



LESSON PLAN : TH.4-HIGHWAY ENGINEERING, SESSION -2023-2024 (SUMMER 2024) BATCH-2022-2025(4th Semester)

Discipline: Civil Engineering	Semester: 4th	Name of the Teaching Faculty: Ashish Kumar Nayak ,Lect. In civil Engg.
Subject: TH.4- HIGHWAY ENGINEERING	No. of days/ per week class allotted: 5	Semester From Date : 16/01/2024 to Date: 26/04/2024
Week	Class Day	Theory/ Practical Topics
		1 Introduction
1ST	1	1.1 Importance of Highway transportation: importance organizations like Indian roads congress, Ministry of Surface Transport, Central Road Research Institute.
	2	1.1 Importance of Highway transportation: importance organizations like Indian roads congress, Ministry of Surface Transport, Central Road Research Institute.
	3	1.2 Functions of Indian Roads Congress
	4	1.3 IRC classification of roads
	5	1.4 Organisation of state highway department
		2 Road Geometries
2ND	1	2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient
	2	2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient
	3	2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient
	4	2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient
	5	2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient
3RD	1	2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient
	2	2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient
	3	2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient
	4	2.1 Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation level, camber and gradient
	5	2.2 Design and average running speed, stopping and passing sight distance
4TH	1	2.2 Design and average running speed, stopping and passing sight distance
	2	2.2 Design and average running speed, stopping and passing sight distance

	3	2.2 Design and average running speed, stopping and passing sight distance
	4	2.2 Design and average running speed, stopping and passing sight distance
	5	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
5TH	1	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
	2	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
	3	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
	4	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
	5	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
		3 Road Materials
6TH	1	3.1 Difference types of road materials in use: soil, aggregates, and binders
	2	3.1 Difference types of road materials in use: soil, aggregates, and binders
	3	3.2 Function of soil as highway Subgrade
	4	3.2 Function of soil as highway Subgrade
	5	3.3 California Bearing Ratio: methods of finding CBR valued in the laboratory and at site and their significance
7TH	1	3.3 California Bearing Ratio: methods of finding CBR valued in the laboratory and at site and their significance
	2	3.4 Testing aggregates: Abrasion test, impact test, crushing strength test, water absorption test & soundness test
	3	3.4 Testing aggregates: Abrasion test, impact test, crushing strength test, water absorption test & soundness test
	4	3.4 Testing aggregates: Abrasion test, impact test, crushing strength test, water absorption test & soundness test
		4 Road Pavements
	5	4.1 Road Pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components Flexible pavements:
8TH	1	4.1 Road Pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components Flexible pavements:
	2	4.1 Road Pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components Flexible pavements:

	3	4.2 Sub-grade preparation: Setting out alignment of road, setting out bench marks, control pegs for embankment and cutting, borrow pits, making profile of embankment, construction of embankment, compaction, stabilization, preparation of subgrade, methods of checking camber, gradient and alignment as per recommendations of IRC, equipment used for subgrade preparation
	4	4.2 Sub-grade preparation: Setting out alignment of road, setting out bench marks, control pegs for embankment and cutting, borrow pits, making profile of embankment, construction of embankment, compaction, stabilization, preparation of subgrade, methods of checking camber, gradient and alignment as per recommendations of IRC, equipment used for subgrade preparation
	5	4.2 Sub-grade preparation: Setting out alignment of road, setting out bench marks, control pegs for embankment and cutting, borrow pits, making profile of embankment, construction of embankment, compaction, stabilization, preparation of subgrade, methods of checking camber, gradient and alignment as per recommendations of IRC, equipment used for subgrade preparation
9TH	1	4.3 Sub base Course: Necessity of sub base, stabilized sub base, purpose of stabilization (no designs) Types of stabilization <input type="checkbox"/> Mechanical stabilization, <input type="checkbox"/> Lime stabilization <input type="checkbox"/> Cement stabilization, <input type="checkbox"/> Fly ash stabilization
	2	4.3 Sub base Course: Necessity of sub base, stabilized sub base, purpose of stabilization (no designs) Types of stabilization <input type="checkbox"/> Mechanical stabilization, <input type="checkbox"/> Lime stabilization <input type="checkbox"/> Cement stabilization, <input type="checkbox"/> Fly ash stabilization
	3	4.4 Base Course: Preparation of base course, Brick soling, stone soling and metalling, Water Bound Macadam and wet-mix Macadam, Bituminous constructions: Different types
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	5	4.5 Surfacing: <input type="checkbox"/> Surface dressing (i) Premix carpet and (ii) Semi dense carpet <input type="checkbox"/> Bituminous concrete <input type="checkbox"/> Grouting
10TH	1	4.5 Surfacing: <input type="checkbox"/> Surface dressing (i) Premix carpet and (ii) Semi dense carpet <input type="checkbox"/> Bituminous concrete <input type="checkbox"/> Grouting
	2	4.6 Rigid Pavements: Concept of concrete roads as per IRC specifications
		5 Hill Roads:
	3	5.1 Introduction: Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling
	4	5.1 Introduction: Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling
	5	5.1 Introduction: Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling
11TH	1	5.1 Introduction: Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling
	2	5.2 Breast Walls, Retaining walls, different types of bends

	3	5.2 Breast Walls, Retaining walls, different types of bends
	4	5.2 Breast Walls, Retaining walls, different types of bends
6 Road Drainage:		
	5	6.1 Necessity of road drainage work, cross drainage works
12TH	1	6.1 Necessity of road drainage work, cross drainage works
	2	6.2 Surface and sub-surface drains and storm water drains. Location, spacing and typical details of side drains, side ditches for surface drainage, intercepting drains, pipe drains in hill roads, details of drains in cutting embankment, typical cross sections.
	3	6.2 Surface and sub-surface drains and storm water drains. Location, spacing and typical details of side drains, side ditches for surface drainage, intercepting drains, pipe drains in hill roads, details of drains in cutting embankment, typical cross sections.
	4	6.2 Surface and sub-surface drains and storm water drains. Location, spacing and typical details of side drains, side ditches for surface drainage, intercepting drains, pipe drains in hill roads, details of drains in cutting embankment, typical cross sections.
	5	6.2 Surface and sub-surface drains and storm water drains. Location, spacing and typical details of side drains, side ditches for surface drainage, intercepting drains, pipe drains in hill roads, details of drains in cutting embankment, typical cross sections.
13TH	1	6.2 Surface and sub-surface drains and storm water drains. Location, spacing and typical details of side drains, side ditches for surface drainage, intercepting drains, pipe drains in hill roads, details of drains in cutting embankment, typical cross sections.
	2	7 Road Maintenance :
	3	7.1 Common types of road failures – their causes and remedies
	4	7.2 Maintenance of bituminous road such as patch work and resurfacing
	5	7.3 Maintenance of concrete roads – filling cracks, repairing joints, maintenance of shoulders (berm), maintenance of traffic control devices
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	2	7.4 Basic concept of traffic study, Traffic safety and traffic control signal
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8 Construction equipments:		
Preliminary ideas of the following plant and equipment:		
	4	8.1 Hot mixing plant
	5	8.2 Tipper, tractors (wheel and crawler) scraper, bulldozer, dumpers, shovels, graders, roller dragline
15TH	1	8.2 Tipper, tractors (wheel and crawler) scraper, bulldozer, dumpers, shovels, graders, roller dragline
	2	8.2 Tipper, tractors (wheel and crawler) scraper, bulldozer, dumpers, shovels, graders, roller dragline
	3	8.3 Asphalt mixer and tar boilers
	4	8.4 Road pavers
	5	8.5 Modern construction equipments for roads.

Mahesh Verma
11/01/2024

Dhruv
11/01/2024

