

IV Year I Semester
Code: 17CE702

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TRANSPORTATION ENGINEERING

Course Learning Objectives

The objectives of this course are:

1. To impart different concepts in the field of Highway Engineering.
2. To acquire design principles of Highway Geometrics and Pavements
3. To learn various highway construction and maintenance procedures

Course Outcomes

Upon the successful completion of this course, the students will be able to:

1. Plan highway network for a given area.
2. Determine Highway alignment and design highway geometrics
3. Design Intersections and prepare traffic management plans
4. Judge suitability of pavement materials
5. design flexible and rigid pavements
6. Construct and maintain highways

SYLLABUS

UNIT I

Highway Planning and Alignment: Highway development in India; Classification of Roads; Road Network Patterns; Necessity for Highway Planning; Different Road Development Plans – First, second, third road development plans, road development vision 2021, Rural Road Development Plan–Vision 2025; Planning Surveys; 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-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- Traffic Volume Studies; Speed studies– spot speed and speed & delay studies; Parking Studies; Road Accidents- Causes and Preventive measures- Condition Diagram and Collision Diagrams; PCU Factors, Capacity of Highways– Factors Affecting; LOS Concepts; Road Traffic Signs; Road markings; Types of Intersections; At-Grade Intersections– Design of Plain, Flared, Rotary and Channelized Intersections; Design of Traffic Signals– Webster Method – IRC Method.

UNIT-IV

Highway Materials: Sub grade soil: classification–Group Index– Sub grade soil strength– California Bearing Ratio–Modulus of Sub grade Reaction. Stone aggregates: Desirable

properties–Tests for Road Aggregates–Bituminous Materials: Types–Desirable properties–Tests on Bitumen–Bituminous paving mix: Requirements–Marshall Method of Mix Design.

UNIT–V

Design Of Pavements: Types of pavements; Functions and requirements of different components of pavements; Design Factors

Flexible Pavements Design factors–Flexible Pavement Design Methods– CBR method– IRC method–Burmister method–Mechanistic method–IRC Method for Low volume Flexible pavements.

Rigid Pavements Design Considerations–wheel load stresses–Temperature stresses– Frictional stresses–Combination of stresses– Design of slabs–Design of Joints–IRC method – Rigid pavements for low volume roads – Continuously Reinforced Cement Concrete Pavements – Roller Compacted Concrete Pavements.

UNIT–VI

Highway Construction and Maintenance: Types of Highway Construction– Earthwork; Construction of Earth Roads, Gravel Roads, Water Bound Macadam Roads, Bituminous Pavements and Construction of Cement Concrete Pavements. Pavement Failures, Maintenance of Highways, pavement evaluation, strengthening of existing pavements

TEXT BOOKS:

1. Highway Engineering, KhannaS.K., JustoC.E.GandVeeraragavanA, NemChand Bros., Roorkee.
2. Traffic Engineering and Transportation Planning, KadiyaliL.R,KhannaPublishers, New Delhi.

REFERENCES:

1. Principles of Highway Engineering, KadiyaliL.R, KhannaPublishers, New Delhi
2. PrinciplesofTransportationEngineering,ParthaChakroborthyandAnimeshDas,PHI Learning Private Limited, Delhi
3. Transportation Engineering and Planning, Papacostas C.S. and P.D. Prevedouros, Prentice Hall of India Pvt. Ltd; New Delhi.
4. Highway Engineering, Srinivasa Kumar R, Universities Press, Hyderabad
5. PracticeandDesignofHighwayEngineering,SharmaS.K.,Principles,S.Chand& Company Private Limited, New Delhi.
6. Highway and Traffic Engineering, SubhashC. Saxena, CBS Publishers, New Delhi.
7. TransportationEngineeringVolumeIbyC.Venkatramaiah, UniversitiesPress,NewDelhi.