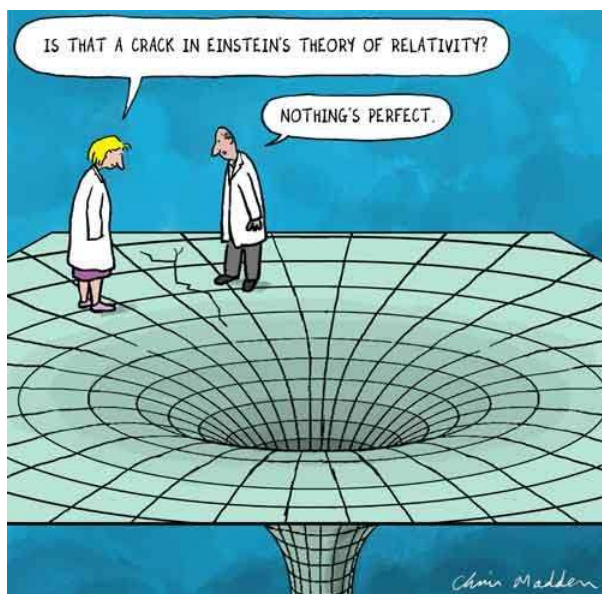


PHYS-201: FUNDAMENTALS OF PHYSICS III
Spring Quarter 2010/2011: 03/28/2011—06/10/2011

Course Objective: The course *Fundamentals of Physics III* introduces the basic conceptual understanding of modern physics needed to keep up with rapidly developing frontiers of science and technology of the 21st century. The end of the 19th and beginning of the 20th century faced dramatic changes in understanding of basic physics principles. Prior to this time, physics dealt with Newton's laws of motion and gravitation, Maxwell's theory of electromagnetism, thermodynamics, and kinetic theory. However, new problems surfaced when scientists confronted very high velocities and very small lengthscales. These new puzzles led to new concepts and new theories: special and general relativity, quantum theory, modern models of atoms and molecules, lasers, superconductivity, and more. This course is a serious though relatively non-mathematical introduction to modern physics concepts. The course begins with a mathematical description of mechanical and electromagnetic wave propagation and proceeds to description of wave phenomena, such as interference and diffraction. In quantum mechanics which dominates physical world at small lengthscales the concepts of a particle and wave merge into one dual description. A particle (e.g. an electron) can be treated either as a particle or as a wave, depending on the experimental situation under consideration. Similarly, electromagnetic radiation can be mathematically described either as a wave or a particle (photon). When the relative velocity of an object with respect to the observer approaches the speed of light, special relativity phenomena have to be taken into account. The course covers some of special relativity phenomena such as length contraction, time dilation, relativistic momentum & energy, and mass-energy relationship.



Course Director and Lecturer: Prof. Brigita Urbanc
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Office: Disque Hall 909 (12-909)

Course Website: For Weekly Updates Check:

http://www.physics.drexel.edu/~brigita/COURSES/PHYS-201_SPRING-2010-2011

Lectures:

Mon & Wed 01:00pm—01:50pm (Session A, DISQUE 108)

Mon & Wed 02:00pm—02:50pm (Session B, DISQUE 103)

[Note: first lecture: Monday 03/28/2011; last lecture: Monday 06/06/2011]

Recitation TAs:

Helenka Casler (hic27@drexel.edu)

Benjamin Coy (btc24@drexel.edu)

Parvez Daruwalla (phd27@drexel.edu)

Erica Smith (ess55@drexel.edu)

Nachiket Vaze (ndv22@drexel.edu)

Adam Yost (ady23@drexel.edu)

TABLE I: RECITATION SESSIONS

Session:	Day	Time Slot	Room	TA
001:	T	09:30am-10:50am	AEL 279	Parvez Daruwalla
002:	T	09:30am-10:50am	LEBOW 133	Erica Smith
008:	T	09:30am-10:50am	LEBOW 134	Nachiket Vaze
003:	T	11:00am-12:20pm	CURTIS 353A	Nachiket Vaze
004:	T	12:30pm-01:50pm	CURTIS 353A	Nachiket Vaze
005:	T	02:00pm-03:20pm	MAIN 301	Helenka Casler
006:	T	03:30pm-04:50pm	ACADMC 104	Helenka Casler
512:	T	05:00pm-06:20pm	CURTIS 352A	Helenka Casler
007:	W	09:30am-10:50am	CURTIS 255B	Parvez Daruwalla
014:	W	09:30am-10:50am	CURTIS 352A	Erica Smith
009:	R	09:30am-10:50am	CURTIS 455	Parvez Daruwalla
010:	R	09:30am-10:50am	CURTIS 459	Erica Smith

Lab Director: Prof. Joseph Trout

E-mails: joseph.jude.trout@drexel.edu, st92l7c3@drexel.edu

LAB TAs:

Nirbhik Modi (njm55@drexel.edu)

Vasavi Arunachalam (va66@drexel.edu)

Shruti Pandya (shp44@drexel.edu)

Rutvi Vyas (rutvi.vyas@drexel.edu)

Adam Yost (ady23@drexel.edu)

Lab Sessions in DISQUE 820A

Important: A detailed week-by-week lab schedule is posted on the course website at www.physics.drexel.edu/~brigita/COURSES/PHYS-201_SPRING-2010-2011.

Help/Office hours: Address all questions and scheduling issues related to (a) labs to Prof. Joseph Trout (b) recitation/discussion issues to recitation TAs; and (c) lectures & exams to Prof. Brigita Urbanc. Note that instructors will NOT provide help with the homework assignments. Read **carefully** the *Mastering Physics Guide* posted on the course website. Please, contact all instructors using e-mail.

Course Material:

- Course Textbook:
Young & Freedman
University Physics, 12th Edition
Pearson/Addison Wesley, 2007
ISBN-10: 080532187X; ISBN-13: 978-0805321876
 - On-Line Assignments:
Visit the *Mastering Physics* website at <http://www.masteringphysics.com/site> and choose the option to register as a new student for the PHYS 201 course, encoded **MPURBANC89099**.
 - Lab Rules and Descriptions:
You will automatically be assigned the letter grade **F** unless you abide to the strict lab rules posted on the course website. Download the pdf file of each lab from the course website, (www.physics.drexel.edu/~brigita/COURSES/PHYS-201_SPRING-2010-2011), print it out, and bring the hard copy to your lab session.
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Lectures:

- (a) Read the relevant chapter(s) from the course textbook **before** each lecture.
 - (b) 100% lecture attendance is required. Failure to attend the lectures will result in reduction of your final grade at instructor's discretion.
 - (c) All cell phones and other distracting electronic devices should be turned off during the lecture.
 - (d) Active participation in the classroom is expected and encouraged.
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LABs:

(a) Attendance at all scheduled labs is required for passing the course. If you miss a lab for legitimate reasons (i.e. illness, etc.), please inform your lab instructor and Dr. Trout (joseph.trout@drexel.edu) as soon as possible. Time is allotted at the end of the quarter for students to make up the labs missed for *legitimate* reasons. The make-up labs will be granted to students at the discretion of the lab director. In week 9, the lab director will announce the make-up lab session, which will take place in week 9 or 10. The make-up lab date(s) will be posted on the course website. No additional make-up labs will be offered.

(b) Lab grades will be computed as follows:

(i) **Prelabs** : 20%

Prelabs for each lab are to be completed and submitted *before* the start of each lab session. Prelabs submitted after the first 20 minutes of the lab session will not receive more than half credit.

(ii) **Experiment** : 70%

You are expected to read the lab instructions before you arrive at the lab. Any lab member that appears to be unfamiliar with the lab material (i.e. expecting the lab instructor or other group members to complete the entire lab) will lose points. Each group must submit a copy of the data collected with all members signing it before leaving the lab. Each student should also keep a copy of the experimental data for use in his/her lab report. Lab material is available on the course web site (www.physics.drexel.edu/~brigita/COURSES/PHYS-201_SPRING-2010-2011).

(iii) **Lab Report** : 10%

You need to prepare your report at home and submit it at the next regularly scheduled lab (submission procedures for the final lab will be discussed in lab by your lab instructor). Grades for late lab reports will be reduced by 10%. Lab reports submitted one (1) week after the due date will receive NO credit. Each report should consist of: (1) a brief summary of the purpose and procedures of the experiment; (2) one or more tables of raw data and results, including the graphs; (3) a description of your final results with an assessment of the factors affecting their accuracy; (4) answers to any questions posed in the lab; and (5) a discussion of what you personally learned from doing the experiment.

Recitations/Discussions:

(a) 100% attendance at all scheduled recitations is required. Failure to attend the recitations will result in reduction of your final grade at instructor's discretion.

(b) The homework assignments will be given through the on-line *Mastering Physics* program. There are 9 homework assignments due at the end of each week (Sundays, 11:59pm), starting at the end of week 2. Each of the homework assignments contributes to the final homework grade. The additional introductory assignment, which is "due" at the end of week 1, is not graded and is meant to train you on how to use the on-line homework assignment program. More detailed description and rules can be found in the *Mastering Physics Guide* posted on the course website.

Grading Information/Missed Exams Policy:

Your letter grade will be based on your total score, obtained from the components listed on Table I. Dates of all exams (Exam 1, Exam 2, Exam 3, and Final Exam) are already or will be posted on the course web site (www.physics.drexel.edu/~brigita/COURSES/PHYS-201_SPRING-2010-2011/). *There will be no make-up or oral exams!* If you miss an exam for a legitimate reason and have a documented, valid reason for doing so, contact the course director as soon as possible. You must state in writing why you missed the exam. *If the course director renders the reason legitimate*, your remaining exams will be reassigned a different weight to compensate for the missed exam. If the reason for missed exam is *not legitimate*¹ or you fail to send your written statement within 48 hours after the exam, the missed exam will be automatically assigned a score of zero.

Academic Honesty: All work during the exams must be your own unaided effort. The homework that you submit must be your own final product, although discussion of strategies and numerical results with others is acceptable. Each member of a lab group must take her/his own notes and write her/his own summarizing essay. In all other situations, active cooperation and peer teaching among students is strongly encouraged.

Schedule Issues: Note that on Friday 04/15/2011, there will be NO classes or labs due to the president John A. Fry inauguration ceremony. There is NO classes on Memorial Day (Monday, 05/30/2011). The last day to withdraw from the course is Friday, 05/06/2011.

TABLE II: GRADING

Grade Components	Contribution
Exam 1 (1hr)	15%
Exam 2 (1hr)	15%
Exam 3 (1hr)	15%
Final Exam (2hrs)	30%
Four Lab Reports	10%
Homework Assignments (HW1-HW9)	15%

¹ Few examples of non-legitimate excuses are: (i) the alarm clock did not work; (ii) I had a cold; (iii) I had friend(s) or family visiting.

TABLE III: TENTATIVE SYLLABUS

TIME TABLE	TOPIC	CH/SEC	RECITATIONS	HOMEWORKS	EXAMS
WEEK 1 03/28–04/01	Periodic Motion Periodic Motion (contd.)	Ch.13/Secs: 1-4 Ch.13/Secs: 5-8	Ch.13:2,8,18,24,28,32	Introductory HW Due: 04/03/2011	
WEEK 2 04/04–04/08	Mechanical Waves Mechanical Waves (contd.)	Ch.15/Secs: 1-4 Ch.15/Secs: 5-8	Ch.13:44,52,57,61 & Ch.15:1,7,8	HW-1 Due: 04/10/2011	
WEEK 3: 04/11–04/15	Sound and Hearing Electromagnetic Waves	Ch.16/Secs: 1-8 Ch.32/Secs: 1-3	Ch.15:14,21,24, 32,65,74	HW-2 Due: 04/17/2011	
WEEK 4 04/18–04/22	Electromagnetic Waves (contd.) Interference	Ch.32/Secs: 4-5 Ch.35/Secs: 1-4	Ch.16:17,33,43 & Ch.32:1,3,8	HW-3 Due: 04/24/2011	
WEEK 5 04/25–04/29 04/28/2011	Diffraction Diffraction (contd.) Chs. 13, 15, 16	Ch.36/Secs: 1-3 Ch.36/Secs: 4-7	Ch.32:13,26,53 & Ch.35:4,17,32	HW-4 Due: 05/01/2011	Exam 1
WEEK 6 05/02–05/06	Photons, Electrons, and Atoms Photons, Electrons, and Atoms (contd.)	Ch.38/Secs: 1-3 Ch.38/Secs: 4-6	Ch.36:3,16,20,31,39,49	HW-5 Due: 05/08/2011	
WEEK 7 05/09–05/13 05/12/2011	Photons, Electrons, and Atoms (contd.) Relativity Chs. 32, 35, 36	Ch.38/Secs: 7-9 Ch.37/Secs: 1-3	Ch.38:2,6,10,17,22,26,28	HW-6 Due: 05/15/2011	Exam 2
WEEK 8 05/16–05/20	Relativity (contd.) Relativity (contd.)	Ch.37/Secs: 4-6 Ch.37/Secs: 7-9	Ch.38:33,38 & Ch.37:4,7,11,17	HW-7 Due: 05/22/2011	
WEEK 9 05/23–05/27 05/26/2011	The Wave Nature of Particles The Wave Nature of Particles (contd.) Chs. 37 & 38	Ch.39/Secs: 1-3 Ch.39/Secs: 4-5	Ch.37:21,29,43 & Ch.39:1,4,6	HW-8 Due: 05/29/2011	Exam 3
WEEK 10: 05/30–06/03	Quantum Mechanics	Holiday Ch.40/Secs: 1-3	Ch.39:10,16,31 & Ch.40:10,26,30	HW-9 Due: 06/05/2011	
WEEK 11: 06/06 Final-TBA	Quantum Mechanics (contd.) Chapters: 13, 15-16, 32, & 35-40	Ch.40/Secs: 4-5		N/A	Final