Indian Institute of Technology
Course Details Report

Course No: OE6930
Course Name: Modeling of Offshore and Coastal Processes

Course Type:

Theory

Description:

This computational lab based course provides hands on training on state of the art wave propagation, circulation and morphodynamic models.

Course Content:

Theories of wind - generated ocean waves - Wind-wave Modelling: Third generation Wind – Wave modelling: WAM, SWAN & STWAVE for wave hind-casting and forecasting.

Deformation of water waves: Solution of Helmholtz and Mild slope equations; Near shore wave propagation in phase-averaging and phase-resolving models; Boussinesq wave model; applications to large bodies and harbours - computations in 2D; introduction to public domain and industry software.

Ocean hydrodynamics: Circulation with Tide, Temperature & Salinity; Turbulence in Ocean; Shallow Water Equations and their solution; applications to Nearshore circulation; Storm surge & Tsunami. Modelling of scalar transport and morphodynamics.

Text Books:

1. Dyke, P. Modeling Coastal and Offshore Processes. Imperial College Press, 2007.
2. Komen, G.J., Cavaleri, L., Donelan, M., Hasselmann, K., Hasselmann, S., Janssen, P.A.E.M. Dynamics and modeling of ocean waves, Cambridge university press, New York, 1994.
3. Nielsen, P. Coastal and Estuarine Processes, World Scientific, 2009.

Reference Books:

1. Mellor G.L., User Guide for a three-dimensional, primitive equation, numerical ocean model, 1998.