

## PY 251 Principles of Physics

### Syllabus

Fall Term 2010

**Instructor:** Claudio Rebbi  
Office: SCI 255  
Phone: 353-9058, 358-5467  
e-mail: rebbi@bu.edu  
Office hours: Mo 3:15PM-4:45PM, Fr 10:00AM-11:30AM and by appointment.

#### Teaching assistants:

Nick Lubbers (discussions and homework)  
Office: SCI B 52  
Phone: 617-653-9442 (lab)  
e-mail: nlubbers@bu.edu  
Office hours: Mo 10:30AM-12noon, Tu 3PM-4:30PM

Colin Howard (laboratories)  
Office: SCI B37  
Phone: 617-353-3424 (or 267-337-1086 in case of no answer)  
e-mail: choward9@bu.edu  
Office hours: Tu 11AM-12:30PM, Th 11AM-12:30PM

**Class meetings:** Lecture: TR 12:30PM-2PM, room SCI 115  
Discussion sessions:  
D1, W 10AM-11AM, SCI B58  
D2, W 11AM-12noon, SCI B58  
Lab sessions:  
L1, R 6:30PM-9:30PM, SCI first floor (computer based labs) or basement  
L2, F 12noon-3PM, SCI first floor (computer based labs) or basement  
L3, W 6PM-9PM, SCI first floor (computer based labs) or basement

Discussion sections will begin Wednesday September 8.

**Books:** *Physics for Scientists and Engineers*, by Paul M. Fishbane, Stephen Gasiorowicz, Steve Thornton, Pearson Prentice Hall, 2005  
*An Introduction to Error Analysis*, 2nd edition, by John R. Taylor, University Science Books, 1997

Goal of this course is to teach fundamental notions of mechanics and thermodynamics, at a level appropriate for students who intend to major in physics.

## Schedule of Lectures

9-2	Introduction
9-7	Straight line motion
9-9	Motion in two and three dimensions
9-14	Newton's laws
9-16	Application of Newton's laws
9-21	Work and kinetic energy
9-23	Potential energy
9-28	Linear momentum, center of mass
9-30	Make-up and Review
10-5	First midterm exam
10-7	Torque, angular momentum
10-12	no class - Monday schedule of classes
10-14	Angular momentum, continued
10-19	Moment of inertia, rotation of rigid bodies
10-21	Statics
10-26	Gravitation
10-28	Gravitation, continued
11-2	Make-up and Review
11-4	Second midterm exam
11-9	Oscillatory motion
11-11	Waves
11-16	Superposition of waves
11-18	Properties of fluids
11-23	Temperature and ideal gases
11-25	no class -Thanksgiving Day
11-30	First law of thermodynamics
12-2	Molecular basis of thermal physics
12-7	The second law of thermodynamics
12-9	Second law of thermodynamics, continued

*Note:* Attendance at lectures and discussion sections is mandatory. Students who cannot attend should justify their absence by sending an email message, before the class they will miss if at all possible, to [rebbi@bu.edu](mailto:rebbi@bu.edu) for the lectures or the appropriate teaching assistant for the discussions. The accumulation of more than 3 unjustified absences at lectures may lead to a one-step reduction in the final grade ( $A \rightarrow A-$ ,  $A- \rightarrow B+$  etc.).

## Schedule of Laboratories

Sept. 22, 23 and 24	Projectile motion - room SCI B9
Sept. 29, 30 and Oct. 1	Constant acceleration - room SCI 134
Oct. 6, 7 and 8	Energy conservation - Room SCI B1
Oct. 13, 14 and 15	Collisions - Room SCI 134
Oct. 27, 28 and 29	Torque and moments of inertia - Room SCI 134
Nov. 3, 4 and 5	Simple harmonic motion - Room SCI B23
Nov. 17, 18 and 19	Mechanical equivalent of heat - room SCI B15
Week of Nov. 29	Makeups - room SCI 136

*Note:* All laboratories must be completed for passing the course.

## Schedule of Exams

10-5, 12:30PM-1:50PM, room SCI 115	1st midterm exam
11-4, 12:30PM-1:50PM, room SCI 115	2nd midterm exam
12-18, 9AM-11AM, room SCI 115	final exam

(Note: students who cannot take the final exam on Saturday for religious reasons should inform the instructor promptly, and in any event no later than November 29.)

## Homework assignments

Homeworks will be distributed weekly and will be due in class one week after they have been assigned.

## Grading

At the end of the course the scores for homework assignments, laboratory reports, midterm exams and final exam will be averaged with two independent set of weights, as follows:

- a) homework 25%, labs 15%, 1st midterm 20%, 2nd midterm 20%, final 20%;
- b) homework 25%, labs 15%, 1st midterm 10%, 2nd midterm 10%, final 40%;

and each student will be given the greater of the two scores.

*Rationale:* The set of weights a) is meant to encourage the students to study regularly during the course and to come to midterms well prepared. The set of weights b) is offered as an alternative to give students who had a slow start but are able to catch up, or students who had a bad day during one of the midterms, the possibility of making up with a good final exam.

Letter grades will then be assigned to the average score  $S$  as follows:

$93 \leq S \leq 100$ :	A
$88 \leq S < 93$ :	A-
$83 \leq S < 88$ :	B+
$78 \leq S < 83$ :	B
$73 \leq S < 78$ :	B-
$68 \leq S < 73$ :	C+
$63 \leq S < 68$ :	C
$55 \leq S < 63$ :	C-
$45 \leq S < 55$ :	D
$S < 45$ :	F

*Note:* In case the distribution of scores turned out to be too low, reflecting unexpectedly difficult midterm or final exams, the students' scores may be rescaled upward before being converted to letter grades.

### **Addendum**

This addendum addresses further standard questions that students may have about the course.

1. Required readings: students are expected to read and study the relevant textbook chapters as well as all lecture notes distributed in class.
2. Web site: syllabus, lecture notes and other relevant material can be found at <http://physics.bu.edu/~rebbi>.
3. Late work: homework assignments must be returned by the deadline stated in the assignment. Extensions may be requested by sending an email message to the instructor only for very serious reasons (grave illness, etc...). Barring emergencies, the request for an extension must be sent before the deadline.
3. Independence of work: students should do their homework assignments by themselves.
4. Students' responsibility: Students should know and understand the provisions of the CAS Academic Conduct Code. (Copies are available in room CAS 105). Cases of suspected academic misconduct will be referred to the Dean's Office.