FC 103 : ENGINEERING MECHANICS

CREDITS : 5 (L = 4, P = 2)

1. Composition and resolution of coplanar forces : Equilibrium of a force system under coplanar forces. Moments and couples. Equilibrium of rigid bodies under coplanar forces. Analytical and graphical methods.

2. Simple and perfect pin-jointed trusses and frames : Determination of support reactions and member forces. Method of joints, method of sections and graphical methods.

3. Centre of gravity of plane and composite sections : Moments of inertia. Centre of mass and mass moment of inertia. Relevant theorems.

4. Flexural members : Simple beams. Type of loads and support conditions, shear force and bending moment. Relation between shear force and bending moment. Diagrams for axial force, shear force and bending moment for beams.

5. Equilibrium of systems with friction : Rough inclined plane, ladder, bearings, screw, simple lifting machines like screw jack. Law of a machine and its efficiency. Reversible and non reversible machines.

6. Dynamics of a particle : Equation's of motion. Newton's 2nd law and D'Alembert's principle. Impulse and momentum, work power and energy. Laws of conservation of energy and momentum.

Rigid bodies in linear and rotational motions. Super elevation. Flywheels Engineering problems. Concept of balancing of rotating masses.

7. Vibration of simple mechanical systems like springs : Free and damped vibrations. Natural frequency and resonance.

8. Elasticity : Hooke's Law, Axial and Lateral stresses and strains. Poisson's ratio. Relations between moduli of elasticity and rigidity, and bulk modulus. Stepped and tapered bars. Composite sections. Temperature stresses.

The laboratory work will consist of experiments based on the topics mentioned : It may also include assignments and problems.

REFERENCE BOOKS :

1. *S. B. Junnarkar and H. J. Shah*

   Elements of Applied Mechanics

   Charotar Publishing House, Anand

2. *R. S. Khurmi*

   A Text book of Engineering Mechanics

   S Chand and Co. Ltd., New Delhi

3. *R. K. Bansal*

   Engineering Mechanics

   Laxmi Publications, New Delhi

4. *B. C. Punmia*

   Strength of Materials