

Branch Name:	Environment Engineering
Program Code:	ET212
Subject Title:	Collection and Conveyance of Water and Wastewater
Subject Code:	2ET2120105T
Pre-requisite Subject:	Basics of Water and Waste Water Engineering

Course Objective:

- Student should acquire knowledge related to basics of water treatment technologies.
- Student should acquire knowledge related to basics of wastewater treatment technologies.
- Student should acquire knowledge related to storm drainage system.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
4	3	1	-	4	24	60	16	40	-	-	-	-	100

Subject Contents			
Sr. No	Topic	Total Hours	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.	8	19
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	24
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.	8	19
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. Public health and Bioinformatics	10	24
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	6	14

Reference Books:

1. “Manual on water supply and Treatment” by CPHEEO, Ministry of Urban Development, Government of India, New Delhi, Latest Edition.
2. “Manual on Sewerage and Sewage Treatment” by CPHEEO, Ministry of Urban Development, Government of India, New Delhi, Latest Edition.
3. Water Supply and Sanitary Engineering by G.S. Birdie and J.S. Birdie, Dhanpat Rai Publishing Co.- New Delhi
4. Wastewater Engineering: Treatment, disposal Reuse by Metcalf and Eddy, (Revised by G. Tchobanoglous) Tata-McGraw Hill, New Delhi
5. 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

List of Experiments:

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 Water GEMS and Sewer GEMS for water distribution and sewage network.

List of Open Source Software/learning website:

- ☐ <http://nptel.ac.in/>
- ☐ <http://elearning.vtu.ac.in/>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	The students should be able to project the quantities of water and wastewater and its collection and conveyance methods	L-4
CLO2	Able to apply knowledge on water transmission and sanitation	L-5
CLO3	Analyze municipal waste water collection and conveyance	L-4
CLO4	Apply knowledge related to storm drainage system.	L-3

L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create

Mapping of CLOs with POs & PSOs

	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
Course Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	M	M	M	M			M		M				M	M	M
CLO2	M	M	M	M			M		M				M	M	M
CLO3	M	M	M	M			M		M				M	M	M
CLO4	M	M	M	M			M		M				M	M	M

H: High, M: Medium, L: Low