

Railway Infrastructure Design

Course Code CE- 477	Credit Hours 3-0
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Course Description

Introduction to railway engineering, Railways structures in Pakistan, Elements of railway track and their characteristics. Importance and design of geometric elements of railway system, track vertical and horizontal alignments. material characteristics of railway track elements, soil mechanics and hydrology of track, gauges, sleepers, ballast, track fastenings. Structural design of formation, sleepers and ballast. track failures and maintenance, track renewal and new line construction. planning and design of railway signaling system, types and operation of signaling system, track circuiting and switching system

Text Book:

1. Railway track engineering: Mundrey, J. S, 2010
2. Railway Transportation Systems by: Christos N. Pyrgidis , 2016
3. Railway Engineering by S. M. Yameen, 1972

Reference Book:

1. Advances in Communications-Based Train Control Systems by F. Richard Yu
2. Railway Signaling & Interlocking by Gregor Theeg, 2017
3. Elements of Railway Signaling Hardcover by Gerald E. Collins
4. Railroad Operation and Railway Signaling by Phillips
5. British Railway Infrastructure by by R. Powell Hendry
6. Principles of Railway Engineering by S. C. Rangwala

Prerequisites :

CE 241 Transportation Engineering–I, CE 242 Transportation Engineering–II

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10

End Semester Exam	50	45-50
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ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1	Railway Engineering Introduction to railway engineering Railways as a mode of transportation Structure of railways in Pakistan
2	Survey and planning Elements of railway track Characteristics of railway elements
3	Geometric Consideration of Railway Track. Geometric design elements Topography of the track
4,5	Geometric Design of Railway Track Railway track alignment Horizontal/Vertical alignment Track geometric design
6	Railway Structural elements Types of gauges, different type of rail sections, rail joints, creep, fish plates, bearing plates, check rail, etc.
7, 8	Structural Design of Railway Track Design aspects of track structure Formation, sleepers and ballast Station layouts, points and crossings, dead ends, and hydrology aspects
9	MSE
10	Railway Crossing Level crossings, over-head bridges, under passes, foot over bridges, etc.
11	Maintenance & Rehabilitation of track Failures/distresses in rails, sleepers, ballast and formation
12	Maintenance of track and use of track machines and other equipment Track renewals and new line construction Problem Based Learning Activity
13, 14	Railway Signaling Planning and design of railway signaling systems Types of signaling and signal equipment Mechanical and electrical signaling Different standards of signaling

15	Maintenance schedules for different types of signals and equipment Track circuiting, switching systems Points and crossings, point machines, panels and their maintenance
16	Advance Signaling System Computer based interlocking, Centralized traffic control Automatic train protection/ cab signaling systems
17-18	End Semester Exam

Practical: Nil.