

Subject Code: 1ET4010403	Subject Title: Transportation Engineering
Pre-Requisite	

RATIONALE:

As we know that the economy of any country is widely dependent either direct or indirect way on the transportation of various commodities which in turn dependent upon the “How efficiently the transportation system of the country is functioning.” Therefore, knowledge and understanding of various design, construction and maintenance aspects of roads, railways and bridges are very important for engineers working at site in order to make transportation system safe and efficient. At diploma level, students are expected to study about these aspects of roads, railways and bridges so as to develop their understanding in order to apply their knowledge in improving civil infrastructure for transportation.

COURSE OBJECTIVE:

Following are the objectives of this course:

- To identify the types of roads as per IRC recommendations.
- To understand the geometrical design features of different highways.
- To perform different tests on road materials.
- To identify the components of railway tracks.
- To identify different types of bridges.
- To learn make report of investigation of roads, railways and bridges.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment
3	-	2	4	60	40	20	30

DETAILS OF COURSE CONTENTS:

Sr. No.	TOPIC	Total Hrs.	WEIGHTAGE
1	INTRODUCTION AND ROAD GEOMETRIC: 1.1 Importance & Classification of roads 1.2 Modes of transportation. 1.3 Requirements of good roads 1.4 and its advantage. 1.5 Road alignment and their types	08	19 %

	1.6 Importance of road alignment. 1.7 Factors affecting the alignment. 1.8 Cross section of road showing its component as per IRC. 1.9 Function of each component. Terms used in road geometry Camber, sight distance, Super elevation, Widening of Road. 1.10 Transition curve and Road Gradient.		
2	ROADMATERIALS AND ITS CONSTRUCTION ASPECTS: 2.1 Types of Pavement. 2.2 Necessity of Soil Stabilization and its methods. 2.3 Types of materials used in road Construction 2.4 Various tests on Aggregate and bitumen. 2.5 Construction of Flexible and Rigid Pavement. 2.6 Types of Failures in roads 2.7 Maintenance of roads and its components	09	21 %
3	DRAINAGE SYSTEM: 3.1 Importance of drainage. 3.2 Purpose of drainage. 3.3 Methods of Surface and Sub-surface drainage. 3.4 Maintenance of drainage system.	04	10 %
4	INTRODUCTION TO PERMANENT WAY: 4.1. Typical cross section of various permanent way as per IRS. 4.2. Function of Various Components. 4.3. Method of fixing the rails with slipper. 4.4. Function of Rail joints. 4.5. Railway gauge, Types of Rail gauge and uniformity of gauge. 4.6. Function of point and crossing. 4.7. Factors affecting point and crossing. 4.8. Components of Turn outs and types of crossing.	08	19 %
5	YARDS AND MAINTENANCE OF RAILWAY TRACK: 5.1 Classification of Yards. 5.2 Function of Various Yards. 5.3 Requirement of Track Maintenance. 5.4 Daily and periodical Maintenance. 5.5 Maintenance of Alignment, Drainage, Track Material and its components, Point and crossing and level crossing.	05	12 %

6	INTRODUCTION, INVESTIGATION AND MAINTENANCE OF BRIDGES: 6.1. Importance and term used in Bridge. 6.2. Component of Bridge and its function 6.3. Requirement of an ideal bridge 6.4. Classification and types of bridge. 6.5. Bridge Site Characteristics 6.6. Factor affecting the selection of Bridge Site. 6.7. Explain following terms: Scour, Afflux, Runoff, Economic Span, Clearance, Freeboard. 6.8. Classification of Cause Way and its limitations. 6.9. Routine and in-depth inspection. 6.10. Requirements of Inspection Report. 6.11. Maintenance of Steel Bridge, Masonry Bridge, Cause Way, Piers, Pile bents, Abutment, Wing Wall, Road Surface, Drainage, Parapet Wall and Bearing.	08	19 %
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COURSE OUTCOME:

After completing this course, student will be able to:

- Perform the tests on the various materials used in the construction work of roads, railways and bridges.
- Identify the types of roads as per IRC recommendations.
- Implement the geometrical design features of different highways.
- Perform different tests on road materials.
- Identify the components of railway tracks.
- Identify the defects in railway tracks.
- To learn create detailed report of site investigation.

LIST OF PRACTICAL:

Sr. No.	Practical / Exercise
1	Draw the dimensional sketches of cross section of road (with function of each part of road), road junction, road curve and widening
2	Carry out the following tests. - On Aggregate 1. Impact test. 2. Crushing test. 3. C B R test. - On Bitumen 1. Flash & Fire test.

	2.Softening point 3. Penetration test
3	Draw the dimensional sketches of cross section of permanent way & points & crossing (with function of each part of road).
4	Prepare a brief report after visit to Railway track & yards.
5	Draw the sketches of various bridges after visiting the bridges in nearby locations.

LIST OF REFERENCES:

S. No.	Title of Books	Author
1	Highway Engineering	S K Khanna & Justo
2	Highway Engineering	S P Bindra
3	Highway Engineering	L R Kadiyali
4	Highway Engineering	S C Rangwala
5	Transport engineering	Vazirani&Chandola
6	Road Railway Bridges & Tunnel Engineering	T D Ahuja & Birdie
7	Road Railway Bridges & Tunnel Engineering	B L Gupta & A K Gupta