3/4 B.Tech. SIXTH SEMESTER

CE6T5 TRANSPORTATION ENGINEERING – II Credits: 3

Lecture: 3 periods/week Internal assessment: 30 marks

Tutorial: 1 period /week Semester end examination: 70 marks

Pre-requisites: Transportation engineering I

Learning objectives:

- To know about railway planning and design
- To study railway track construction maintenance and operation
- To study different modes of transport
- To know about the fundamental of airways, harbor and docks

Course outcomes:

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

1. Know about planning and functions of railway, railway tracks and joints
2. Study geometric design of track, sleepers, fishplates and ballast
3. Understand points, crossing and signaling system
4. Design and plan airport, air craft characteristics
5. Study harbor engineering with plan and design

UNIT-I

TRANSPORTATION SYSTEMS

Role of railways in transportation-Comparison of railway and highway transportation- Development of railway systems with particular reference to India

RAILWAY TRACK, RAILS & RAIL JOINTS

Permanent way: Gauges in Railway track-Railway track cross-sections-Coning of wheels. Functions of rails-Requirements of rails-Types of rails sections-Standard rail sections-Length of rails-Rail failures-Wear on rails. -Types of rail joints - Welding of rails.

UNIT-II

SLEEPERS, FISH PLATES & BALLAST

Functions of sleepers - Requirements of sleepers - Classification of Sleepers -Timber sleepers, Metal sleepers & Concrete sleepers - Comparison of different types of sleepers. Fish plates-section of fish plates-failure of fish plates.

Functions and requirements of ballast-Types of ballast-Renewal of ballast.

GEOMETRIC DESIGN OF TRACK

Necessity-Gradients & Gradient Compensation-Elements of horizontal alignment-Super elevation; Cant deficiency and cant excess- Negative Super elevation-Length of Transition Curve- Length of vertical curve.

UNIT-III

POINTS AND CROSSINGS

Functions of components of turnout- Crossings.

STATIONS & SIGNALLING SYSTEM

Site selection for railway station- Requirements of railway station- Classifications. Objects of signaling - Classification of signals - Controlling- absolute block system. Automatic block system.

UNIT-IV

AIRPORT PLANNING AND DESIGN

Introduction, Development of air transportation system with particular reference to India. Aero plane components- Air–craft characteristics. Selection of site; Apron-Hanger-Typical airport layouts-Airport marking-Airport lighting- Drainage systems.

AIRPORT OBSTRUCTION & RUNWAY DESIGN

Zoning laws-Classification of obstructions-Imaginary surfaces-Approach zone-Turning zone. Runway orientation-Basic runway length-Corrections for elevation-Temperature and gradient-Runway geometric design - LCN system of pavement design.

UNIT-V

DOCKS AND HARBOUR ENGINEERING

Introduction, Types of water transportation-Economics and advantages of water transportation

PLANNING AND DESIGN OF PORT FACILITIES

General layout and design considerations-Pier and wharf structures-Fender systems- and Apron-Container ports-Docks-Light Houses.

Learning resources:

Text books:

1. Railway Engineering by Saxena, S.C. and Arora S., Dhanpat Rai & Sons.
2. Airport Planning and Design, (6^{th} edition) by Khanna, S. K. and Arora, M. G. Nemchand and Bros, Roorkee, 1999.
3. Dock and Harbour engineering by Oza H.P. and Oza G., Anand Chartor Publishing House Pvt , Gujarat, 2010.

Reference books:

1. Railway Engineering by Agarwal M.M., Prabha & Co, New Delhi, 2012.
2. Airport Engineering by Rao G.V., Tata Mc Graw Hill, New Delhi, 1992.

e-learning resources:

http://nptel.ac.in/courses.php
http://jntuk-coeerd.in/