

# GUJARAT TECHNOLOGICAL UNIVERSITY

## CIVIL (TOWN & COUNTRY PLANNING) (48) INFRASTRUCTURE & TRANSPORTATION PLANNING SUBJECT CODE: 2714803 SEMESTER: I

**Type of course:** Major Elective - I

**Prerequisite:** Basic understanding on water supply and sanitation engineering; traffic planning and transportation engineering

**Rationale:** The course shall help understanding the concepts of planning, designing and management of urban infrastructure (service and social).

### Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	PA (V)		PA (I)			
					ESE	OEP	PA	RP		
3	2	2	5	70	30	20	10	20	0	150

### Content:

Sr. No.	Content	Total Hrs	% Weightage
1	<b>Role of Infrastructure in Development</b> Elements of Infrastructure (physical, social, utilities and services); Basic definitions, concepts, significance and importance; Data required for provision and planning of urban networks and services; Resource analysis, provision of infrastructure, and land requirements; Principles of resource distribution in space; Types, hierarchical distribution of facilities, Access to facilities, provision and location criteria, Norms and standards, etc.	10	19
2	<b>Planning and Management of Water, Sanitation and Storm Water</b> Water – sources of water, treatment and storage, transportation and distribution, quality, networks, distribution losses, water harvesting, recycling and reuse, norms and standards of provision, institutional arrangements, planning provisions and management issues; Sanitation – points of generation, collection, treatment, disposal, norms and standards, grey water disposal, DEWATS, institutional arrangements, planning provisions and management issues. Storm water – rainfall data interpretation, points of water stagnation, system of natural drains, surface topography and soil characteristics, ground water replenishment, storm water collection and disposal, norms and standards, institutional arrangements, planning provisions and management issues;	14	26
3	<b>Planning and Management of Municipal Wastes, Power and Fire</b> Municipal and other wastes – generation, typology, quantity, collection, storage, transportation, treatment, disposal, recycling and reuse, wealth from waste, norms and standards, institutional arrangements, planning provisions and management issues. Power – Sources of power procurement, distribution networks, demand	16	30

	assessment, norms and standards, planning provisions and management issues. Fire – History of fire hazards, vulnerable locations, methods of fire fighting, norms and standards, planning provisions and management issues.		
4	<b>City Development and Transport Infrastructure Planning, Management and Design</b> Role of transport, types of transport systems, evolution of transport modes, transport problems and mobility issues; Urban form and Transport patterns, land use – transport cycle, concept of accessibility; Hierarchy, capacity and geometric design elements of roads and intersections; Basic principles of Transport infrastructure design; Traffic and transportation surveys and studies, traffic and travel characteristics; Urban transport planning process – stages, study area, zoning, data base, concept of trip generation Transport, environment and safety issues; principles and approaches of traffic management, transport system management.	14	26

### Reference Books:

1. Bruton, M. J., “Introduction to Transportation Planning,” Hutchinson Publication, London.
2. Kadiali, L. R., “Traffic and Transportation Planning”, Khanna Publishers, Delhi.
3. Ray, S. K., “Transport Planning for Developing Countries”, Prentice Hall of India, New Delhi.
4. FAIR, G. M., Gayer, J. C. and Okun, D.A., “Elements of water supply and Waste water Disposal”, John Wiley & Sons, New York.
5. T. M. Vinodkumar, “Networks and services”, ITPI Reading Manuals.
6. TCPO and Ministry of Works and Housing, “Norms and Standards for Urban Water Supply and Sewerage Services”, New Delhi.
7. A. K. Jain; “Planning designing and engineering of sustainable urban transport systems”, Khanna Publishers, New Delhi
8. Geetam Tiwari (Editor), “Urban Transport for Growing Cities” Macmillan India Ltd; New Delhi (ISBN: 0333 93784 8)
9. Jarry A. Nathanson; “Basic Environmental Technology – Water Supply, Waste Management and Pollution Control”, Prentice Hall of India, New Delhi
10. Sasikumar, Gopi Krishna; “Solid Waste Management”; Prentice Hall of India, New Delhi

### Course Outcome:

After learning the course the students should be able to:

Carry over planning and designing for urban water supply, wastewater collection & conveyance, solid waste management system and will have understanding on other important infrastructure components. Also, students shall be able to carry out studies based on urban transportation systems

### List of Experiments:

1. Population projection using different methods
2. Water demand calculations
3. Designing of water supply & distribution system
4. Designing of wastewater collection and conveyance system
5. Planning and Designing of urban storm water collection and conveyance system
6. Traffic survey (field exercise)
7. Trip generation modeling
8. Trip distribution modeling
9. Trip assignment modeling

10. Transportation master planning
11. Software demonstration – transportation
12. Software demonstration – Water supply
13. Software demonstration – Wastewater
14. Software demonstration – Storm drainage
15. Development of city level infrastructure indicator benchmarks

**Open Ended Problems:**

1. What are the challenges pertaining to urban infrastructure?
2. How urban transportation impacts on economy?
3. How does efficient infrastructure affect quality of life in urban area?
4. Why it is important to maintain urban environment quality?
5. What are the alternative usages of municipal solid waste?

**Assignment work:**

Students shall refer the books and reference materials and prepare answers to the assignment problems including the topics of syllabus. Also, prepare a “Graduate Report” of Innovative Technique and Practice and submit the same with presentation.

**Major Equipment:**

Computers with higher configuration and internet, server.  
DVR system with camera and hard drive for traffic studies

**List of Open Source Software/learning website:**

- CAD drafting tools
- U S Army Corps of Engineers (<http://www.hec.usace.army.mil/software/>)
- MATSim (<http://www.matsim.org/downloads>)
- TRANSIMS (<http://sourceforge.net/projects/transims/>)
- EPANET (<http://www.epa.gov/nrmrl/wswrd/dw/epanet.html>)
- GHydraulics (<http://epanet.de/ghydraulics/>)
- Innovating for sustainable infrastructure (<http://www.innovyze.com/>)