

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**Planning and Management of Utilities and Services**  
**SUBJECT CODE: 1055502**  
**B.PLAN 5<sup>th</sup> SEMESTER**

**Prerequisite:** 4<sup>th</sup> Semester Planning

**Aim:** To Study the Planning and Management of Utilities and Services.

**Objective:**

1. To introduce basics of Utilities and Services Planning.
2. To give exposure to Innovative Techniques for provision of Water Supply, Waste Water Treatment, Storm Water Management, Sanitation and Solid Waste Management, etc.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA(I)	
3	0	0	3	50	50		100	

L- Lectures; T- Tutorial/Teacher Guided Student Activity/Field work; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment.

**Content:**

Sr. No.	Content	Total Hrs
Unit -1	<b>Introduction, Basic Concepts and Theories</b> Role of physical planner in planning of utilities and services, objectives of utilities and services planning and its implications for public health and environmental protection. Familiarizing to CPHEEO manual and guidance	6
Unit -2	<b>Storm Water System</b> Definition of Hydrology, classification, hydrological cycle, urban water cycle; Types precipitation, measurement of precipitation, intensity-duration-frequency relationships, rainfall formula, rainfall maps, significance of interpretation and presentation of rain fall data; Surface water runoff, hydrograph, measurement of discharge for small and big rivers, rainfall data interpretation, method for estimating run off, unit hydrograph and its application, definition of watershed; Flood frequencies, flood protection measures in urban areas. Estimating storm run-off, run-off co-efficient, rainfall intensity, time of concentration; Gravity flow, hydraulic gradient line, Manning's formula and monographs, full flow and partial flow; layout and design of storm water system; General considerations, inlets, self-cleansing velocity, nonscouring velocity, physical layout-design principles, data requirement; hydraulic design of storm water system and computation procedure, points of water stagnation, system of natural drains, surface topography and soil characteristics, ground water replenishment, storm water collection and disposal	6

Unit - 3	<b>Water Supply Systems</b> Surface and ground water sources, quality and quantity, location of sources and water intakes, area requirements of the components of water intakes; Water requirement for different land uses, factors affecting water demand, per capita requirement and its relationship with population sizes, variation of water consumption; seasonal & hourly, peak factor; demand of water for firefighting; Water treatment system, location and space requirements; Components of water distribution systems, water storage location, capacity, fire fighting components, fire hydrants location, spacing, pressure requirement in pipe; Pumps types, efficiency, head loss, pump selection criteria, site selection and space requirements for pump house; Planning of water supply system, organizations and their jurisdictions, basic design guide line and layout of water supply distribution system; Financing water supply system, public and private partnership of providing water; Legal aspects and government policy for urban and rural water supply. Case study discussion on innovative methods and successful urban water supply system; Significance and methods and advantages of water harvesting system Design of water harvesting systems; Government initiatives for water harvesting system and case study discussion	12
Unit - 4	<b>Sanitation and Sewer Systems</b> Methods of sanitations, advantages and limitations; On-site detention, design procedure for on-site detention, Off-site and on-site technology up gradation; Low cost appropriate technologies for sanitation; Quantity of sewage, standards for Indian cities; Sanitary sewer system network and layout, data needs and procedure of planning; Sewer appurtenances; sewer lift station, sewer pumping and forced main manholes; Sewage disposal methods and their advantages and disadvantages, location criteria and capacity; Case study of innovative approaches of sewage disposal in urban area; Approaches for financing and cost recovery for sewer system.	12
Unit - 5	<b>Solid Waste Management</b> Solid waste management for Indian cities, issues and database, quantity of solid waste and its character; Methods of solid waste managements, collection and transportation, disposal of solid waste; Land filling and composting, pre and post treatment; Indore and Bangalore methods, incineration, pyrolysis and recycling park; Area requirements, location and cost aspects of different methods of solid waste disposal systems; Community participation and involvement of Non-Governmental Organizations or NGOs in efficient solid waste management.	12
	<b>Total Hrs</b>	48

#### Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Andy D. Ward, Stanley W. Trimble	Environmental Hydrology	Second Edition 2011	Lewis Publisher
2.	Dr. B.C. Purnia, Ashok Kumar Jain, Arun Kumar Jain	Water Supply Engineering		Laxmi Publisher, Delhi

3.	S.C. Rangwala	Water Supply and Sanitary Engineering		Second Charotar Publishing House, Anand
4.	Urvashi Dhamija	Sustainable Solid Waste Management	First	Academic Foundation, Delhi

**Course Outcome:**

<b>List of Exercises / Practicals:</b>	
1	Field visit to the Water Treatment Plant / Waste Water Treatment Plant / Composting Plant and submit Report
<b>List of Assignments/Tests :</b>	
1	Case study based Assignment on Unit 1, 2 & 3.
2	Case study based Assignment on Unit 4.

**List of Experiments:**

**ACTIVE LEARNING ASSIGNMENTS:** Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.