

# Port and Harbour Structures - Video course

## COURSE OUTLINE

To make the students understand the basic principles of design of port and harbour structures.

The course will cover wide areas such as vessel types, types of harbours, design of entrance channel, turning circle, breakwaters, berthing structures, fenders, bollards, drydocks, slipways, shiplift and offshore structures like single buoy mooring and open sea jetty.

EIA studies like tranquility, shoreline evaluation, dredging, disposal of dredged material, etc will also be discussed.

The course is designed to give understanding of design principles, codal requirements, construction methodology, integrity monitoring, retrofitting and rehabilitation.

Case studies on preliminary project report (PPR) and detailed project report (DPR) on green field ports and modernization of existing ports will also be presented.

## COURSE DETAIL

S.No	Topics
1.	Vessel type and size
2.	Types of harbour
3.	Port planning
4.	Layout of ports
5.	Types of breakwater
6.	Design wave height, tide, storm surge and Tsunami
7.	Naval hydrographic chart and design of entrance channel and turning circle
8.	Design of breakwater
9.	Types of berthing structures



NP-TEL

# NPTEL

<http://nptel.iitm.ac.in>

## Ocean Engineering

### Pre-requisites:

1. Basic civil/ocean engineering.

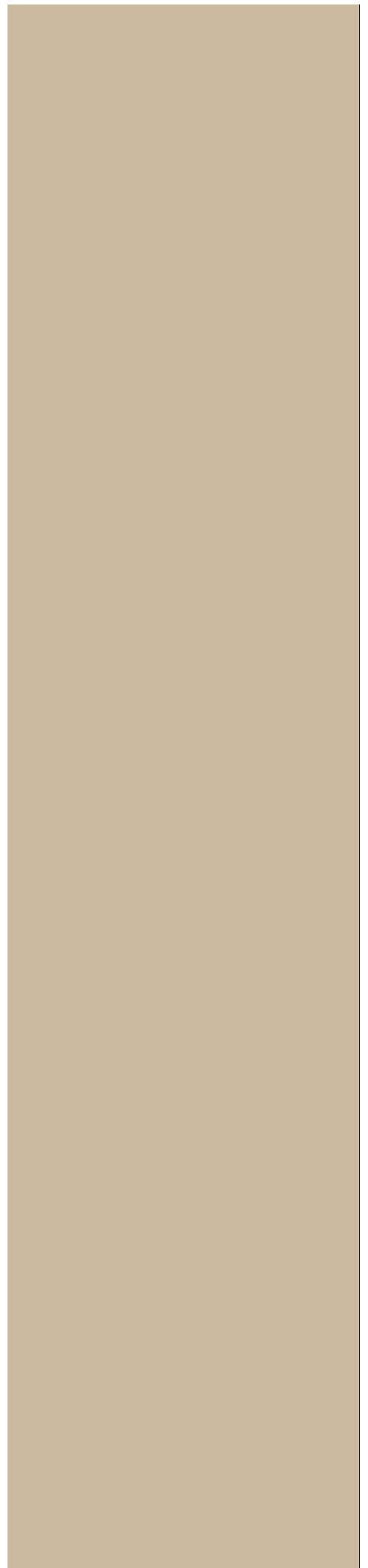
### Additional Reading:

IS-4651 Indian standard Code of practice for planning and design of ports and harbour, Bureau of Indian Standards, New Delhi.

### Coordinators:

**Prof. R. Sundaravadivelu**  
Department of Ocean Engineering IIT Madras

10.	Loads on berthing structures and codal requirements
11.	Berthing force, mooring force and seismic force
12.	Types of fenders
13.	Active and passive earth pressure and differential water pressure
14.	Load combination, WSD and LSD
15.	Analysis of container berth
16.	Analysis of oil jetty
17.	Foundation design of piles
18.	Pile load tests
19.	Ground improvement techniques
20.	Design of caisson and monoliths
21.	Structural design of piles
22.	Construction methodology
23.	Mechanical handling systems
24.	Design for punching shear and design of beams and slab
25.	Tranquility studies and allowable vessel motion
26.	Coastal erosion and accretion
27.	Design of sea wall and groyenes
28.	Dry dock
29.	Slipway



30.	Ship lift
31.	UPV, Half cell potential, low strain and high strain integrity tests
32.	Rapid and comprehensive EIA
33.	PPR on green field ports
34.	DPR on green field ports
35.	Modernization of existing ports
36.	Dredging and disposal
37.	Case studies on effect of earth quake and Tsunami
38.	Case studies on integrity monitoring
39.	Case studies on retrofitting and rehabilitation
40.	SBM and open sea jetty

**References:**

1. Port Design - Guidelines and recommendations by C. A. Thoresen, Tapir Publications.
2. Design of Marine Facilities for the Berthing, Mooring and Repair of Vessels by J. W. Gaythwaite, Van Nostrand.
3. Handbook of Offshore Engineering by S.K. Chakrabarti, Elseviers, 2005.
4. Agerschou, H., Lundgren, H., Sorensen, T., Ernst, T., Korsgaard, J., Schmidt, L.R. and Chi, W.K., (1983). "Planning and Design of Ports and Marine Terminals", A Wiley-Interscience Publication.
5. Per brun (1983). "Port Engineering" Gulf Publishing Co.