PORTS AND HARBOUR STRUCTURES
(ELECTIVE-II)

Course Code: 13CE2115

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Course Outcomes:
At the end of the course the student will be able to:

CO1 : Explain the significance of ports and harbours as a mode of transport.
CO2 : Demonstrate the fundamental principles of wave hydrodynamics and port cargo handling.
CO3 : Demonstrate the basic design of port layout
CO4 : Design, plan and integrate port and harbour infrastructure.
CO5 : Explain the construction, maintenance and renovation aspects of ports and inland waterways

UNIT-I
INTRODUCTION AND FUNDAMENTALS

Introduction: Ports and harbours – an infrastructure layer between two transport media, planning of ports and harbours.
The fundamentals: Tide and current conditions inside harbour, water circulation; breakwaters, jetties and quay walls; mooring, berthing and ship motion inside the port; model studies, physical and mathematical studies.

UNIT-II
DESIGN ISSUES AND DESIGN OF PORT INFRASTRUCTURES

Design issues: Sea port layout with regards to (1) wave action (2) siltation (3) navigability, berthing facilities.
Design of Port Infrastructures: Design of port infrastructures with regards to (1) cargo handling (2) cargo storage (3) integrated transport of goods, planning multipurpose port terminals.

UNIT-III
PORT OPERATIONS

Allowable wave conditions for cargo handling, wave conditions for human safety on quays and breakwaters, forcecasting / nowcasting of wave and current conditions for port operations, dredging and

navigability, hazard scenarios; VTMS and management of computerized container terminal, safety & environment (handling of fire, oil spill, rescue, etc.).

UNIT-IV
INLAND WATERWAYS AND PORTS

Maintenance of waterways, construction of environmentally engineered banks, dredging and disposal processing and storing of polluted dredged materials, development of river information services.

UNIT-V
CONSTRUCTION ASPECTS AND SUSTAINABILITY

Planning and construction expansion and renovation of port and Inland Port Infrastructure.

Global trade and port restructuring/reforms, impact of possible climate change scenarios, sustainable development strategies for cities and ports.

TEXT BOOKS

1. Muir Wood, A.M., and Fleming. C.A., *"Coastal Hydraulics Sea and Inland Port Structures"*, 1st Edition, Hallstead Press, 2002.

2. Ozha & Ozha, *"Dock and Harbour Engineering",* 1st Edition, Charotar Books, Anand., 1990

REFERENCES

1. S.Seetharaman, *"Construction Engineering and Management",* 4th Edition , Umesh publications, New Delhi, 1999.

2. Richand L. Silister, *"Coastal Engineering Volume I & II,* Elsevier Publishers, 2000.

3. Pera Brunn, *"Port Engineering"*, 1st Edition, Gulf Publishing Company, 2001

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