

LESSON PLAN OF 5th SEMESTER CIVIL ENGINEERING(2026-27)		
Discipline: CE	Semester:5th	Name of the Teaching Faculty: GAYATRI JENA
Subject: TRAFFIC ENGINEERING	No. of Days/per week class allotted: 03	AY 2026-2027(W) Semester W.E.F: 01/07/2026
Week	Class Day	Theory Topics
1st	01	UNIT-1-FUNDAMENTAL OF TRAFFIC ENGINEERING -Fundamentals of Traffic Engineering. Traffic engineering- Definition, objects, scope.
	02	Relationship between speed, volume and density of traffic • Road user's characteristics- physical, mental, emotional factors.
	03	Vehicular characteristics-width, length, height, weight, speed, efficiency of breaks.
2nd	01	Road characteristics - gradient, curve of a road.
	02	Design speed, friction between road and tyre surface.
	03	Reaction time - factors affecting reaction time.
3rd	01	PIEV Theory. Revision.
	02	UNIT-II-TRAFFIC STUDIES - Introduction, Traffic Studies.
	03	Traffic volume count data- representation.
4th	01	Total traffic volume, Density.
	02	Analysis of traffic data.
	03	Necessity of Origin and Destination study.
5th	01	Methods of origin and destination.
	02	Revision.
	03	Speed studies - Spot speed studies.
6th	01	Spot speed studies presentation.
	02	Need and method of parking study. Revision.
	03	UNIT-III-ROAD SIGNS AND TRAFFIC MARKINGS - Traffic control devices –definition, necessity.
7th	01	Types of traffic control devices.
	02	Road signs - definition, objects of road signs.
	03	Classification as per IRC: 67-Mandatory or Regulatory, Cautionary or warning, informative signs
8th	01	Location of cautionary or warning sign in urban and non-urban areas.
	02	Points to be considered while designing and erecting road signs.
	03	Traffic markings- 10 32 definition, classification.
9 th	01	Carriageway details.
	02	Kerb details.

		Revision.
	03	Object marking and reflector markers.
10 th	01	UNIT-IV-TRAFFIC SIGNALS AND TRAFFIC ISLANDS- Traffic Signals and Traffic Islands • Traffic signals- Definition, Types, Traffic control signals, pedestrian signals.
	02	Types of traffic control signals - Fixed time, manually operated, traffic actuated signals and location of signals. Compute signal time by fix time cycle, Webster's and IRC method and sketch timing diagram for each phase.
	03	Traffic islands –Definition, advantages and disadvantages of providing islands.
11 th	01	Types of traffic islands - rotary or central, channelizing or Refuge Island.
	02	Road intersections or junctions - Definition, Types of road intersection.
	03	Intersection at grade- Types, basic requirements of good intersection at grade. Revision.
12 th	01	Grade separated intersection- advantages and disadvantages.
	02	Types - flyovers-partial and full Cloverleaf pattern, Diamond intersection, Trumpet type, underpass.
	03	UNIT-V-ROAD ACCIDENT STUDIES AND ARBORICULTURE-
13 th	01	Road Accidents-Definition, types and causes for collision and non- collision accidents.
	02	Measures to prevent road accidents.
	03	Collision and condition diagram.
14 th	01	Street lighting –definition, necessity. Revision.
	02	types- luminaire, foot candle, lumen.
	03	factors affecting their utilization and maintenance.
15 th	01	Arboriculture- definition, objectives.
	02	factors affecting selection of type of trees.
	03	Maintenance of trees-protection and care of road side trees.

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30/06/2026

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LESSON PLAN OF 3 rd SEMESTER CIVIL ENGINEERING(2026-27)		
Discipline: CE	Semester: 3 rd	Name of the Teaching Faculty: GAYATRI JENA
Subject: TRANSPORTATION ENGINEERING	No. of Days/per week class allotted: 03	AY 2026-2027(W) Semester W.E.F: 01/07/2026
Week	Class Day	Theory Topics
1st	01	Unit-1-Overview of Highway Engineering. Role of transportation in the development of nation, Scope and Importance of roads in India and its' Characteristics.
	02	1.2 Different modes of transportation – land way, waterway, airway.
	03	Merits and demerits of roadway and railway;
2nd	01	1.3 General classification of roads.
	02	1.4 Selection and factors affecting road alignment.
	03	UNIT-2-Geometric Design of Highway • Camber: Definition, purpose, types as per IRC – recommendations. 2 Kerbs: Road margin, road formation, right of way. 2.3 Design speed and various factors affecting design speed as per IRC – recommendations.
3rd	01	2.4 Gradient: Definition, types as per IRC – Recommendations.
	02	2.5 Sight distance (SSD): Definition, types IRC – recommendations, simple numerical on SSD. Osd and its numerical
	03	2.6 Curves: Necessity,
4th	01	types: Horizontal, vertical curves.
	02	2.7 Extra widening of roads:
	03	Numerical extra widening.
5th	01	2.8 Super elevation: Definition, formula for calculating minimum and maximum Super elevation and method of providing super-elevation.
	02	Revision
	03	2.9 Standards cross-sections of national highway in embankment and cutting.
6th	01	UNIT-3-Construction of Road Pavements • Types of road materials and their Tests – Test on aggregates- Flakiness and Elongation Index tests, Angularity Number test 3.1 test on Bitumen- penetration, Ductility, Flash and Fire point test and Softening point test. •3.2
	02	Pavement – Definition, Types, Structural Components of pavement and their functions3.3 Construction of WBM road. Merits and demerits of WBM & WMM

		road. •	
	03	3.4 Construction of Flexible pavement / Bituminous Road.	
7 th	01	3.4 Types of Bitumen and its proper- ties, Emulsion, Cutback, Tar.	
	02	Terms used in BR-prime coat, tack coat, seal coat.	
	03	3.4 Merits and Demerits of BR.	
8 th	01	3.5 Cement concrete road -methods of construction,	
	02	3.5 Alternate and Continuous Bay Method, Construction joints, filler and sealers.	
	03	3.5 Merits and demerits of concrete roads.	
9 th	01	Types of joints.	
	02	UNIT-4-Basics of Railway Engineering Classification of Indian Railways, zones of Indian Railways. 4.2 Permanent way: Ideal requirement, Components; Rail Gauge, Types,	
	03	Factors affecting selection of a gauge.	
10 th	01	4.3 Rail, Rail Joints - requirements, types.	
	02	4.4 Creep of rail: causes and prevention.	
	03	4.5 Sleepers and its function.	
11 th	01	Requirement of sleeper	
	02	Types - concrete sleepers and their density .	
	03	4.6 Ballast and its function.	
12 th	01	Types, suitability of ballast.	
	02	Rail fixtures and fastenings – fish plate, spikes, bolts, keys, bearing plates, chairs-types of anchors and anti-creepers.	
	03	UNIT-5-Track geometrics, Construction and Maintenance • Alignment- Factors governing rail alignment. 5.2 Track Cross sections – standard cross section of single and double line in cutting and embankment. Important terms-permanent land, formation width, side drains.	
13 th	01	5.3 Railway Track Geometrics: Gradient, curves- types. Factors affecting, grade compensation, super elevation, limits of Super elevation on curves, cant deficiency, negative cant, coning of wheel, tilting of rail.	
	02	5.4 Branching of Tracks, Points and crossings, Turn out- types, components, functions and inspection.	
	03	Track junctions: crossovers, scissor cross over, diamond crossing, track triangle 5.6 Station -Purpose, requirement of railway station, important technical terms, types of rail- way station,	
14 th	01	Factors affecting site selection for railway station. 5.7	

		Station yard: Classification- Passenger, goods, locomotive and marshalling yards.	
	02	Function & drawbacks of marshalling yards. 5.8 Track Maintenance- Necessity.	
	03	Classification of track maintenance.	
15 th	01	Organisation of track maintenance.	
	02	Tools required for track maintenance with their functions.	
	03	Duties of permanent way inspector, gang mate and key man.	

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LESSON PLAN OF 3RD SEMESTER CIVIL ENGINEERING(2025-26)		
Discipline: CE	Semester: 3rd/3rd	Name of the Teaching Faculty GAYATRI JENA
Subject: MECHANICS OF MATERIAL	No. of Days/per week class allotted: 03	Semester W.E.F:01/07/2026 No. of Weeks : 15
Week	Class Day	Theory Topics
1st	01	UNIT-1-Centre of Gravity and Moment of Inertia Definition of centre of gravity ,Centre of gravity of Symmetrical shapes (solid / hollow square, rectangular, circular, I Sections)
	02	Moment of inertia (M.I.): Definition, Moment of Inertia of solid circular sections. M.I. of plane lamina,
	03	Radius of gyration, section modulus, Parallel and Perpendicular axes theorems (without derivations),
2nd	01	M.I. of rectangle, square, circle, semicircle, quarter circle and triangle section (without derivations).
	02	M.I. of symmetrical and unsymmetrical I-section, Channel section, T-section,
	03	Angle section, Hollow sections and built up sections about centroidal axes and any other reference axis.
3rd	01	Polar Moment of Inertia of solid circular sections.
	02	Numerical on M.I & C.G
	03	UNIT-2-Simple Stresses and Strains Definition of rigid, elastic and plastic bodies, deformation of elastic body under various forces,
4th	01	Definition of stress, strain, elasticity, Hook's law, Elastic limit, Modulus of elasticity. Type of Stresses- Normal, Direct, Bending and Shear and nature of stresses i.e. Tensile and Compressive stresses.
	02	Standard stress strain curve for tor steel bar under tension, Yield stress, Proof stress, Ultimate stress, Strain at various critical points, Percentage elongation and Factor of safety.
	03	Deformation of body due to axial force, forces applied at intermediate sections, Maximum and minimum stress induced, Composite section under axial loading.
5th	01	Concept of temperature stresses and strain, Stress and strain developed due to temperature variation in homogeneous simple bar (no composite section).
	02	Longitudinal and lateral strain, Modulus of Rigidity, Poisson's ratio, Biaxial and tri-axial stresses, volumetric strain, change in volume, Bulk modulus (Introduction only).

	03	Relation between modulus of elasticity, modulus of rigidity and bulk modulus (without derivation).	
6th	01	COMPLEX STRESSES AND STRAINS Principal stresses and strains.	
	02	Occurrence of normal and tangential stresses	
	03	Concept of Principal stress and Principal Planes – major and minor principal stresses and their orientations.	
7th	01	Stresses on a given plane –shear and normal stress components on any inclined plane .	
	02	Mohr's circle and its use in solving problems on complex stresses - Numerical problems.	
	03	UNIT-3-Shear Force and Bending Moment Types of supports, beams and loads.	
8th	01	Concept and definition of shear force and bending moment.	
	02	Relation between load, shear force and bending moment (without derivation).	
	03	Shear force and bending moment diagram for cantilever beams subjected to point loads.	
9th	01	NUMERICAL	
	02	NUMERICAL	
	03	NUMERICAL	
10th	01	Uniformly distributed loads and couple (combination of any two types of loading).	
	02	NUMERICAL	
	03	Point of contra flexure.	
11th	01	UNIT-4-Bending and Shear Stresses in beams Concept and theory of pure bending.	
	02	assumptions, flexural equation (without derivation)	
	03	Bending stresses and their nature, bending stress distribution diagram	
12th	01	Revision	
	02	Concept of moment of resistance and simple numerical problems using flexural equation.	
	03	Shear stress equation (without derivation), relation between maximum and average shear stress for rectangular and circular section, shear stress distribution diagram..	
13th	01	Shear stress distribution for square, rectangular, circle, hollow, square, rectangular, circular ,	
	02	Simple numerical problems based on shear equation. Shear stress distribution for angle sections, channel section, I-section, T section.	
	03	Simple numerical problems based on shear equation	
14th	01	UNIT-5-Columns Concept of compression member, short and long column,	

		Effective length, Radius of gyration, Slenderness ratio. Revision.
	02	Types of end condition for columns. Buckling of axially loaded columns. Euler's theory.
	03	Assumptions made in Euler's theory. Euler's theory limitations.
15th	01	Application of Euler's equation to calculate buckling load.
	02	Rankine's formula details. Rankine theory application to calculate crippling load.
	03	Concept of working load/safe load, design load and factor of safety.

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