

# Engineering Mechanics

## Chapter 1: Statics of Particles

- 1.1 Fundamental Concepts and Principles
- 1.2 Systems of Units
- 1.3 Methods of Problem Solutions
- 1.4 Statics of Particles
- 1.5 Equilibrium of a Particle

## Chapter 2: Equilibrium of Rigid Bodies

- 2.1 Principle of Transmissibility: Equivalent Forces
- 2.2 Vector Product of Two Vectors
- 2.3 Moment of a Force about a Point
- 2.4 Varignon's Theorem
- 2.5 Mixed Triple Product of Three Vectors
- 2.6 Moment of a Force about an Axis
- 2.7 Moment of a Couple
- 2.8 Equivalent Couples
- 2.9 Addition of Couples
- 2.10 Resolution of a Given Force into a Force-Couple System
- 2.11 Further Reduction of a System of Forces
- 2.12 Equilibrium in Two Dimensions
- 2.13 Equilibrium in Three Dimensions

## Chapter 3: Distributed Forces

- 3.1 Centroids of Areas and Lines
- 3.2 Determination of Centroids by Integration
- 3.3 Theorems of Pappus-Guldinus
- 3.4 Distributed Loads on Beams
- 3.5 Centre of Gravity of a Three-Dimensional Body and Centroid of Volume
- 3.6 Composite Bodies
- 3.7 Determination of Centroids of Volumes by Integration
- 3.8 Moments of Inertia of Area
- 3.9 Moments of Inertia of Mass
- 3.10 Determination of the Moment of Inertia of an Area by Integration
- 3.11 Polar Moment of Inertia
- 3.12 Radius of Gyration of an Area
- 3.13 Parallel-Axis Theorem

- 3.14 Moments of Inertia of Composite Areas
- 3.15 Moments of Inertia of Thin Plates
- 3.16 Determining the Moment of Inertia of a Three-Dimensional Body by Integration

#### **Chapter 4: Friction**

- 4.1 The Laws of Dry Friction
- 4.2 Coefficients of Friction
- 4.3 Angles of Friction
- 4.4 Wedge Friction
- 4.5 Wheel Friction and Rolling Resistance
- 4.6 Ladder Friction

#### **Chapter 5: Dynamics of Particles**

- 5.1 Kinematics
- 5.2 Kinetics
- 5.3 Equations of Motion
- 5.4 Work of a Force
- 5.5 Principle of Work and Energy and Kinetic Energy of a Particle
- 5.6 Principle of Impulse and Momentum
- 5.7 Impact of Bodies

