

Section	Professor	Contact Info.	Office hours
AS MWF 9 – 11 AM in SCI B23	Prof. Andrew Duffy Office: PRB 353	Phone: 617-353-9089 E-mail: aduffy@bu.edu	M 11 am – 12 pm F 12 - 1 pm in SCI B39
BS MWF 12 – 2 PM in SCI B23	Prof. Pankaj Mehta Office: SCI 323	Phone: 617-358-6303 E-mail : pankajm@bu.edu	M 10:00-11:00 AM W 2:00-3:00 PM in SCI 323
CS MWF 3 – 5 PM in SCI B23	Prof. Bennett Goldberg Office: PHO 920	Phone: 617-353-5789 E-mail : goldberg@bu.edu	M 1:30-2:30 pm T 4:30-5:30 pm in SCI B39

<b>Recommended Text</b>	"Essential Physics", by A. Duffy, volume 2. Available in the BU bookstore and from Amazon. The bookstore also has Turning Technologies RF clickers.	
<b>Web page</b>	<a href="http://learn.bu.edu">http://learn.bu.edu</a> in the Spring 2014 listing.	
<b>Questions?</b>	For questions, use the course site on Piazza (you will get an e-mail invitation).	
<b>Calculator</b>	You will need a standard scientific calculator for the course (including tests).	
<b>RF transmitter</b>	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 <a href="http://store.turningtechnologies.com">http://store.turningtechnologies.com</a> (enter code B6sC)	
<b>Homework</b>	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 \$31.70, payable on-line after logging into WebAssign (see syllabus page 4).	
<b>Labs</b>	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.	
<b>Exams</b>	Test 1 is Wednesday February 12 <sup>th</sup> Test 2 is Wednesday April 2 <sup>nd</sup> Final exam probably Tues. May 6 <sup>th</sup>	Midterm tests (Tests 1 and 2) are from 6:15 – 8:15 pm (C1) or 7: 30 – 9:30 pm (C2).
<b>Course Grade</b>	15% homework assignments (drop the lowest); 4% discussion quizzes 10% labs (drop the lowest); 5% pre-class quizzes on WebAssign 5% class participation; 1% total for pre-tests and post-tests 17.5% test 1, 17.5% test 2, and 25% final exam	
<b>Absolute Scale (we reserve the right to be more generous than this)</b>	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. 90.00 – 100 for A– and A 75.00 – 89.99 for B–, B, and B+ 55.00 – 74.99 for C–, C, and C+ 45.00 – 54.99 for D ; < 45.00 for F	

**Course web site:** <http://learn.bu.edu>

Your login name is your regular BU login name and your password is your BU 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 PY106 slot with your teaching fellow's name on it, at the homework hand-in box on the first floor of SCI, outside SCI 121). 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% of your course grade. Regular WebAssign assignments are worth 20 points each; assignments #4 and #10 are worth 10 points each and will be combined to count as one assignment out of 20 points; the three hand-in assignments will each be re-scaled to be out of 20 points. Thus, by the end of the course you will have 12 assignments grades, each graded out of 20 points – 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 Blackboard after the due date. To pass the course, **you must get at least 50% of the maximum possible homework score.**

**Discussion sections:** *Studio physics will integrate discussion sections into the overall class, and will be held in SCI B23, our studio classroom. We will generally include them in the Wednesday or Friday class.* 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 quiz that is graded out of 5. The quizzes will count for 4% of the course grade.

**Laboratories:** *Studio physics will have laboratories integrated into the class period and all labs will be held in our studio classroom, SCI B23. They will generally be held on Wednesdays or Fridays. We will be following our own lab schedule that will overlap the other sections, but it could be in a different order. You will still have the same total number of labs. Labs will be modified, but you will still be expected to do a lab report. Your 10% lab grade will also include other hands-on activities that we do.*

Labs begin on Monday January 28<sup>th</sup> with the Electric Fields and Potentials experiment. The complete schedule of experiments is included in the syllabus. (The Electric Charge activity in week 1 counts as a discussion quiz, rather than a lab.) Your best 7 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.

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 Blackboard 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.

**Class:** *Studio physics will have lecture integrated into the classroom with worksheets and hands-on activities. We will follow the same basic format including the pre- and post-test of conceptual knowledge, as well as the pre-class quizzes on WebAssign.* To get the most out of the lectures, you should read over the material ahead of time. The pre-class quizzes on WebAssign count for 5% of your course grade, and grades for participation in class count for 5%. *Studio physics is different than the other sections. You will be working together in groups for much of the time, so your presence in class is simply required. It is **in class** where you will be actively learning physics!*

**Pre-tests and post-tests:** These are done on Blackboard, and count for a total of 1% 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 few videos, 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.**

**Tests:** There are two closed-book midterm tests, and one cumulative final exam. Each tests counts for 17.5% of your final grade, and the final exam counts for 25%. You are allowed to use a standard scientific calculator for the test and final exam. 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.

**Getting help:** The PY106 professors and discussion teaching fellows hold about 20 office hours per week in SCI 121 - please come and see any of us to get help. The schedule is on Blackboard. *This holds for studio physics students as well. We encourage you to use the office hours, where you can get help from any member of the PY106 course staff.*

**On-line help through Piazza:** Unless you have a personal question for your professor, please ask questions about the course through the PY106 site on Piazza. You can also feel free to answer any questions posted by other students – but you should be careful to be helpful without simply giving away answers to homework questions. With all PY106 students, Learning Assistants, Teaching Fellows, and professors monitoring the Piazza site, this should be the best way to get questions answered quickly.

**Who Is Responsible for What:** Contact your teaching fellow first about lab or discussion grading issues, and then your own professor. Professor Duffy is primarily responsible for homework assignments and Blackboard.

**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 \$31.70 (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.
- 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.

Note: the on-line version of the textbook is accessible through WebAssign, using the “e-book” link.

## PY106 Spring 2014 Studio Course Schedule - Page 1

	Date	Topic	Sections (Essential Physics)
1	Wed. 1-15	Pre-tests; Electric Charge lab	16.1 – 16.2
2	Fri. 1-17	Electric Charge; Coulomb's Law	16.1 – 16.4
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-	Mon. 1-20	<b><i>Martin Luther King, Jr. Day</i></b>	-
3	Wed. 1-22	Force and Field	16.4 – 16.5
4	Fri. 1-24	More Electric Field	16.6 – 16.7
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5	Mon. 1-27	Electric Potential Energy	17.1 – 17.2
6	Wed. 1-29	Electric Potential	17.3 – 17.5
7	Fri. 1-31	Potential; Capacitance	17.5 – 17.6
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8	Mon. 2-3	Capacitors and Dielectrics	17.6 – 17.7
9	Wed. 2-5	Current; Resistance; Batteries	18.1 – 18.2
10	Fri. 2-7	Power; Resistors	18.3 – 18.6
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11	Mon. 2-10	Review for test 1	16 – 18.6
12	Wed. 2-12	Resistor Combinations	18.7 – 8.8
	Wed. 2-12	<b>TEST 1 – Wed. evening</b>	16 – 18.6
13	Fri. 2-14	Magnetic Fields	19.1 – 19.2
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	Mon. 2-17	<b><i>Holiday – Presidents' Day</i></b>	-
14	Wed. 2-19	(Mon.) Charges in Magnetic Fields	19.3 – 19.4
15	Fri. 2-21	Force and Torque	19.5 - 19.6
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16	Mon. 2-24	Ampere's Law	19.7 – 19.8
17	Wed. 2-26	Magnetic Flux	20.1
18	Fri. 2-28	Faraday's Law	20.2 – 20.3
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19	Mon. 3-3	Lenz's Law	20.2 – 20.3
20	Wed. 3-5	Motional emf; eddy currents	20.4 – 20.5
21	Fri. 3-7	Generators; Transformers	20.6 – 20.7
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## PY106 Spring 2014 Studio Course Schedule - Page 2

	Date	Topic	Sections (Essential Physics)
	3/10 to 3/14	<b>Spring Break</b>	-
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22	Mon. 3-17	Waves and Sound	21.1 – 21.3
23	Wed. 3-19	Sound; Doppler Effect	21.4 – 21.5
24	Fri. 3-21	Superposition of Waves	21.6 – 21.7
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25	Mon. 3-24	Standing Waves; Music	21.8 – 21.10
26	Wed. 3-26	EM Waves	22.1 – 22.3
27	Fri. 3-28	Polarized light	22.5 – 22.6
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28	Mon. 3-30	Review for Test 2	18.7 – 22
29	Wed. 4-2	Reflection	23.1 – 23.3
-	Wed. 4-2	<b>TEST 2 – Wed. evening</b>	18.7 – 22
30	Fri. 4-4	Spherical Mirrors	23.4 – 23.7
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31	Mon. 4-7	Refraction	24.1 – 24.3
32	Wed. 4-9	Lenses	24.4 – 24.6
33	Fri. 4-11	Human Eye; Camera	24.7 – 24.8
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34	Mon. 4-14	Interference of Light	25.1 – 25.2
35	Wed. 4-16	Diffraction	25.3 – 25.4
36	Fri. 4-18	Thin films	25.5 – 25.7
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-	Mon. 4-21	<b>Holiday – Patriots' Day</b>	-----
37	Wed. 4-23	Quantum Hypothesis	27.1 – 27.2
38	Thurs. 4-24	(Mon.) Photons	27.3 – 27.6
39	Fri. 4-25	Atom Models	28
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40	Mon. 4-28	Radiation; The Nucleus	29.1 – 29.3
41	Wed. 4-30	Radioactivity; Reactions	29.3 – 29.6
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	5-6	<b>Final exam</b>	16 – 29 (omit 26)
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## 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 Blackboard. 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.

You can submit your report to your lab TF (teaching fellow) as a set of neatly stapled looseleaf sheets.

## PY106 Spring 2014 Lab Schedule

Dates	Experiment
Jan. 15 – 17	Electric Charge – counts as discussion quiz
Jan. 22 – 24	<i>No lab – Martin Luther King, Jr. Day</i>
Jan. 27 – 31	Electric Fields and Potentials
Feb. 3 – 7	Ohm’s Law – MBL
Feb. 10 – 14	<i>No lab – Test 1</i>
Feb. 17 – 21	<i>No lab – President’s Day</i>
Feb. 24 – 28	Charge-to-Mass Ratio
Mar. 3 – 7	Faraday’s Law – MBL
Mar. 10 – 14	<i>No lab – Spring Break</i>
Mar. 17 – 21	Electromagnetic Induction
Mar. 24 – 28	Sound – MBL
Mar. 31 – Apr. 4	<i>No lab - Test 2</i>
Apr. 7 – 11	Geometrical Optics
Apr. 14 – 18	Interference and Diffraction – MBL
Apr. 21 – 25	<i>No lab – Patriot’s Day</i>

## PY106 Spring 2014 Homework Schedule

Date	Homework	Date	Homework
Jan. 28	Assignment 1 (Hand-in)	Mar. 18	Assignment 7 (WebAssign)
Feb. 4	Assignment 2 (WebAssign)	Mar. 25	Assignment 8 (WebAssign)
Feb. 10*	Assignment 3 (WebAssign)	Mar. 31*	Assignment 9 (WebAssign)
Feb. 18	Assignment 4 (WebAssign)	Apr. 8	Assignment 10 (WebAssign)
Feb. 25	Assignment 5 (WebAssign)	Apr. 15	Assignment 11 (Hand-in)
Mar. 4	Assignment 6 (Hand-in)	Apr. 22	Assignment 12 (WebAssign)
Mar. 11	None – Spring Break	May. 1*	Assignment 13 (WebAssign)

\* Assignments 3 and 9, due just before the tests, are due on Mondays. Assignment 13 is due on the last day of classes, which is a Thursday.

Homework assignments are due by 10:00 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 of this syllabus), but three assignments will be handed in to the boxes in the basement of the SCI building. Each assignment (besides #4 and # 10) is worth 20 points (the hand-ins are re-scaled to be out of 20), and your lowest assignment grade is dropped.

## PY106 Honor Code

I agree to act with complete honesty in PY106. This includes, but is not limited to, the following:

All work I turn in will be my own, and not copied from any other source.

For in-class questions that require the use of a transmitter to respond, I will submit responses using only my transmitter. **I will not submit responses for anyone else.**

In addition to being reported to the Academic Conduct Committee, examples of grading penalties include:

Zero on an assignment if you copy the assignment, or let someone copy from you.

Zero on a test if there are copying issues, or other examples of misconduct.

Zero for the semester's participation grade if you enter clicker responses for anyone else, or if somebody else enters clicker responses for you while you are not in class.

Name: \_\_\_\_\_ BU ID: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

To help us keep track of the responses to the in-class questions that you answer with your transmitter, please enter the ID number of your Turning Technology clicker, which is the number printed right beneath the bar code on the back of your clicker.

ID number for your clicker: \_\_\_\_\_

Register your Turning Technologies RF clicker on the PY106 Blackboard site.

Please check here after registering your clicker, and before turning this page in. \_\_\_\_\_

Please return this page to your PY106 professor.