Physics 2300
University Physics III – Fluids and Thermal Physics
Fisher 132
MTWΘ 12:05-12:55 PM
Track B, Spring Semester 2006
www.phy.mtu.edu/shaw/PH2300.htm

Instructor:
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rashaw@mtu.edu

Office Hours:
I’m happy to meet with you and help you with homework, discuss physics concepts, etc. --- But in my experience office hours get ignored anyway, so instead send me an email or catch me in class and we can set up a mutually convenient time to meet.

Course Outline:
Welcome to PH2300, which is the third of a five-part, calculus-based sequence in introductory physics. We will be studying fluid mechanics, meaning the properties and motion of fluids (materials that deform continuously when forces act on them), and thermodynamics, meaning the physical laws governing changes in the internal energy of objects. Specifically, we will cover chapters 15-19 of the textbook:
15. Fluids and Elasticity
16. A Macroscopic Description of Matter
18. The Micro/Macro Connection
19. Heat Engines and Refrigerators

The main emphasis of the course will be our study of thermodynamics, which is one of the most beautiful and powerful fields of physics. “Thermo”, as we affectionately call it, is a subject that you could spend a lifetime studying. Consider this quote from one of the leading theoretical physicists of the 20th century: “Thermodynamics is a funny subject. The first time you go through it, you don’t understand it at all. The second time you go through it, you think you understand it, except for one or two points. The third time you go through it, you know you don’t understand it, but by that time you are so used to the subject, it doesn’t bother you anymore.” (Arnold Sommerfeld, 1868-1951). Well, contrary to Sommerfeld’s statement, I hope you will understand at least a little bit of thermodynamics by the end of the semester, and I look forward to learning along with you!

Required References:
Physics for Scientists and Engineers: A Strategic Approach, Randall Knight
[Note: if you don’t own a copy of Knight’s full book, you can get by purchasing just Volume 2, which covers chapters 16-19.]
Mastering Physics Student Access Kit
**MasteringPhysics:**
Mastering Physics is a computer-based instructional tool that we will use in this class. Each student will have an account to use throughout the semester. You will receive further instructions on how to access MasteringPhysics and how it will be integrated into the course.

**Expectations**
Overall, my expectation is that you will take enthusiastic responsibility for learning physics in an active way. Let me explain what I mean by “active”:

1. Read the textbook material prior to class --- I will not make a habit of simply reviewing what is in the book. Instead, I will assume we can start from where the reading left off and work on clarifying the concepts through demonstrations, problem solving, and discussion.
2. Attending and participating in class will be crucial to your success because it is there that we can interact through demonstrations, problem solving, etc.
3. You should start work on homework early enough so that you can ask for help if you need it. There is a great learning process that can take place when you struggle with a problem, then discuss it with me during class or office hours, or with coaches in the Physics Learning Center, and then return to the problem on your own. If you delay starting the homework until the night before it is due or, worse yet, the hour before it is due, you will deprive yourself of a valuable source of feedback and interaction.
4. As an active learner, you have many resources for help with the material in this class, only one of which is the instructor. They include the textbook, the student study guide and online materials, your classmates, and the Physics Learning Center (on the second floor of Fisher Hall). The Physics Learning Center is a good place to go when you are stumped by a problem that you have tried on your own without success. I strongly encourage you to use the learning center and to go there for help once you have spent a fair amount of personal effort on doing the homework. And of course, you are free to visit me during my office hours, or at other times by appointment.

Finally, a few words on academic integrity. Physics is fundamentally about truth, and I believe that academic honesty is crucial aspect of the search for truth, whether it be in the classroom or in the research lab. I fully support the university’s academic honesty policy and I expect the same from each of you.

**Grading:**

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<th>Percentage</th>
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<tr>
<td>50% Homework</td>
<td>A 90-100%</td>
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<td>25% Midterm</td>
<td>AB 85-89</td>
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<td>25% Final Exam (Comprehensive)</td>
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<td>BC 75-79</td>
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Homework:
A homework assignment will be given once a week and will consist of problems similar to those discussed in class. Your problem solutions should include:
1. A diagram and the identification of an appropriate coordinate system;
2. Symbolic identification of the given and unknown quantities;
3. Identification of the definition, concept, or law used to solve the problem;
4. Algebraic solution of the problem;
5. Numerical solution of the problem, where appropriate.

Your work should be neat and well organized. No late homework will be accepted. Lastly, working in groups is a valuable way to learn physics, but the work you submit for grading must be your own.

Exams:
Midterm Exam 12:05 PM to 12:55 PM, Wednesday April 4 (Place: Fisher 328)
Final Exam 12:45 PM to 2:45 PM, Monday April 30 (Place: Fisher 328)

Note: It is your responsibility to be present at the scheduled exam times. Unavoidable conflicts must be discussed with the instructor well ahead of the exam.

Exams will be held during class and, therefore, will be 50 minutes in length. You are free to use a calculator and one 8.5 x 11 sheet of paper with your own notes on it, but not the notes, calculators, or exams of other students.

Some of my Philosophy of Teaching
The following quote is a succinct summary of my teaching philosophy:

“The practice of educators, even if they are well-intentioned, who try to make learning less painful than it is, not only make it less exhilarating, but also weaken the will and minds of those upon whom this fraud is perpetrated.” Mortimer J. Adler, 1941 essay in “The Journal of Educational Sociology”

Welcome again to PH2300 and I look forward to spending the half-semester together learning physics!