

**B.E. Semester: VII**  
**Department of Civil Engineering**

**Subject Name: Urban Transportation Systems (CV704-N-B)**

**Course Category: Program Course Elective – III (PCE)**

**A. Objectives of the Course:**

- To cover concepts of transportation planning, various modes, transit systems and their suitability
- To give idea of modelling in planning, to develop the methodology of travel demand modelling for urban transportation systems
- To provide knowledge of land use planning and transportation interaction

**B. Teaching & Evaluation Scheme:**

Teaching Scheme				Credit	Evaluation Scheme					Total Marks
L	T	P	Total		Theory		IE	CIA	Pra/Viva	
hrs	hrs	hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
3	2	0	5	5	3	70	30	20	30	150

**C. Detailed Syllabus:**

**Module I:**

**1. Introduction:**

Development plans, objectives and goals; level of planning; role of transportation at national, regional and urban level

**2. Urbanization:**

Definition of urban area; trends in urbanization; urban class groups; metropolitan city; transportation problems & identification

**3. Travel Demand:**

Concepts of travel demand; factors affecting demand and the demand functions; calibration methods; sequential, direct demand models; introduction to aggregate and disaggregate approaches

## **Module II:**

### **4. Transportation Surveys:**

The transportation study area definition; division into traffic zones; network identification and coding; types of travel and characteristics of various surveys; home interview; roadside survey; goods, mass transit and intermediate public transport surveys; sampling and expansion factors; accuracy checks, screen line checks, consistency checks

### **5. Travel Forecasting:**

Growth factor methods and urban transportation planning system; growth factors; average growth factor method and Furness method

## **Module III:**

### **6. UTP System:**

Trip generation; zonal regression methods and category analysis; trip distribution method; gravity models and opportunity models; modal split methods; factors affecting modal split; trip end models and trip distribution models; route assignment; factors affecting route choice; diversion curve; shortest paths; all or nothing assignment

## **Module IV:**

### **7. Corridor Identification:**

Prediction issues and forecasting of the travel demand and future desires; corridor identification and corridor screen line analysis

### **8. Mass Transit Systems:**

Bus and rail transit; characteristics, capacities, route planning

### **9. Transportation Plan Preparation:**

Urban forms and structures; point, linear, radial, poly-nuclear developments and preparation of plan, comprehensive and traffic system management plans

**D. Lesson Planning:**

<b>Unit No</b>	<b>Title of the Unit</b>	<b>Minimum Hours</b>	<b>Weightage (%)</b>
1	Introduction	02	05
2	Urbanization	04	10
3	Travel Demand	05	10
4	Transportation Surveys	04	10
5	Travel Forecasting	08	25
6	UTP system	10	25
7	Corridor Identification	04	05
8	Mass transit system	04	05
9	Transportation Plan Preparation	04	05
Total		45	100

**E. Assignments:**

- Minimum 6 theories and/or examples from each units

**F. Instructional Method and Pedagogy (Continuous Internal Assessment Scheme CIA):**

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures, practical and Tutorial which carries 05 Marks.

- At regular intervals assignments is given. In all, a student should submit all assignments of 05 marks each.
- Classroom participation and involvement in solving the problems in Tutorial rooms carries 05 Marks.
- Viva Voce will be conducted at the end of the semester of 05 Marks.
- One internal exam of 30 marks is conducted as a part of Mid Semester evaluation.

## **G. Students Learning Outcomes:**

On the successful completion of this course

- The students will gain an experience in the implementation of planning transportation routes in new developing towns and cities.
- The students will get a diverse knowledge to solve the problem of congestion and inconvenience.
- The students would be able to understand and evaluate current scenarios of traffic management and improve it

## **H. Recommended Study Materials:**

### **a. Text book & Reference Books:**

1. Kadiyali, L.R., Traffic Engineering & Transport Planning, Khanna Publishers, New Delhi
2. Jotin Khisty, S.C. and Kent Lall, B., Transportation Engineering – An Introduction, Prentice-Hall, NJ
3. Salter, R J., Highway Traffic Analysis and Design, ELBS
4. Hutchison, B.G., Introduction to Transportation Engineering, & Planning, McGraw Hill Book Co.
5. John W. Dickey, Metropolitan Transportation Planning, Tata McGraw Hill Pub. Co.
6. Vukan R. Vuchic, Urban Public Transportation System & Technology, Prentice Hall, Inc.
7. Papacostas, C.S., Fundamentals of Transportation System Analysis, PHI
8. Jotin Khisty, C. and Kent Lall, B., Transportation Engineering – An Introduction, Prentice-Hall, NJ

**b. Web Materials:**

1. <http://www.cdeep.iitk.ac.in/nptel>
2. <http://www.nptel.iitm.ac.in> B. Web Materials:

**c. Indian Codes of Practice:**

1. IRC 106: 1990, Guidelines for capacity of Urban Roads in Plain Terrain
2. IRC 2012, Guideline for Pedestrian Facilities
3. IRC 124 – 2017, Bus Rapid Transit Guideline for Indian Cities
4. IRC 86 – 1983, Geometric Design for Urban Roads