# GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

## COURSE CURRICULUM
## COURSE TITLE: URBAN TRANSPORTATION PLANNING
## (COURSE CODE: 3366001)

| Diploma Programme in which this courses offered | Semester in which offered |
|---|---|
| Transportation Engineering | Sixth |

## 1. RATIONALE

Along with the major cities of India, rapid urbanisation of many of the small towns has made planning the transportation systems scientifically and systematically all the more important to render the safe and comfortable travel for all people in the towns and cities. Advancement in all spheres of life has been to a large extent influenced by transportation. Though the transportation brought comfort, pleasure and convenience to our life, it creates problems of congestion, lack of safety and pollution. Such problems can be minimised by proper planning of urban transportation system. This course is designed to undertake the urban transportation planning and implementation scientifically.This course is therefore a key course for transportation engineers.

## 2. COMPETENCY

The course should be taught and implemented with the aim to develop required skills in students so that they are able to acquire following competency:

- **Plan urban transportation systems for a medium size town.**

## 3. COURSE OUTCOMES (COs)

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes:

i. Justify the need for urban transportation system planning.
ii. Undertake transport surveys followed by a report.
iii. Plan the process of trip generation and distribution.
iv. Justify the need of a modal split.
v. Prepare the transportation plans for urban mass rapid transit systems.

## 4. TEACHING AND EXAMINATION SCHEME.

| Teaching Scheme (In Hours) | | | Total Credits (L+T+P) | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | Practical Marks | | Total Marks |
| **L** | **T** | **P** | **C** | **ESE** | **PA** | **ESE** | **PA** | 150 |
| 3 | 0 | 2 | 5 | 70 | 30 | 20 | 30 | |

**Legends: L** - Lecture; **T** - Tutorial/Teacher Guided Theory Practice; **P** - Practical; **C** - Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment.

## 5. COURSE CONTENT DETAILS

| Unit | Major Learning Outcomes (in Cognitive Domain) | Topic and Sub-topics |
|---|---|---|
| **Unit - I Urban Transportation System Planning** | 1a. Describe the role of transportation in urban development.<br>1b. Describe the transportation planning process in urban areas.<br>1c. Explain the factors affecting the transportation system planning.<br>1d. Explain the factors affecting travel demand.<br>1e. Explain the process of urban transport forecasting. | 1.1 Role of transportation in urban development<br>1.2 Transportation problems in urban areas<br>1.3 Purpose of transportation planning<br>1.4 Transportation planning process and factors affecting it<br>1.5 Travel demand and actors affecting it<br>1.6 Urban transport forecasting |
| **Unit - II Transportation Surveys** | 2a. Describe the concept of study area, zoning.<br>2b. Compare the strengths and limitations of different types of transportation survey.<br>2c. Prepare inventory of transport facilities | 2.1 Study area and zoning.<br>2.2 Survey Types: Home interview surveys, Commercial vehicle surveys, Taxi surveys, Road side interview surveys, Post card questionnaire surveys, Registration number surveys, Tag surveys, Public transport surveys, Telephone surveys.<br>2.3 Inventory of existing transport facilities. |
| **Unit – III Trip Generation and Distribution** | 3a. Explain concept and purpose of trip generation.<br>3b. Describe the factors affecting the trip generation and attraction rates.<br>3c. Explain concept and methods of trip distribution. | 3.1 Trip generation: Trip purpose, Problems of trip generation<br>3.2 Factors governing trip generation and attraction rates<br>3.3 Trip distribution<br>3.4 Methods of trip distribution: Uniform factor, Average factor, Detroit, Fratar, Furness and Time factor method<br>3.5 Problems based on trip distribution |
| **Unit – IV Modal Split** | 4a. Explain modal split and factors affecting modal split.<br>4b. Describe the trip characteristics in urban areas. | 4.1 Modal split: in the transport process planning problem and factors affecting modal split<br>4.2 Trip Characteristics in urban areas: Household characteristics, Zonal characteristics, Network characteristics |

| Unit | Major Learning Outcomes (in Cognitive Domain) | Topic and Sub-topics |
|---|---|---|
| **Unit-V Transportation Plan Preparation** | 5a. Explain various terms regarding transportation plan preparation.<br>5b. Describe transportation plan for urban mass rapid transit system.<br>5c. Distinguish the salient features of the rail-based transit systems.<br>5d. Distinguish the salient features of the road-based transit systems. | 5.1 Definitions: corridor, corridor traffic forecasting, corridor traffic study, count, segment, point, segment capacity, screen line<br>5.2 Corridor identification<br>5.3 Mass transit system<br>5.4 Urban mass rapid transit system<br>5.5 Rail based transit – Metro, Light rail transit system (LRT), Mono rail, Sky rail<br>5.6 Road based transit – Bus rapid transit system (BRTS), Electric trolley bus, commuter Bus / City Bus. |

## 6. SUGGESTED SPECIFICATION TABLE WITH HOURS and MARKS (THEORY)

| Unit | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|---|---|---|---|---|---|---|
| | | | R Level | U Level | A Level | Total Marks |
| I | Urban Transportation System Planning | 10 | 05 | 05 | 07 | 17 |
| II | Transportation Surveys | 08 | 03 | 03 | 08 | 14 |
| III | Trip Generation and Distribution | 12 | 03 | 03 | 12 | 18 |
| IV | Modal split | 04 | 02 | 03 | 02 | 07 |
| V | Transportation Plan Preparation | 08 | 03 | 03 | 08 | 14 |
| **Total** | | **42** | **16** | **17** | **37** | **70** |

**Legends: R** = Remember**, U** = Understand**, A=** Apply and above Level (Bloom's revised taxonomy)

**Note:** This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table

## 7. SUGGESTED EXERCISES/PRACTICALS

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills **(outcomes in psychomotor and affective domain)** so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

***Note****: Here only outcomes mainly in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of* ***Course Outcomes*** *related to affective domain. Thus over all development of* ***Programme Outcomes (****as given in a common list at the beginning of curriculum document for this programme) would be assured.*

*Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes*

| S. No. | Unit No. | Practical/Exercise | Approx. Hours Required |
|---|---|---|---|
| 1 | I | Identifying problems in urban areas like parking, delay at intersection, pollution and students will make a brief report regarding problems | 04 |
| 2 | II | Make any two transport survey and prepare a report of outcome. | 04 |
| 3 | I | Prepare write up on transportation planning process | 04 |
| 4 | III | Problems based on trip generation and trip distribution | 08 |
| 5 | IV | Problems based on modal split | 04 |
| 7 | V | Prepare write up about Urban mass rapid transit system | 04 |
| | | **Total** | **28** |

**Note:** The above practical exercise is just for reference. The subject teachers are free to give other exercises related to the curriculum if required.

## 8. SUGGESTED STUDENT ACTIVITIES

i. Visit RTO for getting information about increase in vehicles since last 10 years.
ii. From previous data, forecast the future traffic and suggest planning accordingly.
iii. Identify traffic problems in the city and can give suggestions for minimizing them.

## 9. SPECIAL INSTRUCTIONAL STRETAGIES (If Any)

i Arrange Expert lectures
ii Discuss real life case studies of successful and unsuccessful urban transport planning.

## 10. SUGGESTED LEARNING RESOURCES

### A) Books

| S. No. | Title of Book | Author | Publication |
|---|---|---|---|
| 1 | Traffic Engineering and Transportation Planning | Kadiyali, L. R. | Khanna Publishers, New Delhi |
| 2 | Introduction to Transportation Engg and Planning | Hutchison, B. G. | McGraw-Hill Book Co. |
| 3 | Introduction to Transportation Engg. and Planning | Morlok, Edward K. | McGraw-Hill Book Co. |
| 4 | Urban Public Transit System and Technology | Vuchic, Vukan R. | PHI Learning, New Delhi |
| 5 | Metropolitan Transportation Planning | Dickey, John W. | McGraw-Hill Book Co. |

### B) Major Equipment/Materials

No Equipment or Material required

### C) Software/learning websites

i. http://www.tecmagazine.com/
ii. http://en.wikipedia.org/wiki/Traffic_engineering_(transportation)

## 11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

**Faculty Members From Polytechnics**

- **Prof. (Mrs.) S. B. Khara** , Lecturer in Civil Engineering, G.P.G., Ahmedabad
- **Prof. S. M. Shaikh,** Lecturer in Civil Engineering, G. P. Ahmedabad
- **Prof. G. R. Rohit**, Lecturer in Civil Engineering, G. P. Ahmedabad

**Coordinator and Faculty Members from NITTTR Bhopal**

- **Dr Subrat R**oy, Professor, Department of Civil and Environmental Engineering
- **Prof. M. C. Paliwal**, Associate Professor, Department of Electrical and Electronics Engineering