Engineering Mechanics

AM 108 S1
AM 108 S2

	L	T	P	Credit
Scheme	**3**	**0**	**2**	**04**

- **INTRODUCTION TO FORCES/EQUILIBRIUM OF RIGID BODY** **(08 Hours)**
  - Scalar and vector, system of forces, resultant force
  - Statics of particle. Free-body diagram. Equilibrium of particle in two dimensions.
  - Resultant of three or more concurrent forces, Resolution of a force into components. Rectangular components of a force. Resultant by rectangular components.
  - Concurrent force system in space: Resolution of a force into rectangular components in space.
  - Coplanar Non-Concurrent Force Systems, Moments about Point and Axis. Equilibrium of Non-coplanar Non-concurrent Forces

- **CENTROID AND MOMENT OF INERTIA** **(08 Hours)**
  - Distributed forces: Centroid and centre of gravity. Determination of centroid of lines and areas using integral technique.
  - Determination of centroid of composite wires and areas.
  - Centroid of volumes. Theorems of Pappus - Guldinus and its applications.
  - Second moment of areas. Definition of moment of inertia. Determination of moment of area by integration.
  - Parallel axis theorem for Moment of Inertia. MI of composite area. Concept of Mass moment of inertia of body.

- **TRUSS** **(06 Hours)**
  - Types of structure in Engineering. Trusses and beams: definition, stability and determinacy.
  - Determination of reactions at supports for planar trusses. Basic assumption for analysis of trusses. Procedures for analysis of trusses.
  - Analysis of plane trusses by method of joint. Concept of zero force member. Analysis of plane trusses by method of section.

- **BEAMS AND CABLES** **(06 Hours)**
  - ***Beams***
    Definitions, types of beam, types of loading, types of support. Determination of reactions for simply supported, overhanging beams and compound beam.
  - ***Cables***
    Cables with Concentrated Loads
- **FRICTION** **(05 Hours)**
  - The Law of Dry Friction. Coefficient of Friction, Angle of Friction.
  - Analysis of systems involving dry frictions such as ladder spheres etc.
  - Belt Friction, Analysis of flat belt, wedge friction.

- **KINETICS OF PARTICLES** **(08 Hours)**
  - Force and acceleration. Newton's laws of motion. D'Alembert's principle.
  - Dependent motion of particles. Analysis for dependent motion of particles.
  - Impulse and Momentum: Concept, Definition, Principle of linear momentum and impulse
  - Work Energy Principle.

- **VIBRATIONS** **(03 Hours)**
  - Definitions, Equation of motion for single degree of freedom.
  - Introduction to free and forced vibrations.
  - Procedure for analysis of system involving free and forced vibrations.
  - Example on free vibration.
  - Example on forced vibration.

(Total Lecture Hours: 42)

PRACTICAL:

1. Plane force Polygone
2. Forces in space
3. Simple Plane roof truss
4. Coplanar Parallel foces
5. "E" by searle's apparatus
6. Belt Friction
7. Static Surface Friction
8. Gravitational acceleration
9. Mass M.I. of flywheel

REFERENCES:

1. Beer, F.P. and Johnston, E.R., Vector mechanics for engineers: Statics and Dynamics, Tata McGraw-Hill, New Delhi.
2. Desai,J.A. and Mistry, B.B., Engineering Mechanics: Statics and Dynamics, Popular Prakashan, Surat.
3. Hibbeler, R.C., Engineering Mechanics: Statics and Dynamics, Prentice Hall of India, New Delhi.
4. Meriam, J.L. and Kraige, L.G., Engineering Mechanics: Statics and Dynamics, John Wiley and sons, New York.
5. Rajsekaran s, Engineering Mechanics: Statics and Dynamics, Vikas Publication, New Delhi.
6. Shah H. J. and Junarkar S. B., Applied Mechanics, Charotar publication, Anand.
7. Bhavikatti S. S. and Rajashekarappa KG., Engineering Mechanics, Wiley 'Eastern Ltd