ANNEXURE-XII

Coastal and Offshore Structures

OBJECTIVE:

- To provide basic knowledge on two dimensional wave equation.
- To describe the various types of wave theories.
- To study the effect of wave loads on different coastal structures.
- To improve the knowledge on physical modeling tools in offshore and onshore activities.

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- Stoke, Solitary and Cnoidal water particle kinematics- Wave energy, Power.

Wave deformation- Reflection, Refraction, Diffraction, Breaking of waves- Wave shoaling, Currents: Classification- Behaviour- Design criteria, Scour and other effects of currents.

Wave forces on shore based structures- Wave forces on small diameter members- Wave forces on large diameter members- Horizontal and Vertical cylinders- Irregular shaped structures.

Coastal structures: different types such as seawall, groins and its uses, basic functions and design principles, sediment transport- littoral drift.

Offshore structures- classification, Compliant structures and fixed structures, TLP,FPSO and Spar Platforms – Design principles.

References:

1. Subratakumar Chakrabarti, Hand book of offshore engineering.
2. Coastal, Estuaries and Harbour Engineer's reference book,Michael Abbott, W Alan price.
3. Coastal Engineering Research reports.

Course outcomes:

By the end of this course the students will be able to

- Provides basics of wave hydrodynamics.
- Able to understand the wave deformation.
- Describes wave forces, wave pressures and currents in the coastal areas.
- Provides knowledge on coastal and offshore structures.

Mrs. RB

Mrs. BM

for Senate

10/3/25

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