



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Civil Engineering (Water Resources Engineering) (33)

Subject Code: ME01033071

Subject Name : URBAN WATER & SEWERAGE SYSTEM

w. e. f. Academic Year:	2024-2025
Semester:	1 st Semester
Category of the Course:	PEC

Prerequisite: Fundamental knowledge of water supply and sanitary engineering.

Rationale:	This course covers the fundamentals of urban utilities planning including water supply, sanitation and drainage infrastructure provision for urban areas. The students will be equipped with understanding of various topics of water supply and sewerage systems, basic principles of urban utilities and planning, water distribution network design. Students can further enhance their understanding through exploring the software for water supply and sewerage infrastructure design.
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Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Understand the basic principles of urban utilities and planning.	R,U
02	Analyze and design water distribution networks using various software.	U,A,N
03	Analyze and design sewerage system using various software.	U,N,E
04	To plan the ground water recharge by waste water.	R,U,N,E,C

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150



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Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	URBAN UTILITIES AND PLANNING Urban utilities planning issues, Planning Strategies, Urban Utilities, Water Sensitive Urban Planning, Water Demand and Population Prediction and Management, Types of Urban Water Demand, Fluctuations in Urban Water Demand, Role of Government, Cost of water supply, Rainfall, Runoff and Groundwater and surface water, Groundwater and surface water Properties, Flow Characteristics, Water Intakes and Issues, Ground water Yield.	11	20
2.	WATER DISTRIBUTION SYSTEM Distribution System Layout, Conveyance of water and pumping of water, Pipes, Joints, Meters, Water Distribution Network Design, SCADA Systems, EPANET software, Water GEM software, Water Hydraulics software, Water CAD software, Water quality and testing, Water treatment unit- Primary, Secondary and Tertiary units.	15	35
3.	SANITATION AND SEWERAGE SYSTEM Sanitation basics, Sewage Systems, Water Carriage System and Sewerage Layout, Quantity of Sanitary Sewage, Storm Water Drainage Planning, Sewer Design, Sewerage Network Design, SEWER GEM software, Sewer appurtenances, Storm water drains, Sewer maintenance and cleaning, Laying of sewer and utility corridors, Sewage disposal and treatment in India, Natural methods of sewage treatment, Artificial sewage treatment Primary, secondary and Advanced methods.	14	35
4.	GROUND WATER RECHARGE BY WASTE WATER Artificial recharge, Benefits of artificial recharge, planning of artificial recharge, Artificial recharge techniques, Groundwater conservation techniques. Urban flood management and drainage plans, storm water drainage.	5	10
	Total	45	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)



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R Level	U Level	A Level	N Level	E Level	C Level
10	20	20	20	20	10

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Urban Water Engineering and Management – Mohammad Karamouz, Ali Moridi, Sara Nazif
2. Urban water supply and sanitation – B.C.Barah
3. Water supply and sewerage – Terence J. McGhee
4. Water supply Engineering – Santosh Garg VOLUME 1 & 2
5. Urban utilities planning ,water supply, sanitation and drainage – Prof. Debapratim Pandit IIT Kharagpur Swayam course
6. Bhave, P. R. and Gupta R., Analysis of Water Distribution Networks, Narosa Publishing Co, New Delhi
7. CPHEEO, Manual on Water Supply and Treatment, Ministry of Urban Development GOI.

(b) Open source software and website:

https://onlinecourses.nptel.ac.in/noc21_ar13/preview

Suggested Course Practical List: If any

1. Preparation of layout plan of residential, industrial, commercial and institutional zones by using any software.
2. Water Demand and fire demand Calculation for residential, industrial, commercial and institutional zones.
3. Design of Water Supply System of a Building by using EPANET AND Water GEM etc.
4. Design of Wastewater Collection System (Sanitary Sewer System).

List of Laboratory/Learning Resources Required:

1. AUTO-CAD
2. EPANET
3. Water-GEM/SEWER-GEM
4. GIS/GPS



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PO1	An ability to independently carry out research /investigation and development work to solve practical problems.
PO2	An ability to write and present a substantial technical report/document.
PO3	Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program .
PO4	An ability to apply advanced knowledge and skills appropriate to civil engineering.
PO5	An ability to think critically and apply appropriate logic, analysis, judgment and decision making and to function as an effective member or leader of engineering teams to achieve common goals.
PO6	An ability to use appropriate techniques, skills, and modern engineering tools necessary for engineering practice and commit to professional ethics and responsibilities.

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