

Physics 311 — Mechanics

Spring 2008

Synopsis

A review of basic concepts in Newtonian dynamics and an introduction to the modern formulation of mechanics emphasizing action principles; conservation laws and symmetries; phase-space; and approximation techniques.

Meeting Time

10:30 AM MWF, Brace Lab, Room 202

Instructor

Brad Shadwick, 310 Ferguson, 472-3578, shadwick@mailaps.org
Office Hours: Drop by or by appointment.

Prerequisites

Physics 212 and Math 221 or permission of instructor.

Text

There is no required textbook. We will loosely follow Fowles and Cassiday, *Analytical Mechanics*, Seventh Edition with additional material from other sources.

Useful references include (but are not limited to):

- Aharoni *The special theory of relativity*
- Feynman, *The Feynman Lectures on Physics, Volume 1*
- Goldstein, *Classical Mechanics*
- Landau & Lifshitz, *Mechanics*
- Symon, *Mechanics*

Homework

Assignments will be handed out in lecture each Wednesday and will be due in lecture the following Wednesday. Late homework will not be accepted. You are encouraged to discuss the homework problems with other students, however, the solutions you turn in to be graded must be your own work. Your lowest homework grade will be dropped.

Exams

There will be two mid-term exams, tentatively scheduled for Friday, February 15 and Friday, March 28. A comprehensive final exam is officially scheduled for 7:30 AM on Friday, May 4. We can discuss moving the final to a mutually agreeable earlier day during exam week.

Grading (approximate)

- 40% Final exam
- 40% Mid-term exams
- 20% Homework

Course Outline

The course will cover the following topics (the order is approximate):

- Review of Newtonian Mechanics
- Lagrangian Formulation and Hamilton's Principle
- Phase Space and Hamiltonians
- Harmonic Oscillator
- Rigid Body Dynamics
- Central Forces and Kepler's Laws
- Non-inertial Frames
- Coupled oscillators
- Special Relativity
- Additional Topics

Web Pages

Course materials will be available through the Blackboard system.

Makeup Lecture Time

The instructor will likely need to miss a class from time to time. You will receive a scheduling form to help us choose a mutually agreeable, alternate lecture hour. Once it is determined, please try to keep this time available.