

# Physics 100 Syllabus

Instructor: Taner Edis

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## 1 How to Find Me

The best way to reach me is to e-mail [edis@truman.edu](mailto:edis@truman.edu). Otherwise, you can try calling my office at 785-4583, or faxing me at 785-7604.

I will have office hours from 10:30 to 11:00 and 13:00 to 13:30 every Tuesday and Thursday, from 17:00 to 17:30 on Tuesdays, 15:00 to 16:00 on Thursdays, and from 14:30 to 15:20 Wednesdays. Of course, there's a good chance I will be around my office (MG 3004) at other times as well. Check my [typical schedule](#) to see what hours I am most likely to be available.

I will be using the Internet to post course-related notices and documents. Please [send me your e-mail](#) if you use a non-Truman address, and bookmark the Physics 100 home page, [www2.truman.edu/~edis/courses/100/](http://www2.truman.edu/~edis/courses/100/).

## 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 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

## 4 REQUIRED COURSE MATERIALS

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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 13:30 to 14:50 in MG 1096.

**Labs:** Wednesday 10:30 to 12:20 in MG 1006.  
Wednesday 13:30 to 15:20 in MG 1006.

**Final Exam:** Tuesday May 8, 11:30 to 13:20 in MG 1096.

### 4 Required course materials

- *Physics: Concepts and Connections* by Art Hobson, 4th Edition.
- *Death by Black Hole* 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.

*Death by Black Hole* 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 a number of chapters 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 couple of 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 Useful web sites

- [Quarks to Quasars](#)
- [Insultingly Stupid Movie Physics](#)
- [Warp Drive When?](#)
- [“The Alternate View” columns](#)
- [Science Fiction Stories with Good Astronomy & Physics](#)

## 6 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 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 chapters in *Death by Black Hole* or *The Algebraist*. Anything goes.

## 7 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 *Death by Black Hole* 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.

I care about maintaining academic integrity, and I will apply all relevant Truman policies. See the [Student Conduct Code](#).

For quiz and exam dates, see the [Course Calendar](#) on the Physics 100 web site.

## 8 Labs

You will have a two-hour lab each week, except when midterm exams are scheduled for the lab hour.

Labs are there to give you hands-on experience, and help you get a solid background in the less exotic parts of physics. You won't fully appreciate the physical speculations in science fiction unless you have a decent background in how real physics works.

## 9 Assignments

#	Chapter	Conceptual Exercises	Problems	<i>Death by BH</i>
1.	3 4 (1–5)	1, 2, 7, 22 4, 10, 29, 31	2, 7 10, 13	3, 34
2.	6 (1–6) 8 (1–5) 9 (1–3)	5, 20, 27 3, 9, 19 4, 10, 13	10,16 2 <i>none</i>	1, 16
3.	10 (2–8) 12 (5–7)	15, 27, 39, 46 17, 18	4, 7, 9 <i>none</i>	12, 40
4.	5 (1–4, 6) 11 (1–6)	8, 10, 20, 37 8, 16, 20, 31	5 <i>none</i>	22, 33
5.	13	2, 7, 11, 19, 26, 29, 30, 33	4, 11	2, 26
6.	14	2, 13, 15, 21, 30, 33	3, 4	15
7.	15 (1–4) 12 (1–4)	1, 6, 11, 13, 18, 20, 25 1, 5, 6, 10	<i>none</i> <i>none</i>	6, 21
8.	18 (2–5)	9, 10, 11, 14	4, 5	10, 30

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

## 10 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.

## 11 Policies and Advice

- Expect to spend 7 hours per week outside of class on this course; less if you find the course very easy, more if you find it hard.
- Do not expect to read something once in your text and understand it; plan on going over much of the text more than once.
- I will not lecture directly out of the text, but I expect you to study the text. If you are having difficulty understanding parts of the text 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 end up getting an “incorrect” answer (sometimes there is no “correct” answer!), but it is not acceptable to not try.
- You need not show how you obtain the answer to a multiple choice, yes/no, or similar question with a short answer. For all other work, 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.
- I will return graded work to you during class. Keep all your work in one place for reference, and for possible inclusion in your University Portfolio.
- There will be no making up of labs, tests or quizzes, or late work accepted, unless you are on some legitimate school-related trip, you are sick, there is a death in the family, or something of that nature. If there is some problem which will cause you to miss class I expect you to try to notify me before you miss the class. If you are unable to notify me beforehand, please notify me as soon as possible afterwards. If you don't have a valid reason for missing a class, please don't ask to

make up what you missed. Oversleeping is not a valid reason, nor is a problem with your printer or computer. Problems having to do with non-prescription drugs or alcohol are not valid reasons either. If you miss a class for *any* reason, “valid” or “invalid,” you are responsible for finding out what you missed and for getting work to me on time.

- If you are sick, please *stay home*. You will be allowed to make up whatever you missed.
- Do not ask if you can make up labs, tests, quizzes, or any other work, or if you can take the final exam early, because of problems scheduling rides home. You are expected to be here during the regularly scheduled times. If you choose to be gone at those times and don’t hand in the work due early, you will not be allowed to hand things in late, or to make up any work you missed.
- 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 in that I will often leave you alone during quizzes and tests, and in that I take it on your word alone whether or not you missed a class or test for a valid reason. If I do find anyone cheating or helping someone else cheat, no matter how minor it is, they will automatically fail the course.
- It is a disruption when someone comes in late or leaves before class is over. Please try to be on time and stay until class is over. I will do my best to start and end class on time.
- Have your text, a pen or pencil, and a calculator with you during classes, lab, and tests, and do calculations and derivations along with me during class.