



# GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering- Transportation Engineering

Subject Code: 3721320

Semester – II

Subject Name: DOCKS AND HARBOUR ENGINEERING

Type of course: Program Elective III

Prerequisite: NIL

**Rationale:** Water transportation is one of the important modes for the International and Intercontinental cargo trading at the economic rates. The economic development of the nation depends on the better operation of the cargo and passenger handling on the docks and harbours. It is essential for the transportation engineer to know about the better planning and design of docks-harbour, port activities and infrastructure facilities. Planning of new port requires proper knowledge of location, natural phenomena, environmental impacts, hinterland products, connectivity, forecast of passenger and cargo demand, infrastructure and management aspects. This subject provides knowledge of all components and operational matters

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
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
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
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
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
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
	<b>TOTAL</b>	<b>45 Hr.</b>



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Suggested Specification table with Marks (Theory): (For ME only)

Distribution of marks weightage for cognitive level

Bloom's Taxonomy for Cognitive Domain	Marks Weightage (%)
Recall	10
Comprehension	20
Application	30
Analysis	20
Evaluate	10
Create	10

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

## Reference Books:

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 Outcomes: At the end of the course, Student will be able

Sr. No.	CO statement	Marks weightage %
CO-1	To create an awareness about Docks and Harbour Engineering for the water transportation in the context of regional and intercontinental transportation	20%
CO-2	To know techniques of planning and designing the infrastructures required for Harbour and Port area	30%
CO-3	To understand an impact of various natural phenomena on design of port structure and components of harbour infrastructure	10%
CO-4	To forecast cargo and passenger demand, cargo handling capacity of ports and economic evaluation of port project	30%
CO-5	To determine an impact of water transportation and port activities on environment.	10%



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### 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.