SMU Summer 2009
Physics 1307 : Mechanics
Syllabus

Instructor : Will McElgin
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Office Hours : MWF – 12-2pm (also open door policy)

Text : Wolfson, "Essential University Physics : Vol 1"
Course Website : www.physics.smu.edu/mcelgin/P1307_summer2009/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. The topics of oscillatory, wave, and fluid motion will then be explored. Finally, there will be an introduction to the laws of thermodynamics. There will be an emphasis on in-class problem solving using similar ideas and techniques as required on homework and exams.

Evaluation

There will be three exams (20% each), and a semi-cumulative final (20%). Homework will be assigned nightly and will be discussed the following day, but will not be graded. Attendance in class is strongly expected and, unless expressly told otherwise, students are responsible for all aspects of the class discussion.

Schedule

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

6/4 : Vectors, Projectile and Circular Motion. Chapter 3.

6/5 : Circular Motion, Force and Newton's Laws. Chapters 3 and 4.

6/8 : Force and Newton's Laws. Chapter 4.

6/9 : Newton's Laws. Chapters 4 and 5.

6/10 : More on Newton's Laws. Chapter 5.

6/11 : Exam 1.

6/12 : Work, Energy, and Power. Chapter 6.

6/15 : Work and Energy Conservation. Chapters 6 and 7.

6/16 : Energy Conservation and Gravity. Chapters 7 and 8.

6/17 : Gravity. Chapter 8.

6/18 : Exam 2.

6/19 : Systems of Particles, Momentum, and Rotational Motion. Chapters 9 and 10.

6/22 : Rotational Motion, Torque and Angular Momentum. Chapters 10 and 11.

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

6/24 : Static Equilibrium. Chapter 12.

6/25 : Exam 3.

6/26 : Oscillatory Motion and Waves. Chapters 13 and 14.

6/29 : Fluids, Temperature, and Heat. Chapters 15 and 16.

6/30 : Thermal Physics, and the First Law of Thermodynamics. Chapters 17 and 18.

7/1 : The First and Second Laws of Thermodynamics. Chapters 18 and 19.

7/2 : Final Exam.