III B.TechII Semester

15ACE33-HIGHWAY ENGINEERING

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CourseObjective:

This subject deals with the Planned Development of Highways in India and makes the student aware of the importance of Highways in economic development of a Nation. The subject also deals with various geometric elements of Highways and their Design. Fundamentals of Traffic Engineering also will be taught to the student. The students will be given exposure to Pavement Structure Design by various methods.

UNIT I

HIGHWAY DEVELOPMENT AND PLANNING:

Highway development in India – Necessity for Highway Planning-Jayakar Committee and its Recommendations - Different Road Development Plans- First, Second and Third Twenty Year Road Development Plans-Classification of Roads - Road Network Patterns – Highway Alignment-Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT – II

HIGHWAY GEOMETRIC DESIGN:

Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements-Surface Characteristics, Carriageway, Shoulders, Formation, Right of way; Kerbs, foot paths, Medians- design specifications. Sight Distance Elements- Stopping sight Distance, Overtaking Sight Distance and intermediate Sight Distance- Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- -Vertical curves.

UNIT – III

TRAFFIC ENGINEERING:

Basic Parameters of Traffic-Volume, Speed and Density – Definitions and their inter relationship – Highway Capacity and Level of Service concept – Factors affecting Capacity and Level of Service - Traffic Volume Studies- Data Collection and Presentation-speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams- Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Specifications. Design of Traffic Signals –Webster Method –Saturation flow Rate-Phasing and Timing diagrams – Numerical problems.

UNIT – IV

INTERSECTION DESIGN:

Conflicts at Intersections- Channelisation: Objectives –Traffic Islands and Design criteria- Types of At-Grade Intersections – Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection.

UNIT – V

PAVEMENT DESIGN :

Types Of Pavements – Difference Between Flexible And Rigid Pavements – Pavement Components – Sub Grade, Sub Base, Base And Wearing Course – Functions Of Pavement Components – Design Factors – Flexible Pavement Design Methods – G.I Method, CBR Method, (As Per IRC 37-2002)–Design Of Rigid Pavements – Critical Load Positions - Westergaard's Stress Equations – Computing Radius Of Relative Stiffness And Equivalent Radius Of Resisting Section – Stresses In Rigid Pavements – Design Of Expansion And Contraction Joints In CC Pavements. Design Of Dowel Bars And Tie Bars.

Course outcome:

- *Be able to analyze types of pavements, pavement layers and construction.*
- *Different types of subgrades properties and stabilization techniques.*
- *Be able to differentiate different construction machineries and usage.*
- *Road construction problems and solutions in different land pattern.*
- *Different types of road construction materials and origin of those materials.*
- *An idea on basics of Transportation Engineering*

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna&C.E.G.Justo, Nemchand& Bros., 7th edition (2000).
2. Transportation Engineering, Volume – I by C.Venkataramaiah, Universities Press, Hyderabad.
3. Principles and Practice of Highway Engineering Design – L.R.Kadiyali and Lal-KhannaPublications.

REFERENCES:

1. Traffic Engineering and Transportation Planning by L.R.Kadiyali and Lal- Khanna Publications.
2. Highway Engineering – Dr.S.K.Sharma, S.Chand Publishers