

**Physics 208 – Electricity, Magnetism, and Light – Sects.301-305 Summer 2005**

**Prerequisites:** 1 semester of Calculus (MATH 151) and 1 semester of Mechanics (PHYS 218). Concurrent registration in 2nd semester of Calculus (MATH 152). **Don't even think about taking this course with less preparation; and having completed MATH 152 is strongly advised.** Students are expected to have a working knowledge of of plane and solid geometry, trigonometry, algebra, vectors, differentiation and integration.

**Instructors:** **1st half** - Prof. Wayne M. Saslow, ENPH rm 521, 845-4841, wsaslow@tamu.edu;

**2nd half** - Dr. Teruki Kamon, ENPH rm 430; 845-7740, kamon@physics.tamu.edu

**Office Hours(for both Saslow and Kamon):** MWF 10am-11am, or by appointment.

**Lecture Hours:** MWF 8am-9:25am (**change to 8:10-9:35am?**); Lecture Room: Eng-Phys Lab Building 202.

**Textbook:** *University Physics*, 11th edition, Vol 2, by Young and Freedman, and chapters (0,1,9) by Saslow, obtainable at Kinko's. [In Saslow's hardcopy *Electricity, Magnetism, and Light*, these are chapters R,1,9.]

**Required Lab Manual:** *Laboratory Manual for Physics 208-219*, 8th edition.

**Home Page:** <http://faculty.physics.tamu.edu/saslow/208su05.html>; but we will communicate with the class via neo.

**Help Desk:** To be announced.

**Only for Students Retaking the Course:** As soon as possible, give Prof. Saslow a sheet of paper with your name, and the term, year, and section (or the name of the lecturer) when you took the course. If you had a lab grade of 80 or better, you do not have to retake the lab, but you **must retake the recitation.**

**Recitation meets, but no lab, the first day of class.**

Section	Recitation Room	Time	Lab Room
301	119Held	MW12:00pm-2:50pm	208Held
302	119Held	MW2:00pm-4:50pm	208Held
303	119Held	MW10:00am-12:50pm	208Held
304	119Held	MW3:00pm-5:50pm	209Held
305	118Held	MW1:00pm-3:50pm	209Held

**Recitation:** Recitation/Homework assignments are to give you practice at problem-solving skills, in preparation for exams. Assignment due dates will be announced weekly in class and on the homepage. **Further**, ten recitation quizzes, based on homework and similar problems, will be given. During the second summer session, except for the first assignment all homework will be submitted and graded over the web.

**Labs:** Come prepared. The better-prepared you are, the faster you will complete the lab. Your lab TA will assist you in performing, but will not perform for you, the labs. A very good lab writeup will earn a 90; an excellent one will earn a 100. Download the lab schedule from the homepage.

**Online Math Review Quizzes and 218 Review Quizzes:** Set up your WebCT account. You must score 10 perfect scores on the Math Review Quizzes and 5 perfect scores on the 218 Review quizzes before you will be allowed to access the WebCT homework sets. In addition, at various points in the term, to access the WebCT homework sets you will have to get 5 perfect scores on the Math Review Quizzes. Homework assignments are for you to practice problem solving techniques: (a) For each chapter a selected number of problems in WebCT are assigned as part of your homework/lecture grade. Approximate assignment due dates are given at the end of this syllabus. In recitation the instructor will work selected problems and answer questions. (b) During the semester at least 10 quizzes will be given in recitation, testing your ability to do the assigned homework problems, lecture examples or textbook examples. (c) There also will be occasional in-class assignments based on current lecture material. Prepare for these assignments by keeping up with the readings and homework.

**Exams:** (a) The exams are designed for 75 minutes, but you will have 85 minutes. Exams will be graded strictly, because the feedback you get from exam grading is your primary input on how well you are understanding the course material. Partial credit will be given. You must show your work to receive full credit – an answer alone is insufficient. Your reasoning is an important part of your solution; credit will be taken off for disorganized answers. (b) The standard formula sheet for each exam is at the course web site, for your familiarization; a hard copy will be provided during the exam. (c) Bring a non-graphics calculator to the exams: graphics calculators must be cleared in front of the exam proctor; there may be a line. (d) Bring your student ID to all exams, for purposes of identification. (e) If you miss an exam due to an excused absence (as outlined in University Regulations; very few “excuses” qualify), then you must contact your lecturer no later than the next class meeting to arrange a make-up. Non-excused absences cannot be made up. The Final Exam is comprehensive.

**Grading:** Exam grades will be curved depending on each exam. The grade cutoffs will be given in class, and generally will not follow pre-defined cutoffs. If this term the class performs exceptionally well, the grades this term will be much better than for classes in previous terms.

Total Points	3 Exams	Final Exam	Laboratory	Recitation	Homework/In Class Quizzes
750	300	200	100	100	50

**Note: (a) You must pass the lecture part (exams and final) in order to pass the course; (b) you must also pass the laboratory part in order to pass the course; only then will the total grade be computed.** An alternative grading scheme for the lecture part is applied automatically, where Final = 300, 3 Exams = 200 (and other parts the same). With this scheme you can get at most a letter grade improvement relative to the standard grading scheme. Fewer than ten percent of the class are affected by this alternative scheme.

Last day to drop with no record – Friday, June 3. Last day to Q-drop (drop without penalty) – Wednesday, July 20. Final Exam – Tuesday, August 9, 8am-10am, Eng-Phys Lab Building 202.

### How to Turn in Hard-copy Homework for This Course

1. Give the chapter and date at the top left of the first page. Give your name and section at the top right of the first page. Turn it in at the beginning of the class period when it is due.
2. If there already is a figure for the problem, sketch the figure. **If the solution of the problem requires that you add any material to the statement of the problem, such as a definition of a coordinate that you will use, then redraw the figure with the added material.**
3. Solve the problem, using English to guide the reader to the significance of the final result(s). Algebraic chicken-scratches do not substitute for human language.
4. Turn it in at the beginning of the class period when it is due.

### How to Study for This Course

1. **Physics 208 is probably the most difficult introductory course in the College of Science, in large part because no one can see electricity.** Chapter 0 was written to help you visualize electricity. **Physics 208 is also difficult because it requires understanding and using some reasonably serious mathematics: vectors and integral calculus.** The last sections of Chapters 0 and 1 were written to help you with vectors and with integral calculus. **Physics is not a disconnected set of equations to be memorized, but rather a coherent set of facts and relationships between facts, whose natural expression is in terms of mathematics.** Understanding is much more important than memorization in this course. Dive first for the ideas, not for the equations! **You must keep up with lecture because the material is cumulative.** The math quizzes are given to help you to eliminate your math weaknesses.

2. **To get the most out of lecture, when possible read the appropriate chapter beforehand** (except for the optional sections), as given in the Tentative Schedule. Lectures will emphasize ideas and a few key techniques, but for many details you will have to read the appropriate text.

3. To get the most out of your classmates, form a study group. **Get the names and phone numbers of at least three others in the class.** If you understand an idea, you will understand it even better after you have explained it to someone else, and so will they.

4. Old exam files (at the Website) are an additional resource that should be used well before exam time. **On Homework and Old Exams:** You learn how to drive by driving, and you learn how to solve physics problems by solving physics problems. Don't merely read the problems: **do them.**

5. To do well in exams for this course, recognize that you must solve **additional, unassigned** problems. Merely reading through previously worked problem solutions does not get you actively involved in the problem-solving process and as a result is largely a **waste of time.**

6. If you needed assistance to solve a given type of problem, find a similar problem and try to solve it, in order to assess whether or not you have mastered that type of problem. You may have to go through this cycle more than once until you resolve all of your questions about this type of problem.

**Tentative Schedule - from Young and Freedman (Y&F), unless otherwise noted**

Date	Chapter	HW Assignment (Chapter-Sect.Prob.)
June 1	S0 (Visualization & Vectors)	2.1,2.3,2.4,2.6,8.1,9.1,10.4,10.8
June 3	S1 (Charge & Integral Calculus)	2.1,4.3,6.9,8.1,8.5,9.1,9.2,9.4,9.5,G.3,G.11
June 6	21.1-7 (Electric Field)	4, 12, 19, 23, 31, 40, 46, 49, 58, 62, 71, 75, 83, 87, 92, 94, 105
June 10	22.1-5 (Gauss's Law)	3, 6, 9, 14, 19, 24, 27, 33, 36, 45, 49, 52, 56, 61, 65
June 13	23.1-5 (Electric Potential)	1, 3, 13, 16, 21, 23, 33, 40, 42, 46, 53, 56, 57, 59, 63, 68, 87
June 17	Exam 1	(Chapters 0, 1, 21-23) Friday
June 20	24.1-4 (Capacitance and Dielectrics)	3, 8, 9, 12, 15, 20, 27, 35, 44, 50, 53, 54, 59, 61, 77, 80
June 24	25.1-5 (Current, Resistance & Electromotive Force)	1, 8, 10, 17, 27, 32, 35, 36, 44, 51, 59, 64, 67, 83
June 27	26.1-5 (DC Circuits)	5, 6, 8, 12, 21, 29, 37, 42, 45, 58, 60, 68, 70, 92
July 1	Exam 2	(Chapters 24-26) Friday
July 6	S9.1-6 (Magnets)	2.1,2.5,3.1,3.4,5.1,G.3
July 8	27.1-7 (Magnetic Fields and Magnetic Forces)	1, 4, 8, 13, 20, 31, 35, 39, 44, 57, 66, 67, 75, 79, 89
July 11	28.1-7 (Sources of Magnetic Field)	1, 5, 9, 15, 17, 21, 25, 31, 32, 36, 39, 47, 55, 62, 80, 85
July 15	29.1-7 (Electromagnetic Induction)	3, 5, 9, 11, 17, 20, 22, 27, 32, 33, 37, 44, 54, 69, 76
July 20	30.1-5 (Inductance)	3, 6, 12, 18, 19, 23, 29, 32, 49, 54, 58, 62, 68, 69, 78
July 25	Exam 3	(Chapters 10, 27-30) Monday
July 27	32.1-4 (Electromagnetic Waves)	1, 4, 8, 10, 14, 19, 24, 28, 39, 45, 48, 52, 53
July 29	33.1-3,5,7 (Nature and Propagation of Light)	1, 5, 10, 15, 18, 21, 24, 28, 34, 35, 40, 46, 54, 55, 62
Aug. 1	34.1-4,6 (Geometrical Optics & Optical Instruments)	34 :2, 7, 8, 18, 22, 26, 29, 47, 51, 66, 67, 78, 111, 115
Aug. 5	35.1-3, 36.1-3 (Interference, Diffraction)	35 :3, 6, 8, 11, 14, 20, 28, 36, 42, 56, 58. – 36 :2, 7, 11, 40, 47, 49
Aug. 8	Review	
Aug. 9	Final	Tuesday 8:00am-10:00am

Notes on material not contained in Y&F:

- 1 S0 (Review/Preview) gives the physical picture that is the basis for the equations of electricity. It concludes with a detailed review of vectors – including scalar products, vector products, and rotation.

- 2 S1 presents the early discoveries about electricity, with an emphasis on experiment, on charge conservation, and on the related phenomena of polarization (for insulators) and electrostatic induction (for conductors). It concludes with a detailed review of integral calculus and of lengths, areas, and volumes of common objects.

- 3 S9 discusses magnetic materials, including permanent magnets and how hard you have to pull to get a magnet off the fridge.

- 4 Lecture will also include some material on voltaic cells that explains why little AAA cells and big D cells have the same emf (electromotive force).