Highway and Traffic Engineering

Course Code	Credit Hours
CE-321	3-0

Course Description

This course introduces students with basic elements and features of highways. It covers traffic engineering and facilities, geometric design of highways, roadway features that pertain to the safety of roadway infrastructure users. This course includes human and vehicle behavior, queuing disciplines, shockwave anatomy, design and analysis of traffic controlling mechanisms for intersections, interchanges, and roadway segments. It also covers introductory and basic features of other modes of transportation, in particular railways and airport engineering.

Text Book:

1. Lecture Slides have been prepared based upon the reference materials.

Reference Book:

1. Principles of Transportation Engineering by Partha Chakroborty & Animesh Das (1stEdn)
2. Traffic Engineering, Roess, R., McShane, W., and Prassas, E., Prentice-Hall, Englewood Cliffs, New Jersey, 1998.
3. Airport Engineering by Norman Ashford and Paul H Wright.
4. Principles of Railway Engineering by S. C. Rangwala.
5. Highway Capacity Manual (HCM 2000) & AASHTO's Green Book.

Prerequisites:

Nil**.**

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10

Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assessment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1	Introduction to Transportation Systems (Modes, Models, Infrastructure etc.), Emerging Technologies
2	Highway Planning; Principals, Location Survey in Rural & Urban Areas, Location Controls
3	Elements and Types of Typical Cross-section of Road, Materials, Types and Characteristics, Specification and Tests
4	Introduction to Rail Components and Railway Stations. Permanent Way, Rails, Gauges, Types, Sleepers, Ballast, Formation, and Types of Yards
5	Introduction to Airport and Runway Terminologies Runway Components, Wind Direction and Its Components, Types of Basic Runway Configurations
6	Introduction to Geometric Design and Alignment, Grade Line, Transition Curve
7	Horizontal and Vertical Curves
8	Sight Distance and Requirements, Curve Widening, Introduction to **Civil 3D**

9	**Mid Semester Exam**
10	Traffic Studies and Estimates, Speed-flow Density relationship, Traffic Lane Capacity, Level of Service, Design Speed Introduction to **PTV Vissim**
11	Traffic Safety (signs, markings, signals), Channelization Introduction to signal design concepts
12	Design of Intersection, at Grade & Grade Separated (Access Control) Introduction to **Synchro Plus Sim Traffic**
13 -14	Parking and Accident Studies, Conflict Analysis Application of Artificial Intelligence in Traffic Engineering Intelligent Transportation System (ITS), Advanced Transportation Management Systems (ATMS),
15	Advanced Traveler Information System (ATIS), Delays and Que Formation, Queue Theory (DD1 & MD1)
16	Public Transport System, Rapid Transit modes (BRT), Basic methods for estimating public transport demand, Corridor and network development
17-18	**End Semester Exam**

Practical: Nil.