PHYS 601   Course Outline   F2005

Newton's laws   8/31 – 9/1
        Mechanics of a system of particles
        Conservation Laws
        Lagrange's equations
 Constraints   9/5 – 9/7
        D'Alembert's principle
        Constants of motion
        Examples
Variational Principles   9/12-9/14
        Hamilton's principle
        Calculus of variations
Two body central force   9/19-9/26
        Lagrangian approach
        Periodic and quasiperiodic orbits
        Inverse square law potential
        Scattering – collisions
Kinematics of rigid body motion   9/28-10/5
        Coordinates
        Orthogonal transformations
        Euler's theorems
        Rate of change of a vector - Coriolis force
Exam #1
Rigid body equations of motion   10/10-10/12
        Energy and Angular momentum
        Inertia tensor
        Torque free motion
Small oscillations   10/17-10/19
        Free motion- normal modes
        Driven motion
Special Relativity   10/24-10/26
        Lorenz transformations
        Four vectors
        Relativistic motion of charged particles
Exam #2
Hamilton's equations   10/31-11/09
        Construction
        Relativistic motion
        Cyclic coordinates and conservation laws
        Variational principles

Extra Topics   11/14-11/30

        Geometric optics
        Phase space

Symplectic notation
Canonical transformations
Action angle variables - quantization
Liouville theorem
Adiabatic invariants
Perturbation theory
Chaos
Continuous systems   12/05-12/12
Vibrations in mechanical systems
Electromagnetic fields

Final Exam