

Title of Course: Mechanics of Materials-II

Course Code: MEC409

L-T Scheme: 3-0

Course Credits: 3

Course Contents:

Unit-I

Theory of Failure- significance and its importance; Maximum principle stress theory, Maximum principle strain theory, Maximum shear stress theory, Maximum strain energy theory, Maximum shear strain energy theory; Graphical representation of theories for two dimensional stress system; Yield point phenomena; Strain Aging; Strain hardening; Strain energy and impact loading, expression for strain energy for- gradual, sudden and impact load.

Unit-II

Torsion of a circular shaft; Shear energy in torsion; Torque and power transmitted by solid and hollow circular shaft; Strength of the shaft and torsional rigidity; Strength of the shaft in varying section; Composite shaft; Combined bending and torsion; Concept of closed and open coiled helical springs, Stresses and deflection of helical springs under axial pull.

Unit-III

Theory of columns and strut; Failure of column; Euler's column theory and its limitation; End conditions for long column; Effective length of the column; Rankine formula; Eccentric loading of short strut; column buckling; Empirical column formulae – straight line, initial curvature.

Unit-IV

Analysis of Stress in 3-Dimensions: Body force, surface force and stress vectors, state of stress at a point, normal shear stress components, stress component on arbitrary plane, principal stresses in 3-dimensions, stress invariants, decomposition of stress matrix into hydrostatic and pure shear states, Lamé's stress ellipsoid, differential equations of equilibrium.

Unit-V

Analysis of Strain in 3-Dimensions: introduction, deformation in neighborhood of a point, change of length of linear element, state of strain at a point, principal axes of strain and principal strains, compatibility conditions.

Unit-VI

Stress strain relations for linearity elastic bodies, generalized Hooke's law, stress-strain relations for anisotropic, orthotropic and isotropic materials.

Reference Books:

1. Rajput RK, Strength of Materials (Mechanics of Solids), S.Chand & company Ltd., New Delhi.
2. Rattan.S.S., "Strength of Materials", Tata McGraw Hill Education Pvt. Ltd., New Delhi.



UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Syllabus for Mechanical Engineering (2019-20)

3. Advance Mechanics of Solids, Srinath L.S., Tata McGraw Hill.
4. Solid Mechanics, Kazimi S.M.A., Tata McGraw Hill.