

Conceptual Physics
Physics 880:011 Section 1
Spring 2005

INSTRUCTOR: Dr. Michael W. Roth

OFFICE: Physics 305

OFFICE HOURS: M 10:30 A.M. – 12:00 P.M.; W 3:30 P.M. - 4 P..M.; Th 4 P.M. – 5 P.M.

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URL: <http://www.physics.uni.edu/roth.shtml> (Follow the “Additional information...” link for course web page and other details of my/our activities.)

MEETING SPACETIME INFORMATION: M,W 8:00–10:30 A.M. in PHYS 201.

COURSE DESCRIPTION: Conceptual Physics is a survey course covering classical mechanics (motion and gravity), energy; temperature and heat; waves and sound; electricity and magnetism; light and color; atomic and nuclear structure of matter. Emphasis on observation, interpretation, and conceptual understanding of physical phenomena. Some basic numerical calculations are required.

OBJECTIVES: The mission of Conceptual Physics 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, Conceptual Physics will help the student prepare for a career in a diverse assortment of fields, especially those where science is important. The successful student will be able to envision how physics applies to situations in the everyday world as well as in technical settings.

REQUIRED READING MATERIALS:

- i. Textbook:** W. Thomas Griffith, *The Physics of Everyday Phenomena*, 4th edition, McGraw-Hill, 2004.
- ii. Laboratory Packet:** Conceptual Physics Laboratory Packet, Fall 2005 (available at Copyworks).

PREREQUISITE(S): The student must have satisfied University entrance requirements in English and Mathematics.

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.

EXTRA CREDIT/DROPPED GRADES: I don't offer extra credit that will add numerically to your score, nor do I drop any test scores, the main reason being that I don't want to discount the importance of the regular material being presented in the course. However, doing certain types of extra work can count and can help your overall grade. Since I want you to see physicists other than myself and to feel a welcome part of our Department for a semester, you are invited to attend any of the colloquia listed on our Departmental calendar (go to www.physics.uni.edu and look for "departmental Events"), write a brief one or two page handwritten synopsis and turn it in to me. In addition, I offer practice exams and you are encouraged to complete them and turn them in. I will make a note of how many extra things you have turned in and they may affect the final grade assigned in close borderline cases (up to 2% away from a grade boundary). Also, I drop the lowest homework score and lowest lab report score.

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 the best 7 out of 8 homework sets, 3 in class tests, the best 10 out of 11 laboratory reports and one comprehensive, in-class final examination with the following weights:

- 7 best homework sets of equal weight (100 pts. total possible)
- 3 in class tests of equal weight (300 pts. total possible)
- 10 best laboratory reports of equal weight (100 pts. total possible)
- 1 comprehensive final test (100 pts. possible)

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 alternate arrangements can be

made. If you miss a test, which is not excused, a grade of zero points must 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 activities is welcome, but please keep in mind that your final, turned-in work should be your own and not copied. However, 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, as well as the **physics tutors** who are available at times I will announce. 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.

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

LABORATORY REPORTS: Your Laboratory reports should contain a title, purpose statement and answers to the laboratory questions. Please make sure that **all graphs are on graph paper or done with a computer spreadsheet tool** (I will provide this for you), that **you show all your work** for any calculations and last but not least that any **figures you draw are constructed as carefully and neatly as possible**. Please remember that you have more than a week to turn in your reports. This is mainly because I want to see your best work and I don't want you to feel you have to rush to get any lab report done without thorough consideration. **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*. Lab reports are graded on a scale of 10 points max, but typical scores fall in the 8-9 range. An 8 means that I thought you did a good job on the report. A 9 means you exhibited a particularly clear understanding of the material, possibly made very nice figures, etc. – a *very nice job!* A 10 means you showed unexpected insight and initiative – that you went above and beyond the call of duty in either the activity or the content of the write – up. If you score less than 8 on a given report you may see me and re-submit your work for re-consideration. After all, the activities are a learning tool, not a testing tool.

CONCEPTUAL PHYSICS CLASS SCHEDULE – FALL 2005

Week	Day	Date	Lecture Topic(s)	Laboratory	Text Chapter	Item(s) Due
1	M	Jan. 10	Intro/Motion		1/2	
	W	12		<i>Experiment 1</i>	1/2	
2	M	17	No Class – Martin Luther King, Jr. Day			
	W	19	Falling Objects and Projectile Motion		3	Experiment 1
3	M	24	Newton's Laws : Explaining Motion		4	HW 1 (CH 2)
	W	26		<i>Experiment 2</i>		
4	M	31	Circular Motion, the Planets and Gravity/Angular Momentum Energy		5/8	Experiment 2
	W	Feb. 2		<i>Experiment 3</i>	6	
5	M	7	Energy/Catch-up and review for Exam 1 Exam #1 (Ch. 1-4)		6	HW2 (CH 3,4)
	W	9				
6	M	14	Momentum and Impulse		7	Experiment 3
	W	16		<i>Experiment 4</i>		
7	M	21	Fluids		9	HW3 (CH 5,6,8) Experiment 4
	W	23		<i>Appendix 2</i>	15	
8	M	28	Temperature and Heat		10	Appendix 2
	W	Mar. 2		<i>Appendix 1</i>		
9	M	7	Catch-up and review for Exam 2 Exam #2 (Ch. 7, 9)			HW4 (CH 7,9)
	W	9				
10	M	14	No Class – Spring Break			
	W	16	No Class – Spring Break			

Week	Day	Date	Lecture Topic(s)	Laboratory	Text Chapter	Item(s) Due
11	M	21	Electrostatic Phenomena		12	
	W	23	Electric Circuits	<i>Experiment 8</i>	13	Appendix 1
12	M	28	Electric Circuits / Magnets		13/14	HW5 (CH 10)
	W	30		<i>Experiment 9</i>		Experiment 8
13	M	Apr. 4	Magnets and Electromagnetism		14	
	W	6		<i>Experiment 10</i>		Experiment 9
14	M	11	Catch-up and review for Exam 3			HW6 (CH 12,13)
	W	13	Exam #3 (Ch. 10, 12, 13)			
15	M	18	Light Waves and Color		16	
	W	20		<i>Experiment 14</i>		Experiment 10
16	M	25	Light and Image Formation		17	HW7 (CH 14,16)
	W	27		<i>Experiment 13</i>		Experiment 14
	M	May 2	FINAL EXAMINATION (CUMULATIVE), 8:00 – 9:50 A.M.			HW8 (CH 17)
	F	6				Experiment 13

CONCEPTUAL PHYSICS HOMEWORK LIST – FALL 2005

Homework Set	Chapter	“Q” Problems	“E” Problems	“CP” Problems
1	2	6, 12, 15, 16, 26, 29	3, 11, 12, 16	
2	3	9, 11, 13, 14, 17	2, 7, 11, 12	
2	4	10, 14, 18, 22, 24, 25, 33	7, 9	
3	5	6, 13, 21, 23	8, 13, 14	
3	6	1, 3, 6, 8, 17, 22, 23	4, 10, 14	
4	7	8, 13, 15, 18, 23, 27, 29	4, 11, 14	
3	8	24, 26	8	
4	9	1, 2, 18, 19, 21, 24, 28, 30, 31	7	
5	10	11, 12, 15, 21, 22, 27, 30, 31	8, 10	
6	12	5, 11, 13, 17, 18, 26, 28	8, 10, 13	
6	13	13, 14, 28, 29	9, 12, 15	
7	14	3, 4, 7, 11, 13, 23, 25, 30		4
7	16	4, 8, 9, 11, 18, 22, 23, 26, 27	1, 2	
8	17	3, 6, 12, 13, 15, 18, 20	5, 8, 9	

ABOUT THE HOMEWORK: Homework sets need not be typed but should be neat and readable. Answers to conceptual questions should include all reasoning and answers to quantitative problems should show all steps taken to get the answer. Responses 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.