



NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)



LESSON PLAN

SUBJECT : Th-4 (HIGHWAY ENGINEERING)

CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Introduction	5	5
2	Road Geometrics	20	20
3	Road Materials	9	9
4	Road Pavements	13	13
5	Hill Roads	7	7
6	Road Drainage	7	7
7	Road Maintenance :	7	7
8	Construction equipments	7	7
	Total Period:	75	75

Discipline: CIVIL ENGINEERING	Semester: 4th	Name of the Teaching Faculty: Er. Diptimayee Mohanty
		SESSION : 2023-24 EXAMINATION : 2024 (S)
Week	Class Day	Topics to be Covered
1st	1st	Introduction: 1.1 Importance of Highway transportation: importance organizations like Indian roads congress, Ministry of Surface Transport, Central Road Research Institute
	2nd	1.2 Functions of Indian Roads Congress
	3rd	1.3 IRC classification of roads
	4th	1.3 IRC classification of roads
	5th	1.4 Organisation of state highway department
2nd	1st	Road Geometrics: 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
	2nd	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	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
	4th	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
	5th	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	1st	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
	2nd	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	2.2 Design and average running speed, stopping and passing sight distance

3 rd	4 th	2.2 Design and average running speed, stopping and passing sight distance
	5 th	2.2 Design and average running speed, stopping and passing sight distance
4 th	1 st	2.2 Design and average running speed, stopping and passing sight distance
	2 nd	2.2 Design and average running speed, stopping and passing sight distance
	3 rd	2.2 Design and average running speed, stopping and passing sight distance
	4 th	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
	5 th	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
5 th	1 st	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
	2 nd	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
	3 rd	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
	4 th	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
	5 th	2.3 Necessity of curves, horizontal and vertical curves including transition curves and super elevation, Methods of providing super – elevation
6 th	1 st	Road Materials: 3.1 Difference types of road materials in use: soil, aggregates, and binders
	2 nd	3.1 Difference types of road materials in use: soil, aggregates, and binders
	3 rd	3.2 Function of soil as highway Subgrade
	4 th	3.2 Function of soil as highway Subgrade
	5 th	3.3 California Bearing Ratio: methods of finding CBR valued in the laboratory and at site and their significance
7 th	1 st	3.3 California Bearing Ratio: methods of finding CBR valued in the laboratory and at site and their significance
	2 nd	3.3 California Bearing Ratio: methods of finding CBR valued in the laboratory and at site and their significance
	3 rd	3.4 Testing aggregates: Abrasion test, impact test, crushing strength test, water absorption test & soundness test

7 th	4 th	3.4 Testing aggregates: Abrasion test, impact test, crushing strength test, water absorption test & soundness test
	5 th	Road Pavements: 4.1 Road Pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components
8 th	1 st	4.1 Road Pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components
	2 nd	Flexible pavements: 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,
	3 rd	Flexible pavements: 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 th	Flexible pavements: 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 th	4.3 Sub base Course: Necessity of sub base, stabilized sub base, purpose of stabilization (no designs) Types of stabilization <ul style="list-style-type: none"> • Mechanical stabilization • Lime stabilization • Cement stabilization • Fly ash stabilization
9 th	1 st	4.3 Sub base Course: Necessity of sub base, stabilized sub base, purpose of stabilization (no designs) Types of stabilization <ul style="list-style-type: none"> • Mechanical stabilization • Lime stabilization • Cement stabilization • Fly ash stabilization

9 th	2 nd	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
	3 rd	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
	4 th	4.5 Surfacing: • Surface dressing (i) Premix carpet and (ii) Semi dense carpet • Bituminous concrete • Grouting
	5 th	4.5 Surfacing: • Surface dressing (i) Premix carpet and (ii) Semi dense carpet • Bituminous concrete • Grouting
10 th	1 st	4.6 Rigid Pavements Concept of concrete roads as per IRC specifications
	2 nd	4.6 Rigid Pavements Concept of concrete roads as per IRC specifications
	3 rd	Hill Roads: 5.1 Introduction: Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling
	4 th	5.1 Introduction: Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling
	5 th	5.2 Breast Walls, Retaining walls, different types of bends
11 th	1 st	INTERNAL ASSESSMENT
	2 nd	INTERNAL ASSESSMENT
	3 rd	5.2 Breast Walls, Retaining walls, different types of bends
	4 th	5.2 Breast Walls, Retaining walls, different types of bends
	5 th	Road Drainage: 6.1 Necessity of road drainage work, cross drainage works
12 th	1 st	6.1 Necessity of road drainage work, cross drainage works

12 th	2 nd	6.1 Necessity of road drainage work, cross drainage works
	3 rd	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 th	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 th	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
13 th	1 st	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 nd	Road Maintenance 7.1 Common types of road failures – their causes and remedies
	3 rd	7.1 Common types of road failures – their causes and remedies
	4 th	7.2 Maintenance of bituminous road such as patch work and resurfacing
	5 th	7.3 Maintenance of concrete roads – filling cracks, repairing joints, maintenance of shoulders (berm), maintenance of traffic control devices
14 th	1 st	7.3 Maintenance of concrete roads – filling cracks, repairing joints, maintenance of shoulders (berm), maintenance of traffic control devices
	2 nd	7.4 Basic concept of traffic study, Traffic safety and traffic control signal
	3 rd	7.4 Basic concept of traffic study, Traffic safety and traffic control signal
	4 th	Construction equipments: Preliminary ideas of the following plant and equipment: 8.1 Hot mixing plant
	5 th	8.2 Tipper, tractors (wheel and crawler) scraper, bulldozer, dumpers, shovels, graders, roller dragline

15th	1st	8.2 Tipper, tractors (wheel and crawler) scraper, bulldozer, dumpers, shovels, graders, roller dragline
	2nd	8.3 Asphalt mixer and tar boilers
	3rd	8.4 Road pavers
	4th	8.5 Modern construction equipments for roads
	5th	8.5 Modern construction equipments for roads