

TRANSPORTATION ENGINEERING – I

Lectures : 4 Periods/Week

Sessional marks : 40

Semester End Exam. : 3 Hours

Semester End Exam. Marks : 60

Credits : 4

Course Objectives:

- To emphasize on highway development planning and various surveys to be conducted.
- To understand material properties and performances and limits of various tests
- Introduction to the design concepts, vehicle loading criteria and to demonstrate how they are combined to design and construct road pavements.
- To understand the principles of geometric design, both vertical and horizontal
- Emphasize on various traffic control operations and regulations.

Course Outcomes:

- For proper planning of a road network by linking of various surveys and to evaluate and develop master plans for a better road network.
- Selecting the appropriate materials for use in different road layers for different types of pavements.
- Perform road pavement design and analysis by various IRC and other methods.
- Interpret geometric design fundamentals, in relation to safety and driver comfort, focusing on horizontal and vertical alignment.
- An ability to develop traffic signals and help to properly regulate the traffic and better use of road network.

UNIT – 1

Highway Development and Planning

Brief Introduction; necessity of highway planning surveys preparation of master plan highway planning in India.

Highway alignment

Factors controlling alignment; Engineering surveys, Drawing & report.

UNIT – II

Highway Geometric Design

Highway cross section elements; Sight distance; Design of horizontal alignment; Design of vertical alignment.

Highway materials

Sub grade soils- CBR tests; Stone aggregates; Bitumen materials; Paving mixes.

UNIT – III

Design of Highway Pavements

Design factors; Design of flexible pavements – IRC method, IRC recommendations; Design of Rigid pavements -Westergard's stress equation for wheel loads and temperatures stress; IRC recommendations.

Highway construction and maintenance:

Construction of water bound macadam roads; bituminous pavements and cement concrete pavements; Construction of joints in cement concrete pavements; Maintenance of highways- Water bound macadam roads, Bituminous pavements, Cement concrete pavements.

UNIT - IV

Highway Drainage

Importance of highway drainage; Requirements; Surface drainage; Sub-surface drainage; Road construction in water logged areas and black cotton soils.

Traffic engineering:

Introduction; Traffic characteristics- Road user, vehicular & travel pattern; Traffic operation-signal design; Types of intersections; Design of rotary intersection;

NOTE:

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK:

1. Highway Engineering by S. K. Khanna & C. E. G. Justo; Nemchand & Brothers, Roorkee, 2011.

REFERENCE BOOKS:

1. Principles of Transportation Engineering by Partha Chakroborty & Animesh Das, PHI Learning, 2009.
2. Principles of Transportation Engineering and highway engineering by G. Venkatappa Rao, Tata McGraw-Hill, 1995.

WEB REFERENCES:

<http://nptel.iitm.ac.in/syllabus/syllabus.php?subjectId=105101087>

www.irc.org.in (for various journals and manuals and code provisions)

www.springerlink.com (for various e journals)