

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

**COURSE CURRICULUM
COURSE TITLE: ROAD TRANSPORT ECONOMICS
(COURSE CODE: 3366003)**

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

1. RATIONALE

Road transportation is a branch of Civil Engineering that uses engineering techniques to achieve the safe, efficient and affordable movement of people and goods. Greater vehicular traffic increases the congestion on the roads hampering the safe and efficient movement of goods and services. Therefore, knowledge and understanding of these aspects of Transport Economics are very important for engineers working at site in order to make transportation system safe, efficient and cost effective. At diploma level, students are expected to study about these aspects of Transport Economics so as to develop their understanding of cost effectiveness and apply their knowledge for the transportation projects in the field.

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:

- **Undertake road transport evaluation for safe and efficient transport of goods and services.**

3. COURSE OUTCOMES

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 effective domain to demonstrate following course outcomes.

- Forecast road transport demand
- Evaluate economic aspects of transportation project
- Estimate vehicle operating costs
- Evaluate travel time saving
- Interpret road pricing factors.

4. TEACHING AND EXAMINATION SCHEME

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

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

5. COURSE DETAILS

Unit	Major Learning Outcomes (In Cognitive Domain)	Topic and Sub-topics
Unit-1 Transport Economics and Development	1a. Explain the factors influencing transport economics 1b. Describe the transport demand forecasting methods 1c. Explain need of expressways and toll roads	1.1. Factors influencing transport economics 1.2. Demand forecasting methods 1.3. Utility analysis 1.4. Ordinal analysis. 1.5. Expressways and toll roads
Unit-2 Economic Evaluation of Road Transport	2a. Explain basic principles and need of economic evaluation 2b. Compare the various methods of economic evaluation. 2c. Explain the sources of revenue for highway financing 2d. Explain the criteria for financial viability.	2.1 Economic evaluation: Basic Principles 2.2 Economic Evaluation Methods: Benefit-cost ratio, First Year Rate of Return, Net Present Value, Internal Rate of Return 2.3 Highway finance: Distribution of highway cost, Sources of revenue, Highway financing in India 2.4 Criteria for Financial viability
Unit-3 Vehicle Operating Cost	3a. Describe the factors influencing Vehicle Operating Cost 3b. Explain the utilisation and fixed costs 3c. Describe the Road User Cost Study in India	3.1 Vehicle Operating Cost (VOC)influencing factors: Relationship of fuel consumption, spare parts consumption, maintenance and repair labour costs, tyre life and lubricants 3.2 Utilisation and fixed costs 3.3 Road User Cost Study in India
Unit-4 Travel Time Saving	4a. Economic evaluation of travel time saving on commodity and commuters 4b. Explain methods for monetary evaluation of passengers travel time. 4c. Interpret the results of Indian study on fixed cost of buses and trucks	4.1 Classes of transport users enjoying travel time savings 4.2 Economic evaluation of travel time saving on commodity and commuters 4.3 Methods for monetary evaluation of passengers travel time 4.4 Results of Indian study on fixed cost of buses and trucks
Unit-5 Road Pricing, Traffic Congestion and Restrains	5a. Explain economic principles of road pricing 5b. Explain the concept of road traffic congestion and restraint 5c. Describe the relationship between parking controls and entry charges	5.1 Pricing principles: Economic principles of road pricing 5.2 Requirements of good road pricing system 5.3 Congestion factor and road traffic 5.4 Traffic restraint: Parking controls, entry charges

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

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Transport Economics and Development	4	2	3	3	8
II	Economic Evaluation of Road Transport	12	5	7	8	20
III	Vehicle Operating Cost	8	4	3	5	12
IV	Travel Time Saving	10	4	7	7	18
V	Road Pricing, Traffic Congestion and Restraints	8	3	4	5	12
	Total	42	18	24	28	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 (Outcomes in Psychomotor domain)	Approx. Hours Required
1	I	Tutorials on Basic principles of Economic Evaluation	04
2	II	Tutorials on Methods of Economic Evaluation	06
3	III	Tutorials on Vehicle Operating Cost	04
4	IV	Case study on fixed cost of Buses	04
5	V	Tutorials on Road Pricing, Traffic Congestion	04
6	I to V	Seminar on different aspects	06
		Total	28

8. SUGGESTED STUDENT ACTIVITIES

- i. Undertake site visit of large transportation project and prepare project report.
- ii. Collect, list and study the various methods of economic evaluation undertaken for ongoing transport projects.

9. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

- i. Ask students to study different transport projects and suggest the economic measures to minimize the cost.
- ii. Arrange Expert lectures of Transportation engineers having experience of designing of roads and highways.
- iii. Show video clips of nearby road with traffic movements and discuss the shortcomings in the road design.
- iv. Make the presentation in PPT for a small transport project if possible.

10. SUGGESTED LEARNING RESOURCES**A) Books**

S. No.	Title of Book	Author	Publication
1	Principles of Transportation Engineering	Chakraborty, Partho and Das, Animesh	PHI Learning Pvt. Ltd., Delhi
2	Traffic Engineering and Transportation Planning	Kadiyali, L. R.	Khanna Publishers, New Delhi
3	Principles and Practices of Highway Engineering	Kadiyali, L.R. and Lal, N.B.	Khanna Publishers, New Delhi
4	SP-30-2009. Manual on Economical Evaluation of Highway Projects in India	Indian Road Congress	Indian Road Congress, New Delhi. (second revision)

B) Major Equipment/Materials

No Equipment or Material required

C) Software/learning websites

- i. <http://www.tecmagazine.com/>
- ii. <http://en.wikipedia.org/wiki/transportation>
- iii. <http://www.tredis.com>

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE**Faculty members from polytechnics**

- **Prof. (Mrs.) S. B. Khara**, Lecturer in Civil Engineering, G.P., Himatnagar
- **Prof. K. C. Varmora**, Lecture in Civil Engineering, G.P., Ahmedabad

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr Subrat Roy**, Professor, Department of Civil and Environmental engineering
- **Dr K. K. Pathak**, Professor, Department of Civil and Environmental engineering