Mechanics ME10001

L-T-P-C: 3-1-0-4

Syllabus

Pre-Mid Semester Examination

Force systems: Moment of a force about a point and about an axis; couple moment; reduction of a force system to a force and a couple.

Equilibrium: Free body diagram; equations of equilibrium; problems in two and three dimensions; plane frames and trusses.

Friction: Laws of Coulomb friction; problems involving large and small contact surfaces; application: belt friction.

Properties of areas: First moment of area; second moment of area and polar moment of area; Pappus-Guldinus Theorem.

Post-Mid Semester Examination

Concept of stress and strain: Normal stress, shear stress, state of stress at a point, ultimate strength, allowable stress, factor of safety; normal strain, shear strain, Hooke's law, Poisson's ratio, generalized Hooke's law; analysis of axially loaded members; simple application in design.

Application: Pressure vessels (bi-axial stresses)

Transformation of stress: Transformation of stress; principal stresses; Mohr's circle for stress.

Torsion: Torsion of cylindrical bars, torsional stress, modulus of rigidity and deformation.

Flexural loading: Shear force and bending moment in beam; flexure formula; differential equation of the elastic curve, deflection of beam.

Books

- Engineering Mechanics, J.L. Meriam and L.G. Kraige, J Wiley & Sons (Textbook)
- Vector Mechanics for Engineers, F.P.Beer and E.R. Johnston, T McGraw-Hill.
- Engineering Mechanics, Irving H. Shames, Prentice Hall of India.
- Mechanics of Materials, F.P.Beer, E.R. Johnston, J.T. DeWolf, T McGraw-Hill (Textbook)
- Mechanics of Materials, E.P. Popov.
- Elements of Strength of Materials, Timoshenko & Young, East-West Press Pvt. Ltd.

Marks Distribution

Class Test: **20**, Mid-sem exam: **30**, End-sem exam: **50**, Total: **100**