

# LESSON PLAN

Theory - 04

Discipline: Civil Engg. , UGMIT Rayagada  
Semester: 4<sup>TH</sup>  
Name of the Teaching Faculty:  
Subject: Highway Engineering (TH 4)  
No of Days/week class allotted: 05  
Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-5	<u>Highway Engineering</u> <b>1.0 Introduction:</b> 1.1 importance of highway transportation 1.2 functions of IRC 1.3 IRC classification of roads\ 1.4 Organization of state highway department	
2	6-10	2.1 glossary of terms used in geometric and their importance like ROW, formation width, road shoulder, road margin etc. 2.2 factors affecting geometric design of highways (mainly design speed) and analysis of SSD & OSD	
3	11-15	2.3 necessity of curves, horizontal and vertical curves including transition curves 2.4 necessity of providing super elevation and methods of providing super elevation	
4	16-20	3.1 Difference types of road materials in use : sol, aggregates, binders 3.2 Function of soil as highway subgrade 3.3 California Bearing Ratio : methods of finding CBR valued in the laboratory and at site and their significance	
5	21-25	3.4 Testing aggregates : Abrasion test, impact test, crushing strength test, water absorption test & soundness test 3.5 Aggregates : Availability of road aggregates in India, Requirements of road aggregates as per IS specifications 3.6 Binders : common binders : cement, bitumen and Tar, propertied as per IS specifications, penetration and viscosity test of bitumen, procedure and a significance of cut back bitumen and bituminous emulsion and their use	
6 & 7	26-30 & 31-35	4.1 Road Pavement : Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components	

		<p>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</p> <p>4.3 Flexible pavements : necessity of sub base, stabilized sub bade: purpose of stabilization(no designs)  Types of stabilization “</p> <p>a. Mechanical stabilization</p> <p>b. Lime stabilization</p> <p>c. Cement stabilization</p> <p>d. Fly ash stabilization</p> <p>4.4 Base Course :</p> <p>Preparation of base course</p> <p>a. Brick soling</p> <p>b. Stone soling</p> <p>c. Metalling : Water Bound Macadam and Bituminous Macadam</p> <p>4.5 Surfacing :  Types of surfacing</p> <p>a. Surface dressing</p> <p>b. (i) Premix carpet</p> <p>(ii) Semi dense carpet</p> <p>c. Bituminous concrete</p> <p>d. Grouting</p>	
7 &8	36-40 & 41-45	<p>Methods of constructions as per Ministry of Surface Transport, specifications and quality control</p> <p>4.6 Rigid Pavements :</p> <p>Construction of concrete roads as per IRC specifications : From laying, mixing and placing the concrete, compacting and finishing, curing, joints in concrete pavement, equipment used</p> <p><b>5.0 Hill Roads :</b></p> <p>5.1 Introduction :  Typical cross-sections showing all details of a typical hill road in cut, partly in cutting and partly in filling</p> <p>5.2 Breast Walls, Retaining walls, different types of bends</p>	
8	46-50	<b>6.0 Road Drainage :</b>	

		<p>6.1 Necessity of road drainage work, cross drainage works</p> <p>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</p>	
9	51-55	<p><b>7.0 Road Maintenance :</b></p> <p>7.1 Common types of road failures – their causes and remedies</p> <p>7.2 Maintenance of bituminous road such as patch work and resurfacing</p> <p>7.3 Maintenance of concrete roads – filling cracks, repairing joints, maintenance of shoulders (berm), maintenance of traffic control devices</p>	
10 & 11	56-60 & 61-65	<p><b>8.0 Construction equipments :</b></p> <p>Output and use of the following plant and equipment :</p> <p>8.1 Hot mixing plant</p> <p>8.2 Tipper, tractors (wheel and crawler) scraper, bulldozer, dumpers, shovels, graders, roller dragline</p> <p>8.3 Asphalt mixer and tar boilers</p> <p>8.4 Road pavers</p> <p>8.5 Modern construction equipments for roads.</p>	
12&13	66-70 & 71-75	<p><b>9.0 Traffic studies :</b></p> <p>9.1 Basic concept of traffic study</p> <p>9.2 Traffic safety and traffic control signal</p> <p>9.3 Road junctions</p> <p>9.4 Traffic island and refuge island; advantages and disadvantages</p> <p><b>10.0 Landscaping and Arboriculture</b></p> <p>10.1 Meaning of landscaping and arboriculture</p> <p>10.2 Aesthetics in road side development</p>	