

Concepts of Physics (PHYS 100) Syllabus

Taner Edis

Fall 2018

1 How to Find Me

The best way to reach me is **e-mail**, edis@truman.edu. My office phone is 785-4583, but I don't check messages often.

My office is MG 3004, and my definite office hours are: Tuesdays and Thursdays: 13:30–14:50, Wednesdays: 14:30–15:20. I will almost always be around from 10:30 to 11:45 on Tuesdays and Thursdays as well, but it's just possible that if something else comes up I won't be there—email me ahead of time to make sure. You can also find me in my office at other, less regular times. Check my **calendar** (edis.sites.truman.edu/schedule/) to see when might be best—email me and we'll figure out what is the best time.

I will post course-related notices and documents on the **Concepts of Physics page** (edis.sites.truman.edu/physics-100-concepts-of-physics/).

2 Course Description

This is a course for students who will not necessarily use a lot of physics in their future career, but who are curious about the nature of the universe we live in. Hence I emphasize modern physics, including some of its “weird” aspects, but downplay the mathematical problem-solving typical of more advanced physics courses.

You will encounter physical concepts throughout your life, particularly if you live as an engaged, informed citizen. I certainly hope that you'll learn, for

4 REQUIRED COURSE MATERIALS

example, what terms like “energy” really mean. But my immediate goals are more liberal-artsy. I figure you have the best chance of appreciating physics if you encounter it in the context of science fiction and popular science. My goals are to have you learn enough physics that you’ll be able to understand science fiction better, and to be able to enjoy popular science writing.

This course satisfies the *Physical Science Mode of Inquiry* requirement of Truman State University’s *Liberal Studies Program*.

3 Schedule

Lectures: Tuesday and Thursday from 15:00 to 16:20 in MG 1000.

Labs: Wednesday 9:30 to 11:20 in MG 1002.
Wednesday 11:30 to 13:20 in MG 1002.

Final Exam: Thursday December 13, 11:30 to 13:20 in MG 1000.

4 Required course materials

- *Physics: Concepts and Connections* by Art Hobson, 5th Edition.
- *Astrophysics for People in a Hurry* by Neil deGrasse Tyson.
- *The Algebraist* by Iain M. Banks.

All three of your books are vital to how this course will work, and you need to carefully *read* all of them. Looking at them just before an exam won’t work; you need to regularly read them, and be prepared to discuss them in class.

Physics is a standard textbook. Its job is to walk you through the basic concepts, and serve as a reference to consult when you come across something you don’t understand in the other two books. It’ll also be where you’ll find, at the end of chapters, the various questions and problems you’ll be regularly assigned. We’ll be working through this book throughout the course.

Astrophysics for People in a Hurry is a popular science book consisting of essays related to physics and astrophysics. For the first 11 weeks of the course, we’ll be reading and discussing readings from this together with the

textbook. You don't need to study this book as hard; just enjoy it and try to follow it. If you get stuck, that's OK—I'm counting on you to ask questions!

The Algebraist is a science fiction book, in the “hard science fiction” genre. Banks writes exciting novels with interesting physics and intriguing twists on what physics may have in store in the future. This is, of course, a popular novel—and you should read it as such. Have fun! (This is a course requirement.) During the final weeks of the course we'll be discussing *The Algebraist*, and we will spend a good deal of time asking each other questions based on the book.

5 Class Discussions

In lectures I will go over basic concepts, and I encourage you to join in with questions and observations. My idea of a successful hour in class is not so much when I cover some material I set out to do, but when a student asks an interesting question and we get sidetracked into looking at some fascinating science. An even more successful hour is when students start discussing physics with *each other*, and I can fade into the background.

So be sure to ask questions! 5% of your final grade will be based upon my in-class impression of what you contributed. And don't hesitate when asking. They don't even have to be directly physics questions. As I mentioned, this is supposed to be a liberal-artsy course, so if we drift into discussing the artistic merit of some science fiction, or movie special effects techniques, or philosophical issues, that's perfectly fine with me.

Still, since sometimes students find it hard to leap in, I will also set aside time to more formally devote to discussion. About once a week over the semester, we will have an hour when we start by discussing the assigned reading in *Astrophysics for People in a Hurry*.

6 Quizzes and Exams

On discussion days, I will also give you quizzes which will take up the final 15 or 20 minutes of class time. At least one of the questions in the quiz will be taken from the assigned problems given the week before, and the others will also be typically closely related to the assignments. One question will

be come from the material from *Astrophysics for People in a Hurry* or *The Algebraist* under discussion.

Before each quiz, I will assign about 8 to 10 questions to you from chapter ends in your *Physics* textbook. It is up to you to prepare yourselves by solving these before you come to the quiz. I will not collect homework; the quizzes are all.

I don't mind giving out answers to assignments. If you get stuck, stop by my office, especially during office hours, and I'll work through the assignment with you.

You will have two midterm exams, and a final. The questions will be similar to those you will encounter in your assignments and in your quizzes. You will not be allowed to use any books or notes; I will give you any equations you might need. You will need a calculator with you in exams, as well as most quizzes.

There is one thing that is unusual in my exams: you are allowed to talk to me and ask questions during the exam. I might give hints, or I might look at your attempted answer and tell if you if it's correct or not.

For quiz and exam dates, see the [Course Calendar](#).

7 Labs

You will have ten labs throughout the course. Check the [Course Calendar](#). Each is described in a pre-lab on the [College Physics II web site](#). Read the appropriate pre-lab before you show up for a lab. You may also want to print it out. Don't waste time by having to read up on the lab during lab time.

I will keep things informal; I will not, for example, require a special lab notebook or demand a set format for lab reports. Typically, you will write down what you are doing in the lab on loose sheets of paper. This will include observations, calculations, and graphs. You will turn this in at the end of a lab session. Your pre-labs will provide a list of what exactly you need to turn in at the end. You do not have to collect your material and organize and prettify it for a formal report. Do not write down a description of the experiment, the procedure, and so forth.

You will work in groups of two, or three at most. You will turn in a single report for each lab group.

If you do a competent but unimaginative lab, so that you turn in all the requirements but don't show any evidence of thinking much about what you

8 ASSIGNMENTS

were doing, your group will receive about a 16 or 17 out of 20 points for that lab. Errors and omissions will reduce that grade. Getting closer to 20 requires that you go beyond fulfilling requirements set out in the pre-lab. For example, if you invent some interesting procedure for a measurement, make a relevant observation and speculate on what might have caused it, or show awareness of the possible sources of error and uncertainty in your measurements, write all these down. These impress me.

It's very difficult to organize lab make-ups, so I do not intend to have make-ups. *Do not miss any labs!*

You will also have a lab exam toward the end of the semester. This will be based on activities done during lab, and each of you will work alone. If you make a habit of relying on others in your lab group to handle the equipment and make decisions, then you will not be able to complete the lab exam successfully. Make sure you actively participate in every aspect of every lab.

8 Assignments

#	Chapter (sections)	Conceptual Exercises	Problems	<i>Astro Hurry</i>
1.	3 4 (1–5)	1, 2, 7, 22 4, 10, 29, 31	2, 7 10, 13	1
2.	6 (1–6) 8 (1–5) 9 (1–3)	5, 20, 27 2, 9, 19 4, 10, 15	10,16 2 <i>none</i>	2
3.	10 (2–8) 12 (2–6)	18, 27, 39, 49 10, 17, 29	4, 8, 9 <i>none</i>	3
4.	5 (1–4, 6) 11	8, 10, 20, 37 8, 16, 20, 31	5 <i>none</i>	4
5.	13	2, 8, 13, 22, 28, 30, 33	1, 4	5, 6
6.	14	2, 13, 15, 21, 30, 34	1, 8	7, 8
7.	15 (1–7)	1, 6, 11, 13, 17, 20	5	9, 10
8.	17	4, 7, 9, 10, 11, 14	1, 2, 3	11, 12

Quizzes 9 and 10 will be based on *The Algebraist* alone.

9 Grades

You should consider a grade below 60% unsatisfactory, an “F.” A grade of 75% is satisfactory work, “C.” 85% (“B”) means you have done all that was asked for and appear to understand it. A grade of 95% (“A”) means you have mastered the material—you did all that was asked for and you demonstrated mastery through the clarity of your work. There may be minor changes in how the final letter grades are determined, but if you want to see how you are doing, you should first calculate your percentage as follows.

	Number of:	Points per:	Max points	% of Total
Discussion	1	50	50	5
Quizzes	10	20	200	20
Midterms	2	150	300	30
Final	1	200	200	20
Labs	10	20	200	20
Lab Exam	1	50	50	5
		Total	1000	100

Then, you can find the number of points you’ve earned, and the maximum you could have earned. Your final percentage will be:

$$\text{percentage} = (\text{number of points you've earned} / \text{maximum possible}) \times 100\%$$

Round your result to the nearest tenth of a percent. You can then figure your approximate letter grade from your percentage using the chart below:

Percentage Range	Letter Grade
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

I may shift the borderline between certain 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,” or you may get 92% and end up with a “B.”

You will also have an opportunity to earn up to 40 points of extra credit, on top of the points you acquire normally. For extra credit, you can write a one or two page paper presenting your thoughts about some physics you’ve encountered outside of class—in the news, in science fiction, or in other coursework. You will have two opportunities to try for 20 extra points each; these will be due the first class meeting after each midterm exam.

10 Attendance Policy

You will need to be present in the classroom to do well in this course. But it’s *your* responsibility to make sure you do well. 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.

I cannot guarantee opportunities to make up labs or exams that you might miss. If you let me know ahead of time, I will try and accommodate you as best as I can, and I will make decisions on appropriate make-ups on a case-by-case basis. But again, I cannot guarantee that we can work something out—your best course of action is not to miss anything.

11 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 will

often leave you alone during exams, and I expect you will continue to work as normal in such circumstances.

12 Advice

- Expect to spend at least 7 hours per week outside of class on this course; even more if you find the course hard. Physics is notoriously difficult.
- Do not expect to read something once in your textbook and understand it; plan on going over much of the text more than once.
- I will not lecture directly out of the textbook, but I expect you to study it. If you are having difficulty understanding parts of the textbook which I have not addressed in class, it is your responsibility to ask about those parts.
- I encourage you to ask questions often, and I will ask you questions often. It is perfectly acceptable if you struggle with a question and get bogged down.
- In exams and labs, you must show how you arrived at your result, either by way of an explanation, or by clearly showing the steps in your calculation. If you did something correctly but I am unable to follow your reasoning as it is written, you may receive little or no credit. It is your job to make it easy for me to understand what you are doing.
- Have your textbook, a pen or pencil, and a calculator (one which does trigonometric functions and scientific notation) with you during classes, lab, and tests, and do calculations and derivations along with me during class.

13 Lawyer Avoidance

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.

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the [Disability Services](#) office (x4478) as soon as possible.

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. Students should be aware of the classroom environment and note the exits for the room and building. For more detailed information, please consult the [Emergency Guide for Academic Buildings](#). A [six-minute video](#) provides some basic information on how to react in the event there is an active shooter in your location.

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](#).

Truman State University and its faculty are committed to supporting our students and fostering an environment that is free from bias, discrimination, and harassment. If you have encountered any form of sexual misconduct (e.g., sexual assault, sexual harassment, stalking, domestic or dating violence), we encourage you report this to the University. If you speak with a faculty member about an incident of misconduct, that faculty member is a “mandated reporter” and must notify Truman State University’s Title IX Coordinator (Violette Hall 1308, 785-4354) and share the basic facts of your experience. The Title IX Coordinator will then be available to assist you in understanding all of your options and in connecting you with resources both on and off campus. If you would prefer to have a confidential conversation about an experience, the counselors at University Counseling Services are *not* mandated reporters and they can be reached at 660-785-4014. For after-hours crisis counseling, call 660-665-5621. For more information regarding Truman’s policies and procedures relating to any form of gender discrimination, please consult Truman’s [Non-discrimination Policy](#) and [Complaint Reporting and Resolution Procedure](#).

Education records are subject to 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.