



GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering- Transportation Engineering

Subject Code: 3721315

Semester – II

Subject Name: Behavioral Travel Modeling

Type of course: Major Elective - IV

Prerequisite: NIL

Rationale:

The course is important to study for planning of the traffic system management. The commuter behavior also affects on the efficiency of the transportation management system. The courses discuss stated and revealed preference survey data and its use in travel modeling. The calibration and validation of the models are also covered in the study. The problems of model specification and estimation are covered for practical analysis. It also includes planning and evaluating the transport improvement projects, which requires models to forecast and examine their sensitivity with respect to change in the key variables.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks		
L	T	P		Theory Marks		Practical Marks				
				ESE (E)	PA (M)	ESE (V)	PA(I)			
3	0	2	4	70	30	ESE	OEP	PA	RP	150
						30	0	10	10	

Content:

Sr. No.	Content	Total Hrs
1	Survey design and analysis: Travel surveys and their role in transport planning, survey methods, precision and accuracy in travel surveys, sample design, sampling procedures, survey format, pilot surveys, survey administration, collection of stated and revealed preference data, survey data processing. Introduction, A frame work for choice theories, rational behaviour, economic consumer theory, discrete choice theory, probabilistic theory	8
2	Discrete Choice Models: The multinomial logit model (MNL), Properties of MNL, The hierarchical logit model (HL), Correlation and model structure, The multinomial probit model, Choice by elimination and satisfaction, Habit and hysteresis. Specification and Estimation of Discrete Choice Models, Choice-set determination, Choice-set size, Choice-set formation, Specification and functional form, Statistical estimation, Validation samples, Modeling with stated-preference data	15
3	Advanced concepts: accommodating unobserved population heterogeneity in choice behavior, mixed logit models, joint stated preference and revealed preference modeling, and longitudinal choice analysis, Discrete choice models for integrated land use and transport modeling, review of state-of-the-art and future directions.	12
4	Model Aggregation and Transferability: Aggregate bias and forecasting, Aggregation Methods, Methods to evaluate model transferability, Updating with disaggregate data,	10



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	Updating with aggregate data.	
	TOTAL	45 Hr.

Suggested Specification table with Marks (Theory): (For ME only)

Distribution of marks weightage for cognitive level

Bloom's Taxonomy for Cognitive Domain	Marks Weightage (%)
Recall	10
Comprehension	10
Application	20
Analysis	30
Evaluate	10
Create	20

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.

Reference Books:

1. Ortuzar, J. D. and Willumsen, L.G., Modelling Transport, John Wiley & Sons, New York, 1996.
2. Domencich, T.A. and McFadden, D., Urban Travel Demand: A Behavioral Analysis, North-Holland, 1975.
3. Ben-Akiva, M. and Lerman, S, Discrete Choice Analysis: Theory and Application to Travel Demand, MIT Press, Cambridge, Massachusetts, London. 1985.
4. Oppenheim, N., Urban Travel Demand Modeling: From Individual Choices to General Equilibrium, John Wiley, 1995.
5. Borsch Supan Axel , Econometric analysis of discrete choice, Springer-Verlag, Berlin, 1987.
6. Richardson, Ampt, and Meyburg, Survey Methods for Transport Planning, Eucalyptus Press, 1995.
7. Train, K. E. "Discrete Choice Methods with Simulation". Cambridge, University Press, London.

Course Outcomes: At the end of the course, Student will be able

Sr. No.	CO statement	Marks % weightage
CO-1	To identify suitable type of survey to be conducted for measuring behavioral aspect and identify the type of model for the collected data.	20%
CO-2	To analyse travel surveys and their role in transport planning	10%
CO-3	To evaluate the theoretical framework and random utility theory in which the discrete choice models are cast.	30%
CO-4	To frame statistical estimation for the samples.	20%
CO-5	To Validate the collected sample data with statistical checks.	20%



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List of Tutorials:

1. Problems based on selected papers from journals such as Transportation Research, Transportation Science and Transportation Research Record
2. Problems based on survey conducted by students on stated and revealed preference
3. Problems based on discrete choice models
4. Problems based on statistical validation of samples