

Transportation Engineering II

BEG 365 CI

Year: III

Semester: II

Teaching Schedule Hours/week			Examination Scheme				Total Marks		
			Final		Internal Assessments				
			Theory	Practical	Theory	Practical			
L	T	P	Duration	Marks	Duration	Marks			
3	3	2/2	3	80	-	-	20	25	125

Course Objective:

After the completion of the course, students will be able to design, construct, supervise repair and maintain the roads. They will be familiar with the traffic design, control and operation. The course provides glimpses on the bridge and tunnel as well.

Course Contents:

- 1.0 Introduction and Scope of Traffic Engineering (3 hrs)**
 - 1.1 Definition of traffic engineering
 - 1.2 Scope of Traffic Engineering
 - 1.3 Traffic characteristics
 - 1.3.1 Driver Characteristics
 - 1.3.2 Pedestrian Characteristics
 - 1.3.3 Vehicle Characteristics
- 2.0 Traffic Studies (7 hrs)**
 - 2.1 Traffic volume studies
 - 2.2 Traffic speed studies
 - 2.3 Origin and destination studies
 - 2.4 Traffic flow and capacity studies
 - 2.5 Parking studies
 - 2.6 Accident studies
- 3.0 Road Intersection and Traffic control Devices (6 hrs)**
 - 3.1 Basic requirements of intersections
 - 3.2 Types of intersections and their configuration
 - 3.3 Channelized and Unchannelized intersections
 - 3.4 Rotary Intersection
 - 3.5 Grade separated intersections
 - 3.6 Warrants for signalization and choice of traffic control devices
 - 3.7 Traffic signals, signal design and signs
 - 3.8 Road marking and traffic island
- 4.0 Road lighting (2 hrs)**
 - 4.1 Importance of road lighting
 - 4.2 Factors influencing night visibility
 - 4.3 Requirements of level of illumination in roads
 - 4.4 Design of the lighting system: selection of height of lamps, spacing between light poles, height and overhang of light poles, lateral placement, etc.

- 5.0 Road Pavement (10 hrs)**
- 5.1 Definition and types of pavements
 - 5.2 Differences between flexible and rigid pavement structures
 - 5.3 Loads and other factors controlling pavement
 - 5.4 Design methods for flexible pavements-Road notes 29, 31, CBR, AASTHO.
 - 5.5 Details of the asphalt institute method of design of flexible pavements
 - 5.6 Design methods for rigid pavements and Westergaard's theory
 - 5.7 Stresses due to load, temperature differential and subgrade friction
 - 5.8 Details of the IRC method of design of rigid pavements for highways
- 6 Road Construction Technology (7 hrs)**
- 6.1 Activities and techniques used in road construction
 - 6.2 Tools, equipment and plants used in road construction
 - 6.3 Preparation of road bed: excavation, fill compaction, soil stabilization, etc.
 - 6.4 Construction of low cost roads
 - 6.5 Construction of asphalt concrete layers, including prime coats, tack coats and seal coats
 - 6.6 Construction of surface dressing
 - 6.7 Construction of otta-seal
 - 6.8 Construction of grouted or penetration macadam
 - 6.9 Construction of different types of bituminous premixes
 - 6.10 Construction of cement concrete pavement
- 7.0 Highway Maintenance, Repair and Rehabilitation (6 hrs)**
- 7.1 Classification of maintenance activities for road pavement and road facilities
 - 7.2 Inspection, prioritization and planning of maintenance operations
 - 7.3 Evaluation of pavement distress and pavement condition
 - 7.4 Types of road failure and its causes
 - 7.5 Types and methods of pavement repair
 - 7.6 Types of overlays and strengthening of existing pavements
- 8.0 Introduction to Bridge and Tunnel Engineering (4 hrs)**
- 8.1 Choice of location of bridge site
 - 8.2 Classification of bridges and component parts of a bridge
 - 8.3 Introduction to river bank and protection structures
 - 8.4 Component parts of tunnels and tunnel cross-section
 - 8.5 Type of road and railway tunnel
 - 8.6 Survey for tunnel alignment

Laboratories:

A practical assignment of highway and pavement design that includes data collection will be included in this course. The following studies will be conducted:

- (i) Determination of CBR in the laboratory.
- (ii) Measurement of spot speed and data analysis.
- (iii) Measurement of deflection of pavement surface.

References:

- S.B.Sehgal and K.I. Bhanot. A Text-book on Highway Engineering and Airports, S. Chand and Co. Publishers Ltd., New Delhi
- S.K. Sharma, Principles, Practice and Design of Highway Engineering, S. Chand and Co. Publishers Ltd., New Delhi
- Dr. S.K. Khanna and Dr. C.E.G.Justo, Highway Engineering, Nem Chand & Bros Roorkee (U.P.)