GUJARAT TECHNOLOGICAL UNIVERSITY

ENVIRONMENTAL ENGINEERING (13)
MUNICIPAL ENGINEERING
SUBJECT CODE: 2151306
B.E. 5th SEMESTER

Type of course: Applied Science

Prerequisite: Knowledge of subjects Environmental Sciences I and II

Rationale: To understand the water supply and sewage collection systems in cities

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	2	0	6	70	20	10	30	0	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Water supply scheme: Importance & necessity of water supply scheme, Importance and reliability of water works, essentials of water supply engineering.	3.5	3
2	Sources of water: Surface water sources and ground water sources	11	10
3	Quantity of water: Type of demand. Per capita demand, design period, fluctuation in demand of water, factors affecting demand of water.	3.5	3
4	Pumps and Pumping stations: Need of pumping, classification of pumps, different type of pumps used in water supply, power of pumping, total lift of pump, H.P of pump, location of pumping station, site selection.	7	6
5	Collection and conveyance: Intakes, type of intake, conveyance of water, different type of pipes used in water supply, pipe-joint, laying of pipe, hydrostatic test.	11	10
6	Distribution system: Type of distribution system, different layout of distribution system, methods of supplying water, pressures in distribution system, distribution resources and its capacity, type of reservoirs & accessories, design of distribution system, design of pipelines and analysis of complex pipe networks-Hard cross method.	7	6
7	Valves and Fittings: Different type of valves, hydrants, meters, stop cock & water tap, pipe fittings,leakage & waste of water factors, affecting losses & wastes.	7	6
8	Sanitary works: Definitions, sanitary works, objectives of sewage disposal	3.5	3
9	Systems of sanitation Methods of collection, conservancy systems, collection system, water carriage system, sewerage system	3.5	3

10	Quantity of sanitary and storm sewage Sources of sanitary sewage, factors affecting and determination of quantity of sanitary sewage, factor affecting storm sewage and determination of quantity of storm sewage	7	6
11	Design of sewers: Design period, per capita sewage flow, ground water infiltration, estimation of storm runoff, flow assumption, determination of velocity of flow	11	10
12	Drains and sewers Drains, sewers: sections, sewer material, sewer drawings, corrosion prevention in sewers	3	3
13	Sewers appurtenances Manhole, street inlet, flushing tanks, catch basins, inverted siphon, ventilation of sewers	11	10
14	Construction and maintenance of sewers: Laying of sewers, jointing of sewers, hydraulic testing of pipe sewers, maintenance of sewers, sewer cleaning equipments and devices.	5.5	5
15	House plumbing: Terms, Plumbing tools, traps and system of plumbing	5.5	5

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	**15**	**15**	**15**	**10**	-

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

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. Water supply and sewege system – G. Birdie
2. Water supply and sewege system - Steel and McGhee
3. Water Supply & Sewage Systems - K.N. Duggal
4. Water Supply & Sewage Systems – S. K. Garg

Course Outcome:

After learning the course the students should be able to do:

1. Identify the sources of water and evaluate resources in terms of quantity and quality.
2. Estimate the water demand considering future projection of population.
3. Plan the components of water supply scheme including pipe network, distribution systems, valves and fitting.
4. Estimate the quantity of sanitary and storm sewage.
5. Identify the types of sewers and sewer appurtenances.
6. Design the components of sewage system

List of Tutorials:

1. Water supply scheme
2. Quantity of water

3. Pump and pumping station
4. Collection and conveyance of water:
    - Intake works
    - Pipes
    - Pipe joints
5. Distribution system
6. Design of distribution system-examples
7. Valves and fittings
8. Sanitary works and system of sanitation
9. Quantity of sanitary and storm water
10. Design of sewers-examples
11. Sewer appurtenances
12. Construction and maintenance of sewers
13. House plumbing

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.