

PHYSICS II FOR SCIENCE AND ENGINEERING

880:131, Section 1

Spring 2004

INSTRUCTOR: Dr. Michael W. Roth

OFFICE: Physics 305

OFFICE HOURS: M,W,R,F 10:00 – 11:00 A.M.; T 1:00 – 3:00 P.M.

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MEETING SPACETIME INFORMATION: M,W,F 11:00-11:50 A.M. in Physics 201 (Lecture); T 3:30-5:20 P.M. in Physics 101 (Lab).

COURSE DESCRIPTION: Physics II for Science and Engineering is a calculus-based introductory course covering electricity, magnetism and optics.

OBJECTIVES: The mission of Physics II for Science and Engineering is to spark interest in the eyes of students, to have students question and analyze the world around them, to have students think, and for the class to be an experience far deeper than just a series of meetings and deadlines. At a more pragmatic level, Physics II for Science and Engineering will help the student prepare for a career in any field(s) where science is an essential component. The successful student will be able to envision how the course topics apply to situations in the everyday world as well as in technical settings-not only in conceptualization but also in proficient problem solving using calculus.

REQUIRED READING MATERIALS:

- i. Textbook:** Paul A. Tipler, *Physics for Scientists and Engineers*, W.H. Freeman and Co., 1999 (4th edition).
- ii. Course Packet:** 880:131 Physics II for Science and Engineering Packet containing lab manual, practice exams and homework short answers, available at Copyworks on the corner of 23rd and College.

SUGGESTED READING MATERIALS:

- i. Course Packet:** 880:131 Physics II for Science and Engineering Packet containing lecture notes, available at Copyworks on the corner of 23rd and College.

PREREQUISITE(S)/COREQUISITES: Physics I (800:131).

SPECIAL NEEDS: The Americans with Disabilities Act of 1999 (ADA) provides protection from illegal discrimination for qualified individuals with disabilities. If you have any condition such as a physical or learning disability, which will prevent the fullest expression of your abilities

or will require academic accommodations and would like to request instructional accommodation due to disabilities, you must arrange for such accommodation through the Office of Disability Services, 213 Student Services Center, Tel. 273-2676.

GRADING: I have tried to make every major effort for you in this class worth a “test score”, or 100 points. Your grade will be calculated based on 12 lab/activity reports, 8 homework sets, 3 exams and one in-class final examination with the following weights:

12(lab) activity reports of equal weight (100 points possible total; lowest one dropped)

8 homework sets of equal weight (100 pts. possible total; lowest one dropped)

3 exams of equal weight (300 pts. possible for all exams; none dropped)

1 final test (100 pts. possible; not dropped; not comprehensive)

Although any appropriate curve(s) will be announced in class, *it is assumed that the following standard scale will be utilized.* The grade cutoffs are as follows:

93% and above A,	77% C+,	60% D-,
90% A-,	73% C,	below 60% F
87% B+,	70% C-,	
83% B,	67% D+,	
80% B-,	63% D,	

ATTENDANCE: Although roll is not formally taken in class, it is expected that all participants with body temperatures above 80F will attend regularly. (If you are not in this category please see me.) If there is a reason that you must miss class please talk with me to make arrangements to cover the material.

LATE POLICY: Homework sets and lab/activity reports are due on the dates indicated on the class calendar. Your work is due on time, with the exception of reasonable **documented** excuses. *Late work will be docked 50% of face value and 100% after solutions have been posted.* **Homework solutions will be posted two class days after the due date.** If you are going to miss a test, you **must** notify me in advance (preferably one week) so alternative arrangements can be made. If you miss a test or quiz, which is not excused, a grade of zero points will have to be assessed for that particular piece of work. You must take all three-hour exams as well as the final exam in order to pass the course.

ACADEMIC DISHONESTY/PLAGIARISM: Collaboration on homework and certainly labs/activities is welcome, but please keep in mind that your final, turned-in work should be your own and not copied. Although collegiality is encouraged and supported, no form of cheating/plagiarism will be tolerated in this class. If anyone is suspected of academic dishonesty, I will privately speak with them in an attempt to reach a solution to whatever problem is manifesting itself. If anyone is without doubt determined to be cheating on a given

assignment/test and no resolution can be offered, *negative credit will be given*. In extreme cases, the Department and/or College administration will become involved.

GENERAL PHILOSOPHY: In a nutshell, I believe in having fun while teaching and learning physics. I want you to do your best in a subject that is not easy. If you get behind and the class feels like a diesel tractor pulling you through mud, feel free to use me as a resource to help you. Although I love to do research, your learning and class performance is more important! Asking questions in class is strongly encouraged. If you don't wish to ask questions in class please come by my office, give me a call, make an appointment or even send me anonymous e-mail! Also, I like to talk a little about related contemporary issues in class, so if you've found an interesting newspaper clipping or watched a good documentary you'd like to share with us, please mention that. The most entertaining to me are tabloid articles that beg to be de-bunked using physics. I hope you find that physics is everywhere around you and not just in a class you had to take.

EXTRA CREDIT POLICY: Extra credit that adds to your score or substitutes for missed work is not offered in this class. However, I want to encourage you to feel like a part of the Department and I want to expose you to other scientists. Pursuant to that philosophy, I encourage you to go to our seminars, usually at 4:00 P.M. on various Wednesdays and listed on our website at <http://www.physics.uni.edu/calendar.shtml>. If you turn in one-page handwritten reports to me over the talks, I will keep track of quantity you have turned in. Although not a guarantee, these reports can often be helpful for persons in a borderline grade situation (being within about 1% of a particular grade).

ABOUT THE HOMEWORK: Homework sets need not be typed but should be neat and readable. Answers to conceptual questions should include all reasoning. Answers to quantitative problems should show all steps taken to get the answer. Since you will be provided with numerical answers to all the problems, answers to homework problems that are only a number or answer with no supporting reasoning will not be given credit. **Homework due dates are indicated in the schedule; please see the “Late Policy” section for details.**

ABOUT LABORATORY REPORTS: I will be asking you for a lab report for each lab activity we do. They need not be typed but should be neatly handwritten. Each report should have a title page bearing relevant information followed by answers to questions posed in the lab activity as well as to analysis questions at the end of each lab activity. The best answers are complete, well-constructed sentences. Feel free to take time and elaborate on your ideas! I thoroughly enjoy my job and will gladly take the time to read what you have to say. In fact, the criterion I use for complete answers to questions is the following: *your answer is complete when someone not having seen the lab activity guide is able to reconstruct the question you were responding to just from your answer.*

INSTRUCTOR'S STATEMENT: The instructor reserves the right to modify this syllabus in a reasonable fashion and in the best interest of the class.

PHYSICS II FOR SCIENCE & ENGINEERING – SPRING 2004

Week	Day	Date	Topic(s)	Text Chapter	Items Due
1	M	Jan. 12	The Electric Field I	22	
	W	14	The Electric Field I	22	
	F	16	The Electric Field I	22	
<i>Laboratory topic this week: Activity 4: Electric Charge and Interaction</i>					
2	M	19	No Class – Dr. Martin Luther King, Jr. Birthday		
	W	21	The Electric Field I	22	
	F	23	The Electric Field II	23	
<i>Laboratory topic this week: Activity 1: Specific Heat and Latent Heat</i>					Activity 4
3	M	26	The Electric Field II	23	Homework 1 (CH 22)
	W	28	The Electric Field II	23	
	F	30	The Electric Field II	23	
<i>Laboratory topic this week: Activity2: The First Law of Thermodynamics</i>					Activity 1
4	M	Feb. 2	The Electric Field II	23	
	W	4	Electric Potential	24	
	F	6	Review for Exam I		
<i>Laboratory topic this week: Activity5: Equipotential and Electric Field Lines</i>					Activity 2
5	M	9	Electric Potential	24	Homework 2 (CH 23)
	W	11	Electric Potential	24	
	F	13	Energy and Capacitance	25	Exam 1 (CH 22,23)
<i>Laboratory topic this week: Assisted Work Time</i>					

Week	Day	Date	Topic(s)	Text Chapter	Item(s) Due
6	M	16	Energy and Capacitance	25	
	W	18	Energy and Capacitance	25	
	F	20	Energy and Capacitance	25	
<i>Laboratory topic this week: Activity 3: Work done by a Heat Engine</i>					Activity 5
7	M	23	Current/DC Circuits	26	Homework 3 (CH 24 and 25)
	W	25	Current/DC Circuits	26	
	F	27	Current/DC Circuits	26	
<i>Laboratory topic this week: Activity 7: Electric Current, Resistance and Power</i>					Activity 3
8	M	Mar. 1	Current/DC Circuits	26	
	W	3	The Magnetic Field	28	
	F	5	Review for Exam 2		
<i>Laboratory topic for this week: Activity 8: Series and Parallel Circuits</i>					Activity 7
9	M	8	The Magnetic Field	28	Homework 4 (CH 26)
	W	10	The Magnetic Field	28	
	F	12	Magnetic Field Sources	29	Exam 2 (CH 24,25,26)
<i>Laboratory topic this week: Assisted Work Time</i>					
10	M	15	No Class – Spring Break		
	W	17	No Class – Spring Break		
	F	19	No Class – Spring Break		
<i>Laboratory topic this week: No Class – Spring Break</i>					
11	M	22	Magnetic Field Sources	29	
	W	24	Magnetic Field Sources	29	
	F	26	Magnetic Field Sources	29	
<i>Laboratory topic this week: Activity 9: Magnetic Forces on Moving Electric Charges</i>					Activity 8

Week	Day	Date	Topic(s)	Text Chapter	Item(s) Due
12	M	29	Magnetic Induction	30	Homework 5 (CH 28)
	W	31	Magnetic Induction	30	
	F	Apr. 2	Magnetic Induction	30	
<i>Laboratory topic this week: Activity 10: Electromagnetic Induction</i>					Activity 9
13	M	5	Magnetic Induction	30	
	W	7	Open/Catch-up		
	F	9	Review for Exam 3		
<i>Laboratory topic this week: Activity 11: Reflection and Refraction of Light</i>					Activity 10
14	M	12	Properties of Light	33	Homework 6 (CH 29 and 30)
	W	14	Properties of Light	33	
	F	16	Properties of Light	33	Exam 3 (CH 28,29,30)
<i>Laboratory topic this week: Assisted Work Time</i>					
15	M	19	Optical Images	34	
	W	21	Optical Images	34	
	F	23	Optical Images	34	
<i>Laboratory topic this week: Activity 12: Using Lenses</i>					Activity 11
16	M	26	Interference and Diffraction	35	Homework 7 (CH 33 and 34)
	W	28	Interference and Diffraction	35	
	F	30	Interference and Diffraction	35	
<i>Laboratory topic this week: Activity 15: Interference of Sound Waves and Light Waves</i>					Activity 12
17	T	May 4 (10–11:50 A.M.)	FINAL EXAMINATION (CH 33,34,35)		Homework 8 (CH 35); Activity 15

Physics II for Science and Engineering Homework List

Homework Set	Tipler Text Chapter	Problems
1	22	8, 11, 13, 16, 17, 28, 30, 33, 38, 39, 44, 45, 46, 49, 51, 52, 80
2	23	6, 12, 14, 27, 30, 33, 35, 36, 42, 44, 47, 48, 55, 60, 68
3	24	1, 3, 9, 12, 17, 19, 29, 41, 35, 41, 42, 48, 54, 67, 75
3	25	4, 10, 17, 33, 35, 42, 44, 91, 93
4	26	4, 10, 23, 24, 35, 40, 49, 69, 70, 74, 87, 88, 90, 105
5	28	3, 4, 9, 11, 13, 15, 20, 44, 46, 47, 50, 51, 81, 86
6	29	12, 13, 30, 36, 40, 41, 46, 50, 53, 54, 55, 56, 57, 75, 82, 93, 99
6	30	1, 4, 10, 15, 17, 22, 26, 27, 29, 33, 35, 39, 49, 58, 68, 82, 83, 85
7	33	14, 19, 21, 22, 48, 51, 71, 72, 77, 82
7	34	5, 27, 28, 29, 41, 47, 49, 50, 60, 65, 66, 74
8	35	11, 14, 15, 17, 58, 64, 69