

PHY 220 (lecture)

General Physics I

Dillard University - Fall 2004

Meeting Times:

STERN 219 M W F 11:00a - 11:50a

(STERN 123 R 2:30p - 5:15p) PHY 220 901 L (You must be registered for the laboratory section.)

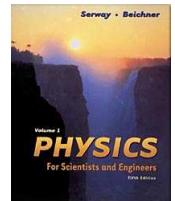
Instructor: Rob Salgado Assistant Professor of Physics Office: Stern 307A Voice: (504)-816-4510	E-mail: rsalgado@dillard.edu Instant-Messengers: AOL, MSN, Yahoo: dillardphysics (do <i>not</i> email here)	Office hours: -to be announced
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Catalog Description:

PHY 220 General Physics I: Particle dynamics in solids. (3 credits for Lecture + 1 credit for Lab)

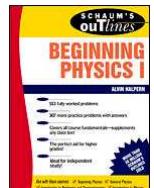
Open to all science, engineering and mathematics majors. Fundamental physical laws of mechanics; kinematics and dynamics; work and energy; rigid body rotational dynamics; waves and oscillatory motions; and gravitation.

Class meets three hours per week for lecture.

[Prerequisite: *PHY 111/112 (Introduction to Engineering Physics I and II), MAT 201 (Analytic Geometry and Calculus I) or concurrent enrollment.*]

Required Textbooks:

"Physics for Scientists and Engineers" (5th edition) by Raymond A. Serway and Robert J. Beichner
(published by Brooks/Cole: ISBN: 0-03-031716-9)



"Schaum's Outline of Beginning Physics I: Mechanics and Heat" by Alvin Halpern
(published by McGraw-Hill: ISBN 0-07-025653-5)

Electronic Materials:

I will maintain a website (for now: <http://physics.syr.edu/~salgado/220/>) that lists the assigned problems and solutions. I will also try to make available the whiteboard/PowerPoint notes and any computer source code (e.g., Python, Maple) that I use for simulations or computations.

Course Goals:

- A. To reinforce basic concepts in physics.
- B. To further develop physical intuition, mathematical reasoning, and problem solving skills.
- C. To further prepare students for the necessarily rigorous sequence in physics and engineering.
- D. To introduce students to research techniques [including laboratory experience, computer-based data acquisition and analysis, and the preparation and delivery of scientific presentations.]

Course Requirements:

Come to class **ON TIME**. Attendance is **REQUIRED**.

"The University recognizes that a student may miss a class for legitimate reasons. In such cases these absences are excusable; however, the student must complete the Student Absence Form." An absence may be excused within 2 weeks of the absence using a form issued only by the Division of the Natural Sciences.

"A professor may drop a student with 3 or more unexcused absences from a course." (2003-2005 University Catalog, page 15)

Note that your attendance is recorded on the official midterm and final grade sheets.

"Academic dishonesty will not be tolerated." (2003-2005 University Catalog, page 15)

Come to class PREPARED and EQUIPPED, having read or written any assignments.

Treat each other with RESPECT. Limit all discussions to the PHYSICS topic under discussion.

Turn OFF all phones, pagers, radios, and other disruptive devices.

Course Procedure:

Three 50-minute lecture meetings and one 165-minute lab meeting per week. Office Hours/Problem Sessions in the Learning Center.

Exams and Quizzes:

In order to encourage you to keep up with the work YOU must do to learn the subject matter, QUIZZES may be given at any time, without warning. [No makeups or extensions. This will be strictly enforced. Be on time.] After every two or three chapters, we will have an announced EXAM on these chapters. There is a cumulative one-hour MIDTERM and a cumulative two-hour FINAL.

There are no makeup exams or quizzes. There are no exceptions. If you are absent for an exam or quiz, you have one week to obtain a Division excuse form. Only if that excuse is valid, **your final exam will carry the weight of your missed exam or quiz**.

Otherwise, you will get no credit for the missed exam or quiz.

Homework:

Homework will be assigned periodically. The bulk of Exam and quiz problems are generally based on homework problems, textbook problems, and textbook examples.

Most of the learning you do in this course is done by **your doing homework problems outside of class!**

However, be sure that you can do the problems *by yourself* since you'll be working on quizzes and exams *by yourself*.

If you need help with your homework, please visit me (with your textbook and your notebooks and with proof that you have tried the problems) during Office Hours... the sooner the better.

** In addition to the regular notebook you use for this class, you must maintain a dedicated “**PHY 220 Homework Notebook**” (spiral-bound notebook with at least 180 sheets). It will be periodically collected, browsed over, graded-for-effort, and promptly returned. You must bring the notebook to each class and to office hours.

How you will use this: (the essential points---a detailed description will be provided on another sheet.)

- You are basically creating your own personal “solution manual” to the assigned homework problems.
- You should want to WRITE DOWN A CLEAR (i.e., logical and legible) AND COMPLETE SOLUTION that you really understand.
 - Start a new problem on a new sheet with the problem number in the upper-right corner...*for organizational purposes*.
 - Try your best to solve the problems by yourself *since this will be an indication of how well you understand the material*.
 - Write down your thoughts on the problem. *What is it really asking? What is it trying to get me to do? What is it trying to teach me?*
 - It's okay if you don't understand at first, but you can understand it if you give it a good and honest try.*
 - If you're stuck, work together with others in a group. *Don't blindly copy the work of others. Try to understand what you write down.*
 - To help make this your work, add your own comments and fill in any missing steps to the group effort.*
 - If you're still stuck, raise questions during class or office hours *then try again*.
- It is possible that you (with possibly the help of your group) were unable to solve the assigned problem by the due date. In that case, you should obtain a copy of my solutions (made available on the web). You must TRANSCRIBE [in your own handwriting] the solution (*adding your own comments and filling in any missing steps*) into your notebook.
- The notebook is expected to be in your handwriting. There should be no loose pages in your notebook.

How I will evaluate your notebook:

- I may or may not announce when I collect the notebooks. (It will be at least once every two weeks.)
- I will be looking to see that you are keeping the notebook up to date. I will only spot-check, not grade, your work.
- I will be looking to see that you are following the rules regarding organization. (*Again, start a new problem on a new sheet.*)
- I will assign a score (to form part of your final grade) and make comments on any deficiencies. You are expected to resolve any deficiencies (including rewriting, if necessary) to avoid further penalties. The original score will not be adjusted.
- Some examples of deficiencies: *missing problems, incomplete problems after solutions are made available, improper format (improper labeling, more than one problem on a sheet, etc.), illegibility, inclusion of non-PHY 220 problems.*

Grades (for the lecture portion), roughly weighted as follows:

20% HOMEWORK NOTEBOOK (FORMAT: see above)

20% QUIZZES (FORMAT: multiple-choice questions, a short problem, and vocabulary definitions)

20% REGULAR EXAMS (FORMAT: many conceptual and computational multiple-choice questions, two or three short problems)

20% MIDTERM EXAM (FORMAT: like a regular exam but cumulative)

20% FINAL EXAM (FORMAT: like two regular exams but cumulative)

A≥88%, B≥76%, C≥64%, D≥50%, F<50%. This class is not graded on a curve.

Borderline cases (between two letter grades): If your exams show an upward trend, your grade may be nudged upwards.

Sequence of PHY 220 topics and the learning objectives: (Homework will be assigned during each chapter.)

Ch 1 Physics and Measurement

Discuss the importance of mathematics and units of measurement. Develop a skill for making approximations.

Ch 2 Motion in One Dimension

Ch 3 Vectors

Ch 4 Motion in Two Dimensions

Distinguish velocity, acceleration, speed, and average velocity. Setup, algebraically- and geometrically-analyze, and physically-interpret kinematics problems. Develop a skill for calculating and reasoning with vectors.

Ch 5 The Laws of Motion

Define and explain Newton's Laws of Motion. Distinguish mass from weight. Setup (with Free-Body Diagrams), algebraically- and geometrically-analyze, and physically-interpret statics and dynamics problems.

Ch 6 Circular Motion and Other Applications of Newton's Laws

Setup, analyze, and interpret circular-motion problems. Interpret Newton's Second Law of Motion as a differential equation.

Ch 7 Work and Kinetic Energy

Ch 8 Potential Energy and Conservation of Energy

Ch 9 Linear Momentum and Collisions

Distinguish force, energy, work, power, momentum, impulse. Setup, analyze, and interpret simple problems involving energy-conservation and momentum-conservation.

Ch 13 Oscillatory Motion (time permitting)

Setup, analyze, and interpret simple-harmonic-motion problems.

Ch 14 The Law of Gravity (time permitting)

Define and explain planetary motion using Kepler's Laws of Planetary Motion and Newton's Law of Universal Gravitation.

Some advice:

Physics is a challenging subject that requires your dedicated attention, but rewards you with skills that you can apply in any discipline!

Physics is cumulative: For example, understanding Ch 8 requires you understand all of the chapters before it.

You must not fall behind! If you find yourself falling behind, you must get some help. Visit the LEARNING CENTER in Stern 301!

Physics is written and spoken in a Mathematical language.

At this stage, Algebra, Trig, Geometry and Pre-Calculus are more important than Calculus. *Review your basic mathematics NOW!*

Physics is about “understanding relationships between physical quantities”, which we uncover by experiment and by mathematical reasoning.

Physics is NOT about formulas and merely plugging-in numbers. Formulas are often only “special cases of expressions of those relationships”.

“Knowing a formula without knowing when it applies” is generally useless.

The act of “plugging-in numbers” measures your ability to do Arithmetic or use a calculator.

The resulting number is only useful when you interpret it physically. *“The right number with wrong physics” is just plain wrong.*

YOU CAN understand and succeed in Physics only if YOU put in the required work.

Just attending lectures and labs is not enough.

Just taking good notes is not enough.

Just reading the textbook is not enough.

Just memorizing formulas and definitions is not enough. Just doing the homework is not enough.

Just reading the solutions is not enough.

There are no shortcuts. **YOU HAVE TO DO IT ALL.**