PORT AND HARBOUR STRUCTURES

(Professional Elective- IV)

Course Code: 19CE2164

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Course Outcomes:

At the end of the course, the student will be able to:

CO1: Understand the significance water transport as an important mode of transport for import and export cargo.

CO2: Assessment of cargo flow through port, requirement of cargo handling and storage and identification of planning and design issues.

CO3: Recognize the importance of allowable wave conditions for cargo handling, safety and environmental issue in ports.

CO4: Management of Inland waterways, its maintenance and dredging requirements.

CO5: Understanding changing trends in global trade, need for restructuring and reforms of ports, sustainable developmental strategies, and impact of possible climate changes on ports and cities.

UNIT-I (10-Lectures)

INTRODUCTION:

Ports and harbors: An infrastructure layer between two transport media, planning of ports and harbors.

Waves**,** Tide and current conditions inside harbor, water circulation; breakwaters, jetties and quay walls; mooring, berthing and ship motion inside the harbors; model studies, physical and mathematical studies.

LO1: Recognize the importance of ports as an important facility for import and export trade.

LO2: Understanding natural and meteorological factors that cause ship motions for planning suitable harbor protection works and berthing structures.

UNIT-II **(10-Lectures)**

PORT LAYOUT: Sea port layout with regards to (1) wave action (2) siltation (3) navigability berthing facilities.

PLANNING AND DESIGN OF PORT INFRASTRUCTURE: Planning and Design of port infrastructures with regards to (1) cargo handling (2) cargo storage (3) integrated transport of goods, planning multipurpose terminals in ports.

LO1: Identify planning designing issues in a port.

LO2: Understanding port infrastructure requirements for efficient cargo handling and storage and further movement to destination.

UNIT-III **(10-Lectures)**

PORT OPERATIONS: Allowable wave conditions for cargo handling, wave conditions for human safety on quays and breakwaters, forecasting/now casting of wave and current conditions for port operations, dredging and navigability, hazard scenarios; VTMS and management of computerized container terminal, safety and environment (handling of fire, oil spill, rescue, etc.).

LO1: Recognize the importance of allowable wave conditions for efficient cargo handling.

LO2: Assess the dredging and navigability requirements in port.

LO3: Recognize the environmental and safety requirements in a port.

UNIT-IV **(10-Lectures)**

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.
LO1: Evolve suitable maintenance measures for inland water ways.
LO2: Recognize the need for appropriate disposal and processing of dredged spoil.

UNIT-V **(10-Lectures)**
CONSTRUCTION, EXPANSION AND RENOVATION: Planning and construction, expansion and renovation of port and Inland Port Infrastructure.

Sustainability: Global trade and port restructuring/reforms, impact of possible climate change scenarios, sustainable development strategies for cities and ports.
LO1 : Evolve sustainable developmental strategies for ports.
LO2 : Assess impact of possible climate change scenarios on ports for remedial action.

Text Books

1. Muir Wood, A.M., and Fleming. C.A.*, "Coastal Hydraulics Seaand 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. *PeraBrunn, "Port Engineering", 1st Edition, Gulf Publishing Company, 2001.*