

INSTITUTE	DIPLOMA STUDIES
PROGRAM	DIPLOMA ENGINEERING (CIVIL ENGINEERING)
SEMESTER	5
COURSE TITLE	RAILWAY HARBOUR AND TUNNEL ENGINEERING
COURSE CODE	09CI2508
COURSE CREDITS	3

Objective:

- 1 To provide students with a broad overview of railway, harbour, and tunnel engineering, including their history, development, and significance in transportation and infrastructure
- 2 To familiarize students with the current trends and challenges in railway engineering
- 3 To expose students to the emerging issues and opportunities in harbour engineering, such as port automation, digitalization, and green ports
- 4 To expose students to the current challenges and innovations in tunnel engineering, such as tunnelling in urban areas, soft ground conditions, and underground construction
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Course Outcomes: After completion of this course, student will be able to:

- 1 Identify the basic concepts and principles of railway, harbour, and tunnel engineering, such as alignment, track structure, drainage, loading, and safety operations
- 2 Plan, design, and construct railway tracks, stations, and structures, such as bridges and level crossings
- 3 Design and manage harbour facilities and structures, such as quays, piers, jetties, and breakwaters
- 4 Plan, design, and construct tunnels, including tunnelling methods, support systems, and ventilation

Pre-requisite of course:No pre requisite required

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	2	50	30	20	25	25
Contents : Unit	Topics						Contact Hours
1	Introduction to Railway Harbour and Tunnel Engineering Introduction to transportation infrastructure and its role in society, History and development of railway, harbour, and tunnel engineering, Significance of railway, harbour, and tunnel engineering in transportation and infrastructure, Basic concepts and principles of railway, harbour, and tunnel engineering, Types of railways, harbour, and tunnels and their design considerations						6
2	Railway Engineering Planning and design of railway tracks, stations, and their structures, Track structure and components, including ballast, sleepers, and rails, Drainage systems for railway tracks and stations, Safety and regulation in railway engineering, High-speed trains and electrification in railway engineering						8
3	Harbour Engineering Planning and design of harbour facilities and structures, including quays, piers, and jetties, Breakwaters and other structures for wave protection, Ship and cargo handling operations in the harbour, Safety and regulation in harbour engineering, Port automation, digitalization, and green ports in harbour engineering						7
4	Tunnel Engineering Planning and design of tunnels, including tunnelling methods and excavation techniques, Tunnel support systems, Tunnel ventilation systems, Safety in tunnel engineering, Tunneling in urban areas, soft ground conditions, and underground construction						7
Total Hours							28

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Assignment 1 Draw the dimensional sketches of a cross-section of the railway track (with the function of each part of the track).	2
2	Assignment 2 Draw the sketches of both left and right-hand turnout and crossing of the railway track showing each part of the track.	4
3	Assignment 3 Draw sketches of the different types of the harbour, piers, quay walls, jetties, quays, piers, and jetties Breakwaters beacons, beacon light, floating navigation aids, and coastal protection work.	4
4	Assignment 4 Draw sketches of various shapes and sizes of tunnels.	4

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
5	Assignment 5 The topic of the Seminar shall be given to a group of students or on an individual basis. The students are required to submit and present/defend the Seminar in the presence of students and teachers and the report including a PowerPoint presentation to be attached with the submission. Each individual student's contribution to group work needs to be made explicit.	8
6	Assignment 6 Based on the curriculum-related topic narrating the case study of railway, Harbour and tunnel engineering with specific safety operations/ problems faced in the field.	4
7	Assignment 7 Visit a railway station & yards and/or nearby jetty and/or for observing various elements of respective structures and prepare a brief report.	2
Total Hours		28

Textbook :

- 1 Harbour, Dock and Tunnel Engineering, Srinivasan, R., Charotar Publishing House Pvt. Ltd., 2018
- 2 A Course in Railway Engineering, S.C. Saxena & S.P. Somani, CBS Publishers & Distributors, 2017

References:

- 1 Railway Engineering, Railway Engineering, Chandra, Satish | Agarwal, M. M, Oxford University Press, 2018
- 2 Tunnel Engineering, Tunnel Engineering, Shapoor Moozdar, Goyal Publications, 2016

Suggested Theory Distribution:

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

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
40.00	40.00	20.00	0.00	0.00	0.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and the need of students. The teacher in addition to the conventional teaching method by blackboard, may also use any of the tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

Instructional Method:

- 2 The internal evaluation will be done based on continuous evaluation of students in the laboratory and classroom
- 3 Practical examination will be conducted at the end of the semester for evaluation of the performance of students in the laboratory.
- 4 Students will use supplementary resources such as online videos, videos, e-courses, Virtual Laboratory.

Supplementary Resources:

- 1 <https://irtpms.indianrailways.gov.in/site/>
- 2 <https://www.ipa.nic.in/>
- 3 <https://nhidcl.com/home/tunneling-projects/>