

ELEMENTARY PHYSICS I

PY105 FALL 2011

Section	Professor	Contact Info.	Office hours
A1 MWF 9 – 10 AM in SCI 113	Prof. Ophelia Tsui Office: SCI 215	Phone: 617-358-4669 E-mail: okctsui@bu.edu	M 10 – 11:30 AM W 10 – 11:30 AM in SCI 121
B1 MWF 2 – 3 PM in SCI 109	Prof. Andrew Duffy Office: PRB 353	Phone: 617-353-9089 E-mail: aduffy@bu.edu	M 12-1; F 3–4 PM W 11:30-12:30 in SCI 121
CAS/MET C1 M 6 – 8 PM ; W 6 – 7 PM in SCI 109	Prof. Kevin Black Office: PRB 371	Phone: 617-358-6241 E-mail: kmblack@bu.edu	M 1:30 – 3 PM Tues. 1:30 – 3 PM in SCI 121
CS MWF 2 – 4 PM in PRB 459	Prof. Bennett Goldberg Office: PHO 920	Phone: 617-358-5789 E-mail: goldberg@bu.edu	--

Recommended Text	"Essential Physics", by A. Duffy, 4 th preliminary edition, vol. 1. Available in the BU bookstore. The bookstore also has Turning Technologies RF clickers.	
Web page	http://webct.bu.edu in the Fall 2011 listing.	
Calculator	You will need a standard scientific calculator for homework and labs. Calculators are NOT ALLOWED on the tests or the final exam.	
RF transmitter	You need a Turning Technologies RF clicker to respond to in-class questions. Buy this separately, either from the BU bookstore or on-line from http://store.turningtechnologies.com (enter code B6sC)	
Homework	Due by 10 pm on the due date (usually Tuesday). Most assignments are turned in on-line on WebAssign. One semester of WebAssign access is \$19.95, payable on-line after logging into WebAssign (see syllabus page 4).	
Labs	The lab manual and pre-labs are available on the course web site. Pre-labs are due at the start of the lab period. Lab writeups are due at the end of the lab period.	
Exams	Test 1 is Wednesday October 5 th Test 2 is Wednesday November 9 th Test 3 date/time is to be determined (during the final exam period)	9 am and 2 pm classes have tests from 6:15-8:15 pm; 6 pm class has tests from 7:30-9:30 pm.
Course Grade	20% discussion section: homework + conceptual exercises 15% laboratory section: best 8 of 9 labs count 5% lecture: pre-session quizzes, class participation, pre-test, and post-test 20% test 1, 20% test 2, and 20% test 3	
Absolute Scale (we reserve the right to be more generous than this)	We will use an absolute grading scale, so you are not competing with your classmates. This is designed to encourage you to help each other learn. 90 – 100 for A– and A 75 – 90 for B–, B, and B+ 55 – 75 for C–, C, and C+ 45 – 55 for D < 45 for F	

Course web site: <http://webct.bu.edu>

To log in, click on MyWebCT at the top right of the screen. Your login name is your regular BU acs login name and your password is your acs kerberos password.

The web site contains all course information, a bulletin board, and a variety of useful physics resources. You will also be able to check your grades (labs, homework, quizzes, etc.) during the semester. **It is your responsibility to check that your grades have been recorded correctly.** If any of your grades are missing or incorrect, contact your teaching assistant and your professor.

Homework: There are two kinds of homework assignments for this course. Most weeks there will be an on-line homework assignment that is turned in on WebAssign. The numbers and/or variables in the on-line assignments can be randomized so everyone gets a unique version of any problem. For three weeks of the semester (once before each test/exam), assignments will be handed in on paper (hand them in at the PY105 box with your teaching fellow's name on it downstairs in the basement of SCI). These assignments are designed to help prepare you for the format and grading system of our tests. In all cases, the assignments are due by 10 pm on the due date, which is generally a Tuesday.

Homework counts for 15 out of the 20 points of your discussion grade. Assignments #5 and #10 are worth 10 points each and will be counted as one assignment out of 20 points. By the end of the course you will have 13 grades out of 20 points for homework assignments – the lowest of these grades will be dropped. You are strongly encouraged to obtain help during discussion sections and/or during office hours. You may discuss homework with classmates, but the work you turn in should be your own. Solutions will be posted on WebCT after the due date. To pass the course, **you must get at least 50% of the maximum possible homework score.**

Discussion sections: These begin Wednesday September 14th. Much of the time in discussion will be spent working with other students in small collaborative groups. Some weeks, at the end of your discussion, there will be a conceptual exercise that is graded out of 5. The conceptual exercises will count for 5 out of the 20 points of your discussion grade.

Laboratories: Labs begin on Monday September 12th with the Forces Between Carts experiment. The complete schedule of experiments is included in the syllabus. Your best 8 lab scores count toward the lab grade, and **you must complete at least 6 labs to receive credit for the course.** A lab is only complete when your personal report is handed in during, or at the end of, the session.

Labs are held either in the basement of SCI or in rooms SCI-134 or SCI-136. The room assignments for a particular week will be posted on all lab doors.

The steps on how to write the lab report are detailed on page 8 of the syllabus. Lab reports are turned in at the end of the 3-hour sessions, so you should be as prepared as possible when you enter the lab. To encourage you to prepare for the lab, each experiment has a pre-lab exercise that counts for 20% of the grade. These exercises are posted on our WebCT site, and must be turned in to your lab TF at the start of the lab period. **Anyone turning in late pre-lab assignments, or completing them after arriving at the lab, will not receive credit for the pre-lab.** You are welcome to discuss the exercises with a lab TF or professor in advance.

Lecture: To get the most out of the lectures, you should read over the material ahead of time. The 5% lecture component of the grade includes grades for participation in the pre-test (0.5%) and post-test (0.5%); grades for the pre-class quizzes on WebAssign (2%), and grades for participation in clicker questions in class (2%).

Pre-test and post-test: These are done on WebCT, and each counts for 0.5% of your grade. As long as you put forth your best effort, you get the full score on this component of the grade.

Pre-class quizzes: To encourage you to prepare for class, before most classes you will be expected to either read the book or view a pre-session video, and then answer a short quiz on WebAssign. This is graded out of 75% of the total possible score (e.g., 75 out of 100 points over the entire semester gets full credit). **Under no circumstance can there be resubmission, makeup or late submission of the pre-class quizzes.**

Making up for missed classes: If you miss a class, you miss out on the participation points associated with that class (participation counts for 2% of your overall grade). Here's how you can make up those missed points. The course schedule (pages 5 and 6) shows the sections from the Essential Physics book that pertain to the class you missed. If you download the "Essential Physics review sheet" from WebCT, fill it in to review the sections you missed, and give it to your professor, you will receive credit for the missed class. There is a copy of the Essential Physics book on reserve in the Science and Engineering library.

You can submit a maximum of 6 Essential Physics review sheets, and they must be submitted within two weeks of your missed class, or by the last day of classes, whichever comes first.

Tests: Three closed-book tests, each covering about one-third of the course material, will be given. **NO CALCULATORS ARE ALLOWED.** Concerns about grading must be brought to your professor's attention within one week after the tests are returned. A random sample of tests will be photocopied before being returned to discourage cheating on re-grade issues.

In exceptional circumstances, an arrangement may be made to take a make-up test. Such an arrangement must be approved and finalized by your professor **ONE WEEK IN ADVANCE OF THE ORIGINALLY SCHEDULED TEST DATE.**

Makeup policy: It is your responsibility to take all quizzes/exams and do all homework and labs according to the posted schedules. There are no makeups. In exceptional circumstances, please contact your professor as soon as possible.

Switching sections: For lecture sections, see the professor of the section you want to switch into.

For discussion sections, please contact Professor Black.

For lab sections, please contact Professor Tsui.

Who Is Responsible for What: If you have comments or concerns about particular aspects of the course please feel free to contact your professor, but also please keep in mind that:

Professor Black is primarily responsible for the discussion sections, but contact your discussion TF first about a particular issue.

Professor Tsui is primarily responsible for the labs, but contact your lab TF first about a particular issue.

Professor Duffy is primarily responsible for WebAssign and WebCT.

Getting help: Between the professors and the discussion teaching fellows, there are about 20 office hours per week in SCI 121 - please come and see any of us to get help.

Ethics Policy: You are expected to be familiar with and adhere to the College of Arts and Sciences Academic Conduct Code. In particular, cheating on exams and quizzes or unauthorized collaboration on lab work will not be tolerated. Evidence of cheating will be reported immediately to your Academic Conduct Committee. Students found guilty of cheating on exams may be penalized by suspension or even expulsion.

Using WebAssign

WebAssign is a web-based homework system we will be using for most of the homework and the pre-class quizzes. There is an excellent guide to using WebAssign on the WebAssign web site - please read through this before submitting the first assignment.

Please contact Prof. Duffy if you have any problems, particularly if you have problems logging in.

The web address for WebAssign is: <http://www.webassign.net/student.html>

You will need to buy access for \$19.95 (good for one semester only) directly from WebAssign with a credit card. To do this, log into WebAssign using the information below and then hit the button for registering with a credit card. **Note that you can do the first assignment without paying for access - you get free access for the first two weeks.**

You will need to enter three pieces of data to log on to WebAssign or to order an access code from WebAssign. These are:

Username: Use your regular acs login name

Institution name: bu

Password:

Your password is your BU student number in the form U12345678. No dashes or spaces!

** Note that if you have used WebAssign previously at BU, such as in Chemistry, then WebAssign will be looking for your old password.

Getting the most out of WebAssign

You only have **two** chances to submit each pre-class quiz answer, but you have **six** chances to submit each answer on each homework assignment. Use your submissions wisely. Note that you can submit the answers to each question individually - you do not need to fill in answers for the whole assignment first. Each time you submit, WebAssign tells you whether you are right or wrong, and then (on the homework, not the pre-class quizzes) you get more chances to correct anything you got wrong.

Things to keep in mind when using WebAssign:

- Start early.
- Come to office hours for help.
- Feel free to work together with other students, but try to do as much as you can on your own.

For the hand-in assignments, make sure that you use your own wordings and make your own drawings. You will be charged of plagiarism if your work is found to resemble your classmate's. Do not hit the refresh button on your browser - that can count as a submission.

- WebAssign offers several advantages over traditional paper homework. These include:
- Numbers and variables can be randomized, so nobody can simply copy answers from anyone else.
- Grading is done automatically, so everyone is treated equally and your grade is recorded soon after the assignment deadline.
- The teaching fellows spend less time grading and more time in office hours helping you.

In general, WebAssign expects numerical answers to be within 1% of the correct answer, so do not round off until the very end and use at least three significant figures in your answers.

PY105 Fall 2010 Course Schedule for A1, B1 & C1 Classes - Page 1

	Date	Date for 6 pm class	Topic	Sections (Essential Physics)
1	Wed. 9-7	Wed. 9-7	Introduction	Chapter 1
2	Fri. 9-9	Mon. 9-12	Vectors, 1-D Motion	1.4 - 2.2
3 L1	Mon. 9-12	Mon. 9-12	Motion in 1 Dimension	2.3 - 2.4
4	Wed. 9-14	Wed. 9-14	Constant Acceleration	2.5 - 2.8
5	Fri. 9-16	Mon. 9-19	Newton's Laws	3.1 - 3.5
6 L2	Mon. 9-19	Mon. 9-19	Forces in 1 Dimension	3.6 - 3.9
7	Wed. 9-21	Wed. 9-21	Relative Velocity	4.1 - 4.3
8	Fri. 9-23	Mon. 9-26	Motion in 2 Dimensions	4.4 - 4.5
9 L3	Mon. 9-26	Mon. 9-26	Projectile Motion	4.6 - 4.9
10	Wed. 9-28	Wed. 9-28	Friction	5.1 - 5.3
11	Fri. 9-30	Mon. 10-3	Applying Newton's Laws I	5.4
12	Mon. 10-3	Mon. 10-3	Review for test 1	Chap. 1 - 5.4
13	Wed. 10-5	Wed. 10-5	Applying Newton's Laws II	5.4
!	Wed. 10-5	Wed. 10-5	TEST 1 – 6:15-8:15 pm or 7:30-9:30 pm	Chap. 1 - 5.4
14	Fri. 10-7	Mon. 10-10	Applying Newton's Laws III	5.4
15	Mon. 10-10	Mon. 10-10	Holiday	-
16	Wed. 10-12	Wed. 10-12	Uniform circular motion	5.5 - 5.7
17	Fri. 10-14	Mon. 10-17	Vertical circular motion	5.8
18 L4	Mon. 10-17	Mon. 10-17	Impulse and Momentum	6.1 - 6.3
19	Wed. 10-19	Wed. 10-19	Center-of-mass	6.4
20	Fri. 10-21	Mon. 10-24	Work and Energy	6.5 - 6.7
21 L5	Mon. 10-24	Mon. 10-24	Energy Conservation	7.1, 7.2
22	Wed. 10-26	Wed. 10-26	Energy Conservation II	7.3
23	Fri. 10-28	Mon. 10-31	Collisions	7.4 - 7.7

PY105 Fall 2010 Course Schedule for A1, B1 & C1 Classes - Page 2

	Date	Date for 6 pm class	Topic	Sections (Essential Physics)
24 L6	Mon. 10-31	Mon. 10-31	Rotational Kinematics	10.1 - 10.3
25	Wed. 11-2	Wed. 11-2	Torque and Rotational Inertia	10.4 - 10.8
26	Fri. 11-4	Mon. 11-7	Static Equilibrium	10.9 - 10.12
27	Mon. 11-7	Mon. 11-7	Review for Test 2	5.5-7, 10
28	Wed. 11-9	Wed. 11-9	Newton's 2 nd Law for Rotation	11.1, 11.2
!	Wed. 11-9	Wed. 11-9	TEST 2 – 6:15-8.15 pm or 7:30-9:30 pm	5.5-7, 10
29	Fri. 11-11	Mon. 11-14	Rolling	11.2 - 11.5
30 L7	Mon. 11-14	Mon. 11-14	Angular Momentum	11.6
31	Wed. 11-16	Wed. 11-16	Rotational Kinetic Energy	11.7 - 11.9
32	Fri. 11-18	Mon. 11-21	Simple Harmonic Motion	12.1 - 12.5
33	Mon. 11-21	Mon. 11-21	Harmonic Motion and Resonance	12.6, 12.7
!	Wed. 11-23	Wed. 11-23	<i>Thanksgiving Break</i>	-
!	Fri. 11-25	Fri. 11-25	<i>Thanksgiving Break</i>	-
34 L8	Mon. 11-28	Mon. 11-28	Static Fluids	9.1 - 9.5
35	Wed. 11-30	Wed. 11-30	Pressure	9.6, 9.7
36	Fri. 12-2	Mon. 12-5	Fluid Dynamics	9.8, 9.9
37 L9	Mon. 12-5	Mon. 12-5	Temperature and Heat	13.1 - 13.5
38	Wed. 12-7	Wed. 12-7	Ideal Gases	14.1 - 14.4, 14.6
39	Fri. 12-9	Mon. 12-12	First Law of Thermodynamics	15.1 - 15.4
40	Mon. 12-12	Mon. 12-12	Thermodynamic Processes	15.5, 15.6
!	TBA	TBA	Test 3	9, 11-15

PY105 Fall 2011 Lab Schedule

Dates	Experiment
Sept. 12 – 16	Forces Between Carts - MBL
Sept. 19 – 23	Constant Acceleration - MBL
Sept. 26 – 30	Projectile Motion
Oct. 3 – 7	<i>No lab - Test 1</i>
Oct. 10 – 14	<i>No lab - Columbus Day</i>
Oct. 17 – 21	Impulse and Work – MBL
Oct. 24 – 28	Momentum and Collisions – MBL
Oct. 31 – Nov. 4	Torque and Moments of Inertia – MBL
Nov. 7 – 11	<i>No lab – Test 2</i>
Nov. 14 – 18	Harmonic Motion – MBL
Nov. 21 – 25	<i>No lab - Thanksgiving</i>
Nov. 28 – Dec. 2	Fluids
Dec. 5 – 9	Specific Heat

PY105 Fall 2011 Homework Schedule

Date	Homework	Date	Homework
*Sept. 16	Assignment 1 (WebAssign)	Nov. 1	Assignment 8 (WebAssign)
Sept. 20	Assignment 2 (Hand-in)	*Nov. 7	Assignment 9 (WebAssign)
Sept. 27	Assignment 3 (WebAssign)	Nov. 15	Assignment 10 (WebAssign)
*Oct. 3	Assignment 4 (WebAssign)	Nov. 22	Assignment 11 (WebAssign)
Oct. 11	Assignment 5 (WebAssign)	Nov. 29	Assignment 12 (Hand-in)
Oct. 18	Assignment 6 (Hand-in)	Dec.6	Assignment 13 (WebAssign)
Oct. 25	Assignment 7 (WebAssign)	*Dec. 12	Assignment 14 (WebAssign)

* The first assignment is due on a Friday. Assignments due just before Tests 1 and 2 are due on Mondays. The very last assignment is due on the last day of classes, which is a Monday.

Homework assignments are due by 10 pm on, generally, Tuesday evenings (unless noted otherwise above with an *). Most of the homework assignments are turned in on-line using WebAssign (see the one-page description of WebAssign on page 4 in this syllabus), but three assignments will be handed in to the boxes in the basement of the SCI building. Each assignment (besides #5 and # 10, which are each worth 10 points) is worth 20 points (the hand-ins are re-scaled to be out of 20), and your lowest assignment grade is dropped.

FOR THE LABORATORY

This page covers the basic requirements for the laboratory. You will not need to write a detailed procedure, duplicating what is in the lab manual. Instead, there will be a one-page handout available when you get to the lab describing what you should hand in for that particular experiment. The focus will be on analyzing and interpreting your data.

Here are some things to keep in mind:

1. The pre-lab assignment (which counts for 20%) must be completed before you get to the lab. These are available on WebCT. The pre-labs help you prepare for the lab session.
2. Lab manual: Read the manual before going to the lab, so you know what to expect.
3. Data analysis: While it is important that results be neatly tabulated and calculations performed correctly, it is equally important that you understand the point of each measurement and the connection between the data obtained and the theory under examination.
4. Think critically, and question everything. Pay attention to the subtle details. If, for instance, your numbers are consistently lower than what you expect, can you come up with a good explanation?
5. Think about how to present the data. Should you stick with a table, or would a graph be better? If you do go with a graph, what should you graph versus what?
6. Conclusions should follow from the data! We are less concerned with the results than the quality of your argument. For example, if your data indicates that momentum is not conserved in a collision, you should state this whether or not your result agrees with the theory. Whenever possible, a quantitative estimate of the uncertainty should be included.
7. Don't blame things on "human error." If you make a mistake in the lab then you can correct it and repeat the measurement. Work carefully, trying to minimize sources of error, and really think about whether the theory applies 100% to the real world where you're taking measurements.
8. You should use high-resolution graph paper, which will be provided in the lab, for your graphs. Drawing graphs on quadrille paper is not accurate enough.
9. You can submit your report to your lab TF (teaching fellow) as a set of neatly stapled loose leaf sheets.