Physics 152

Tentative Syllabus

Lectures: T-F 12:00-12:50 in Kettler Hall room 132

Text: Suggested (but no required) text: Physics for scientists and engineers with modern physics: a strategic approach, Randall D. Knight

Instructor: Mark. F. Masters, Ph.D
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Phone: 481-6153
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Web address: http://users.ipfw.edu/masters/default.htm

Office Hours: Officially, Monday 1330-1430, Thursday 1430-1530, By appointment and, unofficially, when you can find me.

Grading:

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<tr>
<th>Grading</th>
<th>Points</th>
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<tr>
<td>3 - 50 minute exams</td>
<td>300</td>
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<tr>
<td>1 – 110 minute final</td>
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<tr>
<td>Homework and Participation</td>
<td>scaled to 200</td>
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Exam Schedule: February 4, 2011; March 4, 2011; April 8, 2011; May 3, 2011 (13:00-14:50)

About the course: Physics 152 is the first course of a two semester sequence of calculus based physics. The course centers on basic mechanics which is generally Newtonian Mechanics. This material forms the basic building blocks of later classes in Physics 251 (immediately) and in later engineering and physics courses. As such, it is critical that you attain mastery of this material!

Physics is a hierarchical science. That means that what you learn at the beginning is applied throughout all of the physics courses over and over. Often students believe that they can memorize many items for a test and then forget them. This approach is destined to failure in this class. What is critical is understanding.
I expect that you have a basic understanding of math and calculus. This means that you can perform derivatives and integrals and know what an integral and derivative is.

I expect that you can write clearly and concisely in English. I will not give full credit for partial sentences.

In class, you MUST be an active MEMBER of YOUR class. This means that you must participate. You must THINK! The only things not acceptable in this class are saying “I can’t”, “I won’t”, and being brain dead!

I like to have the class have an informal atmosphere. I want you to feel free to ask questions and interrupt. I want you to have fun. Learning new things is fun!

Text: Notice that the text is suggested or recommended. I do this because I do not exactly follow a particular text. Nor do I use chapter problems from the textbook. All of the introductory physics text books have the same material. I expect that YOU as a student are capable of reading the text independently. This means that you find the appropriate section of the text that corresponds to the material we are covering in class. It also means that you do NOT simply glance over the material and say – there I read it – it went in one eye and out the ear! Rather, you have the responsibility to read to understand. To attempt to make sense of what you are reading.

Participation: You are required to participate. Answers such as “I don’t know” (which may be true) or shrugs of shoulders are not acceptable. While you may not know an answer you can think about what the answer could be using what we have discussed in class or you have read previously. I WANT you to be thoughtful. I am not worried about whether your answer is wrong as much as if you Think about your answer.

Attendance: Students are responsible for all materials covered in class and all assignments must be in on time. No late homework will be accepted. Exams must be neat and legible, showing all work and answered using complete sentences. Any appearances of copying work will result in a zero grade for all parties.

Homework: Homework is for you not for me. As such, you need to complete it so that it benefits you. It is given as an activity to learn from. When you complete a homework assignment, you must think about what you are doing, why are you doing it, what is the physics involved.

How I will teach class: This class will be presented in a way that is, perhaps, different from any other class you have ever had. The method is known as interactive engagement. In this approach, I will NOT really lecture and YOU will actively participate in your learning. Learning is not a passive activity. For example, you may passively watch a TV show about magnetic levitation. While you may be inspired by the show to investigate magnetism and be aware that magnetic levitation exists, it is unlikely that you will understand it. Understanding is not memorizing. To understand requires work.

Certainly, if I wanted, I could lecture and cover all of the material in the textbook in a single semester. However, how many of YOU would understand any of the material at the end of such a class? My goal is for you to understand the physics. To understand physics you have to think
about the physics, work with the physics, wrestle with the physics. Physics is NOT just plugging in numbers to get some answer. There is a deeper understanding to physics. One of the main goals of physics is to take a complex system, simplify it so that we can understand it, then add the complexity back in with a deeper understanding of the system as a whole.

There will be frustration, but frustration is not necessarily a bad thing because it is an indicator of struggling with the ideas. You already have ideas (preconceptions) about physics whether you admit to them or not. In order to replace these preconceptions you have to first recognize that you have a preconception then you have to build new concepts, but that is difficult. My role in this class is to help you to recognize these preconceptions and to help you build new correct concepts of the physics. My goal is to have you UNDERSTAND the physics.

In particular, you must always consider asking yourself these questions:

• What is happening?
• How do I know what is happening?
• How is this happening?
• Why is that happening?
• Am I being consistent and paying attention to things I already know?

**Something new:** This semester WE (that’s you and me) will be trying several new approaches to the class (I am an experimental physicist after all). First, in the laboratory we will be breaking completely from tradition and doing laboratories on optics (yes optics). Laboratory will be taught in a way that is different from what you usually have seen, but that is a matter for the lab syllabus.

In class, we will actually do investigations. These investigations will require you to think and apply the physics we are learning.

Second, we will be using a thematic game as part of the course structure. This means the course will be structured as a multiplayer game. The game will have a story-line associated with it (hopefully not too cheesy), and will involve assigned intelligence missions (homework?) and battles (exams?). Through the “game” you will be earning experience points. Points may be earned through a variety of means as will be described later. As you gain experience points, you will gain promotion. As you are promoted, you will gain greater control of your environment. Since much of the class involves group activities, you will gain increased influence on who is part of your group and the size of the group. Of course, with promotion, you also get greater responsibility.

**A word of warning:** One of the best methods to succeed is to keep your professor happy with you. So what could possibly keep someone as strange as a professor happy? This is simple. Work hard on the material, stay engaged with the material. Ask questions (lots) in class, and out of class. Have fun in class. Don’t skip class. Try your best. If you do these simple actions, you will find that your professor will have a lot of respect for your effort. On the other hand, skipping class, being disrespectful will lose your professor’s respect and that will not be particularly good for you.
My expectations of you are:
You will at least 2 hours out of class for every hour in class.
You will prepare for class.
You will think about the physics of every situation.
You will stay on task and not talk about what you are going to do after class or on the weekend or whatever.
You will not cheat.
You will work in groups and I will assign groups.
You are able to do basic mathematics and calculus.
You are able to write in complete sentences using proper English.

Topics covered:
1. Kinematics
2. Forces
3. Rotational motion
4. Statics
5. Momentum
6. Work and Energy
7. Oscillations
8. Fluids

Masters’ Classroom Rules

1. You will occupy a seat in the first four rows – I grade by row!
2. You will not yawn – a yawn is the equivalent to raising your hand.
3. If you answer a question with an “I don’t know” (or equivalent) without any thought you will be expected to entertain the class with a rendition of “I’m a little teapot,” including acting out all of the actions.
4. If you ever use “human error” as a source of error you will be introduced to Mr. Hammer.
5. If you have a question, you will ask it.
6. I reserve the right to throw things at you if you snore in class
7. When you are talking in class you had better be on topic or else!!!
8. New rules will be assigned as I see fit.