PHYSICS 9HE—HONORS MODERN PHYSICS
SYLLABUS FOR SPRING, 2008

- ***INSTRUCTOR*:** **Chuck Fadley, Office: 241 Physics/Geology, Telephone: 530-752-8788, E-mail: fadley9d@physics.ucdavis.edu. (Joint appointment at the Lawrence Berkeley National Laboratory.)**

- ***DISCUSSION SESSION LEADER:*** **Konstantin Chudnovskiy, E-mail: kchudnovskiy@student.physics.ucdavis.edu**

- ***COURSE WEBSITE:*** **A course website has been established at: http://www.physics.ucdavis.edu/Classes/Physics9HE2007/. Various items such as the syllabus, reading and problem assignments, additional reading from other sources, slides used in lecture, references to useful additional study material, problem solutions, samples exams from prior courses, answers to current exams, and other crucial communications will be posted at the course website throughout the quarter. Please check the website frequently.**

- ***READING AND STUDY MATERIAL:*** **The textbook for the course will be Modern Physics for Scientists and Engineers by Thornton and Rex, Third Edition, 2006, Thomson/Brooks-Cole Publishing. You will be responsible for all of the sections assigned in lecture as reading, as well as lecture material or additional items posted at the website which may not be covered in the text. The website will also include copies of slides used during lecture, in *pdf* format. It is a good idea to print the lecture slides so that you can refer to and as necessary make notes on them during lecture.**

- ***HOMEWORK:*** **Homework problems will be given out in class when a chapter is begun. The homework will not be collected, but doing it and understanding it will be crucial to doing well on quizzes, midterm, and the final examination.**

- ***DISCUSSION SESSIONS:*** **It is imperative that you attend your assigned discussion session. This course continues your encounter with a number of new concepts that may at first seem confusing and contrary to normal experience, no matter how well you understand the physics you have studied in the prior four quarters of 9H. Thus, the opportunity to ask broad-ranging questions in the more informal discussion setting is crucial to better understanding and overall success in the course. Attendance in discussion will be recorded and used in assessing your performance in the course (see below).**

- ***OFFICE HOURS:*** **Regular office hours for Professor Fadley will be Tuesdays and Thursdays, 3:00-4:00 PM; additional meetings later on these days may be possible if you have conflicts. Special discussion/question sessions will also be held before both the midterm and the final.**

- ***FIELD TRIP:*** **There will be one optional Saturday field trip, to the Advanced Light Source at the Lawrence Berkeley National Laboratory, to give you a better idea of some current research areas in modern physics.**

- ***EXAMINATIONS:*** **Please bring a calculator to all quizzes, midterms, and the final, as you may need it for completing some problems. Also, please show all of your work and reasoning, as no credit will be given if only the answer is written down. Cases of suspected cheating will without exception be referred to the Office of Student Judicial Affairs.**

  Quizzes: **There will be two closed-book, closed-notes quizzes of 15-minute duration, at the end of a Thursday lecture (see dates in schedule on back side.) The questions here will be similar to some of the homework problems, and should be straightforward to someone who has worked these problems.**

  Midterm and Final Examination: **The midterm, also on a Thursday, and the final examination (see dates and times in schedule on back side) will also be closed-book and closed-notes, with no formula pages allowed, but most useful equations and formulas, as well as all fundamental constants, will be provided to you.**

  Note: No early or makeup quizzes or examinations will be given. **If you must miss a quiz or exam for a health reason, please bring Professor Fadley a written excuse from the health center or a doctor. If you have an excused absence for any quiz or exam (excluding the final examination), its weight will not be counted in determining your final grade, which will then be based only on the rest of the credit items that you have completed.**

  For questions on exam grading, please see Professor Fadley. **Checking of grading will only be done if you turn the exam in to me with a written statement as to the nature of the problem, within one week of the date of return of the exam to you. Do not write on the exam.**

• ***GRADING:*** **Your final grade will be computed as follows:**

Discussion section participation:	**5%**
Quizzes (two):	**15%**
Midterm (one):	**30%**
Final (comprehensive):	**50%**
	100%

Grading will be based upon a curve appropriate to this course, with a letter grade being assigned only at the end of the quarter. Means and standard deviations will be calculated for the quizzes and midterms to give you some idea as to how you are doing.

• ***TENTATIVE COURSE SCHEDULE:***

Week No.	TUESDAY	THURSDAY
1	1/8 Chapters 2(review 9HB-D+Doppler effect) and 15--General Relativity	1/10 Chapter 15—General Relativity
2	1/15 Chapter 5---Waves and Quantum Mech.	1/17 Chapter 5—(continued) QUIZ #1
3	1/22 Chapter 6—Quantum Mechanics	1/24 Chapter 6—Quantum Mechanics
4	1/29 Chapter 7—Hydrogenic Atom	1/31 Chapter 7—Hydrogenic Atom
5	2/5 Chapter 8—Many-electron atoms	2/7 MIDTERM
6	2/12 Chapter 8—Many-electron Atoms	2/14 Chapter 10—Molecules and solids, the Laser
7	2/19 Chapter 10—Molecules and solids, the Laser	2/2 Chapter 10—(continued)
8	2/26 Chapter 10—(continued)	2/28 QUIZ #2 Chapter 13—Nuclear structure
9	3/4 Chapter 13—Nuclear structure	3/6 Chapter 14--Elementary particles
10	3/11 Chapter 14—Continued	3/14 Review

• ***FINAL EXAMINATION:*** **Saturday, March 2, 1:00 PM, Physics/Geology 140.** **Covering all assigned reading and problems, plus any other material treated in lecture.**

• ***FIRST READING AND PROBLEM ASSIGNMENTS:***

Chapter	Reading	Questions/Problems
2—Special relativity	Section 2.10 only, review remaining sections from 9HB, 9HC, 9HC	Probs. In Chap. 2: 51, 54
15—General relativity	15.1-15.4, 15.5--optional (relates to newspaper article in S.F. Chronicle of April 5, 2004 see lecture slides)	Probs. in Chap. 15: 2,4,9,11,17,24--plus: What is the frequency change due to velocity? Use equations in lecture for GPS.