

Branch Name:	Environment Engineering
Program Code:	ET212
Subject Title:	Treatment Process, Design and Drawing
Subject Code:	2ET2120204T
Pre-requisite Subject:	Sustainable waste Management

Course Objective:

- Student should acquire knowledge related to sustainability and to restore the environment for pollution abatement
- Student should acquire knowledge related to examine the technical points that are required to set up water and wastewater treatment plant
- Student should acquire knowledge related to design water treatment plant and wastewater treatment plant

Teaching and Examination Scheme:

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

Subject Contents				
Sr. No	Topic	Total Hours	Weightage (%)	
1	Combination of Unit Processes: Study of fundamental factors affecting choice of treatment units, unit processes and unit operation, hydraulic flow diagram.	6	10	
2	Design of water supply system: Site selection for water treatment plant and its supply network, determination of source yield for ground water and surface water, Design of Flow measuring device, Design of Collection and conveyance system, Preparation of layout plan, Selection of treatment units for surface and ground water sources.	14	35	
3	Concepts of Design Criteria: Hydraulic Detention Time, Flow through velocity, settling velocity, surface loading rate, weir loading rate, organic loading food microorganism ratio, mean cell residence time, dimension ratio, general procedure for design calculation	14	35	
4	Design of Waste water system: Site selection for wastewater treatment plant, Estimation of sewage, Design of Collection and conveyance system, Preparation of detailed layout plan, Selection of conventional treatment units for physiochemical and biological processes, Design of conventional treatment processes, Applicability and limitation for unit processes, challenges and trouble shooting for operating wastewater treatment plant.	8	20	

Reference Books:

1. Schroeder, Water & Waste Water Treatment, McGraw Hill
2. S. J. Arceivala, Waste Water Treatment & Disposal Marcel Dekker
3. Treatment Disposal Reuse, waste Water Engg., Metcalf Eddy Incorporation Waste Water Engineering Disposal & Reuse, McGraw Hill
4. Qasim, Wastewater treatment Plant
5. Qasim, Waterworks Engineering
6. Benefield and Randall, Biological Process Design for wastewater Treatment
7. G. L. Karia and R. A. Christian, Wastewater Treatment Concepts and Design Approach, PHI Learning Ltd.

List of Open Source Software/learning website:

1. <https://nptel.ac.in/>

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

CLO	Description	Bloom's Taxonomy Level
CLO-1	To examine the technical points that are required to set up water treatment plant.	L-4
CLO-2	To examine the technical points that are required to set up wastewatertreatment plant.	L-4
CLO-3	To study advanced techniques for treating water and wastewater	L-2
CLO-4	To design water treatment plant and wastewater treatment plant	L-6

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	
CLO2	M			M	M				M				M	M	
CLO3	M		M	M					M				M	M	
CLO4	M	M	M	M					M				M	M	M

H: High, M: Medium, L: Low