

Devi Ahilya University Indore, India Institute of Engineering & Technology				III Year B.E. (Civil Engineering) (Full Time)			
Subject Code and Name	Instruction Hours Per week			Credits			
6VLRC2:Transportation Engineering - I	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 hours	3	1	2	3	1	1	5

**Course objective:**

1. To know about railway planning and geometric design of railways.
2. To know about highway planning and geometric design of roads.
3. To know about highway maintenance and public transportation systems

**COURSE CONTENTS**

**Unit I: Railway:** Introduction, Rails, Sleepers, Rail fastenings. fish bolts, spikes, bearing plates, chain keys, check and guard rails, Requirement of good ballast, various materials used as ballast, quantity of ballast, different methods of plate laying, material trains, calculation of materials required, relaying of track.

**Unit II: Railway:** Geometric Design, Station & Yards; Points and Crossings & Signaling and interlocking: Formation, cross sections, Super elevation, Equilibrium, Cant and Cant deficiency, various curves, speed on curves. Types, locations, general equipment, layouts, marshaling yards, Definition, layout details, design of simple turnouts, Types of signals in stations and yards, principles of signaling and interlocking.

**Unit III:**

**Highway Planning and Alignment** Different modes of transportation, historical Development of road construction, Highway Development in India, Classification of roads, Road pattern, Highway planning in India, Highway alignment, Engineering Surveys for alignment, Highway project. History and present state of public transportation, role of public transportation in urban development, transit systems, route development.

**Unit IV:**

**Geometric Design of Highways** The highway crosses sectional elements, Sight Distance, Types of sight distances, Design of horizontal alignments, Super elevation, Widening of Pavements on horizontal curves- transition Curves, Design of Vertical alignments, Gradients- summit and Valley Curves.

**UNIT V:**

Tunnel Engineering: general considerations in tunnelling, size and shapes of tunnels , alignment of tunnels, methods of tunnelling, ventilation, lighting and drainage in tunnels.

**REFERENCES**

1. Khana .S.K, Justo .C.E.G – “Highway Engineering,” Nemchand & Bros, Rookies. 2001.
2. Chakroborty, P. and A. Das Principles of Transportation Engineering, Prentice Hall of India Pvt. Ltd, New Delhi, India, 2005.
3. Rangwala SC; Railway Engineering; Charotar Publication House, Anand
4. Railway Engineering by Arora & Saxena - Dhanpat Rai & Sons
5. Kadiyali .L.R, “Traffic Engineering And Transport Planning”, Khanna publishers, Delhi,2009.
6. Ministry of Road Transport and Highways. Specifications for Road and Bridge Works, Fourth Edition, Indian Roads Congress, New Delhi, India, 2001.
7. IRC Codes of Practices
8. Jotin Khisty C. and B. Kent Lall. Transportation Engineering – An Introduction, Third Edition. Prentice Hall of India Pvt. Ltd, New Delhi, India, 2002.
9. Rao G.V. Principles of Transportation and Highway Engineering, Tata McGraw-Hill Publishing Company Ltd., New Delhi, India, 1996.
10. McShane, W.R. and R.P. Roess Traffic Engineering, Prentice Hall, New Jersey, USA, 1990.

**COURSE OUTCOME:**

Students earned credits will develop ability to

CO. No.	CO	PO
CO1	Learn about railway geometric features	PO1, PO2 PO7, PO12
CO2	Ability to plan highway alignments and decide best geometric features	PO1, PO2, PO6, PO7, PO12.
CO3	Learn about highway maintenance and transport system	PO1, PO7, PO8, PO6

**CO-PO Relationship**

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO1	1	1			1							1
CO2	1	1				1	1					1
CO3	1					1	1	1				