

<b>LESSON PLAN: HIGHWAY ENGINEERING</b>		
<b>Discipline :</b>	<b>CIVIL ENGINEERING</b>	
<b>Faculty :</b>	<b>SUBHENDU NAIK</b>	
<b>Semester :</b>	<b>4TH</b>	
<b>Duration :</b>	<b>15 WEEKS (15<sup>th</sup> September 2022 to 22<sup>nd</sup> December 2022)</b>	
<b>Work Load :</b>	<b>Lecture :</b>	<b>5 Lectures per week (50 minutes per Class)</b>
<b>Week</b>	<b>Week Day</b>	<b>Theory</b>
1 <sup>st</sup>	1 <sup>st</sup>	Importance of Highway transportation: importance organizations like Indian roads congress, Ministry of Surface Transport, Central Road Research Institute.
	2 <sup>nd</sup>	Functions of Indian Roads Congress
	3 <sup>rd</sup>	IRC classification of roads
	4 <sup>th</sup>	IRC classification of roads
	5 <sup>th</sup>	Organisation of state highway department
2 <sup>nd</sup>	6 <sup>th</sup>	Glossary of terms used in geometric and their importance, right of way, formation width
	7 <sup>th</sup>	, road margin, road shoulder
	8 <sup>th</sup>	, road margin, road shoulder
	9 <sup>th</sup>	carriage way, side slopes
	10 <sup>th</sup>	kerbs, formation level
3 <sup>rd</sup>	11 <sup>th</sup>	camber and gradient
	12 <sup>th</sup>	Design and average running speed
	13 <sup>th</sup>	Design and average running speed
	14 <sup>th</sup>	stopping and passing sight distance
	15 <sup>th</sup>	stopping and passing sight distance
4 <sup>th</sup>	16 <sup>th</sup>	Necessity of curves,
	17 <sup>th</sup>	horizontal and vertical curves
	18 <sup>th</sup>	horizontal and vertical curves
	19 <sup>th</sup>	transition curves and super elevation
	20 <sup>th</sup>	transition curves and super elevation
5 <sup>th</sup>	21 <sup>st</sup>	Methods o f providing super – elevation
	22 <sup>nd</sup>	Methods o f providing super – elevation
	23 <sup>rd</sup>	Methods o f providing super – elevation
	24 <sup>th</sup>	Methods o f providing super – elevation
	25 <sup>th</sup>	Methods o f providing super – elevation
6 <sup>th</sup>	26 <sup>th</sup>	Difference types of road materials in use: soil,
	27 <sup>th</sup>	aggregates, and binders
	28 <sup>th</sup>	Function of soil as highway Subgrade
	29 <sup>th</sup>	California Bearing Ratio: methods of finding CBR valued in the laboratory
	30 <sup>th</sup>	at site and their significance
7 <sup>th</sup>	31 <sup>st</sup>	Testing aggregates: Abrasion test
	32 <sup>nd</sup>	impact test
	33 <sup>rd</sup>	crushing strength test
	34 <sup>th</sup>	water absorption test and soundness test
	35 <sup>th</sup>	Road Pavement: Flexible and rigid pavement, their merits and demerits,
8 <sup>th</sup>	36 <sup>th</sup>	typical cross-sections, functions of various components Flexible pavements:
	37 <sup>th</sup>	Sub-grade preparation: Setting out alignment of road
	38 <sup>th</sup>	setting out bench marks, control pegs for embankment and cutting, borrow pits, making profile of embankment
	39 <sup>th</sup>	construction of embankment, compaction, stabilization, preparation of

		subgrade
	40 <sup>th</sup>	methods of checking camber, gradient and alignment as per recommendations of IRC equipment used for subgrade preparation
9 <sup>th</sup>	41 <sup>st</sup>	Sub base Course: Necessity of sub base, stabilized sub base, purpose of stabilization (no designs) Types of stabilization
	42 <sup>nd</sup>	Mechanical stabilization Lime stabilization Cement stabilization and Fly ash stabilization
	43 <sup>rd</sup>	Base Course: Preparation of base course, Brick soling, stone soling and metalling
	44 <sup>th</sup>	Water Bound Macadam and wet-mix Macadam, Bituminous constructions: Different types
	45 <sup>th</sup>	Surfacing: Surface dressing
10 <sup>th</sup>	46 <sup>th</sup>	Premix carpet and (ii) Semi dense carpet Bituminous concrete Grouting
	47 <sup>th</sup>	Rigid Pavements: Concept of concrete roads as per IRC specifications
	48 <sup>th</sup>	Introduction: Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling
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	50 <sup>th</sup>	Introduction: Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling
11 <sup>th</sup>	51 <sup>st</sup>	Breast Walls
	52 <sup>nd</sup>	Retaining walls
	53 <sup>rd</sup>	different types of bends
	54 <sup>th</sup>	different types of bends
	55 <sup>th</sup>	Necessity of road drainage work,
12 <sup>th</sup>	56 <sup>th</sup>	cross drainage works
	57 <sup>th</sup>	Surface and sub-surface drains and storm water drains
	58 <sup>th</sup>	. Location, spacing and typical details of side drains
	59 <sup>th</sup>	side ditches for surface drainage
	60 <sup>th</sup>	intercepting drains
13 <sup>th</sup>	61 <sup>th</sup>	pipe drains in hill roads
	62 <sup>th</sup>	details of drains in cutting embankment, typical cross sections
	63 <sup>th</sup>	Common types of road failures – their causes and remedies
	64 <sup>th</sup>	Common types of road failures – their causes and remedies
	65 <sup>th</sup>	Maintenance of bituminous road such as patch work and resurfacing
14 <sup>th</sup>	66 <sup>th</sup>	Maintenance of bituminous road such as patch work and resurfacing
	67 <sup>th</sup>	Maintenance of concrete roads – filling cracks, repairing joints
	68 <sup>th</sup>	maintenance of shoulders (berm), maintenance of traffic control devices
	69 <sup>th</sup>	Basic concept of traffic study, Traffic safety and traffic control signal
	70 <sup>th</sup>	Preliminary ideas of the following plant and equipment:
15 <sup>th</sup>	71 <sup>th</sup>	Hot mixing plant
	72 <sup>th</sup>	Tipper, tractors (wheel and crawler) scraper
	73 <sup>th</sup>	bulldozer, dumpers, shovels, graders, roller dragline
	74 <sup>th</sup>	Asphalt mixer and tar boilers and Road pavers
	75 <sup>th</sup>	Modern construction equipments for roads