II Year-II Semester
(20CE4758) Highways & Railways

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

Pre- Requisites: Fundamentals of surveying

Course Objectives:
The objective of this course is:
- To impart different concepts in the field of Highway Engineering.
- To acquire design principles of Highway Geometrics and Pavements
- To know various components and their functions in a railway track
- To acquire design principles of geometrics in a railway track.
- To know various techniques for the effective movement of trains.

A. HIGHWAY ENGINEERING

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

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.

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; Road Traffic Signs; Road markings; Types of Intersections.

B.RAILWAY ENGINEERING

UNIT–IV:
Components of Railway Engineering: Permanent way components – Railway Track Gauge – Cross Section of Permanent Way – Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density – Rail joints.

UNIT-V:
Geometric Design of Railway Track: Alignment – Engineering Surveys – Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – safe speed on curves – widening of gauge on curves – vertical curves – check rails on curves.
Turnouts & Controllers: Track layouts – Switches – Design of Tongue Rails – Crossings – Turnouts – Diamond crossing – Scissors crossing. Signal Objectives – Classification – Fixed signals – Stop signals – Signaling systems

Course Outcomes:

S.No	Course Outcomes	BTL
1	Plan highway network for a given area.	L5
2	Determine Highway alignment and design highway geometrics.	L4
3	Design Intersections and prepare traffic management plans.	L4
4	Design geometrics in a railway track.	L4
5	Suggest good transportation network	L5

Text Books:

1. Highway Engineering, Khanna S. K., Justo C. E. G and Veeraragavan A, Nem Chand Bros., Roorkee.
2. Traffic Engineering and Transportation Planning, Kadiyali L. R, Khanna Publishers, New Delhi.
3. Railway Engineering by Satish Chandra and Agarwal M.M., Oxford University Press, New Delhi

Reference Books:

1. 'Railway Engineering' by Saxena & Arora – Dhanpat Rai, New Delhi.
2. 'Transportation Engineering Planning Design' by Wright P.H. & Ashfort N.J. – John Wiley & Sons.
3. 'Transportation Engineering' by Srinivasa Kumar R, University Press, Hyderabad
4. 'Highway, Railway, Airport and Harbour Engineering' by Subramanian KP, Scitech Publications (India) Pvt. Limited, Chennai.