

Syllabus for Physics 100 - Concepts of Physics Spring 2017

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Text: *Physics: Concepts and Connections, Fifth Edition* by Art Hobson (ISBN: 978-0321661135)

From the Catalog: This course presents an overview of our understanding of the physical world, covering some main concepts, theories, and experimental techniques of physics. While the course focuses primarily on the conceptual understanding of physics, it also explores some of its historical, technological, philosophical, and aesthetic aspects, and its place in the history of ideas. The range of possible topics includes Newton's laws of motion, gravity, heat, sound, electricity, magnetism, light, relativity, quantum theory, elementary particles, and nuclear physics. Basic algebra skills are expected of the students. The course has a laboratory component that emphasizes quantitative measurements.

The course satisfies the Physical Science Mode of Inquiry of the Liberal Studies Program. According to the catalog, upon completion of the Physical Science Mode of Inquiry, students:

1. Have engaged in scientific experimentation, including the collection, analysis, and interpretation of data;
2. Understand how scientific theories are evaluated and applied;
3. Have learned and used symbolic language, made quantitative measurements, and applied the tools of mathematics to interpret these measurements and to solve quantitative problems; and,
4. Recognize some of the issues in the physical sciences that influence society, and have acquired familiarity with some of the technical language and basic theories of science that inform personal and public decision making.

General Information: This is an introductory course in physics designed for students with no intention of further study in physics and/or little previous exposure to physics. The course will cover some concepts from classical and modern physics. In addition, there will be some coverage of the scientific process and the interaction of physics and society. In the end it is hoped that the student will gain an appreciation of physics and its contribution to the development of our contemporary worldview.

The course will cover most of Chapters 1-9, and 12-13 plus some extra material on Rotational Dynamics and Chaos Theory that is not in the text. **You are expected to read the material in the book.** I will **not** explicitly cover everything in the text during lecture; this does not relieve you of learning the omitted material. **The lectures will contain additional information that is not in the book;** you are responsible for this information as well. To be clear, **you will be responsible for all course material: what is in the assigned reading from the text and what is covered in the lecture material.** Homework assignments for each chapter will be posted on the web. You must do the homework to succeed in this class. You will be expected to do more than just memorize and then reproduce the information on the tests. You will be expected to think critically about the material and synthesize different ideas.

You are expected to do your part in the learning process. I cannot *make* you learn physics; I can only *help* you learn it. You must expend the effort to study it. This includes reading the textbook, thinking about what you have read, asking questions when you do not understand something, coming to class prepared for the lecture, etc; in other words, being engaged in your education.

A word of warning: You will need to understand **everything** by the end of the course. Physics is structured in a linear fashion. At each stage of the class the material builds on what came before. **It will be very difficult to catch up if you fall behind.** You need to stay on top of the material over the course of the semester. "Cramming" for the exams is not very effective in this course. So avoid the crowds and start studying for the final exam today. To help you stay on top of the material, there will be weekly quizzes.

I also want to draw your attention to the following phrase from the catalog description: "it also explores some of its historical, technological, philosophical, and aesthetic aspects, and its place in the history of ideas." This means we will cover more than the mechanics of physics. We will also cover how the understanding of the laws of physics has impacted other fields and society. Much of this material will be covered in the textbook.

Office Hours: Office hours are *not the only times* I am available for help. My listed office hours just indicate the times I guarantee 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. Please check the web for the latest version of my schedule.

Grades: I expect you to learn a certain amount of physics independent of the progress of your classmates. Therefore, your grade will be determined solely by your performance and not how well you do compared to your classmates. Consequently, your final grade will be based on a straight scale: 90-100% = A, 80-89.9% = B, 70-79.9% = C, 60-69.9% = D, and 0-59.9% = F. This means that it is possible for everyone to get an "A" in the course. It also means that it is possible for everyone to fail the course. I encourage you to try for the former rather than the latter.

Your course grade will be derived from the following components

Final Exam	25%
3 one-hour Tests	15% each, one of which is dropped
Quizzes	15%
Lab	15%
Class Participation	5%
Poster	10%

You will be allowed to drop one 1-hour test. You may not drop any of the other grades.

Tests: The three one-hour tests will be given on the dates specified in the schedule. The exams will consist of two parts. The first is "closed book" and is designed to test your conceptual understanding and memory. The second part is designed to test your critical-thinking and problem-solving ability. For the second part you may write (by hand) any notes you wish on a single 3 inch by 5 inch note card to use during the test. You may not use your note card until you turn in the first part of the exam. For the final exam you will be allowed to use two, handwritten, 3 inch by 5 inch note cards on the second part of the exam.

Quizzes: There will be a quiz each week over the material covered the previous week. The material to be covered by the quizzes will be announced in the class period immediately preceding the quiz.

Makeup tests and quizzes: Makeup tests and quizzes will be given only for good reasons. I am the sole judge of what constitutes a good reason. Tip: Oversleeping is not a good reason for missing any class.

The Laboratory Section: We will meet in MG 1006 for the laboratory section associated with the class. Experiment is an integral part of physics. Without experiment, physics is no different from philosophy. (Nothing against philosophy, it is just not physics.) Therefore, your **attendance at the laboratory section is mandatory**; there are no exceptions. The laboratory grade is 15% of the course grade.

The labs will be available on my web page (see above) as a PDF file. **You will be responsible for reading and each lab before you come to your lab section.** I assume you have the capability to read PDF files. The labs will be available by the Sunday evening preceding the class during which you will perform the lab, if not sooner.

THERE IS NO LAB THE FIRST WEEK OF CLASS.

Homework: Homework assignments for each chapter will be posted on the course website. There are four types of problems at the back of each chapter: "Review Exercises", "Conceptual Exercises", and "Problems". You should try to answer **all** of the **Review Exercises**. These are designed to test your reading comprehension – the answers are within the text of the chapter. I will assign questions from the Conceptual Exercises and Problems. These are designed to test your ability to extend the chapter material to new systems/situations. Hobson's answers to the odd-numbered Conceptual Exercises are given at the back of the text. The homework will not be graded but it will be the basis for the quizzes. I strongly urge you to do all of the assigned homework. If you do not understand the answer to a homework problem please ask me.

Class Participation: The class will be somewhat interactive in a Socratic way. I expect everyone to participate. I have included a class participation grade to reward attendance and participation. Being attentive while in class is considered participation. Being disruptive or inattentive, e.g. playing with your phone, will reduce your participation grade.

Poster: You will make a poster presentation of a topic involving physics. You will work on the poster in groups which I will assign. The topic will be your choice but must be related to physics and must be approved by me. Some sources of ideas beyond the internet are the magazines *Scientific American* and *Physics Today*, both of which are in the library. More details will be given in class.

Attendance: I expect you to come to each class. Attendance is implicitly part of the participation grade (see above) since you must be in class to participate. And you are, of course, responsible for all material covered in lecture as well as the text. Please be aware that I will learn who everyone is; I will not need to “call roll” to know if you are coming to class. Please note that you should not have to miss **any** class in order to meet with your academic advisor. If your advisor insists that the only time they can meet with you is during one of your classes then ask them to put it in writing for the instructor of your class. I will not consider any such request to miss class unless it is in writing.

Inclement Weather (e.g. “Snow Days”): We will have class regardless of the weather. The only exception is if the University cancels classes, which almost never happens.

The Web Page: On my web page (mgoggin.sites.truman.edu) there will be a link to a page for this class. Under that page will be pages for homework assignments, labs, etc. Also on the webpage is a link to my weekly schedule. If, for some reason I have to change office hours during the semester, the new hours will be posted on the web. There are also links to other sites that you may find amusing/educational.

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

Academic Honesty: Students are expected to do their own work. Students are expected to work alone on exams and quizzes without the use of any outside resources except the note card outlined below. Students may not use tests from previous semesters when preparing for exams; the use of previous exams encourages memorizing unconnected facts without any understanding. Students are expected to be honest in their dealings with the professor. A student found to have not upheld these expectations is subject to failing this course and being reported to the Dean of Student Affairs and the Vice President for Academic Affairs.

Tips for Success:

Do the homework! I cannot emphasize this enough. You can't learn physics without thinking about it. Writing down your answers to the questions will help you clarify your ideas and study for the exams.

Study daily. Stay on top of the material for the course. The later material depends on the previous material. If you fall behind the later material will be even harder to understand.

Read ahead and ask questions. Read the material to be covered in the next lecture and be prepared to ask questions about the parts that do not make sense.

Come to class. The purpose of lecture is to clarify and expand upon material in the text. Often there is material presented in lecture that is not in the text, e.g. a demonstration or a different example of some idea.

Be engaged in your education. You only get out of an education what you put into it. Make sure you get something out of this class.