

Physics 196 - Physics with Calculus II

Syllabus - Fall 2017

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Office Hours: M, T 4:30-5:30 PM
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T, Th 12:00-1:00 PM
Also by appointment
Web Page: www2.truman.edu/~mgoggin
or mgoggin.sites.truman.edu/

There will be a link for the course on my website. There I will post assignments and other important information. I do not use Blackboard for a variety of reasons.

Required Items:

- *University Physics, 13th or 14th Edition* Vol. 2 or the entire text if you have it, by Hugh D. Young and Roger A. Freedman
- A scientific calculator

From the Catalog: This course continues a survey of basic physics including the theories of electromagnetism and optics. Students learn the concepts and develop the skills needed for advanced coursework in science and engineering. Some of the history of physics, its technological, and philosophical aspects, and its place in the history of ideas are explored. This course includes a laboratory component.

Credits: 5

NOTE: Honors Scholar Course.

NOTE: This course fulfills the Scientific: Physical Science Mode of Inquiry of the Liberal Studies Program.

NOTE: This course counts toward the 63-credit Liberal Arts and Sciences (LAS) graduation requirement.

NOTE: The Science Lab Fee applies to this course.

Prerequisite: PHYS 195 - Physics with Calculus I with grade of C or higher and MATH 198 - Analytic Geometry and Calculus I with grade of C or higher; **Pre- or Corequisite:** MATH 263 - Analytic Geometry and Calculus II. Note: If you are concurrently enrolled in MATH 263 and drop it later in the semester, then you should also drop PHYS 196 at that time. Since everyone has had Analytical Geometry and Calculus I, I will assume you all know how to differentiate and integrate simple functions.

General Information: In some respects, the previous semester of material was like a course in vocabulary and grammar for this new language of physics. This language is not exactly the same as the language of mathematics. One might say it is an obscure and difficult dialect of mathematics. This semester we will be studying the equivalent of short stories written in physics. We will learn about new physical phenomena but we will apply many of the same concepts and ideas that you used in Physics 195 to these new phenomena. Of course some of these phenomena will introduce new “vocabulary” but most of the “grammar” will be the same as last semester.

We will cover Chapters 21 through 36 of the text. We will begin with electricity and magnetism (E&M) and then move on to optics. Beyond learning the content of these chapters, you will also learn how to think like a physicist: how to identify the salient information in physical systems and translate that information into mathematical equations and then solve them.

You will need to understand **everything** by the end of the class, this includes the material from Physics 195. The physics curriculum is structured like a spiral staircase. At each stage of the curriculum the material builds on what came before, including preceding courses. You will periodically return to the same material but at a higher level. The same applies within a course. And like a staircase, the upper levels are only as strong as the levels below. If you don't stay on top of the current material you will not be able to learn subsequent material very well, if at all. It will be very difficult to catch up if you fall behind. In this class we continue to lay the foundation for the rest of your physics classes. The better you learn the material in this course, the better you will do later - not just in your physics courses but also in your other science and math courses. This is because physics is everywhere. It is the foundation of the other sciences. Furthermore, everything in physics connects to everything else in physics.

Course Structure: The structure of the course is nominally 4 hours of lecture and 1 hour of recitation. Rather than reserve a special hour for recitation I prefer to have a more integrated structure where the typical recitation activities such as answering questions about homework problems and going over example problems are embedded in the normal course structure. That way we can address problems when they arise rather than saving them until recitation. I will not lecture straight from the text because I expect you to read it. Class time will be spent on helping you *understand* the material in the text. To that end, I expect you to read the sections of the text listed in the course schedule. You should understand the examples presented in the text for those sections. During class, I will answer questions that arose in your reading; the answers may take the form of mini-lectures. **You should listen to your classmates' questions and my answers even if you think you understood everything in the reading or the question seems to be off-topic.** If you do not do the reading you will probably get lost. If there are no questions, I will probably ask you questions about the material. We will work together on extra example problems.

Homework: Homework will be collected twice a week on Mondays and Wednesdays. The assignments will be posted on the course website. The homework will be graded in the following way. Each problem in an assignment will be graded simply as "correct" or "incorrect". The assignment will be returned the next day. You will have until the next class period to correct those problems marked "incorrect". The resubmitted assignment will then be graded.

Quizzes: There will be a quiz every week except weeks with exams. The quizzes will be one or two of the homework problems. You may use your textbook to take the quiz. You will have enough time to complete the problems if you have done the homework. If you have not done the homework you will not have enough time to do the problems.

The laboratory section associated with the class is an important component of the course. So much so, that it has its own section which is next.

The Laboratory Section: The laboratory component of the course is an important part of learning physics. Experiment and systematic observation are what separate science from other disciplines. Physics is mostly an experimental science. (We usually call it astronomy when all we can do is observe a system without direct control over some parameter.) Experiment is an integral part of physics. Without experiment, physics is no different from philosophy or maybe mathematics. Therefore, your attendance at the laboratory section is mandatory; there are no exceptions: you will **fail the entire course** if you miss more than two laboratory classes without an excuse from me regardless of your grades in the other categories. The work you do in the laboratory section will contribute 15% to your overall course grade. I will provide more details about the laboratory section in a separate document.

Attendance: I will not be formally taking attendance in the sense that I will be calling roll at the beginning of class. However, your absence will be noticed and frequent absences will be noted. The structure of the course demands student involvement. To reward positive participation, I have included a 5 % class participation grade. It is the easiest 5 % that you will ever get in a physics class. But it is impossible to be involved while absent however. Frequent absences will seriously hurt your participation grade.

Grades:

5 %	Class participation
10 %	Homework
15 (or 100)%	Lab work*
10 %	Quizzes
30 %	Best two out of three mid-term exams (15 % per exam)
30 %	Comprehensive Final Exam

* **VERY IMPORTANT:** If you are absent from more than two labs without a good reason, your grade for the *entire course* will be an F regardless of your grades in the other categories. I will be the final judge of what constitutes a good reason. Please contact me as soon as you know you will have to miss lab.

Exams: There will be three midterm exams and a comprehensive final exam. Because of the cumulative nature of physics each midterm exam will effectively be over all the material covered prior to the exam date, *including all of Physics 195*.

Office Hours: Office hours are not the only times I am available for help. My listed office hours just indicate the times I guarantee (with a couple of exceptions I will tell you about) I will be in or near my office (MG 3172) or my research lab (MG 3147). I encourage you to come and ask questions when you need help. If you cannot make it during the regular office hours, then please schedule a time to meet with me. My class schedule is posted on my door. You are also welcome to stop in if my door is open. Also, a couple of my office hours are preceded by my Electronics class. I am sometimes still in class helping students after 4:30. Please come down to MG 1009 if I am not in my office at 4:30 on Tuesday or Thursday.

Students with Disabilities: I am committed to working with students with disabilities in conjunction with Trumans Office of Disability Services to fulfill any needs of those students, in alignment with the Americans with Disabilities Act (ADA) of 1990. Please let me know early if you have special needs.

Academic Honesty: You are to do your own work on the assessment assignments of the course, e.g. quizzes, tests, and lab reports. In addition, you must learn to properly cite the work of others in your lab reports when appropriate. It is part of scientific writing to cite the work of authors who have preceded your work in a field and whose work directly influences your work. If you have questions about proper citation please ask me before you turn in the report. Plagiarism is using the work of others and claiming it as your own. Plagiarism will be grounds for disciplinary action that may include expulsion from school. Changing your data is scientific misconduct and will not be tolerated.