

Physics 505

1. Introduction & Review – Newtonian Mechanics Chap 1 & 2 F&W
 - Central forces, orbits scattering
 - Inertial and non-inertial reference frames
2. Methods of Lagrange (and Hamilton) Chap 3 F&W
 - Calculus of variations, Lagrange's Equations
 - Constrained motion, Forces of constraint
 - Generalized Coordinates
 - Symmetries and Conserved Quantities
 - Hamilton's Equations
 - Flows in Phase Space
3. Small Oscillations and Normal Modes Chap 4 F&W
 - Normal modes
 - Coupled oscillators
 - N-body and Continuous systems
4. Rigid body motion Chap 5 F&W
5. Hamiltonian Dynamics Chap 6 F&W
 - More on Hamilton's Equations
 - Canonical Transformations
 - Hamilton-Jacobi Equation
6. Anharmonic Motion
7. Damped, Driven, Nonlinear Oscillators
8. Chaotic Systems B&G
 - Phase space trajectories and Poincare sections
 - Numerical methods/Maps
 - Regular and chaotic motion