

Haverford College - Physics Department
Physics 101a: Classical and Modern Physics I
Regular Section (F. Crawford)
Fall 2002 Course Topics

Introduction to Physics (Hecht Ch. 1): Measurement; Length/Distance; Mass and Weight; Time; Units; Graphs; Derivatives and Integrals; Vector Calculus

Kinematics: Speed, Velocity, and Acceleration (Hecht Ch. 2, 3): Speed; Velocity; Vector Addition; Inertial Reference Frames; Relative Motion; Acceleration; Gravitational Free Fall; Projectiles

Newton's Laws (Hecht Ch. 4): Inertia; Momentum; Action/Reaction; Weight; Inclined planes; Coupled Motions; Friction; Translational Equilibrium

Centripetal Force and Acceleration (Hecht Ch. 5): Centripetal Acceleration; Circular Motion; Law of Gravitation; Gravity of a Sphere; Terrestrial Gravity; Kepler's Laws of Planetary Motion; Satellite Orbits; Gravitational Fields

Energy (Hecht Ch. 6): Work; Conservative Forces; Kinetic and Potential Energy; Conservation of Energy; Escape Velocity; Power

Momentum and Collisions (Hecht Ch. 7): Momentum; Impulse; Conservation of Momentum; Elastic and Inelastic Collisions; Two-dimensional Collisions

Rotational Motion (Hecht Ch. 8): Angular Displacement, Velocity, and Acceleration; Torque; Center of Gravity; Moment of Inertia; Center of Mass; Rotational Kinetic Energy; Angular Momentum; Conservation of Angular Momentum

Fluid Statics and Dynamics (Hecht Ch. 9): Mass Density; Hydrostatic Pressure; Atmospheric and Gauge Pressure; Buoyant Force; Fluid Flow; The Continuity Equation; Bernoulli's Equation; Viscous Flow

Thermal Properties of Matter (Hecht Ch. 12): Temperature; Linear and Volumetric Thermal Expansion; Ideal Gas Law; Phase Diagrams; Kinetic Theory

Heat and Thermal Energy (Hecht Ch. 13): Heat and Temperature; Specific Heat; Changes of State; Radiation, Convection, and Conduction

Thermodynamics (Hecht Ch. 14): Work; Heat and Internal Energy; Isothermal and Adiabatic Changes; Carnot Engine and Efficiency; Entropy; Microstates and Macrostates

Special Relativity (Hecht Ch. 26): Postulates; Simultaneity; Time Dilation; Length Contraction; Twin Effect; Relativistic Velocity Addition; Relativistic Momentum; Relativistic Energy