

Wave Hydrodynamics - Video course

COURSE OUTLINE

Basic Fluid Mechanics: Conservation of mass and momentum, Euler Equation, Bernoulli's equation, potential flow, stream function.

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 - Wave Forecasting Methods - Spectral description of Ocean Waves - Design wave.

Currents: Classification - Behaviour - Design Criteria, Scour and other effects of currents.

Forces : Wave forces - Morison equation - wave loads on vertical, inclined and horizontal cylinders. Diffraction theory - wave slamming and slapping - wave impact pressures and forces on Coastal Structures - Breakwaters - Seawalls - Model Experiments.

COURSE DETAIL

S.No	Topics	No.of Hours
1	Basic fluid Mechanics	3
2	Waves: Classification of water waves - Two dimensional wave equation and wave characteristics - wave theories - Small amplitude waves	12
3	Finite amplitude waves - Stokian, Solitary and Cnoidal wave theories	2
4	Water particle kinematics - wave energy, power	6
5	wave deformation - Reflection, Refraction, Diffraction Breaking of waves	3
6	Spectral description of Ocean Waves - Design wave.	4
7	Currents: Classification - Behavior - Design Criteria	2
8	Forces: Wave forces - Morison equation - wave loads on vertical, inclined and horizontal cylinders.	10



NP-TEL

NPTEL

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Ocean Engineering

Pre-requisites:

1. Basic fluid Mechanics.

Coordinators:

Prof. V. Sundar

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9	Diffraction theory - wave slamming and slapping - Model Experiments	4
Total		46

References:

1. Sarpkaya, T. and Isaacson, M., Mechanics of Wave Forces on Offshore Structures, Van Nostrand Reinhold Co., NewYork, 1981.
2. Dean, R.G. and Dalrymple, R.A., Water wave mechanics for Engineers and Scientists, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1994.
3. Ippen, A.T., Estuary and Coastline Hydrodynamics, McGraw-Hill Book Company, Inc., NewYork, 1978.
4. Shore Protection Manual Volume I and II, Coastal Engineering Research Centre, Dept. of the Army, US Army Corps of Engineers, Washington DC, 1984.
5. Sorenson, R.M., Basic Coastal Engineering, A Wiley-Interscience Publication, New York, 1978.