



# Indian Institute of Technology

## Course Details Report

**Course No: OE5110**

**Course Name: Experimental Methods & Measurements**

**Course Type:**

Theory

**Description:**

To give an overview about physical models and different measurement techniques for applications in testing of Ocean [Naval], offshore and coastal structures.

**Course Content:**

Dimensional Analysis with special reference to Model Studies in Hydrodynamic and Coastal Engineering problems. Principles of Similitude. Design of Models and Fabrication. Hydrodynamic test facilities, Wave makers, Wave absorbers, Modeling of Environment: 2-D and 3-D Wave generation, Transfer function. Modeling of fixed offshore structures: Measurement Techniques for Drag and Inertia Forces. Hydrodynamic models: Short-wave and Long wave hydrodynamic models. Modeling of Coastal Structures: Rubble mound Structures, floating structures. Laboratory measurement techniques: Basics of instrumentation systems, Different types of measurement systems and their principles; Signal conditioning and data acquisition, Sources of noise, and errors in instrumentation systems, Filtering, data, and spectral analysis. Laboratory Class: • Calibration of wavemaker transfer function; Distorted model scale; Generation of different types of waves; difference in wave generation using 1st order and 2nd order transfer function; Pressure measurement under waves; Force measurements, Case studies. Calibration of following transducer: Wave probe, LVDT, Accelerometer, Pressure transducer, Load cell, Inclinometer.

**Text Books:**

1. Steven A. Hughes, Physical Models and Laboratory Techniques in Coastal Engineering, World Scientific, Singapore, 1993. Chakrabarti, S.K., Offshore Structure Modeling, World Scientific, Singapore, 1994

**Reference Books:**

1. Clayton, B.R. and Bishop, R.E.D., Mechanics of Marine Vehicles, Gulf Publishing Co., USA, 1982. Hanna, R.L. and Reed, S.E., Strain Gauge-User's Handbook, 1993. Beckwith, T.G., Marangoni, R.D. and Lienhard, J.H., Mechanical Measurements, Addison Wesley, USA, 1993. Collacot, R.A., Structural Integrity Monitoring, Chapman and Hall, London, 1985