

## ACADEMIC LESSON PLAN FOR SUMMER SEMESTER -2022

Department: Civil Engg.  
Govt Polytechnic, Balasore  
Name of the Faculty: GAYATRI JENA  
Sub: Highway Engineering.

Course Code : TH-4  
Theory : 5 P/W  
Total Periods : 75 P/Sem  
Examination : 3 Hours  
Sem : 4<sup>th</sup> Civil Engg.

Class Test : 20 Marks  
End Semester Exam : 80 marks  
TOTAL MARKS : 100 Marks  
Start : 14<sup>th</sup> FEB 2023

WEEK	PERIOD	TOPIC
1 <sup>st</sup>	1 <sup>st</sup>	INTRODUCTION: Importance of Highway transportation, RTMTM Road construction.
	2 <sup>nd</sup>	Importance organizations like IRC. Ministry of surface transport, Central Road Research Institute.
	3 <sup>rd</sup>	Functions of Indian Road Congress. Classification of Roads.
	4 <sup>th</sup>	IRC Classification of Roads. Revision of RTMTM Road construction concept.
	5 <sup>th</sup>	Short revision of previous class. Organization of State highway department
2 <sup>nd</sup>	1 <sup>st</sup>	ROAD GEOMETRICS: Elements of geometric design.
	2 <sup>nd</sup>	Glossary of terms used in geometric and their importance like Design speed, topography and design hourly volume and capacity.
	3 <sup>rd</sup>	Cross section elements:-right of way, formation width and road margin.
	4 <sup>th</sup>	Revision of previous class. Road shoulders, parking lanes, lay-byes.
	5 <sup>th</sup>	Bus bays, drive ways, cycle tracks, foot path and guard rails
3 <sup>rd</sup>	1 <sup>st</sup>	Short revision of previous class. Carriage way, side slopes, kerbs.
	2 <sup>nd</sup>	Formation level, camber and Gradient.

	3 <sup>rd</sup>	Definition of sight distance. Types of sight distance.
	4 <sup>th</sup>	Brief knowledge of stopping sight distance.
	5 <sup>th</sup>	PIEV theory: Perception time, intellection time, emotion time and volition time.
4 <sup>th</sup>	1 <sup>st</sup>	Numerical based on stopping sight distance(SSD).
	2 <sup>nd</sup>	Overtaking sight distance(OSD).
	3 <sup>rd</sup>	Numerical based on Overtaking sight distance(OSD) or passing sight distance.
	4 <sup>th</sup>	Short revision of previous class. Necessity of curves, horizontal curve, vertical curves and its type.
	5 <sup>th</sup>	Transition curves Requirement of transition curve in highway construction.
5 <sup>th</sup>	1 <sup>st</sup>	Short revision of previous class. Definition of Super elevation Necessity of super elevation
	2 <sup>nd</sup>	Methods of providing super elevation. Maximum super elevation for different terrain.
	3 <sup>rd</sup>	Numerical based on super elevation on curve.
	4 <sup>th</sup>	Extra widening of pavement Mechanical widening Psychological widening.
	5 <sup>th</sup>	Short revision of previous class. Numerical based on extra widening of pavement.
6 <sup>th</sup>	1 <sup>st</sup>	ROAD MATERIALS: Different types of road materials in use: soil aggregates
	2 <sup>nd</sup>	Short revision of previous class. Binders and its properties
	3 <sup>rd</sup>	Layers of pavement.
	4 <sup>th</sup>	Function of soil as highway subgrade.
	5 <sup>th</sup>	California bearing ratio: Procedure of CBR test.
7 <sup>th</sup>	1 <sup>st</sup>	Method of finding CBR value at laboratory and at sites and its significance.

	2 <sup>nd</sup>	Revision of previous class. Testing of aggregates: Abrasion test.
	3 <sup>rd</sup>	Impact test and crushing of aggregate test.
	4 <sup>th</sup>	Short revision of previous class. Water absorption test and soundness test.
	5 <sup>th</sup>	ROAD PAVEMENTS: Definition of pavement. Flexible pavement with cross section .
	8 <sup>th</sup>	1 <sup>st</sup>
	2 <sup>nd</sup>	Sub-grade preparation: Setting out alignment of road ,setting out bench marks ,control pegs for embankment and cutting.
	3 <sup>rd</sup>	Borrow pits ,making profile of embankment, construction of embankment, compaction and stabilization.
	4 <sup>th</sup>	Preparation of subgrade, methods of checking camber, gradient and alignment as per IRC. Equipment used.
	5 <sup>th</sup>	Sub base course: Necessity of sub base, stabilized sub base. Purpose of stabilization.
	9 <sup>th</sup>	1 <sup>st</sup>
	2 <sup>nd</sup>	Base course: Preparation of base course, brick soling, stone soling and metalling.
	3 <sup>rd</sup>	Short Revision of previous class. Water bound macadam, wet mix macadam.
	4 <sup>th</sup>	Bituminous construction and its different types.
	5 <sup>th</sup>	Surfacing: Surface dressing; premix carpet and semi dense carpet.
	10 <sup>th</sup>	1 <sup>st</sup>
	2 <sup>nd</sup>	Rigid pavement with its cross section , its merits and its demerits.
	3 <sup>rd</sup>	HILL ROADS: Introduction of hill roads.
	4 <sup>th</sup>	Typical cross sections of all details of hill road in cut
	5 <sup>th</sup>	Typical cross sections of all details of hill road in partly in cutting.

11 <sup>th</sup>	1 <sup>st</sup>	Typical cross sections of all details of hill road in partly in filling.
	2 <sup>nd</sup>	Revision of previous class. Breast wall in hill roads.
	3 <sup>rd</sup>	Retaining walls in hill roads.
	4 <sup>th</sup>	Different types of bend in hill roads.
	5 <sup>th</sup>	ROAD DRAINAGE: Necessity of road drainage work.
12 <sup>th</sup>	1 <sup>st</sup>	Cross drainage works and its type.
	2 <sup>nd</sup>	Surface and sub-surface drains and storm water drains. Location and spacing of drains.
	3 <sup>rd</sup>	Short revision of previous class. Typical details of side drains.
	4 <sup>th</sup>	Side ditches for surface drainage.
	5 <sup>th</sup>	Short revision of previous class. Intercepting drains and pipe drains in hill roads.
13 <sup>th</sup>	1 <sup>st</sup>	Details of drains in cutting embankment and typical cross section.
	2 <sup>nd</sup>	ROAD MAINTAINANCE: Introduction, necessity of road maintenance.
	3 <sup>rd</sup>	Short revision of previous class. Common types of road failures-their causes.
	4 <sup>th</sup>	Short revision of previous class. Remedies of common type of road failures.
	5 <sup>th</sup>	Maintenance of bituminous road such as patch work and resurfacing.
14 <sup>th</sup>	1 <sup>st</sup>	Maintenance of concrete roads-filling cracks repairing joints.
	2 <sup>nd</sup>	Maintenance of shoulders(berm), maintenance of traffic control devices.
	3 <sup>rd</sup>	Basic concept of traffic study , traffic safety and traffic control signal.
	4 <sup>th</sup>	CONSTRUCTION EQUIPMENT: Hot mixing plant, tippers.
	5 <sup>th</sup>	Revision of previous class. Tractors, scrapers and bull dozer.



15 <sup>th</sup>	1 <sup>st</sup>	Dumpers, Shovels and graders.
	2 <sup>nd</sup>	Roller and draglines.
	3 <sup>rd</sup>	Asphalt mixers and tar boilers
	4 <sup>th</sup>	Revision of previous class. Road pavers
	5 <sup>th</sup>	Modern construction equipment for roads.

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19/3/23

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