SMU Summer 2010
Physics 1307 : Mechanics
Syllabus

Instructor : Will McElgin
Office : Fondren 49
Phone : 214-768-2819
Email : mcelgin@physics.smu.edu
Office Hours : MWF – 12-2pm (also open door policy)

Text : Wolfson, "Essential University Physics : Vol 1"
Course Website : www.physics.smu.edu/mcelgin/P1307_summer2010/P1307.html
Lecture Times : MTWRF – 9:00am-10:50am
Lecture Location : Fondren 158

Description of the Course

This course is intended as a calculus-based introduction to classical mechanics. The goal is for the student to gain an understanding of the relationship between force and motion embodied in Newton's laws, and to understand how to make use of these laws to solve physical problems. Initial topics to be covered will include single particle motion, Newton's laws of mechanics, and uniform circular motion. The concept of conservation of (kinetic plus potential) energy which follows from Newton's laws will then be explored in detail, along with a treatment of motion in a gravitational field. Following this, the motion of systems of particles and the concept of conservation of momentum will be discussed. This will be followed by a discussion of rotational motion of extended bodies and the related concepts of torque, angular momentum, and static equilibrium. Finally, the topics of oscillatory, and fluid motion will be explored. There will be an emphasis on in-class problem solving using similar ideas and techniques as required on homework and exams.

Evaluation

Grading will be entirely based on three exams (33% each). Homework will be assigned but not collected. Attendance in class is strongly expected and, unless expressly told otherwise, students are responsible for all aspects of the class discussion.

Instructor Formulated Student Learning Outcomes

It is expected that students should be able to incorporate physical concepts with mathematical techniques to solve problems in Mechanics and related topics. While only algebraic techniques will be required on exams, calculus will be utilized in the class discussion and in selected homework problems, and is expected that students will be conversant in these descriptions of physics.

General Education Student Learning Outcomes

Students demonstrate the ability to understand, critique, and draw conclusions from numerical arguments and data. Students demonstrate basic facility with the methods and approaches of scientific inquiry and problem-solving.

Schedule

6/1 : One-dimensional Motion and Vectors. Chapters 2 and 3.

6/2 : Vectors, Projectile and Circular Motion. Chapter 3.

6/3 : Circular Motion, Force and Newton's Laws. Chapters 3 and 4.

6/4 : Force and Newton's Laws. Chapter 4.

6/7 : Newton's Laws. Chapters 4 and 5.

6/8 : More on Newton's Laws. Chapter 5.

6/9 : Exam 1.

6/10 : Work, Energy, and Power. Chapter 6.

6/11 : Work and Energy Conservation. Chapters 6 and 7.

6/14 : Energy Conservation and Gravity. Chapters 7 and 8.

6/15 : Gravity. Chapter 8.

6/16 : Systems of Particles, Momentum, and Rotational Motion. Chapters 9 and 10.

6/17 : Rotational Motion and Torque. Chapter 10.

6/18 : Rotational Motion and Torque. Chapter 10.

6/21 : Exam 2.

6/22 : Angular Momentum, and Static Equilibrium. Chapters 11 and 12.

6/23 : Angular Momentum, and Static Equilibrium. Chapters 11 and 12.

6/24 : Static Equilibrium. Chapter 12.

6/25 : Oscillatory Motion. Chapter 13.

6/28 : Oscillatory Motion and Fluids. Chapters 13 and 15.

6/29 : Fluids. Chapter 15

6/30 : Exam 3.