

PORTS AND HARBOUR STRUCTURES (ELECTIVE-II)

Course Code: 15CE2115

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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 hydro dynamics 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

(10-Lectures)

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

(10-Lectures)

DESIGN ISSUES AND DESIGN OF PORT INFRASTRUCTURES

Design issues: Sea port layout with regards to (1) wave action (2)siltation (3) navigability (4) 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 (10-Lectures)
PORT OPERATIONS

Allowable wave conditions for cargo handling, wave conditions for human safety on quays and breakwaters, hindcasting, forcecasting/nowcasting of wave and current conditions for port operations. Navigability, hazard scenarios; VTMS, dredging, and management of computerized container terminal, safety & environment (handling of fire, oil spill, residue, etc.).

UNIT-IV (10-Lectures)
INLAND WATERWAYS AND PORTS

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

UNIT-V (10-Lectures)
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*”, 1stEdition, 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. Richard L. Silister, “*Coastal Engineering Volume I & II*, Elsevier Publishers, 2000.
3. Pera Brunn, “*Port Engineering*”, 1st Edition, Gulf Publishing Company, 2001