

PHYSICS 105: PHYSICS AND SOCIETY

Spring Semester 2008

CLASS TIME: Tuesdays & Thursdays, 12:30 - 13:45, Regener 114
TEXTBOOK: P. G. Hewitt, *Conceptual Physics, Tenth Edition*

TEACHER: Colston Chandler
OFFICE HOURS: to be arranged
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THE COURSE

If you are curious about how common things work and about physics that is relevant to social and political issues, but you don't want to be a professional physicist, Physics and Society is just the course for you! No previous background in physics or mathematics is required. Just bring a lively curiosity and a dedication to learning new things.

Depending on *your* interest, possible topics include:

- **physics of everyday things:** toys, sports, dance, air conditioners, automobile engines, xerographic copiers, TV sets, cameras, the human eye, lasers, holograms;
- **socially relevant physics:** ballistic missile defense, medical imaging, global warming, radioactivity and its uses, nuclear power (and waste), nuclear weapons;
- **cosmological physics:** motions of the planets and stars, black holes and the structure of galaxies, the cosmic background radiation, the evolution of the universe.

Along the way we will learn about the fascinating people who had the ideas and made the discoveries.

GOALS OF THE COURSE

This course is intended as a general introduction to physics. It is hoped that by the end of the course you will:

- understand in general terms what science is and is not;
- understand something of the logical and quantitative analysis that physicists use in their quest to understand nature and why they use that analysis;
- be able to recognize the working of physics in the life of society and in their personal every-day life, and to understand the basic physics principles involved;
- be able to communicate effectively about physics subjects; and
- have an historical perspective on physics.

IN THE CLASSROOM

In the classroom it will be assumed that you have completed the reading assignment for the day. You are encouraged to ask any questions you have about the reading in advance (via personal contact or email) so that the instructor can be better prepared to address them in class. While the readings may be briefly reviewed in class if there are questions from you, most of the classroom time will be devoted to related material that may not be in the textbook.

Always ask questions in class!! If you are confused, ask a question! If you understand, test your understanding by asking a question! If you are bored, ask a question that will make the class more interesting for you!

READING ASSIGNMENTS

A list of reading assignments will be posted. At the beginning of class on the due date you are to hand in a short (no longer than one page) essay in which you state one of the important points of the assigned reading and you illustrate it by some analogy or example from your life.

These reading assignments will be graded: 0 points if not handed in or not relevant to the assigned reading; 1 point if satisfactory; 2 points if excellent. Graded papers will normally be returned at the beginning of the following class.

HOMEWORK

Weekly homework assignments will be posted. Homework papers are due at the beginning of class on the date due, in either electronic or paper form.

Homework papers will be graded according to a point system that will be explicitly part of each problem. Graded papers will normally be returned at the beginning of the following class, after which extended answers will be posted.

MIDTERM EXAM

The midterm exam on Thursday, 13 March, will be closed book.

Roughly half the exam will consist of two questions taken from a list posted on Tuesday, 4 March. The remainder of the test will be questions about your homework problems.

Midterm exam papers will be graded according to a point system that is explicitly incorporated into the exam questions. Graded papers will be returned at the first class following the exam, after which extended answers will be posted.

FINAL EXAM

The final exam on Thursday, 15 May, will be closed book.

Roughly one quarter of the exam will consist of two questions taken from a list posted on Tuesday, 6 May. An additional quarter will consist of questions about your homework problems since the spring break. The remaining half of the exam will consist of similar sorts of questions designed to let you demonstrate your comprehensive knowledge of the material covered during the semester.

Final exam papers will be graded according to a point system that is explicitly incorporated into the exam questions. Graded papers will not be returned unless you pick it up at the office of the instructor. Answers will not be posted but will be available at the office of the instructor.

EXTRA CREDIT

You may earn extra-credit points by operating physics exhibits in 'Explora' (the science museum in Old Town). You are to: (1) describe the apparatus (perhaps with a drawing); (2) describe what you actually did to operate the apparatus; and (3) record your observations of what the apparatus did. You are then (4) to explain briefly the physics of your experiment. Your one-or-two-page written report of all this can earn up to 2 extra-credit points. You may submit reports for up to five different *physics* exhibits, thus earning up to 10 extra credit points.

Your extra-credit reports may be submitted (in electronic or paper form) at any time through class in Thursday, 24 April. No extra-credit reports will be accepted after that time.

POSTINGS

All assignments, homework and exam solutions, and other class materials will be posted on Ereserves, part of the UNM Libraries electronic reference system. A sheet giving instructions for access will be available from the instructor.

ATTENDANCE

Attendance at every class meeting is strongly encouraged. It is your best chance to benefit from interactions with the instructor and your classmates.

In addition, there will be a questionnaire to be handed in at the end of every class. This will be your opportunity to tell the instructor what has been clear, what has not been clear, and to communicate about any other class-related matter.

While class attendance is not required, excessive absences will rob you of any benefit of doubt when it is time to assign the course grade.

LATE WORK

Late reading assignments and homework are not normally accepted. Make-up exams are given only in extremely unusual circumstances. Late extra-credit assignments are not accepted at all.

Work submitted in advance of the due date is always accepted.

DROP POLICY

Before February 29 you may drop the course for any reason, but please do inform the instructor of your decision.

After February 29, it would be wise to discuss your intent with the instructor before you drop. Your situation with respect to the course grade may not be as dire as you think. In general, however, whether you would be assigned a WP or WF grade upon dropping will depend on your course work up to the official date of dropping.

GRADING

All work will be graded mainly on the basis of scientific accuracy and quality of reasoning (always based on physical law). The quality of writing style may, however, also be considered.

The course grade will be composed of the following elements:

- reading–10%;
- homework–40%;
- midterm exam–20%;
- final exam–30%.
- extra credit–10%.

Letter grades will be assigned according to the following scheme.

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| A: | 90–110 |
| B: | 70–89 |
| C: | 50–69 |
| D: | 30–49 |
| F: | 0–29 |

Plus and minus grades will be assigned, as well.