TRANSPORTATION ENGINEERING

VI Semester: CE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACEC25	Core	L	Т	Р	С	CIA	SEE	Total
		3	1	0	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		
Prerequisite: Surveying and Geomatics								

I. COURSE OVERVIEW:

Road networks are vital parts of the infrastructure for ensuring safe and efficient public mobility and supply chain. Traffic control refers to the traffic engineering, regulation, management and safety with an integrated approach in traffic system. This course gives an overview on Transportation engineering with respect to Design and maintenance of highways as per IRC standards. This course also focuses on developing new transportation systems and infrastructures, including highways. Further the course is useful to solve the complex problems related to the traffic management by collecting and evaluating the data such as traffic flow, density, speed and volume.

II. COURSE OBJECTIVES:

The students will try to learn:

- I. Understand the highway planning process and carry out surveys involved in planning and highway alignment.
- II. Remember various geometric elements involved in design of highways and expressway.
- III. Understand the various traffic studies and to implement traffic regulation and control measures.
- IV. Understand the engineering properties of pavement materials used in highway construction.
- V. Understand the factors affecting design and performance of flexible and rigid pavements as per IRC.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

- CO 1 **Recall** the fundamentals of highway engineering for effective planning and Remember development of highways based on the mission requirement.
- CO 2 **Identify** highway intersection at urban areas for promoting continuous flow Apply without congestions.
- CO 3 Analyze traffic signals at intersections for avoiding conflicts and promoting free Apply flow of traffic.
- CO 4 **Classify** the various traffic parameters considered in traffic study for Analyze regulating traffic at various controlled and uncontrolled intersections.
- CO 5 **Elucidate** the mechanical properties of pavement construction materials for Understand enhancing serviceability and durability of highwaypavements.
- CO 6 **Analyze** the stresses induced in rigid pavements considered fordesigning, CC Apply pavements to improve their performance.

IV. COURSE SYLLABUS:

MODULE –I: HIGHWAY DEVELOPMENT AND PLANNING(9)

Classification of roads, road development in India, Current road projects in India, highway alignment, factors affecting alignment, Engineering surveys, drawing and reports, highway project.

MODULE -II: GEOMETRIC DESIGN OF HIGHWAYS(9)

Introduction, highway cross section elements, sight distance elements, stopping sight distance, overtaking sight distance and intermediate sight distance, design of horizontal alignment; design of vertical alignment; design of intersections.

MODULE -III: TRAFFIC ENGINEERING AND CONTROL(9)

Traffic Characteristics, traffic engineering studies, traffic flow and capacity, traffic regulation and control.

Design of parking facilities; highway lighting and Accident studies: causes and measures.

MODULE -IV: PAVEMENT MATERIALS(9)

Materials used in Highway Construction- Soils, Stone aggregates, bituminous binders, bituminous paving mixes; Portland cement and cement concrete: desirable properties, tests, requirements for different types of pavements.

MODULE -V: DESIGN OF PAVEMENTS(9)

Introduction; flexible pavements, factors affecting design and performance; stresses in flexible pavements; design of flexble pavements as per IRC; rigid pavements- components and functions; factors affecting design and performance of CC pavements; stresses in rigid pavements; design of concrete pavements as per IRC; problems.

V. TEXT BOOKS:

- 1. Khanna, S.K., Justo, C.E.G and Veeraragavan, A, "Highway Engineering", Revised 10th Edition, Nem Chand & Bros, 2017.
- 2. Kadiyalai, L.R. "Traffic Engineering and Transport Planning", Khanna Publishers, 2013.
- 3. ParthaChakraborty, "Principles of Transportation Engineering", PHI Learning, 2017.

VI. REFERENCE BOOKS:

- 1. Fred L. Mannering, Scott S. Washburn, Walter P. Kilareski, "Principles of Highway Engineering and Traffic Analysis", John Wiley, 4th Edition, 2007.
- 2. Srinivasa Kumar, R, "Textbook of Highway Engineering", Universities Press, 2011.
- 3. Paul H. Wright and Karen K. Dixon, "Highway Engineering", Wiley Student Edition, 7th Edition, 2009.

VII. WEB REFERENCES:

- 1. http://www.nptelvideos.in/2012/11/introduction-to-transportation.html
- 2. http://www.nptelvideos.com/civil_engineering/transportation_engineering_video_lectures.php
- 3. https://nptel.ac.in/courses/105105107/
- 4. https://nptel.ac.in/courses/105101087/

VIII. E-Text Books:

1. http://e-booksdirectory.com/details.php?ebook=5616