

SYLLABUS Physics 9HD - Fall 2009

MEETING PLACE & TIME: MWF. 10:00 – 10:50 am, 140 Physics/Geology

INSTRUCTOR: Prof. Shirley Chiang, office 235 Physics/Geology

- tel: 530-402-7113; FAX: 530-752-4717; E-mail: chiang@physics.ucdavis.edu
- Office hours:
 - Wed. 11:00 a.m. - noon, 235 Physics/Geology
 - Thurs. 1:10 - 2:00 p.m., 154 Roessler; if no one comes by 1:15 p.m., I will go back to my office, and you may find me there.
 - After any lecture, you may accompany me back to my office.
 - Also by appointment.

TEXT: Edward M. Purcell, *Electricity and Magnetism*, Berkeley Physics Series, Vol II, 2nd edition, reprinted edition available at UCD Bookstore

CLASS WEB SITE: Go to www.physics.ucdavis.edu, click on “course websites” on the left, then click on Physics 9HD under Fall 2009, or go directly to <http://www.physics.ucdavis.edu/Classes/Physics9HD/index.html>

See web site for syllabus, link to lab manual, other information.

Problem Set Solutions will be posted on <http://my.ucdavis.edu>

DISCUSSION/LABORATORY in 154 Roessler

TA and Reader for Homework: Konstantin Chudnovskiy, office 410 Physics/Geology

- tel. 415-999-8217; E-mail: chudnovskiy@physics.ucdavis.edu
- Office hours: to be determined
- Section A01, CRN 36329: Tuesday, Thursday, 2:10 - 4:00 p.m.
- Section A02, CRN 36330: Tuesday, Thursday, 4:10 - 6:00 p.m.

The discussion/laboratory is required. Discussions will usually be on Tuesdays, and laboratories will usually be on Thursdays. Discussion begins on Tues. Sept. 29, and laboratory begins on Thurs. Oct. 1. They continue throughout the quarter, except for no lab on Thanksgiving, Nov. 26.

Grading is on a high pass, pass, low pass, or fail basis. **Failing the laboratory means failing the course.** Passing the laboratory means your 9HD course grade is unaffected by your laboratory performance. High pass in the laboratory increases your course grade by 1/3 of a grade point (e.g., B increases to B+); low pass means your course grade is reduced by 1/3 of a grade point (e.g., B decreases to B-). If your course grade is A, however, a high pass in the laboratory will not increase your grade to A+.

EXAMINATIONS

There are two midterms and one final examination. Each midterm will be given during a class period and will be 50 minutes. The final exam is 2 hours and is comprehensive, covering all of the material in the course. No makeups are available on midterms. If you have an excused absence from a midterm, the grading will be arranged to weight the remaining midterm and the final examination more heavily.

For each midterm examination, you will be permitted to bring one sheet of 8 ½ x 11 inch sheet of paper with formulas and information which you have written or typed on both sides (but not reduced photocopies of problem sets, notes, or midterm review summary sheet). You should

also bring your calculator to do arithmetic. I will provide plain white paper, but you may use your own blank lined paper if you wish.

The same rules apply to the final examination, but you may bring THREE sheets of formulas as described in the previous paragraph.

Answers to exam questions must show the basic principles used in the solution. All work for problems must be shown on the exams. **Answers without explanation will not receive credit, even if correct.**

LECTURE SCHEDULE AND READING ASSIGNMENTS

(dates subject to change – check class website for any revisions)

We will cover Chapters 1-9 of Purcell, with the exception of the following sections: 4.4-4.6, 6.3, 7.7

Lecture	Day	Date	Topic	Reading (Purcell sections)
1	Fri	Sept 25	Coulomb's Law, Electric field	
2	Mon.	Sept. 28	Electric potential energy, integrating to find E field	1.1 – 1.8.
3	Wed.	Sept. 30	Flux and Gauss's Law	1.9-1.13
4	Fri.	Oct. 2	Force on charge layer, energy in electric field, electric potential	1.14-1.15, 2.1-2.6
5	Mon.	Oct. 5	Divergence, Laplacian	2.7-2.12
6	Wed.	Oct. 7	Curl, Stokes' Theorem	2.13-2.16
7	Fri.	Oct. 9	Electric conductors	3.1-3.2
8	Mon.	Oct. 12	Uniqueness theorem, Method of images	3.3-3.4
9	Wed.	Oct. 14	Capacitance	3.5-3.8
10	Fri.	Oct. 16	Capacitors in circuits	
11	Mon.	Oct. 19	Electric Current, Ohm's Law	4.1-4.3
12	Wed.	Oct. 21	DC circuits, Kirchhoff's Laws,	4.7-4.10
13	Fri.	Oct. 23	Variable currents	4.11
14	Mon.	Oct. 26	Midterm 1	Chapters 1-3
15	Wed.	Oct. 28	Special relativity, moving charges	Appendix A, 5.1-5.4
16	Fri.	Oct. 30	Electric fields of moving charges	5.5-5.7
17	Mon.	Nov. 2	Fields and forces on moving charges	5.8-5.9
18	Wed.	Nov. 4	Forces on current-carrying wires, magnetic fields	6.1-6.2
19	Fri.	Nov. 6	Using Ampere's Law to find magnetic field from wire, coil, solenoid, torus	
20	Mon.	Nov. 9	Biot –Savart Law	6.4-6.6
	Wed.	Nov. 11	Veteran's Day Holiday	
21	Fri.	Nov. 13	Lorentz transformation of E and B fields, Hall Effect	6.7-6.9
22	Mon.	Nov. 16	Electromagnetic Induction	7.1-7.5
23	Wed.	Nov. 18	Mutual inductance, self inductance, Energy in B field, circuit with self-inductance	7.6, 7.7 (result only), 7.8-7.10

24	Fri.	Nov. 20	Midterm 2	Chapters 4-6
25	Mon.	Nov. 23	AC circuits	8.1-8.4
26	Wed.	Nov. 25	More ac circuits, displacement current, Maxwell's equations	8.5, 9.1,-9.3
	Fri.	Nov. 27	Thanksgiving Holiday	
27	Mon.	Nov. 30	Electromagnetic waves, energy transport in waves	9.4-9.7
28	Wed.	Dec. 2	Polarization of light	
29	Fri.	Dec. 4	Quarter Review	
	Thurs	Dec. 10	Final Examination, 3:30 – 5:30 PM, 140 Physics	Chapters 1-9

HOMEWORK

Homework will be graded. Homework is due at the beginning of the lecture class period, usually on Fridays. No late homework will be accepted. Your lowest homework score will be dropped. See tentative schedule below. Solutions will be placed on <http://my.ucdavis.edu> after the due dates.

You may work on the homework in groups, but it is your responsibility to write up your own solution to the problems.

Students are encouraged to do their homework in the same format as they expect to do the examinations. The solutions should clearly indicate the physical principles being used and show which numbers are associated with which variables.

PROBLEM ASSIGNMENTS (Dates and problems subject to change; check course website for updates). Any changes in assignments will also be announced in lecture.

Date Due	Set #	Problem Assignment from Purcell
Fri. Oct. 2	1	1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 1.16, 1.24
Fri. Oct. 9	2	1.18, 1.20, 1.30, 1.33; 2.1, 2.8,
Fri. Oct. 16	3	2.4, 2.7, 2.14, 2.15, 2.19, 3.1, 3.5
Wed. Oct. 21	4	3.6, 3.10, 3.11, 3.12, 3.14
Mon. Nov. 2	5	4.1, 4.8, 4.17, 4.20, 4.21, 4.22 plus additional problem on handout
Mon. Nov. 9	6	4.15 (note that the problem refers to Fig. 4.16 on p. 152, NOT the figure for 4.16 on p. 164), 4.25, 4.32, 5.1, 5.5, 5.8, 5.15
Mon. Nov. 16	7	5.6, 6.2, 6.3, 6.4, 6.5, 6.12, 6.27
Wed. Nov. 25	8	7.3, 7.4, 7.7, 7.9, 7.14, 7.15, 7.17
Fri. Dec. 4	9	8.3, 8.7, 8.13, 9.1, 9.5, 9.9

GRADING POLICY

Homework	total	20%
Midterms (each 20%)	total	40%
Final		40%
TOTAL		100%

Laboratory and discussion grades will be used to adjust the course grade, as described above.