

TRANSPORTATION ENGINEERING

Course Code: 15CE1113

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Prerequisites : Surveying

Course Outcomes:

At the end of the course the student will be able to:

- CO 1** Describe highway development programme and various types of road layouts.
- CO 2** Distinguish pavement construction materials
- CO 3** Design of highway geometrics
- CO 4** Analyse the traffic characteristics, accidents and specify the traffic regulations
- CO 5** Discuss the at-grade and grade-separated intersections.

UNIT-I

(10 Lectures)

HIGHWAY DEVELOPMENT AND PLANNING:

Highway development in India– Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT-II

(10 Lectures)

HIGHWAY MATERIALS:

Highway Materials- Soil, Aggregate and Bitumen –Test on Aggregate– Aggregate properties and their importance. Tests on Bitumen – Bituminous Concrete – Requirements of design mix – Marshall Method of Bituminous mix design, Introduction of Emulsion & Cutback.

UNIT-III**(10 Lectures)****HIGHWAY GEOMETRIC DESIGN-I :**

Importance of Geometric Design- Design Controls and Criteria- Highway Cross Section Elements- Sight Distance Elements- Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance.

HIGHWAY GEOMETRIC DESIGN-II:

Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment- Gradients- Vertical Curves.

UNIT-IV**(10 Lectures)****TRAFFIC ENGINEERING:**

Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies-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.

TRAFFIC REGULATION AND MANAGEMENT:

Road Traffic Signs – Types and Specifications – Road markings- Need for Road Markings-Types of Road Markings- Design of Traffic Signals –Webster Method –IRC Method.

UNIT-V**(10 Lectures)****AT GRADE INTERSECTION DESIGN:**

Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelisation: Objectives –Traffic Islands and Design Criteria – Rotary - Types.

GRADE SEPARATED INTERSECTION DESIGN:

Types of Grade Separated Intersections- Rotary Intersection – Flyovers, ROB, Cloverleaf (partial, full). Criteria for selection, Advantage, Disadvantages of grade separated intersection.

TEXT BOOKS:

1. S.K. Khanna & C.E.G.Justo, “*Highway Engineering*”, 7th Edition, Nemchand & Bros., 2000.
2. L.R. Kadiyali and Lal, “*Principles & Practices of Highway Engineering*”, 4th Edition, Khanna Publications, 2004.
3. V.N. Vazirani and S.P.Chandra, “*Transportation Engineering*”, Vol. I, 4th Edition, Khanna Publications, 1994.

REFERENCES:

1. S.P. Bindra, “*Highway Engineering*”, 4th Edition, Dhanpat Rai & Sons, 1981
2. Dr. L.R. Kadyali, “*Traffic Engineering & Transportation Planning*”, 6th Edition, Khanna publications, 1997.
3. NPTEL Videos
4. Indian Road Congress, Ministry of Road Transport and Highways, and Special Publications.