B.Tech IV Year	L	T	P	To	C
	4	0	-	4	4

CE441 RAILWAY AND AIRPORT ENGINEERING

(Dept. Elective - IV)

Course Description and Objective:

In Railway Engineering, the students are taught various components of permanent way, design of geometric elements of railway track and types of stations and yards and signaling and control systems in railways. In Air transportation the growth of air transport, aircraft characteristics, planning of airports, imaginary surfaces, and the design of runways are dealt.

Course Outcomes:

- *Design and analyze the railway track system*
- *Understand the process of execution of railway projects*
- *Carryout the geometrical design of the airport infrastructure*
- *Prepare structural designs of runway*
- *taxiway, and apron-grate area*

UNIT - I

Introduction: Role of railways in transportation; Comparison of railway and highway transportation; Development of railway systems with particular reference to India; Classification of railways.

Railway Track Permanent way: Gauges in Railway track, Railway track cross – section; Coning of wheels.

Rails & Rail Joints: Functions of rails; Requirements of rails; Types of rails sections; Standard rail sections; Length of rails; Rail failures; Wear on rails, Requirements of an ideal joint; Types of rail joints; Welding of rails.

Sleepers: Functions of sleepers; Requirements of sleepers; Classification of Sleepers – Timber sleepers, Metal sleepers & Concrete sleepers; Comparison of different types of sleepers.

UNIT – II

Fish Plates: Fish plates, section of fish plates, failure of fish plates.

Ballast: Functions and requirements of ballast; Types of ballast; Renewal of ballast.

Geometric Design of Track: Necessity; Gradients & Grade 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 turnouts; Crossings.

Stations And Yards: Site selection for railway station; Requirements of railway station; Classifications; Station yards; Level crossings.

Signaling: Objects of signaling; Classification of signals; Controlling- absolute block system. Standards of inter locking.

UNIT – IV

Introduction to Airport Planning: Development of air transportation system with particular reference to India; Air craft components; Air–craft characteristics.

Airport planning and layout: Selection of site; Apron; Hangar; Typical airport layouts; Airport markings; Airport lighting; Drainage systems.

Airport Obstruction: Zoning laws; Classification of obstructions; imaginary surfaces; Approach zone; Turning zone.

UNIT – V

Runway Design: Runway orientation; Basic runway length; Corrections for elevation, temperature and gradient; Runway geometric design.

Specifications for Structural Design of Airport Pavements: Design factors methods for flexible and rigid pavements; LCN system of pavement design.

TEXT BOOKS:

1. S.C.Saxena and S.Arora, “Railway Engineering”, 12th ed., Dhanpat Rai & Sons, 2009.
2. S. K. Khanna & M. G. Arora, “Airport Planning and Design”, 16th ed., Nemchand & Bros, Roorkee, 2007.

REFERENCE BOOKS:

1. M.M.Agarwal, “Railway Engineering” 1st ed., Prabha & Co., New Delhi, 2010.
2. G.V.Rao, “Airport Engineering”, 2nd ed., Tata Mc Graw Hill, New Delhi, 2000.