

Physics 8D
General PHYSICS
Spring 2009



When:

Lecture: Wed: 11:00 am - 1:20 pm

Lab: Fri: 9:30 am - 12:30 pm

Where:

Lecture Room 1822 (in the science building)

Lab Room 1831 (in the science building)

Instructor:

Dr. Kevin Ankoviak

Office: 1823

Phone: (925) 4241386

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Office hours:

Tue. 10:30 – 11:30 am

Wed. 1:00 – 2:00 pm

Required Texts:

"Physics for Scientists and Engineers," by Knight, 2nd Ed.

Supplies:

Graph paper or graphing software, scientific calculator, ruler, protractor.

Course Description:

Physics 8D takes up about where 8C left off. We'll start with the downfall of Newtonian Physics, relativity, then cover quantum mechanics, atomic and nuclear physics. We will follow that up with molecular physics, fusion, fission, and finally cosmology and particle physics. This is a 3 unit course. Plan to spend at least **10** hours of out-of-class study per week.

Prerequisites:

A grade of C or better in Math 3 (Calculus) and Physics 8C.

Attendance is required.

If you miss more than **2** classes **or** **2** labs, you may be automatically dropped. If the drop date has passed you will receive an F grade.

Note: It is **your responsibility** to officially drop the course if you want to withdraw.

<u>Grading:</u>	
Lab Reports	25%
Reading Quizzes	5%
Homework Tests	40%
Two exams	30%

The following grade distribution will be used.	A = 90-100%
	B = 80-89%
	C = 70-79%
	D = 60-69%
	F = 0-59%

Cheating in any form will not be tolerated.

If caught, at best, you will fail the course, and at worst, you will be "expelled for academic dishonesty" which will be placed on your permanent transcripts. If you are uncertain of what constitutes academic dishonesty, refer to the Academic Policies section of your Las Positas College Catalog.

Homework:

You are required to read the entire assigned chapters prior to coming to class. Take notes while you read and during class, and **ask questions**.

Can you learn how to swim without getting wet? Can you learn physics without solving problems? No to both questions. So about 20 questions and problems are assigned from each chapter. The homework will not be collected or graded. However, doing the problems *yourself* is the best way to do well on the tests.

Collaboration:

To succeed you must attempt all the problems yourself. I suggest that you work in small groups (2-3). Once a solution is reached, write the answer in your own words. To simply copy the group answer or study the solutions will not help you when you have to swim on your own during exams. Copying from your lab partners is cheating.

Homework tests.....40%

A 30 minute test is given every week or so at the beginning of class. The test will cover the material from the previous week, as well as earlier related topics. The test will include one or two multiple choice questions, one or two short problems or one long problem. The test is based on, but is not identical to the homework. You may use a formula sheet and a calculator. The lowest test score is dropped automatically.

Two long Exams.....30%

One 2 hour midterm and one 2 hour final exam will be given. They are open textbook and you may bring a formula sheet. The exams will include multiple choice questions, short problems, and long problem. No make-ups will be given.

Laboratory Reports.....25%

All lab reports must be submitted within two week of its assignment. Beyond this, no late reports will be accepted, except when accompanied by a written proof of absence. Your lowest lab grade of the term will be dropped before determining your final grade.

Reading quizzes.....5%

You are required to complete weekly reading assignments before coming to class. To encourage this behavior, a 3 question quiz will be given once or twice a week. The quizzes will cover the reading assignments themselves. Concepts will be emphasized, not equations.

You are responsible for all policies and rules in this document.

Phys 8D GENERAL PHYSICS SYLLABUS-Spring 2009

Wk	Ch	Topics	Experiment (Fri)
1	25	Matter Waves	Michelson Interferometer Relativity
2	25	Matter Waves	
3	37	Relativity	
4	37	Relativity	
5	38	The End of Classical Physics	
6	38	The End of Classical Physics	
5	39	Quantization	
6	39	Quantization	
7	40	Wave Functions and Uncertainty	
8	40	Wave Functions and Uncertainty	
9	41	One-Dimensional Quantum Mechanics	Midterm Preview
10	41	One-Dimensional Quantum Mechanics	Midterm Midterm Postview
11	42	Atomic Physics	
12	42	Atomic Physics	
13	43	Nuclear Physics	Review
14	43	Nuclear Physics II	
15	44	Cosmology and Particle Physics	
16	44	Cosmology and Particle Physics II	
17		Review	

Final Exam...Friday May 29, 9:30 am, Room 1822

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

- Clearly present written analysis of physics problems, including explanation of the approach, and application of appropriate principles and laws of physics and mathematics (including calculus and vector analysis) leading to the solution.
- Participate effectively as a member of a lab team which conducts successful physics experiments.
- Prepare a satisfactory written report of a physics experiment which includes:

Synthesis and mathematical analysis of data to obtain a measurement of a physical quantity or to verify a physical law; including analysis of errors, and a thorough discussion and assessment of the result.

To succeed in a physics course

- * **Read the book** before class, take notes and write down questions as you read.
- * **Ask me questions** in class and at office hours and ask your classmates.
- * **Take notes** in class. I will write your exams not your textbook authors.
- * **Attempt all homework** problems yourself. If you get stuck, don't give up and assume you can skip this topic. Physics builds on previous material, so ask for help.
- * **Collaborate** with classmates on homework and exam preparation.
- * **Explain** difficult concepts to others.

"If you can't explain it to your grandmother, then you really don't understand it."-R.P.Feynman.

* Make use of the Math lab, computer lab, and the Tutoring Center.

* If you have special needs, I'll do my best to accommodate you.

Homework. Attempt at least all the following yourself.

Homework assignments will be given each week as we near completion of a chapter. Approximately 5 conceptual questions, 20 problems and a derivation problem will be assigned. Homework problem sets will **NOT** be collected.

Phys 8D GENERAL PHYSICS LABORATORY

No scientific principle is accepted unless it has passed rigorous experimental tests. These twelve or so experiments you will perform, will provide you with physical evidence that the principles you learn in lecture are not some scientist's opinions.

You are expected to arrive on time and to read the experiment **before** you come to class. Lab reports are due at the beginning of class two weeks after the experiment is performed. Late reports will **not** be accepted except in cases of documented and verified emergency or illness.

The laboratory is an essential part of the course, so attendance will be taken and if you are absent, you can not turn in a lab report using someone else's data. If you miss more than two reports, you may be dropped automatically. No make-up labs will be given, but your lowest lab grade will be dropped.

During lab, I encourage you to collaborate on all parts of the experiment. You are not supposed to divide the labor among your partners. Always check your partners' work since you will use whatever data they gather. You must write the data in the lab manual, notebook paper is not acceptable. Outside of lab, you will **type your own report in your own words.**

Before you leave, you must clean-up your area and neatly put all the equipment back on the carts. Eating and drinking are not allowed in the classroom.

Format Guidelines

Your report **must** follow the following formats.

1. Typed using a clear dark standard font: 12-14 point, double space, Do not use fancy, artistic, or calligraphic fonts. One inch margins on all sides, and number all pages sequentially using Arabic numerals: 1 2 3 Staple your report in the upper left corner. Use white paper only on one side. All sections must be typed except for calculations and numerical questions.
2. The report should be clear, concise, and concrete. **Neatness counts!** Include enough **white space** between clearly titled sections. Always use titles for the sections outlined below.
3. Check your spelling, grammar, and punctuation.
4. All figures must have a title and caption that is understandable independent of the report. They should be numbered sequentially, e.g. Graph 1, Figure 3, Table 2.

The reports are graded based on (1) format, and (2) content. A report is given a grade of 100 points if it is perfect. That is if you (1) follow the above guidelines, and (2) you understand the experiment and results.

How to write lab reports

Lab reports must be prepared on a word processor and should include the following sections:

Cover sheet with title, date, your name and lab partner's names.. Use a **large** font size.

I. Purpose of experiment in your own words (1-2 sentences).

II. Summary of the experiment.

The **Summary** should include what you did in lab, what apparatus you used, what calculations you performed, what graphs you plotted, and what results you obtained using words not numbers. This is not a procedures section. Do not list data, and do not explain the results here (2-3 sentences, this section should be short.)

III. Data Tables.

You must create your own data tables for your report.

IV. Sample calculations (one for each type of calculation.)

V. Graphs of data:

- a. All graphs should have a title, and should be done on graph paper or using graphing software.
- b. Axes should be clearly labeled with units and scale.
- c. Interpret the graph. What can you infer from its shape or slope? Write this result on the graph in a box at a clear corner or blank space.

VI. Table of Results.

Give the final results only, include the accepted values and percentage errors. Include units. Do not explain the results, just list them.

VII. Error Analysis.

Always start with the phrase: the biggest source of error in this experiment is.... Discuss sources of error, how they may be avoided, and how they affect your results. Discuss how good your results are considering error propagation. Show a sample error propagation calculation.

VIII. Conclusions.

- a. What principle or physical law of nature did you investigate?
- b. What did you learn?

This is the most important section. (one or two short paragraphs)

Do not restate how you did the experiment.

IX. Questions.

Typed answers to assigned **questions**. Always explain. Type all word answers. You may hand print in ink any mathematical solutions.

