

Branch Name:	Civil engineering
Program Code:	ET401
Course Name:	Transportation Engineering
Course Code:	2ET4010403
Pre-requisite Course:	---

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 to Transportation Engineering : 1.1 History of road transportation. 1.2 Importance & Classification of roads. 1.3 Requirements of good roads 1.4 Modes of transportation and its advantage. 1.5 Describe the basic parts of railway track and its functions. 1.6 Describe Tunnel Classification and its functions	06	16 %
2	Road Transportation & Materials Aspects: 2.1 Types of Pavement. 2.2 Road alignment and their types 2.3 Importance & Factors affecting of road alignment. 2.4 Cross section of road components as per IRC 2.5 Types of materials used in road Construction 2.6 Various tests on Aggregate and bitumen. 2.7 Operating of Hot mix plant. 2.8 Construction of various types of Pavement 2.9 Types of Failures in roads 2.10 Maintenance of roads and its components	08	23 %
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	Permanent Way, Yards & Maintenance of Railway Track 4.1 Typical cross section of various permanent way as per IRS.	16	32 %

	4.2 Typical cross section of various permanent way as per IRS. 4.3 Function of Various Components. 4.4 Method of fixing the rails with slipper. 4.5 Function of Rail joints. 4.6 Railway gauge, Types of Rail gauge and uniformity of gauge. 4.7 Example of slippers & rail requirement in Permanent Way 4.8 Advance equipment used in construction of railway track Function of point and crossing. 4.9 Factors affecting point and crossing. 4.10 Components of Turn outs and types of crossing. 4.11 Classification of Yards. 4.12 Function of Various Yards. 4.13 Requirement of Track Maintenance. 4.14 Daily and periodical Maintenance. 4.15 Maintenance of Alignment, Drainage, Track material and its components, Point and crossing and level Crossing.		
5	Bridges & Tunnels : 5.1 Importance and term used in Bridge. 5.2 Component of Bridge and its function 5.3 Requirement of an ideal bridge 5.4 Classification and types of bridge. 5.5 Factor affecting the selection of Bridge Site. 5.6 Explain following terms: Scour, Afflux, Runoff, Economic Span, Clearance, Free board. 5.7 Classification of Cause Way and its limitations. 5.8 Routine and in-depth inspection. 5.9 Requirements of Inspection Report. 5.10 Types of tunnels 5.11 Tunnel Site Characteristics 5.12 Advance construction method of tunnel 5.13 Advantages & Disadvantages of tunnel 5.14 Factors affecting the site selection for tunnel	8	19 %

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. Carry out the following tests - 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

LIST OF OPEN SOURCE SOFTWARE/LEARNING WEBSITE:

1. www.waterbouww.tudelft.nl/
2. www.learnrstv.com
3. www.blackwellpublishing.com
4. www.hrpwa.org
5. www.creativeworld9.com
6. npTEL.iitm.ac.in

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To identify the types of roads as per IRC recommendations.	2 Understanding
CLO2	To understand the geometrical design features of different highways.	2 Understanding
CLO3	To perform different tests on road materials.	3 Applying 5 Evaluate
CLO4	Perform the tests on the various materials used in the construction work of roads, railways and bridges.	3 Applying, 5 Evaluate
CLO5	Identify the types of roads as per IRC recommendations.	2 Understanding
CLO6	Implement the geometrical design features of different highways.	3 Applying, 4 Analyzing

Course Learning Outcomes	Program Outcomes(Po's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CLO1	L											
CLO2	H				M							
CLO3	M		M		M		M					
CLO4	M		M		M							
CLO5	L											
CLO6	M		L			L					M	

H: High, M: Medium, L: Low