OE2024: ANALYSIS OF STRUCTURES

Course Content:

Work and energy theorems, Reciprocal theorem, Analysis of indeterminate frames and trusses, Unit load and conjugate beam methods, introduction to Influence lines diagram, Strain energy of beams, bars and torsion members, Matrix formulation of displacement method for frame, truss, bar and torsion members, Beam on elastic foundation and its stiffness matrix, 3D beam element, Transformation, assembly of stiffness matrices.Beam Column theory, Geometric stiffness matrix, Buckling of bars and frames, Introduction to finite element method with application to buckling; 2D and 3D theory of elasticity, Equilibrium and compatibility equations in cartesian and polar coordinates, Strain-displacement relations, Plane stress and plane strain, Use of stress function in 2D problems. Application of matrix methods to problems of marine structures.

Text Books:.

1. **L S Srinath**, "Advanced Mechanics of Solid", Tata McGraw Hill. New Delhi, 2003
2. **F Guarracino and A Walker**, "Energy Methods in Structural Mechanics", Thomas Telford Publishing, London, 1999.
3. **Madhulit Mukhopadhyay, Abdul Hamid Sheikh,** "Matrix and Finite Element Analysis of Structure", Ane Books Pvt Ltd, New Delhi., 2009.

Reference Books:

1. **R D Cook, D S Malkus and M E Plesha**, "Concepts and applications of Finite Element Analysis", John Wiley & Sons, 1988
2. **D Menon**, "Structural analysis", Narosa, New Delhi, 2010.
3. **D Menon**, "Advanced Structural analysis", Narosa, New Delhi, 2010

Prerequisite: