TRAFFIC ENGINEERING AND MANAGEMENT (Professional Elective- I)

Course Code: 20CE1153

L T P C 3 0 0 3

Pre-requisites: Surveying and Geomatics, Transportation Engineering.

Course Outcomes:

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

CO1: Discuss traffic characteristics and analyse the traffic data (L4)

CO2: Analyse parking data for designing parking facilities (L4)

CO3: Design the signalized Intersection (L3)

CO4: Design effective traffic signal system and discuss the effects of traffic on environment(L3)

CO5: Explain traffic signs and road markings for highway safety (L2)

UNIT-I

(10 Lectures)

INTRODUCTION:

Traffic Engineer Responsibility, Ethics & Liability; Modern Problems

COMPONENTS OF TRAFFIC & CHARACTERISTICS:

Road users: Visual, Perception-Reaction Time, Pedestrian, Impacts of Drugs, Alcohol & Aging, Psychological & Personality related factors.

Vehicle: Concept of Design Vehicle, Turning, Braking & acceleration Characteristics

Traffic measurement: Volume: Volume, Demand & Capacity; Volume Patterns & Characteristics; Field techniques, Manual, Portable & Permanent Counts; Intersection Volume Studies & Presentation; Peak Hour Factor Speed: Spot Speed Studies, Uses, Measurement; Travel-Time Studies, Field Study & Display Density: Measurement; Volume, Speed, Density Relation Accidents: Data Collection, Site Analysis-Collision & Condition Diagram, IRC accident data forms.

Learning outcomes:

At the end of the unit, the student will be able to

1. discuss the components of traffic (L2)

- 2. analyse the traffic volume data (L4)
- 3. analyze the speed and accident related data (L4)

UNIT-II

(10 Lectures)

HIGHWAY CAPACITY:

Definition of Capacity – Importance of capacity – Factors affecting Capacity- Concept of Level of Service- Different Levels of Service- Concept of Service Volume- Peak Hour Factor.

PARKING STUDIES:

Types of parking facilities – On street and Off Street Parking Facilities; Parking Studies- Parking Inventory Study – Parking Survey by Patrolling Method- Analysis of Parking Data and parking Characteristics, Accumulation & Duration –Design Aspects- parking dimensions- Multi Story Car Parking Facility-Design standards.

Learning outcomes:

At the end of the unit, the student will be able to

- 1. explain various aspects of highway capacity (L2)
- 2. discuss about the concept of level of service (L2)
- 3. analyze the parking data (L4)

UNIT-III

TRAFFIC CONTROL & REGULATION

Introduction: Level I Control: Basic Rules of the road, Level II Control: YIELD and STOP Control, Level III: Traffic Control Signals–Advantages, Disadvantages, Warrants-Phase & Ring Diagram

Unsignalised Intersection: Conflicting Volume, Critical Gap, Follow-Up Time, Potential Capacity, Shared-Lane Capacity, Estimating Control Delay & Queue Length; Roundabout. **Signalised Intersection:** Design by Webster & IRC Method, Signal Coordination: Time-Space Diagram for One-way & Two-way streets, Shock Waves.

Vehicle Actuated Signals: Introduction, Advantages, Disadvantages, Types

Learning outcomes:

At the end of the unit, the student will be able to

- 1. explain various aspects of traffic control (L2)
- 2. discuss about the unsignalised Intersection (L2)
- 3. design the signalised Intersection (L3)

UNIT-IV

INTELLIGENT TRANSPORTATION SYSTEM (ITS):

ITS Application, Network optimization, Sensing with Detectors, In- Vehicle Routing and personal route information, The Smart Car, Electronic Toll Collection, The Smart Card, Congestion Pricing, Dynamic Assignment, Bus Transit & Paratransit-Emerging Issues

TRAFFIC & ENVIRONMENT:

Detrimental effect of traffic on environment – Air Pollution –Pollutants due to Traffic – Measures to reduce Air Pollution due to Traffic- Noise Pollution – Measures to reduce Noise Pollution.

Learning outcomes:

At the end of the unit, the student will be able to

- 1. explain various aspects of Intelligent Transportation System (L2)
- 2. discuss about the effect of traffic on environment (L2)

3. design measures to reduce pollution (L3)

UNIT-V

TRAFFIC SIGNS AND ROAD MARKINGS:

Types of Traffic Signs- Cautionary, Regulatory and Informative Signs- Specifications- Pavement markings- Types of Markings – Lane markings and Object markings- Standards and Specifications for Road Markings.

HIGHWAY SAFETY:

(10 Lectures)

(10 Lectures)

(10 Lectures)

Problem of Highway Safety – Types of Road accidents- Causes – Engineering Measures to reduce Accidents- Enforcement Measures – Educational Measures- Road Safety Audit- Principles of Road Safety Audit.

Learning outcomes:

At the end of the unit, the student will be able to

- 1. explain various aspects of traffic signs and road markings (L2)
- 2. discuss about the measures to reduce accidents (L2)
- 3. explain the principles of road safety audit (L2)

Text Books:

- 1. Kadiyali L.K, "Traffic Engineering and Transportation Planning", 3rd Edition, Khanna Publishers", 2004.
- 2. Mannering and Kilareski, "Highway Engineering and Traffic Analysis", 3rd Edition, John Wiley Publications, 2007.
- 3. Roger P.Roess, Elena S. Prassas, William R. McShane, "Traffic Engineering", 3rd Edition, Prentice Hall, 2004.

References:

- 1. Khisty C. J., "Transportation Engineering An Introduction", 3rd Edition, Prentice Hall, 2010.
- 2. Papacostas C.S., "Fundamentals of Transportation Engineering", 2nd Edition, Prentice Hall of India, 2005.
- 3. Partha Chakroborthy and Animesh Das, "Principles of Transportation Engineering", 2nd Edition, Prentice Hall of India, 2005.
- 4. IRC Codes (35, 67)