



SYNERGY SCHOOL OF ENGINEERING, DHENKANAL
LESSON PLAN
SESSION 2025-2026
DEPARTMENT OF CIVIL ENGINEERING

Discipline: Civil Engineering	Semester: 3 rd /W 2026	Name of the Faculty: Kuhudi Biswal Email: kuhudibiswal789@gmail.com
Subject: TRANSPORTATION ENGINEERING	No. of Days/week: 03	Start Date: 01/07/2026 End Date: 05/11/2026

Week	Class Day	Theory Topics
1st	1st	Overview of Highway Engineering, Role of transportation in the development of nation
	2nd	Scope and Importance of roads in India and its' Characteristics. Different modes of transportation – land way
	3rd	waterway, airway. Merits and demerits of roadway and railway
2nd	1st	General classification of roads
	2nd	Selection and factors affecting road alignment.
	3rd	Geometric Design of Highway, Camber: Definition, purpose, types as per IRC recommendations.
3rd	1st	Kerbs: Road margin, road formation, right of way.
	2nd	Design speed and various factors affecting design speed as per IRC – recommendations.
	3rd	Gradient: Definition, types as per IRC Recommendations.
4th	1st	Sight distance (SSD): Definition, types IRC – recommendations
	2nd	Sight distance (SSD) Simple numerical.
	3rd	Curves: Necessity, types: Horizontal, vertical curves.
5th	1st	Extra widening of roads: numerical examples.
	2nd	Super elevation: Definition, formula for calculating minimum and maximum Super elevation and method of providing super-elevation.
	3rd	Standards cross-sections of national highway in embankment and cutting.
6th	1st	Types of road materials and their Tests – Test on aggregates- Flakiness and Elongation Index tests
	2nd	Angularity Number test, test on Bitumen- penetration
	3rd	Ductility, Flash and Fire point test and Softening point test.
7th	1st	Pavement – Definition, Types, Structural Components of pavement and their functions
	2nd	Construction of WBM road. Merits and demerits of WBM & WMM road.
	3rd	Construction of Flexible pavement / Bituminous Road
8th	1st	Types of Bitumen and its properties
	2nd	Emulsion, Cutback, Tar, Terms used in BR-prime coat, tack coat, seal coat, Merits and Demerits of BR.

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	3rd	Cement concrete road -methods of construction, Alternate and Continuous Bay Method
9 th	1st	Construction joints, filler and sealers, merits and demerits of concrete roads. Types of joints.
	2nd	Basics of Railway Engineering, Classification of Indian Railways
	3rd	zones of Indian Railways, Permanent way: Ideal requirement
10 th	1st	Components; Rail Gauge, types
	2nd	Factors affecting selection of a gauge.
	3rd	Rail, Rail Joints - requirements
11 th	1st	Creep of rail: causes and prevention.
	2nd	Sleepers - functions and Requirement, types - concrete sleepers and their density
	3rd	Ballast - function and types, suitability.
12 th	1st	Rail fixtures and fastenings – fish plate, spikes, bolts, keys, bearing plates
	2nd	chairs-types of anchors and anti- creepers
	3rd	Track geometrics: Alignment- Factors governing rail alignment.
13 th	1st	Track Cross sections – standard cross section of single and double line in cutting and embankment. Important terms-permanent land
	2nd	formation width, side drains, Railway Track Geometrics: Gradient, curves- types and factors affecting, grade compensation
	3rd	super elevation, limits of Super elevation on curves, cant deficiency, negative cant, con- ing of wheel, tilting of rail.
14 th	1st	Branching of Tracks, Points and crossings, Turn out- types, components, functions and inspection. Track junctions: crossovers, scissor cross over, diamond crossing, track triangle.
	2nd	Station -Purpose, requirement of railway station, important technical terms, types of railway station
	3rd	factors affecting site selection for railway station. Station yard: Classification- Passenger, goods
15 th	1st	Locomotive and marshalling yards. Function & drawbacks of marshalling yards.
	2nd	Track Maintenance- Necessity, Classification, Tools required for track maintenance with their functions
	3rd	Organization of track maintenance, Duties of permanent way inspector, gangmate and key man.
16 th	1st	Doubt Clearing, Numerical solving & Previous year question discussion
	2nd	Doubt Clearing, Numerical solving & Previous year question discussion
	3rd	Doubt Clearing, Numerical solving & Previous year question discussion


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