GUJARAT TECHNOLOGICAL UNIVERSITY
CIVIL (TRANSPORTATION ENGINEERING) (13)
BASICS OF TRANSPORTATION ENGINEERING
SUBJECT CODE: 2721316
M.E. 2nd SEMESTER

Type of course : Open Elective

Prerequisite : Nil

Rationale :

The development of any nation depends on the development of transportation facility. Transportation helps in conducting various economic activities in the country. It is important to study the various modes of transportation modes. It also includes the study of travel demand and its distribution. The course is helpful to understand the overview of the role of transportation engineering. It includes the study of traffic engineering. The design aspects of the pavement and its evaluation methods are included in the study. It is compulsory to check the viability of the projects which require huge investment.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks		Practical Marks				
				ESE (E)	PA(M)	PA (V)		PA (I)		
L	T	P	C			ESE	OEP	PA	RP	
3	2#	2	5	70	30	20	10	10	10	150

Content:

Sr.No.	Topics	Teaching Hrs.	Module Weightage
1	Introduction: Importance of transportation, various modes and their suitability.	5	10%%
2	Urban transportation systems planning: Public, private, para-transit systems, coordination, routing, scheduling, fare structure.	5	10%
3	Travel demand modeling: Land use planning, trip generation, trip distribution, modal split, trip assignment, their analysis.	5	10%
4	Traffic Engineering: Basic elements-user, facility, vehicles, environment. Their characteristics and inter actions, traffic flow, classified volume, PCU concept, speed-flow-density relationship, headway, travel time and delay measurement techniques, O-D survey, accident analysis.	5	10%
5	Traffic Infrastructures: Highway geometric elements, curves, intersections, rotary, grade-separated intersections, markings, signs, signals, parking, bus stops, terminal area, truck terminals.	5	10%
6	Railway, Air port and Docks-Harbour: Their planning at the regional context, important characteristics, cargo and passenger demand forecasting, planning and design of terminal area facilities.	5	10%
7	Pavements: Types, materials, tests, design criteria, ESWL, EWLF, CBR method, Marshall stability test, C.C. pavement design, joints, Construction methods for flexible and rigid pavements, failures,	10	30%

	evaluation study, Benkelman beam deflection study, unevenness measurement, design of overlays, maintenance management.		
8	Economic evaluation and Environmental Impact Assessment procedures for transportation projects.	5	10%

References:

1. B.G.Hutchinson, Principles of urban transportation system planning- McGraw-Hill, New York, 1974
2. Edward K.Morlok, Transportation Engg. and Planning
3. W.Dickey, Metropolitan Transportation Planning Tata McGraw-Hill, New Delhi, 1975
4. Blunder and Black, Land useTtransportation System
5. J.Ortuzer and L.G. Willumsen, Modelling Transport, Johan Wiley and Sons Chincester,1994
6. Vukan R. Vuchic, Urban Transit : Operations, Planning and Economics, Wiley Sons Publishers.
7. Peter White, Public Transport, UCL Press
8. Kadiyali L.R., Traffic Engineering and Transport Planning, Khanna Publishers
9. Khisty, C J., Transportation Engineering – An Introduction, Prentice-Hall, NJ
10. TCRP Report 30, TCRP Report 95, TCRP Report 100
11. S.C. Saxena, Traffic Planning and Design, Dhanpat Rai Pub., New Delhi.
12. Partho Chakraborty and Animesh Das, Principles of Transportation Engineering, PHI
13. C. S. Papacostas, Fundamentals of Transportation System Analysis, PHI.
14. James H. Banks, Introduction to Transportation Engineering, WCB-McGraw Hill, New York
15. L.J.Pingnataro, Traffic Engineering; Theory and Practice. Prentice Hall, Englewood Clitts, 1973.
16. M.Wohl and B.V.Martin, Traffic System Analysis for Engineering and Planners, McGraw-Hill. New York,1983.
17. D.R.Drew, Traffic Flow Theory and Control, McGraw Hill. New York 1968.
18. W.R.McShane, R.P.Roess and E.S.Prassas, Traffic Engineering, Prentice Hall, New Jersey, 1990.
19. R.J.Salter, Highway Traffic Analysis and Design, McMillan, Hampshire, 1989.
20. Highway Capacity Manual, Transportation Research Board, Washington D.C.,1997, 2000
21. Kadiyali L.R.and Lal, N. B., Principles & Practice of Highway Engineering, Khanna Publishers, Delhi.
22. Khanna S.K., Justo C.E.G., Highway Engineering, Nem Chand & Bros., Roorkee.
23. Khanna S.K., Arora M.G., Jain S.S., Airport Planning & Design, Nemchand Bros., Roorkee
24. Horenjeff Robert, The planning & Design of Airports, McGraw Hill Book Co.
25. Saxena S.C., Railway Engineering, Dhanpat Rai & Sons, 1995.
26. Bindra S.P., Docks & Harbour Engineering, Dhanpat Rai Publications,
27. Srinivasan R., Harbours, Docks & Tunnel Engineering, Charotar Publishing House, Anand, 1999.

Course Outcomes:

1. To provide the basic understanding of Transportation Engineering and its main divisions.
2. To make the students aware of techniques used in transportation planning, traffic flow management, pavement – design, construction and its maintenance

List of Practicals:

1. Problems based on trip generation, trip distribution, modal split and route assignment
2. Problems based on spot speed study
3. Problems based on accident analysis
4. Problems based on Highway geometrics.
5. Problems based on passenger and cargo demand forecasting.
6. Problems based design of flexible pavement, rigid pavement, overlay design.
7. Problems based on economic evaluation of the projects.

Open Ended Problems:

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website