PY 408  Course Information

Instructor:            So-Young Pi       PRB 569,  (617) 353-4780
                      soyoung@bu.edu
Grader:                TBA
Office hours:       Tue, Thu, 2-3 & Wed 10-11; additional office hours by appointment
Prerequisite:        PY 251, 252 (211, 212) and PY 355
Text:                 Classical Dynamics
                      Thorn & Marion (5th ed.)
References:          For same level as this course: Classical Mechanics, H. Goldstein (2nd or 3rd ed.)
                      Classical Mechanics; J. Taylor (1st ed.)
                      For higher level than this course: Mechanics; L. Landau & E. Lifshitz (3rd ed.)
Exams:               2 mid-term exams and a final:
                      mid-term 1: Thu, Oct. 2
                      mid-term 2: Thu, Nov. 6
                      Note: If you are ill and miss an exam, you must submit a doctor’s letter
to take the exam later.
Homework:            There will be weekly problem sets.
                      Solutions will be posted on PY 408 website.
                      No credit will be given for the late homework and there will be no exceptions to this rule. This applies
to those who added the course late or become ill. However, your lowest grade will be dropped.
Reading Assignments: The weekly reading assignments will cover most of the lecture
material of the week. This is important for understanding lectures.
                      Lecture notes will be posted on PY 408 website.
Grading:             The course grading will be based on these components:
                      homework  15 %
                      mid-term 1  15 %
                      mid-term 2  20 %
                      final      30 % (comprehensive)
                      Lab        20%
                      In order to pass this course you should not miss more than two sets of HW.
Course Description:

This course begins with a review of Newtonian mechanics in a more advanced level than in freshman physics. The first part of the course includes an overview of Newtonian mechanics and its application to simple problems including linear and nonlinear oscillations and gravitation. The second part of the course introduces Hamiltonian and Lagrangian formalism which is an alternative, more powerful approach to classical mechanics. This formalism contains a succinct explanation of conservation laws through the concept of symmetries of a given dynamical system. Moreover, it provides a bridge from classical to quantum mechanics. We then study central force motion, dynamics of a rigid body and coupled oscillators.

Note: I will follow the text closely. Therefore, the textbook is required.

Tentative course schedule:

Week of lectures (Tue, Thu) Chapters
Sept. 2 overview and review of Newtonian mechanics 2
Sept. 9 review of Newtonian mechanics 2
Sept.16 oscillations 3
Sept.23 oscillations 3
Sept.30 nonlinear oscillation midterm 1 4
Oct. 7 gravitation 5
Oct. 14 Hamiltonian and Lagrangian mechanics (no lecture on 14th) 6, 7
Oct. 21 Hamiltonian and Lagrangian mechanics 7
Oct. 28 Hamiltonian and Lagrangian mechanics 7
Nov. 4 central force midterm 2 8
Nov. 11 central force, scattering 8, 9
Nov. 18 Dynamics of a rigid body 9, 11
Nov. 25 Dynamics of a rigid body (no class on 26th) 11
Dec. 2 Dynamics of a rigid body, coupled oscillators 11, 12
Dec. 9 coupled oscillators 12