys-ii/*) is where course-related documents will live. I have no use for Brightspace; I'll keep the minimum there to satisfy administrative requirements, but if you want up-to-date details about how you're doing, it's best to email me.

2 Course Description

This course complements and extends a prior or concurrent course in algebra-based introductory waves, optics, electricity, and magnetism. The use of calculus to derive equations and solve problems in physics is integrated with graphical and algebraic problem solving techniques. The completion of this course and a college-level algebra-based physics course is equivalent to a course in calculus-based physics.

This course involves a fair amount of individual problem-solving. Physics is notorious in that you might think you grasp the concepts, but often discover otherwise when confronted with a problem you have to solve. *Much of your learning will come about as you solve problems!*

Together with PHYS 186, this course can count as an Honors Scholar course, even for students whose majors require PHYS 186.

3 Schedule

Lectures: Wednessday from 16:30 to 18:20 in MG 1096.

Lab: Wednesday 16:30–18:20 in MG 1096.

Final Exam: Friday December 12, 13:30–15:20 in MG 1096.

4 Required course materials

We will refer to an online textbook, Crowell's *Simple Nature*, which is available in PDF for free.

5 Topics

The semester will proceed as follows, with small changes as necessary:

1. The Harmonic Oscillator
2. The Wave Equation and its Solutions
3. Phase Shifts and Interference
4. Ray Optics from Fermat's Principle
5. Advanced Ray Optics
6. Continuous Charge Distributions
7. Relating Potential and Field
8. Midterm Exam

9. Differential Circuit Equations
10. Vector Calculus, Flux, and Gauss's Law
11. Magnetism and Biot–Savart
12. Ampère's Law
13. Induction and Faraday's Law
14. Maxwell's Equations

6 Assignments

You learn physics by solving problems. You will have ten assignments during the semester, due the Wednesdays of most weeks without an exam. Just write your answers on loose sheets of paper, staple them, and turn them in during the class meeting on deadline days. Alternatively, you can email me a PDF or pictures of your solutions.

I want students to communicate with me about the problems they are working on. Walk into my office or send me email, and tell me about your thought process so far.

30% of your final grade will be based on your homework assignments. Please don't use AI for your solutions. You presumably want to learn physics, and you will only learn physics by doing it yourself.

If you turn in your assignment on paper, I will mark it up with a red pen and return it to you during our next class meeting. I won't write long explanations of mistakes, but you're always welcome to talk to me and ask for a fuller explanation of what might have gone wrong with your solution attempt. If you turn in your assignment by emailing me a PDF or photos, I can get your grade to you quicker, sometimes even on the same day. But I won't mark up electronic submissions; you'll need to ask me for any substantial explanations.

I'm not strict about assignment deadlines: homework is supposed to be practice, not a mini-exam. *If you need an extension for any reason, just email me.* I will extend your deadline, no questions asked. On the other hand, you need to do these assignments on time so that you don't fall behind, which is a really bad idea in physics. Please respect the deadlines as best as you can.

7 Exams

You will have three exams which will take two hours each. Two of the exams will be during the semester, and the third is the final. All have equal weight, 20%. You may consult *paper* notes or textbooks during exams, but nothing with an internet connection. If you're going to make mistakes, make your own—don't give me AI slop.

8 Grades

There may be minor changes in how I determine the final letter grades, but here is what everything is worth:

Assignments	30%
Class Participation	10%
Exams	$3 \times 20 = 60\%$

The default percentage ranges corresponding to letter grades are:

89.5%–100.0%	A
79.5%–89.4%	B
69.5%–79.4%	C
59.5%–69.4%	D
0.0%–59.4%	F

"Class participation" represents the flexibility I will have in adjusting your grade depending on my judgment of how you've performed. It will naturally be higher the more I get to know your work, and the more you ask questions and participate in the classroom.

Since I am not strict with deadlines, students will have turned in different amounts of work at any given time. This means that automating current percentage calculations is not possible. The best way for you to obtain your current standing in the course is to email me and ask, so I can figure out exactly what your percentage is and email you back.

I may shift the borderline between letter grades by a small amount so that the line lands in the middle of a naturally occurring gap. Thus, it is possible you may get 88% and end up with an "A," but do not count on it.

9 Attendance Policy

You will need to be present in the classroom to do well. But it's *your* responsibility to make sure you do well. I will not keep track of your attendance, and if you're not there, I will assume you have good reason to be absent. If you are sick, please stay home! You don't need to tell me when you expect not to be present.

I cannot guarantee opportunities to fully make up exams that you miss. If you let me know ahead of time, I will accommodate you as best as I can, and I will make decisions about make-ups on a case-by-case basis.

10 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.

In any case, I do not expect academic dishonesty, nor will I go out of my way to look for it. I run my classes on a kind of honor system: I leave you alone during exams, and while it is fine to consult textbooks or look things up online, I expect you will present me with your own work in the end.

11 Learning Objectives

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

- Apply physical reasoning to predict, explain, and calculate the outcome of various idealized and real-world physical systems;
- Select among and choose the most appropriate problem-solving strategies for physics problems;
- Combine mathematical manipulations of physics equations, including calculus-based techniques, with verbal and/or written explanations to communicate reasoning and results;
- Identify and explain the few fundamental principles on which contemporary physics is based (such as conservation laws and symmetry);
- Derive important equations that apply to physical systems using mathematics including calculus.

12 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, August 18 and ending 11:59 pm Saturday August 23. 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 1 credit hour. Students will be expected to spend about 3 hours a week on coursework, which will consist of work on the current assignment due, extra problem solving, and exam preparation,.

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.