GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Civil Engineering

Course / Subject Code: ME01065031

Course / Subject Name : Collection and Conveyance of Water and Wastewater

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

Prerequisite:	Student shall have studied basics of water & wastewater engineering
Rationale:	To provide knowledge related to the requirement of water and wastewater and its design. How the water is collected and distributed through conduits is an essential part of knowledge of Engineers dealing with water and waste water treatment plants.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	calculate discharge of flow through pipes	R,U,N
02	Design pipe network	A,N
03	Analyze AND Evaluate water distribute network	N,E
04	Plan a layout for sewer network	U,C,A
05	Provide proper Rain water harvesting system	U,N,A

**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
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Principle of Hydraulics Fluid properties, Types of fluid flow, Continuity principle, energy principle and moment principle, Flow through pipes and head losses, Flow measurement, Venturimeter, Orifice meter, Notches.	9	20
2.	Water Transmission and Sanitation: Need for transport of water and wastewater, pipe network-water transmission main design, Gravity and Pumping, Water Hammer Low cost sanitation system: septic tank, soak pit	10	25
3.	Conveyance of water Water distribution networks, Analysis of water distribution system, Introduction of use of computer software in water transmission and water distribution. Storage capacity of reservoir.	9	20
4.	Municipal Waste water Collection and Conveyance: General design Principle of sewer, Method of Collection of sewer, Layout and design of municipal sewer, sewer appurtenances, sump well and sewage pumping, Recent development in sewerage system design-maintenance of sewers.	10	25
5.	Urban Strom Drainage system: Necessity of Storm Drainage-Separate and Combined system, Rainfall Intensity-duration frequency curve estimation of runoff-control of storm water pollution-Rain water Harvesting	7	10
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	**20**	**20**	**20**	**10**	**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. "Manual on Sewerage and Sewage Treatment" by CPHEEO, Ministry of Urban Development, Government of India, New Delhi, Latest Edition.

2. "Manual on water supply and Treatment" by CPHEEO, Ministry of Urban Development, Government of India, New Delhi, Latest Edition.
3. Practical Handbook on Public Health Engineering by Bajwa, G.S. Deep Publishers, Shimla, 2003 6. Water Supply and Pollution Control by Viesman, Hammer, Dun Donnelley Publisher, New York
4. Wastewater Engineering: Treatment, disposal Reuse by Metcalf and Eddy, (Revised by G. Tchobanoglous) Tata-McGraw Hill, New Delhi
5. Water Supply and Sanitary Engineering by G.S. Birdie and J.S. Birdie, DhanpatRai Publishing Co.-New Delhi

(b) Open source software and website:

http://nptel.ac.in/

http://elearning.vtu.ac.in/

Suggested Course Practical List: If any

1. Numerical on various methods of Population Projection, water demand and waste water generation
2. Design of water distribution network by hardy cross method.
3. Design of Sewer Network.
4. Estimation of storm water runoff
5. Basic Application of WaterGEMS and SewerGEMS for water distribution and sewage network.

List of Laboratory/Learning Resources Required:

Hydraulic Bench

* * * * * * *