ELEMENTARY PHYSICS II - Lecture PY106 FALL 2019

Lecture Section	Professor	Contact Info.	Office hours
A1 MWF 2:30 – 3:20PM	Prof. Shyamsunder Erramilli Office: PHO 824 Office hours: SCI 121	Phone: 617-353-1271 E-mail: shyam@bu.edu	W 3:30 – 5:30 pm

Recommended Text + Workbook	Book - "Essential Physics", by A. Duffy, volume 2. Workbook -"Essential Physics Workbook, volume 2", by A. Duffy. Both are available in the BU bookstore and from Amazon, and the book is available through WebAssign.
Questions?	For questions, use the course site on Piazza (you will get an e-mail invitation).
Calculator	It will be helpful to have a standard scientific calculator for the course, but calculators are **not allowed on the tests or final exam**.
Clicker	We'll be using the Top Hat response system – you will need the app or web access.
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 $31.70, payable on-line after logging into WebAssign (see syllabus page 4).
Labs	The lab manual and pre-labs are available on the course Piazza site. Pre-labs, which count for 20% of the lab grade, are due at the start of the lab period. Lab writeups are due at the end of the lab period.
Exams	Test 1 – Oct 2* Test 2 - Nov 6* Final exam TBD * Schedule on page 5 Midterm tests (Tests 1 and 2) are from 6:30 – 8:15 pm [TBC]
Course Grade	16% homework assignments (drop the lowest); 4% discussion quizzes 10% labs (drop the lowest); 5% pre-class quizzes on WebAssign 4% class participation; 1% total for pre-tests and post-tests 16% test 1, 16% test 2, and 23% final exam; 5% Top Hat assignments
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. 90.00 – 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 sites:

1. For grades, Blackboard Learn: http://learn.bu.edu

Your login name is your regular BU login name and your password is your BU kerberos password. 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.

2. For online homework: http://webassign.net (See page 4 for more details)

3. For discussion and announcements: Piazza, at http://piazza.com/bu/spring2018/py106/home

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 16% of your course grade. Regular WebAssign assignments are worth 20 points each; assignments #6 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 assignment 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: You will spend much of the discussion time working with other students in small collaborative groups. Some weeks there will be a quiz that is graded out of 5. These quizzes will count for 4% of the course grade.

Laboratories: In studio physics, labs are integrated into the class time, and held in the studio classroom, typically on Wednesdays. 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.

The steps on how to write the lab report are detailed on page 8 of the syllabus. Lab reports are usually turned in at the end of the session, so you should be as prepared as possible when you start. 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 linked through our Piazza site, and must be turned in to your lab TF at the start of the lab. Anyone turning in late pre-lab assignments, or completing them after arriving, will not receive credit for the pre-lab. You are welcome to discuss the exercises with a TF or professor in advance.

Studio: To get the most out of class, 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 4%. Studio physics may be different from what you're used to. 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 online, 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 16% of your final grade, and the final exam counts for 23%. **No calculators are allowed on the midterms or final exam.** Re-grade requests must be submitted within one week after the midterm grades are released. Final exams are not released, but you can make an appointment to see your final.

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 Piazza.

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: Your teaching fellows will answer questions about lab and discussion grades. If they cannot answer your question, contact your professor. Professor Duffy is primarily responsible for homework assignments; Professor Rohlf is primarily responsible for posting slides on Piazza; Professor Gross is primarily responsible for the lab component; Professor Carey is primarily responsible for the discussion component; and Professor Gregor is our Gradescope guru.

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. Erramilli 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. 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.

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

PY106 Fall 2019 Course Schedule Part 1/2

#	Date	Topic	Sections in Textbook	Lab (Mon/Tue)	Discussion (Thu/Fri)
1	Wed. 4 Sept.	Electric Charge	16.1		Pre-test (room SCI 134 or SCI 136)
2	Fri. 6 Sept.	Coulomb's Law/Superposition	16.2 – 16.4		
3	Mon. 9 Sept.	Electric force F_E and electric field E	16.4 – 16.5	#1: Electric charge	
4	Wed. 11 Sept.	Conductors	16.6 – 16.7		Ch. 16
5	Fri. 13 Sept.	Electric potential energy U_E and electric potential V	17.1 – 17.2		
6	Mon. 16 Sept.	More on electric potential	17.3 – 17.5	#2: Electric fields and potentials	
7	Wed. 18 Sept.	Batteries and capacitors	17.6 – 17.7		Ch. 17
8	Fri. 20 Sept.	Current I, resistance R, Kirchoff's Law, Ohm's Law	18.1 – 18.3		
9	Mon. 23 Sept.	Power, Series and Parallel	18.4 – 18.6	#3: Capacitors	
10	Wed. 25 Sept.	Resistor Networks, Meters	18.7 – 18.8		Ch. 18
11	Fri. 27 Sept.	Multi-loop circuits RC circuits	18.9 – 18.10		
12	Mon. 30 Sept.	Examples from Ch. 18		no lab this week	
13	Wed. 2 Oct.	Review for Test 1	Ch. 16 – 18		
	Wed. 2 Oct.	**TEST 1: 6:30 – 8:15pm**	**Ch. 16–18**		
14	Fri. 4 Oct.	Magnetic fields	19.1 – 19.2		
15	Mon. 7 Oct.	Magnetic forces	19.3 – 19.4	#4: e/m ratio electron	
16	Wed 9 Oct.	Magnetic torques	19.5 – 19.6		Ch. 19
17	Fri. 11 Oct.	Generating magnetic fields	19.7 – 19.8		
	Mon. 14 Oct.	**Columbus Day Holiday**			
18	Tue. 15 Oct.	Faraday's Law	20.1 – 20.3	no lab this week	
19	Wed. 16 Oct.	Motional emf	20.4 – 20.5		Ch. 20
20	Fri. 18 Oct.	Generators and transformers	20.6 – 20.7		

Information in this table might change during the semester. Any changes will be made clear in the lectures and via Piazza.

PY106 Fall 2018 Course Schedule Part 2/2

#	Date	Topic	Sections in Textbook	Lab (Mon/Tue)	Discussion (Thu/Fri)
21	Mon. 21 Oct.	More Examples: Ch 19 & 20	Ch. 19, 20	#5: Faraday's Law MBL	
22	Wed. 23 Oct.	Waves	21.1 – 21.3		Ch. 21
23	Fri. 25 Oct.	Sound, Doppler, Superposition	21.4 – 21.6		
24	Mon. 28 Oct.	Superposition and Interference	21.7-21.10	#6: Electromagnetic induction	
25	Wed. 30 Oct.	EM waves and light	22.1 – 22.2		Ch. 22
26	Fri. 1 Nov.	Radiation pressure/Doppler Effect	22.3 – 22.4		
27	Mon. 4 Nov.	Polarization	22.5 – 22.6	no lab this week	
28	Wed. 6 Nov.	Review for Test 2	Ch. 19 – 22		
	Wed. 6 Nov.	**TEST 2: 6:30 – 8:15pm**	**Ch. 19–22**		
29	Fri. 8 Nov.	Ray Model of Light, Reflection	23.1 - 23.3		
30	Mon. 11 Nov.	Spherical mirrors	23.4 - 23.7	No lab this week	
31	Wed. 13 Nov.	Refraction/Dispersion	24.1 -24.3		Ch. 23, 24
32	Fri. 15 Nov.	Thin Lenses	24.4 – 24.7		
33	Mon. 18 Nov.	Interference and Diffraction	25.1 – 25.5	#7: Geometrical optics	
35	Wed 20 Nov.	Photoelectric effect	27.1 – 27.3		Ch. 25,27
36	Fri. 22 Nov.	Particles and waves	27.4 – 27.6		
37	Mon. 25 Nov.	Radioactive decay	29.1 – 29.5		
	27-30 Nov.	**Thanksgiving Recess**			
37	Mon. 2 Dec.	Nuclear and Particle Physics	29.6 – 29.8	#8: Interference & Diffraction	
38	Wed. 4 Dec.	Relativity			Post-test + evals
39	Fri. 6 Dec.	The Big Bang			
40	Mon. 9 Dec.	Review for Final Exam	23–25,27,29	no lab this week	
	TBA	**FINAL: 3:00 –5:00pm**	Cumulative		

Information in this table might change during the semester. Any changes will be made clear in the lectures and via Piazza.

Top Hat Assignments

We'll have a new feature this semester, which will count for 5% of the course grade. A significant fraction of this grade will be based on participation. The goal of the Top Hat assignments is to give you some incentive to read and practice outside of class. This also reduces the emphasis on the tests and the final exam (these still count for a total of 55% of the grade, down from 60%).

The Top Hat assignments are split into three parts. Each part will be graded out of 50% of the total possible points for that part, and then we'll combine the scores into a grade out of 5. The three parts match the topics that are the focus of the tests and final exam.

	Available	**Due by**
Part 1 (modules 1-4)	Start of semester	Oct. 15
Part 2 (modules 5-7)	Oct. 16	Nov. 12
Part 3 (modules 8-12)	Nov. 13	Last day of classes

LABS

You will not need to write a detailed procedure for the labs. Instead, there will be a handout available when you start 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 arrive on a lab day. These are available through Piazza. The pre-labs help you prepare for the lab session. Labs are generally due at the end of the lab session (usually a Wednesday).

2. 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.

3. 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?

4. 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.

5. 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.

PY106 Fall 2019 Homework Schedule

Date	Homework		Date	Homework
Sept. 17	Assignment 1 (WebAssign)		Nov. 4*	Assignment 8 (WebAssign)
Sept. 24	Assignment 2 (WebAssign)		Nov. 12	Assignment 9 (WebAssign)
Sept. 30*	Assignment 3 (Hand-in)		Nov. 19	Assignment 10 (WebAssign)
Oct. 8	Assignment 4 (WebAssign)		Nov. 27	***No HW - Thanksgiving***
Oct. 15	Assignment 5 (WebAssign)		Dec. 3	Assignment 11 (Hand-in)
Oct. 22	Assignment 6 (WebAssign)		Dec. 9*	Assignment 12 (WebAssign)
Oct. 29	Assignment 7 (Hand-in)			

* Assignments 3 and 8, due just before the midterm tests, are due on a Monday. Assignment 12 is due on Monday of the last week of classes.

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 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

You should be aware of the Academic Code of Conduct – please look that up and make sure you adhere to the guidelines. We would also ask you to sign the following:

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.

In addition to being reported to the Academic Conduct Committee for any breaches of the code of conduct, 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.

Name: _____ BU ID: _____

Signature: _____ Date: _____

Please return this page to your PY106 professor.