CE(PC)506	**Transportation Engineering**	2L + 1T	3 Credits
Course Outcome	After going through this course, the students will be able to: **1.** Understand the knowledge of planning, design and the fundamental properties of highway materials in highway engineering. **2.** Apply the knowledge of geometric design and draw appropriate conclusion. **3.** Interpret the concept of different methods in design, construction of the pavement. **4.** Interpret traffic parameters by applying the knowledge in traffic planning and intersection design.		
Prerequisite	Class-XII level knowledge of Physics, Mathematics; Undergraduate level knowledge of Engineering Mechanics, Strength of Materials, Soil Mechanics		
Module 1	**Introduction to Highway Engineering** Scope of Highway Engineering; Jayakar Committee Report: Recommendations – CRF, IRC, CRRI; Scope of Motor Vehicle Act; Recommendations of Nagpur Road conference; Road Classification as per third 20 years road development plan (1981-2001); Basic types of Road Patterns and its scope of application		2L+1T
Module 2	**Highway alignment** Factors controlling Highway Alignment; Engineering Surveys for Highway Alignment.		1L+1T
Module 3	**Geometric Design** Cross-sectional elements of highway; Design Parameters (as per IRC) – Vehicle dimensions, Carriageway width, Design speed, Frictional coefficients (Lateral and Longitudinal) etc; Design Principles of Horizontal Alignment: Camber, Sight Distance (PIEV theory, SSD, OSD, ISD); Horizontal Curves – [Radius, Super elevation, Extra widening, Set back distance, Transition curve]; Design Principles of Vertical Alignment: Gradients; Grade Compensation; Vertical Curves – Summit Curve, Valley curve.		8L+4T
Module 4	**Traffic Engineering** Traffic studies: Fundamental parameters of Traffic Flow (speed, flow, density, capacity) and their basic relations; Basics of Spot Speed Studies- Speed and Delay study- O & D study; Intersections and Channelization: At Grade and Grade Separated intersections; Conflict points; Salient features of Rotary; Traffic Signs; Signal Design – Basic concepts of IRC design method, 2 phase signal design by Webster method.		7L+3T
Module 5	**Pavement Design** Pavement materials: Bitumen, Aggregate, Subgrade soil; Types of Pavement: Flexible and Rigid pavements and their typical cross-sections; Design parameters: Wheel Load, ESWL, Tyre Pressure, CBR, Resilient Modulus & Poisson's Ratio of various layers, Subgrade Modulus etc. Design of Flexible Pavement using IRC 37:2018 Design of Rigid Pavement: Wheel Stresses, Frictional Stresses and Warping Stresses; Expansion, Contraction and Construction Joints; Design of Rigid Pavement thickness, Dowel Bar and Tie Bar. Distresses in Pavements		8L+5T
Module 6	**Sustainability** Scope of adoption of sustainable construction techniques by using recyclable hazardous materials- fly ash, plastics, recyclable construction materials.		1L+1T

Reference	**Sl.**	**Book Name**	**Author**	**Publishing House**
	1	Transportation Engineering	Kadiyali L.R	Khanna Book Publishing Co. (P) Ltd.
	2	Traffic Engineering and Transport Planning	Kadiyali L.R	Khanna Publishers
	3	Highway Engineering	Khanna, S.K. and C.E.G. Justo	Nem Chand and Bros
	4	Transportation Engineering – An Introduction	Jotin Khisty C. and B. Kent Lall	Prentice Hall of India Pvt. Ltd
	5	Principles of Transportation and Highway Engineering	Rao G.V.	Tata McGraw-Hill Publishing Company Ltd
	6	Specifications for Road and Bridge Works, Fourth Edition	Indian Roads Congress	Ministry of Road Transport and Highways