

COURSE NAME: PHYS-112 General Physics II
DEPARTMENT: Physics
SEMESTER: Spring 2006
INSTRUCTOR: Viktor Martisovits
OFFICE: VSC 123
OFFICE HOURS: TBA, posted on the office door, and by appointment
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TEXT: P. A. Tipler, *Physics for Scientists and Engineers, Fourth Edition* (W. H. Freeman and Company/Worth Publishers, New York, 1999), Vol. 1 and 2.
PREREQUISITE: PHYS-111
COREQUISITE: MATH-132

COURSE DESCRIPTION:

A thorough basic course in all branches of physics with an emphasis on mathematical analysis. Designed for science and engineering majors. Required for advanced physics courses. One three-hour lab per week. A continuation of PHYS-111.

OBJECTIVES AND GOALS:

After taking this course, the student should be able to:

- understand why physics is an integral part of liberal arts education.
- understand the unique position of physics among science and engineering disciplines as the primary science of nature.
- understand the role of physics in broader economical, social, and environmental implications for the whole society.
- understand that physics is a dynamic, continuously evolving discipline.
- understand that everything in physics is subject to verification by experiments.
- understand the role of mathematical formulas in physics.
- think for a physics course.
- read and analyze basic physics texts.
- understand fundamental concepts of physics.
- understand general laws and principles of physics.
- obtain the rest of knowledge using deductive techniques.
- understand the logical structure of physics and appreciate its importance.
- solve qualitative and quantitative physics problems.
- perform physics measurements and process experimental data.
- write laboratory reports about experiments performed.

IMPLEMENTATION:

Physics is a scientific discipline which cannot be memorized. To learn physics means to understand it and be able to apply it, which is a process requiring a lot of time and effort (please recall that this is a five-credit course!) and, simultaneously, being extremely rewarding and sometimes even fun ☺. It is extremely important to STUDY PHYSICS EVERY DAY because new material assumes the familiarity with the material previously covered. It is impossible to understand and apply new material without mastering the old material on which it is based. General college guidelines suggest that for each semester hour, students should spend one hour in class and, on average, two hours outside of class per week. Applied to General Physics, this gives eight hours outside of class per week, which has the greatest impact if distributed evenly throughout the week. It is very helpful to schedule a time and a place to study physics for each day. As a reminder: YOU CANNOT AFFORD TO GET BEHIND IN THIS CLASS! Please get help from me, your classmates, the supplemental instructor, or the Center for Academic Excellence when you encounter difficulties. Attending class with regularity and a willingness and desire to learn will help you greatly.

The construction of understanding and problem-solving skills will involve the following components utilizing both individual and group work.

Reading assignments should be read at least two times or until full understanding is achieved. The first reading will serve as the initial exposure to the new material and should be done before the material is covered in class. It should generate questions for in-class discussion. The second reading should be done after the class devoted to the material and should reinforce the understanding of the material. Do not try the problem-solving assignments without reading the relevant portion of text, not simply skimming the sample problems. The reading assignments should be executed individually. The assigned text should be read slowly and carefully trying to understand the meaning and the importance of each word in every sentence and each symbol in every equation. The same attention should be given to sample problems solved in the text, which are extremely useful to introduce important problem-solving skills. You should always have a piece of scratch paper available while reading so you can actively follow manipulations of formulas and equations. The most important formulas and equations should be written on a separate sheet of paper while reading. This formula sheet will be useful for class discussions, problem-solving assignments, and your preparation for tests. In addition, you might be allowed to use the formula sheet on some tests or the final exam. There might be unannounced short quizzes about selected reading assignments to reinforce crucial material.

We will meet in lecture/discussion sessions four days a week. In addition to lectures covering the most important material from the reading assignments, we will discuss important/difficult aspects of the material and some typical examples, try to relate the material to real-life situations, and answer any relevant questions. The material covered will include some so-called derivations, which are very important to demonstrate the logical structure of physics and relationships between its various elements and are, in

fact, an important element of the physics scientific method. The derivations also help us better understand the essence of the element being derived. Everybody is expected to participate actively in the lecture/discussion sessions and study the class notes before coming to the next session. There will be unannounced short quizzes about the class notes and the discussion from previous sessions.

We will have regular problem-solving assignments, which will include both qualitative and quantitative problems. These are extremely important because the full understanding of the material is achieved by its active application. In the process of working on the assignments, you should develop and improve critical-thinking skills and problem-solving abilities so the assignments must be challenging. Diligently working on the assignments pays off with big dividends at test time! It is crucial that you start working on the assignments immediately after they are assigned so you have enough time to go through the necessary learning process, which is not always straightforward. Your written solutions must include all the necessary diagrams, formulas and equations (including the ones you start from), and the complete explanation of all the steps involved (the same effort will be required on tests). Omitting these elements and just giving the final answer with no work shown will be worth no credit. Make sure that all your equations and formulas are correct including the vector notation, signs, and units (please be careful especially about the vector notation). The final copy you turn in should be neat and legible. Please do not turn in your first draft. You will work on the assignments individually and in groups.

There will be an attempt to regularly collect selected individual problem-solving assignments and have selected problems graded for each student. An announcement that an individual assignment will be collected may or may not occur. Some individual assignments might be self-evaluated.

Group problem-solving assignments will be collected regularly. One of their goals is to promote the exchange of ideas and team work. However, before going to a group meeting, you should review the relevant reading assignments and class notes and try to solve the assigned problems on your own. In this way, when you later meet with your group, you will function more effectively. During group meetings you will be presenting informally to the rest of your group about your progress on each assigned problem. Every member of a group must produce their own written solution to all assigned problems. Selected problems will be graded for one randomly chosen member of each group, and every member of the group will receive the same grade as the chosen member. It is therefore important that your group learn to work well together so that you all will be successful. It is recommended that each group set expectations and rules for its members. Every member of a group will be peer-evaluated by the rest of the group. The areas that will be evaluated include how regularly and how well-prepared you come to group meetings, the quality of your informal presentations about your progress, how much you contribute during group meetings, and how seriously you take your group responsibilities.

Thursdays will be devoted to laboratory experiments, which represent a very important part of the course. You will be working on the experiments in groups. Pre-lab questions, the analysis of collected experimental data, lab homework, and lab reports will be done individually. More details will be provided in the first laboratory session.

GRADING:

We will try to have three tests and a comprehensive final exam. The day of the tests will depend on the day the relevant chapters are completed. It is your duty to notify me immediately about any conflicts you have with test times. The final exam will be held on May 10, 2005, at 8:00 a.m. The tests and the final exam will include some theory questions, qualitative problems, and quantitative problems. They will require some numerical calculations so you must have a calculator with you. You must work out the solutions step by step, include relevant diagrams, and write explanations of what you have done and the names of the formulas and equations you use. It is important to do the problems as neatly and clearly as possible. Anything which I am not able to read will receive no credit. Any work on the tests and the final exam must be done individually, and you cannot communicate with anybody except the instructor. The tests will be significantly different from the problem-solving assignments so you will have difficulties if you try to memorize problem solutions. (The purpose of the problem-solving assignments is to learn problem-solving skills and deepen your understanding of concepts.) You would benefit by beginning reviewing for each test at least one week in advance. Each test will have the same weight equal to 100 points. The weight of the final exam will be 150 points. The final exam must be taken to complete the course.

The problem-solving assignments, pre-lab questions, lab homework, lab reports, and other written assignments are due at the beginning of the specified class. Generally, no late work will be accepted. The weights of the individual and group problem-solving assignments are equal to 100 and 100 points, respectively. The peer evaluations of group work will weigh 50 points. The weight of the laboratory experiments and the other laboratory-related assignments is equal to 150 points. Please note that all the assigned laboratory experiments must be completed. The weight of the quizzes is equal to 100 points, and they cannot be made up. Finally, there will be 50 points for attendance.

The total course grade will be curved; however, the following grades are guaranteed: 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 (63-66), D- (60-62), F (0-59). Other factors such as attendance, participation, effort, and trends may also play a (minor) role.

ATTENDANCE:

Attendance is required as stipulated by college policies. I hope that you will discover soon that it is for your benefit to be in class. This is especially true for physics, for which continuous study is extremely important. Important administrative information such as changes in scheduled tests and due dates will be given in class. The most important aspect of attendance is the exchange of ideas. Your participation in class will also allow me to evaluate what is needed in class. Please notify me in advance when absence will be necessary.

DISABILITIES:

Central College abides by interpretations of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973 that stipulates no student shall be denied the benefits of an education "solely by reason of a handicap." Disabilities covered by law include, but are not limited to, learning disabilities, hearing, sight, or mobility impairments, and other health related impairments. If you have a documented disability that may have some impact on your work in this class for which you may require accommodations, please see me and Nancy Kroese, Director of Student Support Services and Disabilities Services Coordinator, (x 5247) during the first two weeks of the semester so that such accommodations may be arranged.

PLAGIARISM AND OTHER ACADEMIC DISHONESTY:

Plagiarism and cheating of any form are serious offenses and may result in an F for the assignment, the course, or expulsion from the college. The details of Central's Academic Integrity policy are found in the Student Handbook, on the web. A copy will be sent to you via e-mail during the first week of the semester. It is your responsibility to read and understand the contents of that policy before you submit work to be graded. Questions regarding the policies and enforcement of the policies may be addressed to me during class or during office hours.

NOTIFICATION OF PARTICIPATION IN COLLEGE SANCTIONED EVENTS:

Mock Trail participants, choir tour participants, athletes, and others who must miss a class for participating in a college sanctioned event are expected to notify me in advance and complete work including tests in advance of the absence. It is the student's responsibility to communicate with me in advance regarding their absences and determine a schedule for make up work.

