

**PHYS 1408: University Physics I (Majors Section)
Spring 2009**

Professor: Dr. Ron Wilhelm
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Schedule: T,Th 12:30pm – 1:50pm
F 2:00pm – 4:50pm (Lab)

Class Location: Science Building Room 118

Office Hours: MWF 10:00 – 11:00 AM., T,TH 11:30 – 12:30 AM.

Course Materials:

- ❑ Alonso & Finn (1996). *Physics*. Addison-Wesley
- ❑ You must purchase a lab journal for this course.
- ❑ All other materials (extra handouts) will be available in class.

Course Description

This course will cover all of the basic concepts of mechanics. It is a calculus-based course and we will, in particular, make use of differential calculus to derive equations and solve problems. We will also develop a solid understanding of the use of vector analysis which is fundamental for this course and all other physics courses. We will conduct physics labs which are inquiry based and which will aid in conceptual understanding of a topic and also prepare students with the skills to conduct research in the future. The small size of this physics section will allow a great deal of interaction between the instructor and fellow students. The basic topics covered in the course will include:

- ❑ An introduction to the mathematical methods of vector analysis (e.g. the dot and cross product) used to describe the interactions between two vectors.
- ❑ Kinematics which deals with displacement, velocity and accelerations.
- ❑ Forces, including centripetal and gravitational forces, and the concept of torque.
- ❑ Conservation laws such as conservation of energy, momentum and angular momentum.
- ❑ Simple harmonic oscillators
- ❑ Temperature, heat transfer and the laws of kinetic theory
- ❑ Einstein's Special Theory of Relativity

Outcomes

So that the student will have:

1. Knowledge of basic processes, concepts and principles of the laws of motion, energy, momentum, circular motion, gravitation, waves, and sound;

2. Knowledge and understanding of the concepts and laboratory techniques found in university physics;
3. Knowledge of metric measures;
4. Proficiency in organization and use of laboratory equipment;
5. Proficiency in process skills, including identifying and controlling variables, interpreting data, formulating and testing hypotheses and experimenting.

Course Objectives:

Upon completion of this course, the student will be able to:

1. State the fundamental physical laws of motion, energy, momentum, circular motion, gravitation, waves, and sound;
2. Use calculus and algebra in solving problems and deriving equations in the fields mentioned in the objective above;
3. Use the concept of a vector along with trigonometry to solve a wide range of problems;
4. Utilize basic problem solving processes, including observation, inference, measurement, prediction, use of numbers, classifying and use of space and time relationships;
5. Use computers to perform laboratory experiments and analyze and graph data;
6. Correctly use measuring devices and other equipment introduced in the lab;
7. Work effectively in group situations.

Methods of Assessing the Expected Learning Outcomes

We will have quizzes, two midterms, journal and homework assignments, surveys, a final project, and one final exam which will assess your level of understanding of basic concepts, facts, discussed topics and reading material. Graded journal entries and homework assignments will be used to assess understanding of individual topics covered in our daily discussions, and pre- and post-tests will be used to assess gains in content understanding over the extent of the course.

Participation: Participation will count as 10% of your grade. If you come to class and participate each day, not coming late, not leaving early, being on task (working on the appropriate experiment), etc., you will receive the full participation grade. **If you miss more than three classes, you will lose your entire participation grade.**

Homework: Homework will be graded and will count as 15% of your grade. It is an important part of the class. Late homework will not be accepted, with the exception that you will be allowed to turn in one homework late. Other late homework will not be accepted.

Labs: The attendance at the weekly laboratory is mandatory. The lab portion of this course is where you will learn experimental techniques and gain conceptual understanding. The labs will be exploratory based and you will learn from your lab partners. It is therefore not acceptable to miss lab. If you must miss lab due to illness or some other factor that is outside of your control, I must be informed in advance and you will be required to make up the work on your own time.

You will turn in formal lab write-ups, with lots of explanations, discussion, calculations and error analysis. It is crucially important that you take good notes (see journals) so that you are able to complete the formal lab write-up on your own at home.

Journals: All lab topics will be written in your course journals. These journals will be periodically graded throughout the term. Your grade on journal entries will be based on both quantity and quality of the entry. Missing entries will be give zero points and entries deemed as partial or of sub-standard quality will not receive full credit. Your journals are 5% of your grade.

Project: We will study one topic as a project outside of class. You will be given materials to work on outside of class. There will be questions to answer and turn in that will be graded. More information on the project will be given out in class. The project will be considered your lab final and worth 3 laboratory grades.

Quizzes: There will be quizzes on content and process covered in class, homework, readings and exercises up to that point. Quizzes will count 5% of your grade.

Exams: There will be two midterm exams and a final exam on content and process covered in class, homework, readings and exercises up to that point. Each midterm exam will count 15% of your grade and the final will count 20% of your grade. The tentative schedule for the exams are:

Midterm exam 1	February 20 th , 2009
Midterm exam 2	April 24 th , 2009
Final Exam	Thursday, April 30 th , 2009, 4:30 – 7:00 P.M.

Grades: The grades will be distributed as follows:

Participation	10%
Homework	15%
Journals	5%
Laboratory	15%
Quizzes	5%
Midterm 1	15%
Midterm 2	15%
Final Exam	20%

Grade Scale

90 - 100	=	A
80 - 89	=	B
70 - 79	=	C
60 - 69	=	D
Below 60	=	F

Any student who, because of a disabling condition, may require some special arrangements to meet the course requirements should contact the instructor as soon as possible so that necessary accommodations can be made. Proper documentation must be presented from the Student Disability Services (AcessTECH). For the complete description of this policy see Texas Tech Operating Policy 34.22 online.

Any student absent for a religious holiday should make the intention known prior to the absence and shall make up missed exams in accordance with Texas Tech Operating Policy 34.19

Students will foster a spirit of academic integrity, and they will not present work as their own that was not honestly performed by them. For a complete description of this policy see Texas Tech Operating Policy 34.12