# Physics 196 - Physics II
# Syllabus - Fall 2020

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**Office Hours*:** M 11:30 AM-1:30 PM, T 4:30-5:30 PM
W, 11:30 AM-12:30 PM; Th 4:30-6:00 PM
T, Th 12:00-1:00 PM
Also by appointment**
W, Sept. 30th, office hour moved to 3-4 PM

**Web Page:** `http://www2.truman.edu/~mgoggin`
or `http://mgoggin.sites.truman.edu/`

***Technically, all office hours are by appointment. These are times I will be available for a Zoom consultation. I will post a link in Blackboard†. There will also be a password. But send me an email to let me know you want to meet. I do not plan to stare at an empty Zoom window for my entire office hours. If you prefer to meet face-to-face, you also need to send me an email so that I don't have a crowd outside my door. And by face-to-face I mean you would be in the doorway of my office and I would be across the room.**

****Here "by appointment" means at times that are different from those listed above because of schedule conflicts.**

†Yes, for those of you who have had me before, I am using Blackboard, to be prepared if we need to pivot to online instruction again. (I still don't like it.)

**COVID-19 NOTICE:** The Fall 2020 semester is taking place in the middle of a global pandemic. We have experienced our society turned upside down and inside out. In the Spring 2020 semester Truman (and everywhere else) shifted to online instruction due to the pandemic. In terms of number of cases and deaths, the US is worse off now than we were then. But we have learned a lot more about the virus. We have a better understanding of how it spreads and how to minimize that spread. You should already be aware of the special rules for holding classes that are in place. You will notice the sparse seating in the classroom. Please do not move the chairs to new locations. Also, please sit at the same location every day you are in class. That will help with contact tracing, should it be necessary. You will be required to wear a face covering that completely covers your nose and mouth. You will be expected to keep the covering on at all times while we are meeting. In the event you arrive to class without a face covering, I will ask you to leave until you are able to obtain one and return. Thank you for your help in containing this virus and helping to protect your peers.

*Proctorio Online Proctoring* If we have to move to online instruction, exams and quizzes may be proctored using Proctorio. Therefore, students will be required to have a webcam (external or built-in) with a microphone when taking an exam or quiz. Students understand that this remote recording device is purchased and controlled by the student and that students should select private spaces for the testing. Students with concerns may discuss the location of an appropriate space for the recordings with their instructor or advisor.

There is a fee that will be charged to you the student at the time of the proctored exam. That fee may be up to $10 per exam. (Discounts may occasionally be in effect and are not under the control of Truman). The number of times we will need to use the service will depend on when in the semester we move online, should that be necessary. If we have more than one exam left then, you are encouraged to choose the "course fee" model instead of the "individual test fee" model as you pay for the first exam. You will be charged a bundle price equal to two individual exams. Subsequent exams will then be conducted at no additional charge to you. If you choose the individual test fee option, you will be charged each time you

take a proctored test.

Proctored exam information will be provided prior to any proctored exam. Be aware you must use Google Chrome to take the exam, install the Proctorio Chrome browser extension (from `https://getproctorio.com/`), and show an official photo identification (ID). You can use either a valid drivers license, passport, or school ID. For additional information about online proctoring, students may visit the Proctorio Support For Students website (`https://proctorio.com/support`).

**There will be more about COVID-19 later in the syllabus.**

# Course Information

**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
- An access code to *Mastering Physics* for *University Physics* I will choose assignments that are independent of the edition. The differences between editions tend to be mostly cosmetic.
- 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. A more detailed schedule for the course will be given in a separate document.

**Course Objectives:** At the end of the this course the student shall be able to analyze and develop methods to solve problems involving:

- electrostatics
- magnetostatics
- electromagnetic radiation
- AC and DC electrical circuits
- geometrical and wave optics, including polarization
- all the physical phenomena and laws covered in Physics 195

The student shall also be able to explain in words the underlying physical principles responsible for the observed behavior of systems involving the same above listed phenomena. **Homework:** To minimize passing paper back and forth, we will be using the online homework system in *Mastering Physics*. The details of the assignments will be there and/or in Blackboard. This should not change if we go to online instruction.

**Quizzes:** There will be a quiz every week except weeks with exams. The quizzes will be one or two of specially designated homework problems from your text. 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 problem(s). [**COVID-19 NOTE:** If we have to go online, you will turn in through Blackboard scans of all the assigned quiz problems.]

**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. Let me know ahead of time if you need to miss lab. 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. [**COVID-19 NOTES:** I understand that attendance may be complicated by COVID-19. I will handle that on a case-by-case basis. But, I am relaxing my usual lab attendance policy. You will not automatically fail the class if you miss too many labs. If we have to go online, you may need

to perform simple experiments at home using relatively common items. You may need to spend ≈ $25 on supplies and/or install a physics app on your phone.]

**Attendance:** After the first day or two, I will not be calling roll at the beginning of class. I will know if you are there or not. I will keep a record of attendance for contact tracing purposes.

If you have a valid reason to be absent, for example illness or participation in a sanctioned University activity, you need to inform me before the class you will be missing or as soon as possible if you are physically unable to contact me before class. The only coursework that can be rescheduled after the work has been returned to the class is lab work. Labs may only be rescheduled for valid reasons. Don't miss lab!

**Grades:**

| | |
|---|---|
| 10 % | Homework |
| 15 % | Lab work |
| 15 % | Quizzes |
| 60 % | Three mid-term exams (20 % per exam) |

**Exams:** There will be three midterm exams worth 20% each. Because of the change in the academic calendar, we will not have a comprehensive final exam. That said, 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*. I *can* write a single problem that incorporates most of the material from Physics 195 and 196. It would be a long problem. I am not saying I *will* give you such a problem. [**COVID-19 NOTE:** If we have to pivot to online instruction, exams will use the Proctorio proctoring system which will be an added cost that will depend on when we go online. Please see the note on the first page of this syllabus.]

**Emergency Procedures:** In each classroom on campus, there is a poster of emergency procedures explaining best practices in the event of an active shooter/hostile intruder, fire, severe weather, bomb threat, power outage, and medical emergency. This poster is also available as a PDF at this link: `http://police.truman.edu/files/2015/12/Emergency-Procedures.pdf` .

Students should be aware of the classroom environment and note the exits for the room and building. For more detailed information about emergency procedures, please consult the Emergency Guide for Academic Buildings: `http://police.truman.edu/emergency-procedures/academic-buildings/`

This six-minute video provides some basic information on how to react in the event there is an active shooter in your location:

`http://police.truman.edu/emergency-procedures/active-shooter/active-shooter-preparedness-video/`

Truman students, faculty, and staff can sign up for the TruAlert emergency text messaging service via TruView. TruAlert sends a text message to all enrolled cell phones in the event of an emergency at the University. To register, sign in to TruView and click on the Truman tab. Click on the registration link in the lower right of the page under the Update and View My Personal Information channel on the Emergency Text Messaging or Update Emergency Text Messaging Information link. During a campus emergency, information will also be posted on the TruAlert website `http://trualert.truman.edu/`.

**Academic Honesty:** You are to do your own work on the assessment assignments of the course, e.g. quizzes, tests, and lab reports. It is okay to discuss homework assignments with each other to further your understanding of the material but the work you turn in should be your own version of the solution. In addition, you must learn to properly cite the work of others in your work 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 experimental data is scientific misconduct and will result in more severe penalties on the assignment than simply getting the "wrong" answer would.

**Credit Hour Justification:** 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 two hours (1:50) of laboratory work in the lab and 1 hour of work outside the lab time each week per credit hour awarded. This average time per week for an average student may have weekly variations.

**Disability Services:** To obtain disability-related academic accommodations students with documented disabilities must contact the course instructor and the Office of Student Access and Disability Services (OSA) as soon as possible. Truman complies with ADA requirements. For additional information, refer to the Office of Student Access and Disability Services website at `http://disabilityservices.truman.edu/` You may also contact OSA by phone at (660) 785-4478 or email `mailto:studentaccess@truman.edu`

**Discrimination and Title IX:** Truman State University, in compliance with applicable laws and recognizing its deeper commitment to equity, diversity and inclusion which enhances accessibility and promotes excellence in all aspects of the Truman Experience, does not discriminate on the basis of age, color, disability, national origin, race, religion, retaliation, sex (including pregnancy), sexual orientation, or protected veteran status in its programs and activities, including employment, admissions, and educational programs and activities. Faculty and staff are considered mandated reporters and therefore are required to report potential violations of the Universitys Anti-Discrimination Policies to the Institutional Compliance Officer. Title IX prohibits sex harassment, sexual assault, intimate partner violence, stalking and retaliation. Truman State University encourages individuals who believe they may have been impacted by sexual or gender-based discrimination to consult with the Title IX Coordinator who is available to speak in depth about the resources and options. Faculty and staff are considered mandated reporters and therefore are required to report potential incidents of sexual misconduct that they become aware of to the Title IX Coordinator. For more information on discrimination or Title IX, or to file a complaint contact:

> **Dr. Lauri Millot**, Institutional Compliance Officer, Title IX and Section 504 Coordinator
> Office of Institutional Compliance
> Violette Hall, Room 1308
> 100 E. Normal Ave
> Kirksville, MO 63501
> Phone: (660) 785-4354
> `mailto:titleix@truman.edu`

The institutions complaint procedure can be viewed at `http://titleix.truman.edu/files/2015/08/University-Complaint-Reporting-Resolution-Procedure.pdf` and the complaint form is accessible at `http://titleix.truman.edu/make-a-report/` .

**FERPA:** 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 Registrars Office, or Student Affairs depending on the type of information. For more information about FERPA, see`http://www.truman.edu/registrar/ferpa/`.

**Disruptive behavior:** "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 instructors 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." (*From Washington State University, suggested by Lou Ann Gilchrist*).