Physics 123 – "Physics Majors/Minors" Section

Fall 2008, MWF 1:00-1:50 p.m., C285 ESC

Physics 123 is an introduction to fluids, thermodynamics, waves, optics, and special relativity. Physics 121 and Math 112 or equivalents should be completed before taking this course. All are welcome, but this section is designed for physics and physics teaching majors and minors. It will be more challenging and in-depth than the non-major section, and modern physics (other than relativity) will not be covered.

Instructor: Dallin S. Durfee

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Office Hours: 2-3 p.m. MWF in Underground Lab or by appointment

Grading: 25% Homework, 10% Labs/Writing, 25% Exams, 20% Final, 10% Quizzes, 10% Term Project

Class URL: http://www.physics.byu.edu/faculty/durfee/courses/Fall2008/physics123m/

Class Goals: You should gain a new understanding of physics and a greater ability to predict and control the behavior of different physical systems. In addition, this course will teach you mathematical methods, reasoning, and general problem solving skills. In addition to learning the "course material," you will become better prepared for future physics courses, and better equipped to understand and appreciate the universe around you.

In addition to learning physics, I hope this class will broaden your interest in and understanding of, well… life, the universe, and everything! My understanding of science and math has affected all aspects of my life, from the way I manage my finances to my understanding and appreciation of the gospel. It has sharpened my reasoning skills and awakened a fascination of the universe we live in.

Study Groups and Office Hours: Although I expect that this will be a challenging course for all of you, if you put forth the effort you will do well and have fun. It has been shown in several studies that the time spent working with classmates and personal contact with faculty members are two of the most important factors in a student's success in college. As such, ***I strongly encourage and will do whatever I can to help you to establish study groups and to make myself available to you***. Students who have taken advantage of these opportunities in the past have formed friendships which have lasted well beyond Physics 123, and which have helped their learning in future courses.

One of the best ways to optimize your efforts in this class is to take advantage of office hours. I recommend that you work what you can on the homework before class, and then come down to the study area in the underground lab after class to work on your homework. Here you will find other students from the class to work with. Because I hold my office hours in the underground

* The secret passageway to the underground lab is located on the ground floor of the ESC on the north end of the building. There you'll find a door without a lock, which opens up to a long, descending stair case. My lab and the study area are at the bottom of the stairs, just past the mysterious fountain of water coolness.

lab at this time, you will also have ready access to me when you have questions that your classmates can't answer.

If you can't make it to office hours, I highly recommend that you set up a study group of your own. If you are interested, there are things I can do to help you communicate with other students to set this up. You are also free to stop by my office or lab at any time or arrange a specific time to meet with me to ask questions or get advice about the homework, ideas from class or the book, physics in general, career paths, graduate school, or anything you want.

Textbook: There are two books for this course. The primary text is ***Physics for Scientists and Engineers with Modern Physics***, Sixth Edition, Volume 3, by Serway and Beichner. The second book is ***Physics phor Phynatics***, First Edition, by yours truly. This book contains supplementary material on waves and General Relativity. It is a very inexpensive book --- I shopped around for an inexpensive printer, and I don't receive any royalties for this book. Both books are available in the bookstore.

The reading assignments are listed in the class schedule. ***It is of great importance that the assigned reading be done before class***. There will be daily reading quizzes.

Homework: Assignments are due on their listed due date ***any time before the building closes***. Place assignments in the slot labeled "physics 123, section 2" in the boxes near room N375 ESC. ***Be sure to write your CID number in at the top of each assignment*** or I will not be able to give you credit for your work (if you don't have one or aren't sure what yours is, you can get one from the class web page). Homework will be returned to the slots next to the box where homework is handed in, sorted by the first two digits of your class ID. Other students will have access to your graded homework, so if you don't want others to know your scores, don't put your name on the assignment. ***Homework solutions will be posted on blackboard*** (not the regular class web page) early on the morning after the assignments are due.

Homework must be legible, and all steps must be clear. ***If the grader has difficulty following your work you will lose points***. All homework should be done symbolically as far as possible. When numerical results are required, do not put numbers into your equations until the end. Unless otherwise noted, numerical answers should be given in standard SI (mks) units, and should be given to ***three significant digits***. ***Late homework will not normally be accepted***. Instead, your two lowest homework scores will be dropped. I will bend this rule if circumstances out of your control have prevented you from turning in ***more than two homework sets*** on time.

Students are ***strongly encouraged*** to discuss and work homework together, but any assignment handed in must be entirely your own work.

Labs: You will perform several short experiments, similar to the "walk-in" labs in physics 121. Some will be set up in room S415 ESC. The days that they are available are listed on your schedule. The rest are computer simulations, available on the class web page. They will run on any up-to-date computer with Java. I can get you access to the physics computer labs, if needed.

A worksheet for each lab is available on the web. ***The worksheets may be turned in at any time on or before the last day of the lab***. They are placed in the same slot and will be returned in the same manner as homework. You are encouraged to work and discuss the labs in groups, but

everyone must be present and participate, and all analysis must be your own work. ***Labs typically may not be made up*** (tell me ASAP if you have special circumstances).

In-Class Writing: At various times during class I will stop and give you a minute or two to write a short but complete paragraph summarizing what we've discussed. I will then randomly pick one student to read their summary to the class. I have found that these exercises help students internalize ideas and find and fill in the holes in their understanding --- I often think that I understand an idea well, and don't realize that I'm missing something until I try to explain it to someone else or write the idea down. These short writing assignments will also help you improve your writing skills. Writing skills are very important in science and engineering, and you should take advantage of every opportunity you have to develop them. Although we don't have time in this course to do graded, formal writing assignments, these short assignments will help you improve your ability to organize your ideas and write concisely.

At the end of the semester you will receive a score based on my perception of your efforts. To simplify grade keeping, this score will be recorded as lab #12. You will receive full points if you make an honest effort – even if your summaries contain incorrect information. If you don't take the assignment seriously, fail to write, or refuse to present when called upon you will lose points. However, as with any assignment, I will do everything I can to accommodate those with special circumstances or needs (but I can only meet your needs if you let me know what they are).

Exams: There will be three unit exams during the semester and a final exam during finals week. Exam problems will be similar to homework problems. Unit exams will be given in the testing center. There will be no time limits, other than the closing time of the testing center. You will be allowed one 8 1/2" x 11" page of hand-written (not photocopied) notes and an *un-programmed* calculator.

The final exam will be given in the classroom at the date and time given in the BYU final exam schedule. The final exam will be comprehensive. You will be allowed to use your textbook, any course handouts, your graded homework, exams, and labs, and any notes that you yourself have written. You will also be allowed to use an *un-programmed* calculator.

Quizzes: There will be several "quiz" and "thought" questions presented in each class period. The first question will be given at the beginning of class, so it is important for you to be on time. In order to participate in the quizzes, you will need to purchase a remote and register it on the class web page. *Quiz questions* will check your preparation for each class, and should not be very difficult if you are caught up on the reading. You will be awarded three points for every correct answer to a quiz question, and one participation point for every wrong answer. *Thought questions* will be used to help me pinpoint misconceptions and to encourage discussion. A participation point will be given for any answer on these questions, regardless of whether your answer is right or wrong. At the end of the day, the total score for your quiz and thought questions will be tallied. Your lowest two daily quiz scores will be dropped when computing your final grade. ***As with homework, quizzes cannot be made up***. Talk to me ASAP if you have a problem which will result in missing more than two quizzes.

Term Project: The term project is an opportunity for you to propose and conduct a simple experiment or to theoretically, mathematically, or computationally investigate an aspect of the course in more depth. Term project guidelines, as well as a list of suggested projects and examples of projects done in prior semesters are available on the class web page. Note in the

guidelines that there are actually three due dates – one for a proposal, one for a progress report, and one for the final report. If you wish, you may bring your project or a presentation of your results to show to other class members the last day of class.

Grading: Your scores will be available online through the class web page. **Please regularly check that your scores are recorded correctly.** Your letter grade will be determined from your total percentage, according to the cutoffs below. I reserve the right to soften the grading scale, based on my perception of this class's performance relative to other semesters, but I will not raise it (i.e. you are guaranteed at least the letter grade given below for a given percentage). Because the class is not graded on a curve, it is to your advantage to help one another!

A	94	B-	77	D+	60
A-	89	C+	73	D	56
B+	84	C	69	D-	50
B	80	C-	64	E	0

Tutorial Lab: The tutorial lab is located in ***N304 or N361 ESC*** (it changes each semester, check the sign on the door) and is open most of the day. It is a great place to do your homework. This way, when you get stuck you can get immediate help from classmates who are also doing their homework there! The tutorial lab is a great place for study groups to meet.

Physics Majors Handbook: I strongly suggest that all physics majors and minors take a good look at http://www.physics.byu.edu/Undergraduate/handbook.aspx

University Policy: BYU encourages teachers to include the following statements in each class syllabus. I strongly support these statements. In addition, I urge you to review the honor code of the University, found at http://www.byu.edu/stlife/campuslife/honorcode/

BYU's policy against sexual harassment extends not only to employees of the university but to students as well. If you encounter sexual harassment, gender-based discrimination, or other inappropriate behavior, please talk to your professor, contact the Equal Employment Office at 422-5895 or 367-5689, or contact the Honor Code Office at 422-2847.

BYU is committed to providing reasonable accommodation to qualified persons with disabilities. If you have any disability that may adversely affect your success in this course, please contact the University Accessibility Center at 422-2767. Services deemed appropriate will be coordinated with the student and instructor by that office.

The study of (insert discipline) requires a degree of concentration and focus that is exceptional. Having small children in class is often a distraction that degrades the educational experience for the whole class. Please make other arrangements for child care rather than bringing children to class with you. If there are extenuating circumstances, please talk with your instructor in advance.