Syllabus Fall 2008 - Physics 151 Dr. Frosso Seitaridou

Goals of the Course

Using the scientific method we will learn and understand the basic concepts and principles of physics. To achieve this goal, we will use laboratory exercises, discuss real-world applications, and employ the mathematical tools of algebra and calculus. We will be covering a lot of important concepts during this semester. For this reason, you will have to review the material frequently via homework assignments and quizzes.

Important Information

Instructor and Contact Information: Dr. Frosso Seitaridou. You can reach my by emailing at eseitar@LearnLink.Emory.edu or by calling my office at 4-8344

Office Hours: My office is at Pierce 209. I have an open door policy: if I am in the office and the door is open, feel free to come in. We can talk about physics and homework assignments, your student life, and anything else you would like to chat about. You can definitely find me at my office on **Mondays and Tuesdays, 2-4 pm**. You will be notified if, for some reason, there is a change to these days/times

SI and Lab assistants: SI for 151 is Nourine Ahmed (the day/time of her session will be announced). She will also be the lab assistant for Thursday's lab session. Daniel Real will be the lab assistant for Wednesday's lab session. I ask that you are very respectful of their time. Also, do not expect that Nourine and Daniel will be helping only you all the time. You need to be respectful of your classmates as well!

Prerequisite: Math 111 and Math 112 (Math 112 can be taken concurrently)

Textbook: Serway and Jewett, *Physics for Scientists and Engineers with Modern Physics*, Seventh Edition

Homework: The homework assignments will be due at the date stated in class, usually one week from the date it was given out in class. **Late homework will not be accepted unless in the case of a medical emergency.** My goal is to ensure that you keep up with the material covered in class. **A homework assignment will normally be worth 90 points so that, together with the quiz, there will be a total of 100 points for the week (see below).**

Quizzes: There will be frequent quizzes on the material that was covered in the past two lectures. I will not be giving out warnings for the quizzes. Also, quizzes cannot be made up: If you miss class the day when a quiz is taken, then you will get a zero for that quiz. Just as with the homework assignments, my goal is to ensure that you review the material frequently. You cannot possibly learn a concept if you see it only once. **A quiz will be 10 points, and those points will be counted as part of that week's homework.** That means that the homework will be 90 points and the quiz 10 points, so that you will have a total of 100 points for that week. The grade for the quiz will count as part of the homework.

Tests and Exams: There will be three tests and one final exam. The tests will be on the material covered up until that point (the second test will cover the material after the first test and, similarly, the third test will be on the material after the second test). All tests will be taken on Friday afternoons (see detailed schedule below). The final exam will be cumulative. There is no such thing as a make-up exam!

Attendance and Class Participation: I find attendance and class participation to be vital for this course. You will find the homework to be really easy to do, if you come to class and you actively participate by asking questions. **ATTENDANCE IS MANDATORY FOR LAB SESSIONS**.

Tardiness and Cell Phones: Being late for a class, or having your cell phone ring in the middle of one, is distracting not only for you but also for me and for your classmates. Students who are late for class for more than 5 min will generally not be allowed to attend that day's lecture. Student's whose cell phone rings during class will be asked to leave the classroom. For the same reason, I will not allow food or drink during class, with the exception of a bottle of water.

Grading: Grades given for this course will be a subset of A (93-100), A- (90-92), B+ (87-89), B (83-86), B- (80-82), C+ (77-79), C (73-76), C- (70-72), D+ (67-69), D (60-66), F (below 60). See Catalog. The final grade will be determined based on the following weighting:

Homework (with the quizzes): 50%

Exams: 15% tests, 10% for the final

Labs (notebook, report, project): 15%

Class participation: 10%

Course Content: Mechanics, Wave Motion, and Thermodynamics

Important Note: The following table is subject to change, depending on the rate at which we are covering the material.

Date	Material Covered
Thursday, Aug. 28, 2008	Class Logistics – Go over the syllabus The Scientific Method Chapter 1: The size and scale of things (dimensions, units and their conversions, uncertainty in measurements, estimates)
Tuesday, Sept. 2, 2008	Chapter 3: Vectors Chapter 2: Rate of change of a physical quantity Distance vs. displacement Average and Instantaneous velocity 1D motion with constant velocity
Thursday, Sept. 4, 2008	Chapter 2: Average and instantaneous acceleration 1D motion with constant acceleration Free fall
Tuesday, Sept. 9, 2008	Chapter 4: Motion in 2D – Projectile motion Relative velocity Chapter 5: Newton's laws of motion
Thursday, Sept. 11, 2008	Chapter 5: Newton's laws of motion (cont.)
Tuesday, Sept. 16, 2008	Chapter 6: Uniform and nonuniform circular motion Motion in accelerated frames Motion in the presence of resistive forces
Thursday, Sept. 18, 2008	Catch up on lectures – Review for the upcoming test
Friday, Sept. 19, 2008	**Test 1: On Chapters 1-6**
Tuesday, Sept. 23, 2008	Chapter 7: Work, energy and the relation between them Conservative and non-conservative forces

	Potential Energy Work and energy of a spring Energy diagrams
Thursday, Sept. 25, 2008	Chapter 8: Conservation of Energy Power
Tuesday, Sept. 30, 2008	Chapter 9: Momentum and impulse Conservation of Momentum Elastic and Inelastic collisions
Thursday, Oct. 2, 2008	Chapter 9: Motion of a system of particles (center of mass) Chapter 10: Rotational motion
Tuesday, Oct. 7, 2008	Chapter 10: Torque Chapter 11: Angular momentum
Thursday, Oct. 9, 2008	Chapter 12: Rigid bodies in equilibrium Elasticity
Tuesday, Oct. 14, 2008	Midsemester break – No classes
Thursday, Oct. 16, 2008	Catch up on lectures – Review for the upcoming test
Friday, Oct. 17, 2008	**Test 2: On Chapters 7-12**
Tuesday, Oct. 21, 2008	Chapter 14: Deformation of solids Density and Pressure Buoyant forces and Archimedes' principle
Thursday, Oct. 23, 2008	Chapter 15: Periodic motion - Simple harmonic oscillator (SHO - mass on a spring) SHO – pendulum Damped and forced oscillations
Tuesday, Oct. 28, 2008	Chapter 16: Waves – Propagation, reflection and transmission
Thursday, Oct. 30, 2008	Chapter 16: The wave equation Chapter 17: Sound waves – Speed and intensity
Tuesday, Nov. 4, 2008	Chapter 17: The Doppler effect Applications of sound waves **Note: First full lab report due today**
Thursday, Nov. 6, 2008	Chapter 18: Superposition and interference Standing waves Resonance
Tuesday, Nov. 11, 2008	Chapter 18: Applications of standing waves Beats
Thursday, Nov. 13, 2008	Catch up on lectures – Review for the upcoming test
Friday, Nov. 14, 2008	**Test 3: On Chapters 14-18**
Tuesday, Nov. 18, 2008	Chapter 19: Temperature and the zeroth law of thermodynamics Thermometers and temperature scales Thermal expansion of solids and liquids
Thursday, Nov. 20, 2008	Chapter 20: Heat and internal energy Specific heat and calorimetry Latent heat and phase change Work in Thermodynamic processes The first law of thermodynamics
Tuesday, Nov. 25, 2008	Chapter 21: The ideal gas and the kinetic theory of gases Adiabatic processes The equipartition theorem Molecular speed distribution

Thursday, Nov. 27, 2008	Thanksgiving recess – No class
Tuesday, Dec. 2, 2008	Chapter 22: Heat Engines Entropy **Note: Second full lab report due or oral presentation during the lab sessions**
Thursday, Dec. 4, 2008	Chapter 13: Universal gravitation Kepler's laws
Tuesday, Dec. 9, 2008	Last day of classes – Review for the final exam
Wednesday, Dec. 17, 2008	Final Exam

Chapters 1, 2, 3, 4, 5, 6	Test 1 (September 19, 2008, 2-4 pm)
Chapters 7, 8, 9, 10, 11, 12	Test 2 (October 17, 2008, 2-4 pm)
Chapters 14, 15, 16, 17, 18	Test 3 (November 14, 2008, 2-4 pm)
Chapters 19, 20, 21, 22	Final Exam (December 17, 2008, 9 am-12 pm, cumulative)

Working with the Honor Code: The Oxford College Honor Code applies to quizzes, tests, and exams. You are encouraged to work on homework and laboratory assignments together, since two or more heads are always better than one. However, you are expected to write up your own homework solutions and laboratory reports. For example, you can work with friends/classmates on problems. However, when you go home and you are by yourself, you are expected to redo all those problems and write up the solutions you are going to hand in. For quizzes, tests and exams you are asked to follow the instructions given by me and abide by the Honor Code. For example, you are only allowed to use books when I specifically tell you that you can. Also, sharing calculators, pencils, etc., is not allowed.

Religious Holidays: You need to tell me immediately if any religious holidays, other than those designated in the schedule above, will interfere with the course, especially the final exam and tests

How to Solve a Physics Problem

Your homework assignments will consist of discussion questions and problems. In your homework solutions I expect to see that you solve the problems following several important steps.

1. Read the problem carefully so that you know what is given and what is asked.
2. Draw a picture. I cannot think of any physics problems that can be solved without drawing a good picture.
3. Label all the quantities in the diagram, those that are given and those that you need to find. Also, **show your coordinate system and show which direction you have defined as positive!**
4. State the Physics Laws that apply to that problem and explain why. Here, I am not asking for an essay, a sentence is enough. For example: ``The system is isolated ➔ Conservation of Momentum applies."
5. Write the law in equation(s) form. To continue the example, at this point you will say: $\overrightarrow{P_{final}} = \overrightarrow{P_{initial}}$
6. Solve the equations and substitute the values. **Always include the units!** Also, show your work! You cannot just write the initial equation and then the result. You have to show me the intermediate steps. This way, I can identify the wrong step and help you understand why what you did is not right.
7. Check your answer. Do the units match? Does the sign in front of your result make sense? Is the answer too big or too small compared to what you expected?

Requirements for the Lab portion of this course

For the lab portion of the course, you are required the following:

1. Have a lab notebook. Your lab notebook is where you will record details of your experiment. Each time you do an experiment you will have to record
    a. The title of the experiment. Include your name, your partners' names and the date
    b. The goal of the experiment: in a couple of sentences you will have to describe what you are trying to measure and why
    c. A list of the materials/equipment you are using for this lab assignment
    d. What you are measuring and why (State what formulas you need and why in order to go from the quantities you are measuring to the quantities you are interested in).
    e. Show your results (measured quantities and the quantities you wanted to find). In this section you would show the graphs (label axis and show the units) and any other results (such as tables) that you gathered during the experiment.
    f. Discuss the results. I am not really asking for an essay here, just say if the results you got were as expected (and why) describe and show the errors in your measurements and, in a couple of sentences, say what you would do differently if you had to do the experiment again.
    g. Conclusion. In a small paragraph summarize the experiment and explain what you got out of it
2. A full lab report (for due date, see the table above). For one lab experiment (I will announce which one) you will have to do one lab report. Almost all the elements your lab report will contain are the same as above (a-g) but they are going to be more detailed. For example, you will have to explain in full every step of your lab experiments, your conclusions, etc. I will give a more detailed handout on this when the time comes. The lab report will be corrected and graded and detailed comments will be given. If you desire, you could resubmit the lab report (after addressing all the comments) and the lab report will be re-graded, erasing in this way the first grade. You can only resubmit the lab report once. A handout on the elements of a full lab report will be given during the semester.
3. Towards the end of the semester you will have a choice of a) either doing another full lab report (on an experiment of your choice, this time) or doing a small final project. For the final project you will have to pick a topic and, using the physics you have learned throughout the semester, you will have to explain how it works during a 15min oral presentation. As an example, a topic can be "How do rockets fly?" Depending on your preference (how many people decide to do the project) we will have the last lab section of the semester devoted to the presentations. The final projects will be group projects.