

**COURSE OBJECTIVE:**

1. To familiarize with different branches of mechanics
2. To familiarize with Static equilibrium of particles
3. To familiarize with Properties of surfaces and volumes.
4. To familiarize with fundamental concepts of dynamics

**COURSE CONTENT:**

**Coplanar Concurrent Forces:** Introduction to Engineering Mechanics: What is Engineering Mechanics? Classification of Engineering Mechanics, Statics, Dynamics, Kinematics, Kinetics etc. Fundamental Laws of Mechanics.

**Resolution and Composition of Forces:** Force, Pressure and Stress, Free Body Diagram, Bow's Notation, Characteristics and Effects of a Force, System of Forces, Resolution of a Force, Composition of Forces, Resultant / Equilibrant Force, Law of Parallelogram of Forces, Law of Triangle of Forces, Polygon Law of Forces, Lami's Theorem, Equilibrium of a Body Under Two / Three/More Than Three Forces. Law of Superposition of Forces.

**Coplanar Non Concurrent Forces:** Moment of a Force, Principle of Moments/ Varignon's Theorem, Parallel Forces : Resultant of Parallel Forces, Couple: Moment of a Couple, Resolution of Force into a Couple. Coplanar Non Concurrent Forces: Resultant of Coplanar, Non Con-Current Forces.

**Beams:** Types of Beams: Simply Supported Beam, Overhanging Beam, Cantilever Beam. Types of Supports of a Beam or Frame: Roller, Hinged and Fixed Supports. Load on the Beam or Frame: Different Types of Loading. Support Reaction of a Beam or Frame: Analytical Method. Truss Analysis: Method of Joints & Sections.

**Centroid and Centre of Gravity:** Centroid, Centre of Gravity, Determination of Centroid of Simple Figures, Centroid of Composite Sections. Centre of Gravity of Solid Bodies. Area Moment of Inertia: Basic Concept of Inertia, Definition of Moment of Inertia, Theorems of Moment of Inertia, Radius of Gyration, Polar Moment of Inertia of Standard Sections, Moment of Inertia of Composite Section, Principal Moment of Inertia, Mass Moment of Inertia.

**Introduction to Dynamics:** Overview of Dynamics, Basic Concepts and Terms Used in Dynamics, Motion, Types of Motion, Newton's Laws of Motion, Newton's Law of Gravitation.

**COURSE OUTCOMES**

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to identify, formulate, and solve engineering problems

**LABORATORY**

Experiments as suggested by the course coordinator.

**EVALUATION**

Evaluation will be continuous an integral part of the class as well through external assessment.

**REFERENCES**

*KL Kumar, Engineering Mechanics, Tata McGraw- Hill Education*  
*Ferdinand.P. Beer. E, Russell Johnston Jr., David Mazurek, Philip J Cornwell, "Vector Mechanics for Engineers: Statics and Dynamics" , McGraw - Hill*  
*Timoshenko, and Young, "Engineering Mechanics", Tata Mc-Graw Hill*  
*P.N. Chanchandramouli, Engineering Mechanics, PHI Learning Private Limited.*