Marwadi University

**Master of Technology**

**Civil Engineering (Transportation)**

# 01TR0206: Dock & Harbor Engineering

**Objective of the Course:** Objectives of introducing this subject at first year level in Masters of civil engineering is:

- 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

**Credit Earned: 4**

**Students learning outcomes:**

After successful completion of the course it is expected that student will be able to:

- To create an awareness about Docks and Harbour Engineering for the water transportation in the context of regional and intercontinental transportation.
- To know techniques of planning and designing the infrastructures required for Harbour and Port area.
- To understand an impact of various natural phenomena on design of port structure and components of harbour infrastructure.
- To forecast cargo and passenger demand, cargo handling capacity of ports and economic evaluation of port project.
- To determine an impact of water transportation and port activities on environment.

**Teaching and Examination Scheme**

| Teaching Scheme (Hours) | | | Credits | Theory Marks | | | Tutorial/ Practical Marks | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|
| Theory | Tutorial | Practical | | ESE (E) | CSE (M) | Internal (I) | Viva (V) | Term Work (TW) | |
| 3 | 2 | 0 | 4 | 50 | 20 | 30 | 25 | 25 | 150 |

# Master of Technology

## Civil Engineering (Transportation)

**Detailed Syllabus**

| Sr. No. | Title of the unit | Number of hours |
|---|---|---|
| **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 | 09 |
| **2** | **Natural Phenomenon** | |
| | Wind, Tides, Water waves, Wave decay & port, wave diffraction, breaking, reflection, Littoral drift, sediment transport, Effects on Harbour and structure design | 09 |
| **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 | 09 |
| **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 | 09 |
| **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 | 09 |

**Suggested lists 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

**Suggested Theory Distribution**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

| Distribution of Theory for course delivery and evaluation | | | | | |
|---|---|---|---|---|---|
| Remember | Understand | Apply | Analyze | Evaluate | Create |
| 10% | 15% | 10% | 35% | 20% | 10% |

**Instructional Method and Pedagogy:**

1. Use of Learning Management system like canvas
2. Demonstration through ppt and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

**Recommended Study Material:**

**Reference Book:**

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

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