

## **OE2054: OCEAN WAVE HYDRODYNAMICS**

### **Course Content:**

Review of Basic Fluid Mechanics: Conservation of mass and momentum, Euler Equations, Bernoulli's equation, velocity potential, stream function. Ocean Environment, Waves: Classification of water waves – Two-dimensional wave equation and wave characteristics – wave theories – Small amplitude waves – Finite amplitude waves – Stokian, Solitary and Cnoidal wave theories – Water particle kinematics – wave energy, power. Wave deformation – Reflection, Refraction, Diffraction, Breaking of waves – Spectral description of Ocean Waves – Design wave. Wave-Currents Interactions, Radiation Stress. Forces: Wave forces – Morison equation – Wave loads on vertical, inclined and horizontal cylinders. Diffraction theory – wave slamming and slapping. Lab : Measurement of wave properties such as L, H, T, C and Cg. Wave Reflection, pressure measurements, force estimations, mass transport velocity, random waves, wave paddle transfer function

### **Text Books:**

1. **Dean, R.G. and Dalrymple, R.A.**, Water wave mechanics for Engineers and Scientists, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1994

### **ReferenceBooks:**

1. **Sarpkaya, T. and Isaacson, M.**, Mechanics of Wave Forces on Offshore Structures, Van Nostrand Reinhold Co., New York, 1981
2. **Weigel, R.L.** Oceanographical Engineering, Prentice Hall Inc, 1982
3. **Sorenson, R.M.**, Basic Coastal Engineering, A Wiley-Interscience Publication, New York, 1978.

### **Prerequisite:**