

Branch Name:	Transportation Engineering
Program Code:	ET211
Course Name:	Docks & Harbours Engineering
Course Code:	2ET2110302T
Pre-requisite Course:	Basic civil/ocean engineering, docks & harbour engineering

Course Objective:

1. To have an overall knowledge of the design and construction of docks, harbours and ports as a whole.
2. To understand the function of different components of docks and harbours.
3. To make the students understand the basic principles of design of port and harbour structures.
4. To understand 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.

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
5	3	2	-	5	24	60	16	40	-	-	-	-	100

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Water Transportation: Scope, Merits, Developments of Water Transportation in India, Inland waterways, River, Canal, Inland water Transportation, Development of ports & Harbours, Harbour classification, Site selection, Harbour dimensioning.	9	20%
2	Natural Phenomena: Wind, Tides, Water waves, Wave decay & port, wave diffraction, breaking, reflection, Littoral drift, sediment transport, Effects on Harbour and structure design.	9	30%
3	Harbour Infrastructures: Types of breakwaters, jetty, dock fenders, piers, wharves, dolphin, mooring accessories, Repair facilities, wet docks, lift docks, dry docks, gates for graving docks, floating docks, slipways, locks And gates.	9	10%
4	Port facility: Transit shed, warehouses, cargo handling, container handling, Inland port facility, Navigational aids, types, requirements of signals, lighthouses, beacon light, buoys. Dredging & coastal protection: Types of dredgers, choices, usage of dredged material, sea wall protection-sea wall revetment, bulkhead.	9	30%
5	Planning of ports: regional and intercontinental transportation development, forecasting cargo & passenger demand, regional connectivity, cargo handling capacity of port, economic evaluation of Port project, impacts of port activities.	9	10%

References:

1. Bindra S.P., Docks & Harbour Engineering, Dhanpat Rai Publications.
2. Srinivasan R., Harbours, Docks & Tunnel Engineering, Charotar Publishing House, Anand, 1999.
3. Alonzo Def. Quinn, Design and Construction of Ports and Marine Structure, McGraw - Hill Book Company, New York.
4. Oza H.P., & Oza G.H., Dock & Harbour Engineering, Charotar Publishing House, Anand.

Course Learning Outcomes:

Students who successfully complete this course will be able to:

1. Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.
2. Explain the significance of port and harbours as a mode of transport.
3. Demonstrate the fundamental principles of port cargo handling.
4. Demonstrate the basic design of port layout.
5. Design, plan and integrate port and harbour infrastructure.
6. Explain the construction, maintenance and renovation aspects of ports and inland waterways.

List of Tutorials:

1. Problems based on cargo and passenger demand forecasting for the ports.
2. Problems based on planning and design of harbour infrastructures.
3. Problems based on planning and design of port area infrastructure.
4. Problems based on cargo handling capacity of port.
5. Problems based on economic evaluation of port project.

Field Visit:

A visit of any port to understand various port components and port planning in a better way.

Course Learning Outcomes (CLO):

After successful completion of the course the students shall be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted	L-1, L-2
CLO2	Explain the significance of port and harbours as a mode of transport	L-1, L-2
CLO3	Demonstrate the fundamental principles of port cargo handling	L-1, L-2, L-3
CLO4	Demonstrate the basic design of port layout	L-1, L-2, L-3, L-4
CLO5	Design, plan and integrate port and harbour infrastructure	L-1, L-2, L-4, L-5
CLO6	Explain the construction, maintenance and renovation aspects of ports and inland waterways	L-1, L-2

L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create

Mapping of CLOs with Pos & PSOs

	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
Course Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	M	M	M		M				M		H	M	M	M	
CLO2	M	M	M	M			M					M	M	M	M
CLO3	M	M	M	M	M	M				H		M	M	M	
CLO4	M	M	M	M		M	M					M	M	M	M
CLO5	M	H	M	M	M	M			H			M	M	M	
CLO6	M	M	M	M				L			M		M	M	M

H: High, M: Medium, L: Low