

GUJARAT TECHNOLOGICAL UNIVERSITY

CIVIL (TRANSPORTATION ENGINEERING) (13)

TRANSPORTATION FACILITY DESIGN

SUBJECT CODE: 2741302

M.E. 4TH SEMESTER

Type of course: Major Elective - V

Prerequisite: Urban Transportation System Planning and Traffic Engineering

Rationale:

The fast development in technology and increased demand in transportation of passengers and freight, necessitate better infrastructures in the transportation sector. Properly designed infrastructures will attract the people to the mass transit systems and also provide better safety, comfort and time saving. This subject will provide knowledge of design of transportation infrastructures like, highway, intersections, flyovers, terminal stations of bus transit and rail transit, terminal area of airports and sea ports. It is also necessary to promote the non-motorized transport considering environmental problems. This subject also includes the design of cycle tracks and pedestrian facilities.

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)			
					ESE	OEP	PA	RP		
3	2#	0	4	70	30	30	0	10	10	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Introduction: Design of highways, design of at-grade intersections, design of signalized intersection, design of grade separated intersection, terminal design, and design of facilities for non-motorised transport.	8	18
2	Terminal Planning & Design: Terminal functions, analysis of terminals, process flow charts of passenger & goods terminals, terminal processing time, waiting time, capacity & level of service concept, study of typical facilities of highway, transit, railway, airport and waterway terminals, concept of inland port.	9	22
3	Design of Highways: Hierarchy of highway system, functions, design designations, concepts in horizontal & vertical alignment, integration, optical design, geometrical standards for mobility & accessibility components, cycle track design, bridge architect, landscaping and safety considerations, evaluation and design of existing geometrics.	9	22
4	Design of Intersections: Review of design of at-grade intersections, signal coordination – graphic methods & computer techniques, grade separated intersections – warrants for selection, different types & geometric standards, spacing & space	9	22

	controls, ramps & gore area design.		
5	Pedestrian facility design: Footpath, Zebra crossings, Foot over bridge, Under pass, Pedestrian precincts, Pedestrian actuated signals.	7	16

Reference Books:

1. Kadiyali, L.R., Traffic Engineering and Transport Planning, Khanna publishers.
2. IRC-SP41: Guidelines for the Design of At-Grade Intersections in Rural & Urban Areas
3. Salter, R J., Highway Traffic Analysis and Design, ELBS.
4. Edward K. Morlock, Introduction to Transportation Engineering & Planning, International Student Edition, Mc-Graw Hill Book Company, New York.
5. Khanna S.K., Arora M.G., Jain S.S., Airport Planning & Design, Nemchand Bros., Roorkee
6. Horenjeff Robert, The planning & Design of Airports, McGraw Hill Book Co.
7. Saxena S.C., Railway Engineering, Dhanpat Rai & Sons, 1995.
8. Vukan R. Vuchic, Urban Transit : Operations, Planning and Economics, Wiley Sons Publishers.
9. Bindra S.P., Docks & Harbour Engineering, Dhanpat Rai Publications,
10. Srinivasan R., Harbours, Docks & Tunnel Engineering, Charotar Publishing House, Anand, 1999.

Course Outcome:

After learning the course the students should be able:

1. To be conversant with the design aspects of transportation facilities required for the users.
2. To be aware of design standards of transportation facilities along with aesthetic and safety aspects.

List of Tutorials:

1. Problems based on design of at-grade intersections, signalized intersection.
2. Problems based on design of grade separated intersections.
3. Problems based on design of facilities required for non-motorised transport and pedestrians.
4. Problems based on design of terminals for passenger and goods on highway, railway, airport and waterway port.
5. Problems based on design of horizontal and vertical alignment of highways with landscaping and safety aspects.

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.