

LESSON PLAN

Department: Civil Engineering	Semester : 3rd SEC- A	Name of the Teaching faculty: SAILAJA BHUYAN	
Subject :- Th2. TRANSPORTATION ENGINEERING	No.of Days/ week class allotted : 03	Semester from date: 14/07/2025 to 15/11/2025 No. of Weeks :18 Topics to be covered:-	
Week	Class Day	Topics	Remarks
1ST WEEK	1st	UNIT-I: Overview of Highway Engineering • Role of transportation in the development of nation, Scope and Importance of roads in India and its' Characteristics	5
	2nd	Different modes of transportation – land way, waterway, airway.	
	3rd	Merits and demerits of roadway and railway	
2ND WEEK	1st	General classification of roads.	
	2nd	Selection and factors affecting road alignment	
	3rd	UNIT-II: Geometric Design of Highway • Camber: Definition, purpose, types as per IRC – recommendations.	10
3RD WEEK	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 WEEK	1st	Sight distance (SSD): Definition, types IRC – recommendations, simple numerical	
	2nd	Curves: Necessity, types: Horizontal, vertical curve	
	3rd	Extra widening of roads: numerical examples.	
5th WEEK	1st	Super elevation: Definition	
	2nd	formula for calculating minimum and maximum Super elevation, method of providing super-elevation.	
6th WEEK	1st	Standards cross-sections of national highway in embankment and cutting.	
	2nd	UNIT-III: • Types of road materials and their Tests – Test on aggregates-Flakiness and Elongation Index tests, Angularity Number test,	10
	3rd	test on Bitumen penetration, Ductility, Flash and Fire point test and Softening point test	
7th WEEK	1st	Pavement – Definition, Types,	
	3rd	Structural Components of pavement and their functions • Construction of WBM road.	
8th WEEK	1st	Merits and demerits of WBM & WMM road.	
	2nd	Construction of Flexible pavement / Bituminous Road,	
9TH WEEK	1st	Types of Bitumen and its properties - ties, Emulsion, Cutback, Tar, Terms used in BR-prime coat,	
	2nd	tack coat, seal coat, Merits and Demerits of BR.	
	3rd	Cement concrete road -methods of construction, Alternate and Continuous Bay Method	
10TH WEEK	1st	Construction joints, filler and sealers, merits and demerits of concrete roads. Types of joints.	
	2nd	UNIT-IV Basics of Railway Engineering • Classification of Indian Railways, zones of Indian Railways	10
	3rd	• Permanent way: Ideal requirement, Components;	
11TH WEEK	3rd	Rail Gauge, types, factors affecting selection of a gauge.	
12TH WEEK	1st	Rail, Rail Joints- requirements, types	

12TH WEEK	2nd	Creep of rail: causes and prevention	
	3rd	Sleepers - functions and Requirement,	
13TH WEEK	1st	types - concrete sleepers and their density	
	2nd	Ballast - function and types, suitability	
	3rd	Rail fixtures and fastenings – fish plate, spikes, bolts, keys, bearing plates,	
14TH WEEK	1st	chairs-types of anchors and anticreepers.	
	2nd	UNIT-V: Track geometrics, Construction and Maintenance • Alignment- Factors governing rail alignment	10
	3rd	Track Cross sections – standard cross section of single and double line in cutting and embankment. Important terms-permanent land, formation width, side drains	
15TH WEEK	1st	Railway Track Geometrics: Gradient, curves- types and factors affecting, grade compensation, super elevation, limits of Super elevation on curves, cant deficiency, negative cant, coning of wheel, tilting of rail.	
	2nd	Branching of Tracks, Points and crossings, Turn out- types, components, functions and inspection.	
	3rd	Track junctions: crossovers, scissor cross over, diamond crossing, track triangle.	
16TH WEEK	1st	Station -Purpose, requirement of railway station, important technical terms,	
	3rd	Types of rail- way station,factors affecting site selection for railway station	
17TH WEEK	1st	Station yard: Classification- Passenger, goods, locomotive and marshalling yards. Function & drawbacks of marshalling yards.	
	2nd	Track Maintenance- Necessity, Classification, Tools required for track maintenance with their functions	
	3rd	Organisation of track maintenance, Duties of permanent way inspector, gangmate and key man	
18TH WEEK	1st	Doubt Clearing Class	
	2nd	Doubt Clearing Class	
	3rd	Revision	



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LESSON PLAN			
Department: Civil Engineering	Semester : 3rd SEC- A	Name of the Teaching faculty: SAILAJA BHUYAN	
Subject :- Th4 BUILDING MATERIAL & CONCRETE TECHNOLOGY	No.of Days/ week class allotted : 03	Semester from date: 14/07/2025 to 15/11/2025 No. of Weeks :18 Topics to be covered:-	
Week	Class Day	Topics	Remarks
1ST WEEK	1st	UNIT-I: Overview of Construction Materials, Scope of construction materials in Building Construction, Transportation Engineering, Environmental Engineering, and Irrigation Engineering (applications only)	2
	2nd	Selection of materials for different civil engineering structures on the basis of strength, durability, Eco friendly and economy. Broad classification of materials –, Natural, Artificial, special, finishing and recycled.	
	3rd	Unit: II • Natural Construction Materials-Requirements of good building stone; general characteristics of stone; quarrying and dressing methods and tools for stone.	5
2ND WEEK	1st	Structure of timber, general properties and uses of good timber, different methods of seasoning for preservation of timber, defects in timber, use of bamboo in construction	
	2nd	Asphalt, bitumen and tar used in construction, properties and uses	
	3rd	Properties of lime, its types and uses. • Types of soil and its suitability in construction.	
3RD WEEK	1st	Properties of sand and uses, Classification of coarse aggregate according to size	
	2nd	Unit: III Artificial Construction Materials • Constituents of brick earth, Conventional / Traditional bricks, Modular and Standard bricks, Special bricks – fly ash bricks, Characteristics of good brick, Field tests on Bricks, Classification of burnt clay bricks and their suitability, Manufacturing process of burnt clay brick, fly ash bricks, Aerated concrete blocks.	5
	3rd	• Flooring tiles – Types, uses	
4th WEEK	1st	Pre-cast concrete blocks- hollow, solid, pavement blocks, and their uses	
	2nd	• Plywood, particle board, Veneers, laminated board and their uses	
	3rd	• Types of glass: soda lime glass, lead glass and borosilicate glass and their uses. • Ferrous and non-ferrous metals and their uses.	
5th WEEK	1st	Unit: IV Cement, Aggregates, Water and Admixture, Composition of Cement • Manufacturing process of Cement – dry and wet (only flow chart), types of cement and its uses. Field tests on cement	10
	2nd	Physical properties of OPC and PPC: fineness, standard consistency	
6th WEEK	1st	Setting time, soundness, compressive strength of cement.	
	2nd	Testing of cement: Laboratory tests-fineness, standard consistency, setting time, soundness, compressive strength. Storage of cement and effect of storage on properties of cement.	
	3rd	BIS Specifications and field applications of different types 10 of cements: Rapid hardening, Lowheat, Portland pozzolana, Sulphate resisting, Blast furnace slag, High Alumina and White cement	
7th WEEK	1st	Aggregates: Requirements of good aggregate, Classification according to size and shape.	
	2nd	Fine aggregates: Properties, size, specific gravity, bulk density, water absorption and bulking, fineness modulus and grading zone of sand, silt content and their specification as per IS 383. Concept of crushed Sand	
8th WEEK	1st	Water: Quality of water, impurities in mixing water and permissible limits for solids as per IS: 456.	

8TH WEEK	2nd	Admixtures in concrete: Purpose, properties and application for different types of admixtures such as accelerating admixtures	
9TH WEEK	1st	Retarding admixtures, water reducing admixtures, air entraining admixtures and super plasticizers. (concepts only)	
	2nd	Unit: V Concrete, • Concrete: Different grades of concrete, provisions of IS 456 (Latest).	8
	3rd	Duff Abraham water cement (w/c) ratio law, significance of w/c ratio,	
10TH WEEK	1st	Selection of w/c ratio for different grades	
	2nd	Maximum w/c ratio for different grades of concrete for different exposure conditions as per IS 456.	
	3rd	Properties of fresh concrete: Workability: Factors affecting workability of concrete.	
11TH WEEK	1st	Determination of workability of concrete by slump cone, compaction factor, Vee-Bee Consistometer	
	2nd	Value of workability requirement for different types of concrete works. Segregation, bleeding and preventive measures.	
	3rd	Properties of Hardened concrete: Strength, Durability, Impermeability	
12th WEEK	3rd	Unit: VI Concrete Mix Design and Testing of Concrete , • Concrete mix design: Objectives, methods of mix design	5
13TH WEEK	1st	Study of mix design as per IS 10262 (only procedural steps).	
	2nd	Non- destructive testing of concrete: Rebound hammer test	
	3rd	Working principle of rebound hammer and factor affecting the rebound index.	
14TH WEEK	1st	Ultrasonic pulse velocity test as per IS 13311 (part 1 and 2), Importance of NDT tests.	
	2nd	Unit: VII Quality Control of Concrete, • Concreting Operations: Batching, Mixing, Transportation, Placing, Compaction, Curing and Finishing of concrete	5
	3rd	Forms for concreting: Different types of form works for beams, slabs, columns, materials used for form work, requirement of good form work. Stripping time for removal of form works per IS 456.	
15TH WEEK	1st	Waterproofing: Importance and need of waterproofing	
	2nd	Methods of waterproofing and materials used for waterproofing.	
	3rd	Joints in concrete construction: Types of joints, methods for joining old and new concrete, materials used for filling joints.	
16TH WEEK	1st	Unit: VIII Special Concrete and Extreme Weather concreting,	5
	2nd	Special Concrete: Properties, advantages and limitation of following types of Special concrete: Ready mix Concrete, Fiber Reinforced Concrete	
	3rd	High performance Concrete, Selfcompacting concrete and light weight concrete	
17TH WEEK	1st	Cold weather concreting: effect of cold weather on concrete, precautions to be taken while concreting in cold weather condition. (only concepts)	
	2nd	Hot weather concreting: effect of hot weather on concrete, precautions to be taken while concreting in hot weather condition. (only concepts)	
	3rd	Revision	
18th WEEK	1st	Revision	
	2nd	Revision	
	3rd	Revision	


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LESSON PLAN			
Department: Civil Engineering	Semester : 5TH SEC- B	Name of the Teaching faculty: SAILAJA BHUYAN	
Subject :- Th3 RAILWAY & BRIDGE ENGINEERING	No.of Days/ week class allotted : 04	Semester from date: 14/07/2025 to 15/11/2025 No. of Weeks :18 Topics to be covered:-	
Week	Class Day	Topics	Remarks
1ST WEEK	1st	Section: A :- RAILWAY UNIT-I Introduction 1.1 Railway terminology	2
	2nd	1.2 Advantages of railways 1.3 Classification of Indian Railways	
	3rd	Unit: II Permanent way, 2.1 Definition and components of a permanent way	5
	4th	2.1 Definition and components of a permanent way	
2ND WEEK	1st	2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges under different conditions	
	2nd	2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges under different conditions	
	3rd	2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges under different conditions	
	4th	Unit: III Track Materials , 3.1 Rails 3.1.1 Functions and requirement of rails	10
3RD WEEK	1st	3.1.2 Types of rail sections, length of rails	
	2nd	3.1.3 Rail joints – types, requirement of an ideal joint	
	3rd	3.1.4 Purpose of welding of rails & its advantages 3.1.5 Creep- definition, cause & prevention	
4th WEEK	1st	3.2 Sleepers 3.2.1 Definition, function & requirements of sleepers	
	2nd	3.2.2 Classification of sleepers, 3.2.3 Advantages & disadvantages of different types of sleepers	
	3rd	3.3 Ballast 3.3.1 Functions & requirements of ballast	
5th WEEK	1st	3.3.2 Materials for ballast	
	2nd	3.4 Fixtures for Broad gauge 3.4.1 Connection of rails to rail-fishplate, fish bolts	
	3rd	3.4.2 Connection of rails to sleepers	
	4th	Unit:IV Geometric for broad gauge, 4.1Typical cross – sections of single & double broad gauge railway track in cutting	10
6th WEEK	1st	4.1Typical cross – sections of single & double broad gauge railway track in cutting and embankment	
	2nd	4.1Typical cross – sections of single & double broad gauge railway track in cutting and embankment	
	3rd	4.2 Permanent & temporary land width	
	4th	4.2 Permanent & temporary land width	
7th WEEK	1st	4.3 Gradients for drainage	
	2nd	4.3 Gradients for drainage	
8th WEEK	1st	4.4 Super elevation – necessity & limiting valued	
	2nd	4.4 Super elevation – necessity & limiting valued	

8TH WEEK	3rd	4.4 Super elevation – necessity & limiting valued	
	4th	Unit: V Points and crossing, 5.1 Definition, necessity of Points and crossings	4
9TH WEEK	1st	5.1 Definition, necessity of Points and crossings	
	2nd	5.2 Types of points & crossings with tie diagrams	
	3rd	5.2 Types of points & crossings with tie diagrams	
	4th	Unit: VI Laying & maintenance of track, 6.1 Methods of Laying & maintenance of track	4
10TH WEEK	1st	6.1 Methods of Laying & maintenance of trac	
	2nd	6.2 Duties of a permanent way inspecto	
	3rd	6.2 Duties of a permanent way inspecto	
	4th	of a bridge	2
11TH WEEK	1st	1.3 Classification of bridges 1.4 Requirements of an ideal bridge	
	2nd	Unit: II Bridge site investigation, hydrology & planning	5
	3rd	2.1 Selection of bridge site, Alignment,	
	4th	2.2 Determination of Flood Discharge	
13TH WEEK	1st	2.3 Waterway & economic span	
	3rd	2.4 Afflux, clearance & free board	
	4th	Unit: III Bridge foundation 3.1 Scour depth minimum depth of foundation	8
14TH WEEK	1st	3.1 Scour depth minimum depth of foundation	
	2nd	3.1 Scour depth minimum depth of foundation	
	3rd	Types of bridge foundations – spread foundation, pile foundation- well foundation – sinking of wells, caission foundation	
	4th	Types of bridge foundations – spread foundation, pile foundation- well foundation – sinking of wells, caission foundation	
15TH WEEK	1st	Types of bridge foundations – spread foundation, pile foundation- well foundation – sinking of wells, caission foundation	
	3rd	3.3 Coffor dams	
	4th	3.3 Coffor dams	
16TH WEEK	1st	Unit: IV Bridge substructure and approaches 4.1 Types of piers	5
	2nd	4.2 Types of abutment	
	3rd	4.2 Types of abutment	
	4th	4.3 Types of wing walls	
17TH WEEK	1st	4.4 Approaches	
	2nd	Unit: V Culvert & Cause ways 5.1 Types of culvers – brief description	5

18th WEEK	1st	5.1 Types of culvers – brief description	
	2nd	5.2 Types of causeways – brief description	
	3rd	5.2 Types of causeways – brief description	
	4th	5.2 Types of causeways – brief description	


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