GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering Syllabus

Subject Code : 3726510

Subject Name : Economics of Transportation Projects

WEF Academic Year:	2023-24
Semester:	2
Category of the Course:	Program Elective IV

Prerequisite :	**Nil**
Rationale :	Infrastructure development plays an important role for the development of a country's growth. Indian's rate of urbanization is very high. There is need for infrastructure becomes paramount. The aim of a good transportation system is to provide an efficient, quick and safe transportation to its users. These parameters are counted as the benefit of transportation. The subject includes the study of laws of demand and supply. It also includes the study of various methods of estimating National Income. In the study, various methods of economic evaluations are covered. It also discusses the present road scenario, its future growth and financing strategies for highway projects with reference to Indian context. Also this subject covers the various impact studies on a highway project.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Practical		
L	T	PR	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	**PRINCIPLES OF ENGINEERING ECONOMICS** Need for economic evaluation, Basic Principles of Economics, Micro and Macro Economics Concept, Transport Economics, Revenue, Profit, Depreciation, Break-even Point, Laws of Return and Congesting Pricing.	3	10
2	**TRANSPORTATION DEMAND AND SUPPLY** Demand and utility, Laws of Demand–Supply Equilibration, Simultaneous Equation Bias in Demand–Supply Equilibration, Dynamics of Transportation Demand and Supply, Concept of Transportation Supply, Elasticities of Travel Demand, Consumer and Social Surplus, Application of the Elasticity Concept: Demand	10	20

	Estimation, Latent Demand, Emerging Issues in Transportation Demand Estimation.		
3	**TRANSPORTATION COST** Classification of Transportation Costs, Transportation User Costs, Impacts of Demand Elasticity and Induced Demand on User Costs, Cost Estimating Methods, Pavement Cost Analysis, Life Cycle Cost Analysis, Direct and Indirect Benefits, Vehicle Operation Cost (VOC): Components of VOC, Procedure for Assessing VOC, Factors Affecting VOC: Distance and Time Related Congestion Factors, VOC Estimation in Work Zones, VOC Estimation: IRC and AASHTO Practices, HDM-4 Road User Effects. Total Transportation Cost, Value of travel time savings, Value of Increased Comfort and Convenience – Accident Cost, Reduction in Maintenance Cost, Issues in Transportation Cost Estimation	10	20
4	**ECNOMIC EVALUATION** Highway Project Appraisal, Project Alternatives, Scenario Generation, Methods of Economic Analysis, Discounting and Non-Discounting Methods – Net Present Value, Benefit Cost Ratio and Internal Rate of Return, Analysis of Public Projects, Case Studies, Project Feasibility for Highway Sector, Financing Mechanism- taxes, tolls private financing.	9	30
5	**IMPACT STUDIES** Travel-Time Impacts: Categorization of Travel Time, Procedure for Assessing Travel-Time Impacts, Issues Relating to Travel-Time Value Estimation. Evaluation of Safety Impacts: Procedure for Safety Impact Evaluation, Methods for Estimating Crash Reduction Factors, Elasticity of Crash Frequency, Safety-Related Legislation. Economic Efficiency Impacts: Interest Equations and Equivalencies, Criteria for Economic Efficiency Impact Evaluation. Air Quality Impacts: Air Pollution Sources and Trends, Estimating Pollutant Emissions, Air Pollution from Other Modes, Monetary Costs of Air Pollution.	10	20
	Total	**42**	**100**

Reference Book:

1. D. M. Mithani, Economic Analysis – (Himalaya)
2. Indian Roads Congress (IRC) SP: 30 (2019). Manual on Economic Evaluation of Highway Projects in India
3. Fair and Williams, Economics of Transportation, Harper and Brothers, Publishers, New York, 1959.
4. R. Winfrey, Economic Analysis for Highway International Textbook Co., Pennsylvania. USA,1969
5. G. Harrl Clell, A Manual for the Economic Appraisal of Transport Projects, World Bank Report, Washington D. C.1980.
6. Heggie. I. G, Transportation Engineering Economics, McGraw Hill Publishers.

7. Winfrey. R, Economic Analysis for Highways, International Text Book Company.
8. L. R. Kadiyali , Traffic Engineering and Transport Planning -, Khanna Publishers.
9. Road User Cost Study, CRRI.
10. J. W. Dickey, Road Project Appraisal for Developing Countries, John Wiley & Sons.
11. B. Sengupta, H. Guha, Construction Management & Planning, Tata McGraw Hill, New Delhi
12. Button, K. (1993). Transport Economics, 2nd edition, Edward Elgar, Aldershot, UK.
13. Banerjee A. and D. Mazumdar (1999). Fundamentals of Economic Principle and Problems. ABS Publishing House, New Delhi.
14. David H. and Brewer A. (2000). Transport: An Economics and Management Perspective. Oxford University Press, UK.
15. Sinha K.C. and Labi S. (2007). Transportation Decision Making: Principles of Project Page 46 of 94 Evaluation and Programming. John Wiley & Sons, USA
16. James L. Riggs, David D. Bedworth and Sabah U. Randhawa (2009). Engineering Economics, Tata McGraw Hill, New Delhi.
17. Sarkar P K., and Maitri V. (2010). Economics in Highway and Transportation Planning, Standard Publisher, New Delhi, 2010.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level*
CO-1	**Understand** economics principles and estimate road user cost and time value of money.	UN
CO-2	**Identify** and **evaluate** the demand and utility for transport project.	EL
CO-3	**Estimate** transportation costs of projects proposals for different alternatives.	AN
CO-4	**Evaluate** the project economics using different methods for economic evaluation.	EL
CO-5	**Carry out** impact studies on various transport related problems.	AP

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

List of Practical's based on:

1. Basic principles of economics, demand and supply.
2. Transportation demand and supply.
3. Deriving transport cost.
4. Different methods for economic evaluation and financial feasibility of a project.
5. Economic evaluation of a project using different
6. Toll fixation.
7. Impact studies/case studies.

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