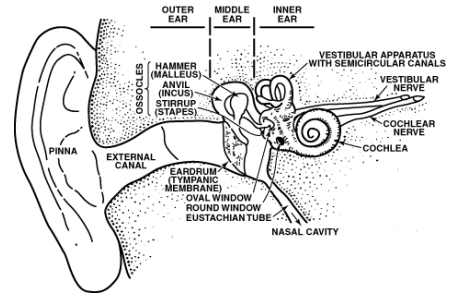


SYLLABUS

Boston University
CAS PY 241
Principles of General
Physics I Fall 2019



PY 241 is intended for well-prepared students of the life sciences, particularly those interested in a degree in medicine, and especially students in the 7-Year Medical Program. It is a fast-paced course that, including PY242, will cover Classical Mechanics, Thermal Physics, Fluids, Electricity, Magnetism, Optics, and the basics of Quantum Mechanics and Nuclear Physics.

Instructors: Office hours posted on Piazza!

Prof. Robert Carey, Physics Research Building (PRB) Room 375
carey@bu.edu, +1 (617) 353-6031

LA Alan Perry, perrya@bu.edu, +1 (904) 349-4184

TF Gaoxiang Mei, gxmei@bu.edu

Prerequisites: A good grasp of mathematics is essential. Students should be fluent with algebra, trigonometry, vectors, and arithmetic. This course will be taught using calculus. MA123 (Differential Calculus) or equivalent is a prerequisite, and MA124 (Integral Calculus) should be taken concurrently or already be satisfied by an equivalent. Many freshmen will have satisfied the prerequisites through Advanced Placement exams.

Online Material: Material such as homework assignments and solutions, exams and solutions, office hours, the updated syllabus will be posted on Piazza, to which you should already have been invited. Likewise, you'll be able to find other resources to help you learn the material. Blackboard Learn will be used for posting grades - you will need a Kerberos password to gain access. (**learn.bu.edu**)

Lectures: The topic to be presented during each lecture is listed on the course calendar, and generally matches with a chapter of the textbook. Attendance at lectures is required. In order to gain the most from each lecture, you should read the chapters in advance. The lecture may occasionally include an impromptu short quiz. Such quiz grades, attendance, and active participation will be allocated up to 5% of the final score used to determine your letter grade, at the discretion of the instructor.

Lectures are Tuesday-Thursday in SCI-B58 from 12:30 to 1:45 PM.

FlipItPhysics: We will use the online prelectures and checkpoint exercises from FlipItPhysics. You can purchase and register with FlipItPhysics at www.flipitphysics.com (start by clicking "Student" under "Get access to FlipItPhysics"). When asked for a student ID, enter your BU user name (which is your BU email address without the @bu.edu, the same user ID that you use to log into Blackboard. For example, if your BU email address is alberteinstein@bu.edu, then your FlipIt Physics student ID would be alberteinstein.) The Course Access Key is e635d2c8. Your scores on the prelecture and checkpoint exercises will count for 5% of our final grade.

Textbook: Fundamentals of Physics, 10th Edition: Halliday, Resnick and Walker. The 10th edition is available at the bookstore but since I won't be assigning problems from the book, feel free to purchase any recent edition. The 7th edition or later should be OK.

Exams: There will be three exams: two midterms plus a final during the regularly scheduled final exam period. These three exams will represent more than half of your final grade in the course: 23% for the final exam and 16% for each of the midterms. The tentative dates for the midterms are

Midterm 1: Oct. 3

Midterm 2: Nov. 7

Discussion Sections: Discussion sections are a required part of the course. You must have an assigned discussion section. The teaching fellow and learning assistant will supplement the lecture material, assist in problem solving, and help prepare you for exams. The discussions will be run as workshops with students spending most of their times attacking physics problems in small groups. The TF and LA will help students and lead group activities. Several times per semester, graded quizzes will be given. The discussion sessions will count for 5% of your grade but that grade will depend entirely on participation.

Discussion Section D1: Friday, 10:10-11 AM in SAR-300.

Discussion Section D2: Friday, 2:30-3:20 PM, in PRB-150

Homework: Problem sets will generally be released on Monday, and are posted on Piazza. They will generally be due a week later, on Monday at 5pm. You should place your finished solutions in boxes located on the first floor of the Metcalf Science Center (SCI). You may work together to tackle questions, but the solution you turn in must be your own. Your problem sets should be neat, readable, and sufficiently well organized that your approach to the problem is clear to the grader. For most full-length problems, at least one page of paper per problem is appropriate. Place a box around final answers so they are easy to find. The homework will be graded by the teaching assistant and will be returned during discussion section or lecture. Solutions will be posted on Piazza. Once the solutions are posted we cannot accept homework for grading. Homework scores will account for 15% of your grade.

Labs: Laboratory sections are a required part of the course. You will perform six experiments and record your observations and measurements in a suitable laboratory notebook. A low-cost, quadrille, spiral-bound notebook is satisfactory. The format of the laboratory reports is addressed in a post on piazza. Reports are due one week after the lab is completed, often the next session. Laboratory scores will account for 15% of your grade. **All labs are required.** Turning in fewer than all assigned labs will result in a grade of F. Lab guides are available from:

http://physics.bu.edu/ulab/all_labs.html

Lab Section L1: Mondays, 3:30-6:15 PM.

Lab Section L2: Tuesdays, 8-10:45 AM.

The lab schedule is shown below. Guidelines for lab reports will be posted on piazza.

Makeup rules: For students with valid excuses (determined by your assigned lab or discussion TF, in consultation with the lecturer), you may be allowed to attend an alternate section. If you need to miss a section, we would rather have you complete the work the same week. There will be an opportunity to make up one missing lab at the end of the semester, again if a valid excuse is authorized in advance. There will be no makeup exams except for very serious, documented excuses such as illness. There will be no makeups for discussion or lecture quizzes.

Grading Summary:

5% FlipIt Physics

23% Final Exam

16% Midterm 1

16% Midterm 2

5% Discussion

15% Homework

15% Laboratory

5% Lecture Activities

Academic Conduct: You are expected to be familiar with and adhere to the [College's Academic Conduct Code](#). The homework and labs you turn in must be your own work, subject to reasonable collaboration with your peers in this class as discussed above. Use of solution manuals, solutions from previous years, or help from postings on the Internet is expressly forbidden. Cheating on exams, quizzes, or other course work will not be tolerated. Evidence of cheating will be reported to your college's Academic Conduct Committee. This is a serious matter and has resulted in both grade penalties and program expulsion in recent years.

Lecture/Lab Schedule

#	Date	Topic	Chapter	Lab (Mon/Tue)
1	Tue. 3 Sept.	Introduction, Linear Motion	1,2	No Lab
2	Thu 5 Sept.	Linear Motion	2	
3	Tue. 10 Sept.	2D Motion	3	Graphical Analysis
4	Thu 12 Sept.	2D Motion	4	
5	Tue. 17 Sept.	Newton's Laws of Motion	5	Projectile Motion
6	Thu.. 19 Sept.	Newton's Laws of Motion	5	
7	Tue. 24 Sept.	Applications of Newton's Laws	6	Constant Acceleration - MBL
8	Thu. 26 Sept.	Applications of Newton's Laws	6	
9	Tue 1 Oct.	Work and Energy	7	No Lab
10	Thu. 3 Oct.	Midterm Exam 1	1-6	
11	Tue. 8 Oct.	Energy, Gravitation	8 (13)	No Lab
12	Thu 10 Oct.	Linear Momentum	9	
	Tue. 15 Oct.	Monday Schedule		No lab
13	Thu.. 17 Oct.	Linear Momentum	9	
14	Tue. 22 Oct.	Rotational Motion	10	Collisions
15	Thu. 24 Oct.	Torque and Angular Momentum	11	

#	Date	Topic	Chapter in Textbook	Lab (Mon/Tue)
16	Tue. 29 Oct.	Angular Momentum	11	No Lab
17	Thu. 31 Oct.	Equilibrium	12	
18	Tue. 5 Nov..	Fluids at Rest	14	No lab
19	Thu 7 Nov.	Midterm Exam 2	7-12	
20	Tue. 12 Nov.	Fluids in Motion	14	Torque and Moment of Inertia
21	Thu.. 14 Nov..	Oscillations	15	
22	Tue. 19 Nov.	Waves	16	Simple Harmonic Motion
23	Thu. 21 Nov.	Waves	17	
24	Tue 26 Nov.	Temperature/Heat	18	No Lab
25	Thu. 28 Nov.	Thanksgiving		
26	Tue. 3 Dec.	Kinetic Theory	19	No Lab
27	Thu 5 Dec.	Kinetic Theory	19	
28	Tue. 10 Dec.	Entropy & Second Law	20	Specific Heat and Latent Heat