

Branch Name:	Environment Engineering
Program Code:	ET212
Subject Title:	Fundamentals of Water and Wastewater Treatment Practical
Subject Code:	2ET2120101P
Pre-requisite Subject:	Water and Waste Water Engineering

Course Objective:

- Student should acquire knowledge related to the requirement of water treatment technologies and its design.
- Student should acquire knowledge related to the requirement of wastewater treatment technologies and its design.
- Student will get knowledge related to contaminant and its control in water.

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.	
1		-	2	2	-	-	-	-	10	25	10	25	50

List of Experiments:

1. Introduction to Standards, collection and preservation of samples, sampling techniques and laboratory equipment
2. Physical Parameters of water & wastewater quality like turbidity, conductivity, colour and odour etc.
3. Major Chemical Characteristics of water & wastewater like Solids, DO, Chlorides, Hardness, Acidity, Alkalinity, heavy metals etc. using most modern instruments
4. Jar Test for determining optimum dosage of coagulant
5. Major Biological parameters of water using Presumptive, confirmative and completed test using appropriate culture media and microscope
6. Experimentation based on Optimum doses required for different field condition turbidity
7. Experiment on BOD and COD of water and wastewater
8. Model of water & wastewater treatments

Major Equipment:

- Jar Test Apparatus
- Titration Apparatus
- pH meter
- Conductivity Meter Hot Air Oven
- BOD Incubator
- Dissolved Oxygen Meter
- Turbidity meter
- Microscope
- Spectrophotometer

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Recognize and define the quality parameters typically used to characterize wastewater	L-2
CLO2	Describe various types of process units used for preliminary and primary treatment, e.g., screening, equalization, primary settling and explain their functions	L-2
CLO3	Describe and explain how biological wastewater treatment removes pollutants	L-3
CLO4	Describe various biological wastewater treatment processes and recognize pros and cons of each process	L-2
CLO5	Explain the principles of the suspended and attached growth biological processes and the factors that influence and control these processes	L-2
CLO6	Recognize emerging technologies for advanced wastewater treatment and water recycling	L2
CLO7	Describe a disinfection process in terms of contact time and chemicals usage	L-2
CLO8	Discuss wastewater treatment excess sludge handling, treatment, disposal and biosolids application	L-3
CLO9	Draw schematics of typical water and wastewater treatment plants.	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	
CLO2						M	M							M	
CLO3	L			M										M	
CLO4						M	M							M	
CLO5				M										M	
CLO6	M		M		L		M						M	M	
CLO7						M	M							M	
CLO8	L			M										M	
CLO9	M		M		L		M						M	M	

H: High, M: Medium, L: Low