

LESSON PLAN

DISCIPLINE: Civil Engineering		SEMESTER: 4 th Semester		NAME OF THE TEACHING FACULTY: Ganesh Pradhan Lecturer (Civil Engineering)	
SUBJECT: HIGHWAY ENGINEERING(Th4)		NO. OF DAYS/PER WEEK CLASSES ALLOTTED: 5		SEMESTER FROM DATE: 15.03.2022 TO DATE: <hr/> NO. OF WEEKS: 15	
Week	Class Day	Theory Topic			
1ST	1. Introduction				
	1st	1.1	Importance of Highway transportation: importance organizations like Indian roads congress,		
	2nd		Ministry of Surface Transport, Central Road Research Institute.		
	3rd	1.2	Functions of Indian Roads Congress		
	4th	1.3	IRC classification of roads		
	5th	1.4	Organization of state highway department		
2ND	2. Road Geometrics				
	1st	2.1	Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way,		
	2nd		Factor affecting geometric design: design speed, topography, traffic factor, deign hourly volume and capacity, environmental other factors.		
	3rd		Highway cross section element: pavement surface characteristics ,cross-slop, carriageway,		
	4th		Traffic separator, kerbs,		
	5th		road margins: shoulder, guard rail, width of formation		
3RD	1st		Right of way: land width , building line, typical cross section of road		
	2nd	2.2	Design and average running speed, sight distance		
	3rd		Types of sight distance: SSD, OSD, etc.		
	4th		Stopping sight distance and their analysis with numerical problems		
	5th		Over taking sight distance and their analysis with numerical		
4TH	1st		Reaction time and PIEV theory		
	2nd		Horizontal curves, design of super-elevation, minimum super-elevation, max. super-elevation		
	3rd		Provide Extra widening of road, (mechanical and psychological)		
	4th		Numerical on extra widening		
	5th		Horizontal transition curve		
5TH	1st		Vertical alignment		
	2nd		Design and average running speed, stopping and passing sight distance		
	3rd	2.3	Necessity of curves, horizontal and vertical curves including transition curves and super elevation,		
	4th		Methods of providing super – elevation		
	5th		Super elevation on Up gradient and down gradient		

6 TH	3. Road Materials	
	1 st	3.1 Difference types of road materials in use:
	2 nd	Compaction of soil sub grade and equipment
	3 rd	aggregates, and binders
	4 th	Compaction of aggregate and equipment
	5 th	3.2 Function of soil as highway Sub grade
7 TH	1 st	Function of soil as highway Sub grade
	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
	4 th	crushing strength test, water absorption test & soundness test
	5 th	crushing strength test, water absorption test & soundness test
8 TH	4. Road Pavements	
	1 st	4.1 Road Pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components Flexible pavements:
	2 nd	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,
	3 rd	4.3 compaction, stabilization, preparation of subgrade, methods of checking camber, gradient and alignment as per recommendations of IRC, equipment used for subgrade preparation
	4 th	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
	5 th	<ul style="list-style-type: none"> • Cement stabilization • Fly ash stabilization
9 TH	1 st	4.4 Base Course: Preparation of base course, Brick soling,
	2 nd	stone soling and metaling,
		Water Bound Macadam and wet-mix Macadam,
	3 rd	Bituminous constructions: Different types
	4 th	4.5 Surfacing: <ul style="list-style-type: none"> • Surface dressing (ii) Premix carpet and (ii) Semi dense carpet
5 th	<ul style="list-style-type: none"> • Bituminous concrete • Grouting 	
10 TH	1 st	4.6 Rigid Pavements: Concept of concrete roads as per IRC specifications
	2 nd	Flexible pavement
	5. Hill Roads	
	3 rd	5.1 Introduction: Typical cross-sections showing all details of a typical hill road in cut,
		5.2 Partly in cutting and partly in filling
4 th	Breast Walls, Retaining walls	

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