

PCCI4303 **ADVANCED MECHANICS OF MATERIAL** (3-0-0)

Module I

Theories of failure: Maxm principal stress theory, maxm shear stress theory, maxm strain theory, total strain energy theory, maxm distortion theory, octahedral shear stress theory graphical representation and comparison of theories of failure

Thick cylinders subjected to internal and external pressures compound cylinders, computer application in analyzing stresses in thick cylinders.

Unsymmetrical bending: Properties of beam cross section, slope of neutral axis, stresses and deflection in unsymmetrical bending, shear centre.

Module II

Curved Beam: Bending of beam with large initial curvature, Stress distribution in beam with rectangular, circular and trapezoidal cross section, stresses in crane hooks, ring and chain links.

Elementary concept of theory of elasticity, stresses in three dimensional, equations of equilibrium and compatibility, plane stress, computer analysis of two dimensional state of stress or strain at a point.

Module III

Advanced topics in strength of materials: Repeated stresses and fatigue in metals, concept of stress, Concentration, notch and stress concentration factors.

Experimental stress analysis: Resistance strain gauges, strain Rosettes, Two dimensional photoelastic methods of stress analysis, stress optic law, light and dark field in a polariscope, Isoclinic and Isochromatic fringe patterns, Computer Analysis of strain from strain rosette measurement.

Textbook:

- 1 Advanced Mechanics of Solids, L.S. Srinath, TMG.
2. Advanced Mechanics of Materials, Kumar & Ghai, Khanna Publisher.
3. Advanced Mechanics of Materials: Seely and Smith, John Willey, New York.
4. Mechanics of Materials by Gere & Timoshenko, CBS.