PORT AND HARBOUR STRUCTURES

(Professional Elective-4)

II Semester

Course Code: 19CE2164	**L**	**P**	**C**
	3	**0**	**3**

Prerequisites:-Transportation Engg-II

Course Outcomes:

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

CO 1 Explain the significance of port 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 **(10-Lectures)**

INTRODUCTION: Ports and harbours–an infrastructure layer between two transport media, planning of ports and harbours.

The fundamentals: Waves**,** 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.

Learning outcomes:

1 . Compare concept of ports and harbours.(L5)
2 . Recognise fundamentals of berthing and ship motions. (L2)
3. Discuss about models studies (L2)

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

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.

Learning outcomes:

1. Identify designing issues in port. (L1)
2. Design of port infrastructures. (L6)
3. Discuss the planning of multipurpose port terminals (L2)

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

PORT OPERATIONS: Allowable wave conditions for cargo handling,wave conditions for human safety on quays and breakwaters, forecasting/nowcasting 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.).

Learning outcomes:

1. Analyze the wave conditions. (L4)
2. Assess the dredging and navigability in port. (L5)
3. Explain the hazardous scenarios (L2)

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.

Learning outcomes:

1. Categorize maintenance of waterways. (L1)
2. Compare the dredging and disposal processing. (L5)
3. Discuss the development of river information services (L2)

UNIT-V **(10-Lectures)**

CONSTRUCTION ASPECTS: 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.

Learning outcomes:

1. Categorise planning and inland port infrastructure. (L1)
2. Choose sustainable aspects in the ports. (L2)
3. Explain the sustainable strategies for cities and ports (L2)

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. PeraBrunn, *Port Engineering*,1st Edition,GulfPublishing Company, 2001.

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

3. Richand L.SilIster *Coastal Engineering* Volume I&II, Elsevier Publishers, 2000.