Physics 160: Introductory Physics II *Spring 2005*

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	Room	Time
Recitation	Eaton 111	10:10-11:05 MWF
Laboratory	Eaton B18	1:30-5:00 W
Laboratory	Eaton B18	1:30-5:00 R

Texts & Materials
- Hugh Young and Roger Freedman, *University Physics*, 11th Edition
- Frederick Bueche and Eugene Hecht, *Schaum's Outline of College Physics* (Recommended)
- Physics 160 Laboratory Manual, available at the College Store
- 5 × 5 Quad Ruled Composition book as a Laboratory Notebook
- Instructors' Solution Manual is on reserve in the library

Objectives
The objectives for this course are for students to obtain a working knowledge of electrical and magnetic phenomena, geometric and wave optics, relativity, and the old quantum theory.

About Physics 160
The theory of electromagnetism is the crowning achievement of 19th century physics. James Clerk Maxwell provided the missing piece that joined magnetism with electricity. He also showed that there should be waves of electric and magnetic fields that traveled at the speed of light. Maxwell's theory also contained the seeds of the destruction of Newton's mechanics, which was finally replaced by Einstein's relativistic mechanics one hundred years ago. Within twenty years of Einstein's discovery, the whole classical picture was overthrown by the advent of quantum mechanics. We'll briefly touch on these twin pillars of 20th century physics, which have yet to be replaced by a better theory.

I hope you'll agree with me that the second term of introductory physics is the beginning of the best part of physics; physics starts to seem less mechanistic and more "mysterious," though it is still heavily grounded in mechanics. About half of the semester will be spent studying electricity and magnetism and we'll follow Maxwell by showing that electromagnetic waves travel at the speed of light. Then we'll study the behavior of light. The end of the course will be an introduction to relativity and quantum physics.

Unlike the first term, the more difficult material comes early and stays difficult until about the end of the seventh week of term. From then on we have a "breather" with optics (which isn't as mathematical) and then we have some very interesting elements of modern physics, which also isn't quite as taxing mathematically.

As I did last term, I again ask that you make an effort to read the text and to work as many problems as you can on the material, doing even more problems than are assigned. There simply is not enough time for me to cover all the material in the time allotted to lecture.

Recitations
Recitation is a place to get your questions answered, to see if you did the homework correctly, to learn how to approach problem solving, and to discuss the reading. I expect students to attend recitation, to bring questions, and to be interactive.

Course Requirements

Laboratory	Quizzes
Daily reading assignments in text	2 Hour Exams
Class attendance and involvement	Final Exam
Homework problems, and other assignments	

Grading
The class will be graded on a straight percentage with the following breakdown:

A: 88% – 100%	C: 60% – 74%	F: < 50%
B: 75% – 87%	D: 50% – 59%	

I will not grade on a "curve," unless I feel that my exams were inappropriately difficult. In that case, I will add points to each exam to bring the grades up to where I feel they should have been. In other words, an exam score of 80% is guaranteed to be at least a "B." The final grade will be composed of five elements, three of which are the quizzes and exams. The other two elements are the laboratory and homework/participation. The numerical grade will be computed using two schemes and your final grade will determined by the higher of the two.

α	β	Element
10%	10%	homework/participation
20%	20%	laboratory
30%	15%	hour exams
10%	5%	quizzes
30%	50%	final exam

Homework
It is very important that you do the homework. Doing the homework thoroughly and correctly is more important than attending recitation, insofar as learning the material is concerned. It is also quite helpful if you do additional problems of your own choosing from the course text, the recommended Schaum's Outline, or any other source. Your grade is more a reflection of how much useful work you did outside of class than of how "mentally quick" you are. Homework will be irregularly collected, inspected, and marked. No advance warning of homework collection will be given. The contribution of the homework to your grade will be based more on the number of problems you did and less on how well you did them.

Laboratories
All of the laboratories must be completed in order to pass the course. A laboratory is not complete until you have handed in a laboratory report or have completed a laboratory practical exam for that laboratory. You need to purchase a laboratory manual and a laboratory notebook. Be sure that the notebook you purchase is a Composition Book that is bound and has quadrille (graph paper) lines. Laboratory sections do not meet every week, so you should pay attention to the meeting times in the syllabus. I expect students to have read the lab manual *before* entering the laboratory. I expect all students in laboratory to contribute to their lab groups' efforts and to solve any problems that may arise by thinking about what they should do to get the experiment to work and trying it before they find me and ask for help. Just giving up on the experiment and waiting (or calling my name) for help is not acceptable. If you wish me to help you, please find me, tell me what

is the matter, and ask my help. I am more concerned that you learn something interesting from laboratory than that you finish the lab. Keeping a neat lab notebook is important (especially since concise, neat notebooks are generally much more helpful when you are writing a lab report or answering questions on a lab practical.) If you cannot state what you are doing or what you learned simply and concisely, then you probably need to think more about it!

Quizzes
There will be short quizzes in recitation every so often, announced in advance. They will usually be a single problem, but sometimes two or three very short problems.

Exams
There will be two hour exams and a final exam. The hour exams will be in recitation on February 16 and April 6. The final exam will be during the period set by the Registrar's office, which this term is 7:00 - 10:00 p.m. Saturday May 7. The hour exams will be at least four problems. You will be allowed to bring one ***handwritten*** 8.5″× 11″ page (one side) of notes to each hour exam and two ***handwritten*** 8.5″× 11″ pages (two sides total) to the final exam.

Missed & Late Work Policy
Late homeworks will not be accepted. If you miss a quiz and you have a valid excuse, you may take a quiz the next day for 80% credit. If you miss your regularly scheduled laboratory, you must make up your laboratory work before the end of the semester, but you must turn in a typed laboratory report for that lab instead of completing a laboratory practical exam. If you miss an hour exam and have a valid excuse (a note from your physician, *etc.*), you will be allowed to count the other hour exam for twice the weight. You must check with me ***before*** you miss the exam unless you fall ill suddenly before the exam, in which case you should contact me as soon as you are well. ***There will be no makeup for the final exam.***

Office Hours
Initially office hours will be Monday at 3:00 pm, Friday at 1:30 pm, and by appointment. If people who wish to discuss with me but cannot make those times will suggest alternatives, I will try to make more convenient hours for everyone. In addition, you may stop by any time to see if I am free to discuss physics, life, the universe, or anything else. If my office door is closed, I am very likely to be busy.

About T.J. Allen
I am a theoretical physicist working on particle physics and gravitation. I received my Ph.D. from Caltech in 1988 for work I did in string theory. I have been teaching since 1980, at the University of Wisconsin, the California Institute of Technology, SUNY Utica/Rome, and HWS. I have been extremely interested in physics for the past thirty some years and my interest in it only grows. Some other interests of mine are calligraphy, computers, piano, yoga and the martial art Aikido. Teaching is very important to me. My students and former students have a curious way of becoming part of my "extended family."

Syllabus

The reading assignments are to be done and the homework assignments are to be attempted before recitation on the day in which they are assigned. Homework assignments are to be *completed* by the following recitation so you have time to ask questions on the material before they are due. Be careful in finding the questions (Q:) and problems (P:). In the text the questions are labeled "Discussion Questions" and the problems are be labeled "Exercises," "Problems," or "Challenge Problems."

Some problems are more difficult or more mathematical than the others. If you have trouble, go on to another problem and come back to the troublesome one. I expect that everyone will attempt all of the problems and complete most of them.

The laboratories will be done in your laboratory section, either on Wednesday or Thursday.

If we fall well behind (or get well ahead of) this syllabus — as is quite possible and maybe even likely — a revised version will be distributed.

Date	**Reading**	**Homework Assignment**	**Laboratory**
Mon 17 Jan	Ch 21: §*1-4*	Q: 5, 14; **(# 1)** P: 1, 5, 23, 26, 31, 37	
Wed 19 Jan	Ch 21: §*5-7*	Q: 16, 24; **(# 2)** P: 43, 53, 58, 59, 86	*No Lab*
Fri 21 Jan	Ch 22: §*1-5*	Q: 1, 2, 6, 8, 15; **(# 3)** P: 1, 3, 6, 9, 11, 29, 39, 56	1
Mon 24 Jan	Ch 23: §*1,2*	Q: 1, 2, 5; **(# 4)** P: 1, 3, 11, 21, 27, 31	*Voltage/Current*
Wed 26 Jan	Ch 23: §*3-5*	Q: 9, 12, 18; **(# 5)** P: 33, 37, 41, 50, 63	*Relationships*
Fri 28 Jan	Ch 24: §*1,2*	Q: 1, 3; **(# 6)** P: 1, 5, 13, 15, 23, 57	2
Mon 31 Jan	Ch 24: §*3,4*	Q: 8, 9; **(# 7)** P: 25, 30, 39, 60, 71	*Kirchhoff's*
Wed 2 Feb	Ch 25: §*1-3*	Q: 7, 10; **(# 8)** P: 1, 8, 11, 13, 17	*Laws*
Fri 4 Feb	Ch 25: §*4,5*	Q: 11, 14; **(# 9)** P: 29, 33, 41, 47a,c, 59	3
Mon 7 Feb	Ch 26: §*1-3*	Q: 1, 5, 9; **(# 10)** P: 1, 9, 10, 14, 20, 29	
Wed 9 Feb	Ch 26: §*4,5*	Q: 13, 16; **(# 11)** P: 35, 37, 42, 54, 70, 91	*R-C Circuits*
Fri 11 Feb	Ch 27: §*1-3*	Q: 1, 7 ; **(# 12)** P: 1, 3, 10a,b	4
Mon 14 Feb	Ch 27: §*4,5*	Q: 14; **(# 13)** P: 15, 26, 28, 31	
Wed 16 Feb	**Exam 1**		*No Lab*
Fri 18 Feb	Ch 27: §*6,7*	**(# 14)** P: 37, 45, 47, 66, 75	5
Mon 21 Feb	Ch 28: §*1,2*	Q: 2; **(# 15)** P: 1, 5, 8	*Magnetic*
Wed 23 Feb	Ch 28: §*3-5*	Q: 5; **(# 16)** P: 15, 22, 24	*Field*
Fri 25 Feb	Ch 28: §*6,7*	Q: 9; **(# 17)** P: 31, 32, 57, 62, 79	6

Date	Reading	Homework Assignment	Laboratory
Mon 28 Feb	Ch 29: §*1-3*	Q: 1, 3; **(# 18)** P: 1, 3a, 6, 17, 20	
Wed 2 Mar	Ch 29: §*4,5,7*	Q: 6; **(# 19)** P: 24, 27, 33, 37, 60, 61	*No Lab*
Fri 4 Mar	Ch 30: §*1-3*	**(# 20)** P: 1, 4, 7, 11, 12, 17	7
Mon 7 Mar	Ch 30: §*4-6*	Q: 10, 11; **(# 21)** P: 19, 28, 35, 37	
Wed 9 Mar	Ch 32: §*1-3*	**(# 22)** P: 1, 3, 5	*No Lab* 8
Spring Break March 11 – 20			
Mon 21 Mar	Ch 32: §*4-6*	Q: 4, 5, 8; **(# 23)** P: 13, 21, 39, 49	
Wed 23 Mar	Ch 33: §*1-3*	Q: 3; **(# 24)** P: 1, 5, 11, 13, 17	*No Lab*
Fri 25 Mar	Ch 33: §*4-7*	Q: 5, 9, 15, 19; **(# 25)** P: 23, 25, 29, 35, 53	9
Mon 28 Mar	Ch 34: §*1,2*	Q: 3, 5; **(# 26)** P: 3, 5, 7, 13, 64	*Prisms &*
Wed 30 Mar	Ch 34: §*3,4*	Q: 9; **(# 27)** P: 15, 22, 23, 25, 29, 94	*Lenses*
Fri 1 Apr	Ch 34: §*5,6*	Q: 15, 19; **(# 28)** P: 35, 37, 41, 45, 47	10
Mon 4 Apr	Ch 34: §*7,8*	**(# 29)** P: 49, 51, 53, 57, 58, 114	
Wed 6 Apr	**Exam 2**		*No Lab*
Fri 8 Apr	Ch 35: §*1,2*	Q: 2, 4; **(# 30)** P: 5, 6, 11, 15	11
Mon 11 Apr	Ch 35: §*3-5*	Q: 13, 17; **(# 31)** P: 23a, 27, 29, 34	
Wed 13 Apr	Ch 36: §*1-3*	Q: 1, 5; **(# 32)** P: 1, 3, 11, 17, 55	*No Lab*
Fri 15 Apr	Ch 36: §*4-7*	Q: 12; **(# 33)** P: 19, 23, 33, 35, 38, 39a, 41	12
Mon 18 Apr	Ch 37: §*1-4*	Q: 2,5; **(# 34)** P: 1, 3, 7, 9	*Diffraction*
Wed 20 Apr	Ch 37: §*5,7*	Q: 8; **(# 35)** P: 11, 29a	*Grating*
Fri 22 Apr	Ch 37: §*8,9*	Q: 12; **(# 36)** P: 32, 33, 56	13
Mon 25 Apr	Ch 38: §*1-3*	Q: 1; **(# 37)** P: 1, 2, 15, 17	
Wed 27 Apr	Ch 38: §*4,5*	Q: 3, 11; **(# 38)** P: 21, 23, 25	*No Lab*
Fri 29 Apr	Ch 39: §*1-3*	Q: 1, 2, 3; **(# 39)** P: 1, 7, 13, 17, 22	14
Mon 2 May	**Summary & Review**		

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