



**LESSON PLAN OF CEPC203 TH:2 Transportation Engineering FOR THE SESSION 2025-26(WINTER-2025) BATCH-2024-27, GOVT. POLYTECHNIC, KANDHAMAL**

Discipline: civil engineering	Semester: 3rd	Name of the Teaching Faculty: <del>Goutam Chasen Pradhan, Sr. Lect. in Civil Engg.</del> <b>Rajkumar Halba, Lect. in Civil Engg.</b>
Subject: CEPC203 TH:2 Transportation Engineering	No. of days/ per week class allotted: 3	Semester From Date : 14/07/2025 to Date: 15/11/2025 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics (as per Blooms Taxonomy)
1st	1st	<b>Unit-I Overview of Highway Engineering</b> , Role of Transportation in National Development (Remembering, Understanding) Topic: Importance of transportation, scope of roads in India.
	2nd	Characteristics and Modes of Transportation (Understanding) Topic: Characteristics of roads, comparison of roadway, railway, waterway, airway.
	3rd	Classification of Roads (Remembering, Understanding) Topic: General classification of roads (e.g., NH, SH, rural roads).
2nd	1st	Road Alignment – Selection and Factors (Understanding, Applying) Topic: Factors affecting road alignment (topography, traffic, cost).
	2nd	Review and Practical Application (Applying) Topic: Overview of Unit-I.
	3rd	<b>Unit-II Geometric Design of Highway (Part 1)</b> Camber and Kerbs (Remembering, Understanding) Topic: Definition, purpose, types of camber (IRC recommendations), kerbs, road margin.
3rd	1st	Design Speed and Right of Way (Understanding, Applying) Topic: Design speed, factors affecting it, road formation, right of way.
	2nd	Gradient (Understanding, Applying) Topic: Definition, types of gradients (IRC recommendations).
	3rd	Sight Distance (SSD) (Applying, Analyzing) Topic: Definition, types, IRC recommendations, simple numerical problems.
4th	1st	Curves in Highway Design (Understanding, Applying) Topic: Necessity, types of curves (horizontal, vertical).
	2nd	<b>Unit-II Geometric Design of Highway (Part 2)</b> Extra Widening of Roads (Applying, Analyzing) Topic: Extra widening, numerical examples.
	3rd	Super Elevation (Applying, Analyzing) Topic: Definition, formula for min/max super elevation, methods to provide it.
5th	1st	Standard Cross-Sections (Understanding, Applying) Topic: Cross-sections of national highways in embankment and cutting.
	2nd	Review and Practical Application (Evaluating) Topic: Geometric Design Overview.
	3rd	Case Study Analysis (Analyzing, Evaluating) Topic: Application of geometric design to a real-world highway project.
6th	1st	<b>Unit-III Construction of Road Pavements (Part 1)</b> Road Materials and Tests – Aggregates (Remembering, Understanding) Topic: Tests on aggregates (Flakiness, Elongation, Angularity Number).
	2nd	Road Materials and Tests – Bitumen (Understanding, Applying) Topic: Tests on bitumen (Penetration, Ductility, Flash/Fire Point, Softening Point).
	3rd	Pavement Types and Components (Understanding) Topic: Definition, types, structural components, and their functions.
7th	1st	WBM Road Construction (Applying, Analyzing) Topic: Construction of WBM roads, merits, demerits, WMM comparison.
	2nd	Bituminous Road Construction (Applying) Topic: Construction, types of bitumen, terms (prime coat, tack coat, seal coat).
	3rd	<b>Unit-III Construction of Road Pavements (Part 2)</b> Cement Concrete Roads – Construction (Understanding, Applying) Topic: Methods (Alternate, Continuous Bay), construction joints
8th	1st	Cement Concrete Roads – Joints and Merits (Analyzing) Topic: Types of joints, fillers, sealers, merits, demerits.
	2nd	Review of Pavement Construction (Evaluating) Topic: Overview of pavement types and construction.
	3rd	Practical Application – Pavement Design (Applying, Evaluating) Topic: Design a pavement for a specific road type

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11/07/25  
(Lect. Stage-I, Civil)

9th	1st	Case Study on Road Construction (Analyzing, Evaluating)Topic: Real-world road construction project analysis.
	2nd	<b>Unit-IV Basics of Railway Engineering (Part 1)</b> Indian Railways and Permanent Way (Remembering, Understanding)Topic: Classification, zones, permanent way requirements.
	3rd	Rail Gauges and Rails (Understanding, Applying)Topic: Rail gauges, types, factors affecting gauge selection, rail joints
10th	1st	Creep of Rail and Sleepers (Understanding, Applying)Topic: Creep causes/prevention, sleeper functions types, concrete sleeper density.
	2nd	Ballast and Rail Fixtures (Understanding)Topic: Ballast functions, types, suitability, rail fixtures (fish plates, spikes, bolts).
	3rd	Rail Fixtures and Fastenings (Applying, Analyzing)Topic: Chairs, keys, bearing plates, anchors, anti-creepers.
11th	1st	<b>Unit-IV Basics of Railway Engineering (Part 2)</b> Review of Permanent Way Components (Analyzing)Topic: Overview of rails, sleepers, ballast, and fixtures.
	2nd	Case Study on Railway Components (Evaluating)Topic: Application of permanent way components in a real-world railway.
	3rd	Practical Application – Permanent Way Design (Applying, Evaluating)Topic: Design a permanent way for a railway section.
12th	1st	Railway Engineering Overview (Understanding, Analyzing)Topic: Synthesis of Unit-IV concept
	2nd	Numerical and Practical Exercises (Applying)Topic: Calculations related to rail gauges and sleeper density.
	3rd	<b>Unit-V Track Geometrics, Construction, and Maintenance (Part 1)</b> Rail Alignment and Track Cross-Sections (Remembering, Understanding)Topic: Factors governing rail alignment, standard cross-section (single/double line).
13th	1st	Track Geometrics – Gradient and Curves (Understanding, Applying)Topic: Gradient, curves, grade compensation, super elevation, cant deficiency.
	2nd	Coning of Wheel and Tilting of Rail (Applying, Analyzing)Topic: Coning of wheel, tilting of rail, negative cant.
	3rd	Points, Crossings, and Turnouts (Understanding, Applying)Topic: Points, crossings, turnouts (types, components, functions).
14th	1st	Track Junctions (Understanding, Analyzing)Topic: Crossovers, scissor crossover, diamond crossing, track triangle.
	2nd	<b>Unit-V Track Geometrics, Construction, and Maintenance (Part 2)</b> Railway Stations (Remembering, Understanding)Topic: Purpose, requirements, types, site selection factors
	3rd	Station Yards (Understanding, Applying)Topic: Classification (passenger, goods, locomotive, marshalling), functions, drawbacks.
15th	1st	Track Maintenance (Applying, Analyzing)Topic: Necessity, classification, tools, duties of inspectors, gangmate, keyman.
	2nd	Course Review and Synthesis (Evaluating, Creating)Topic: Overview of Units I–V.
	3rd	Final Project and Presentation (Creating)Topic: Design a Combined Highway and Railway Plan.

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14/07/2025

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