

OE5500: FEM APPLIED TO OCEAN ENGINEERING

Course Content:

Introduction – Different approaches to finite element formulation – Different types of element and interpolation functions, Lagrange & Hermitian Polynomials, natural co-ordinates – Derivation of element property matrices – Assembly – solution of finite element equations – Structural and geotechnical problems – Nonlinear analysis. Application to fluid mechanics problems, Fluid-structure interaction – Diffraction of waves, 2D formulation using mild – slope equation – use of infinite elements – Added mass and damping matrices for floating bodies, 2D formulation – Harbour resonance, Liquid sloshing – Vibrations of underwater structures Introduction to Boundary element techniques.

Text Books:

1. **J.N. Reddy.** 1984. An Introduction to the finite element method. McGraw Hill. (third edition, 2005)
2. **O.C. Zienkiewicz, R.W. Lewis and K.G. Stagg (eds.)** 1978. Numerical methods in Offshore Engineering. Wiley

Reference Books:

1. **R.D. Cook.** 1981. Concepts and applications of finite element analysis. Wiley
2. **O.C. Zienkiewicz.** 1977. The Finite Element Method. McGraw Hill. (vol.I, II, III)
3. **K.J. Bathe.** 1981. FE procedures in Engineering Analysis.

Prerequisite: