



Indian Institute of Technology

Course Details Report

Course No: OE5500

Course Name: FEM Applied to Ocean Engineering

Course Type:

Theory

Description:

To introduce the finite element concepts and its applications in the field of offshore, naval and coastal 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.