GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3171303

Semester – VII
Subject Name: INDUSTRIAL WASTEWATER POLLUTION AND CONTROL

Type of course: professional Elective Course

Prerequisite: Knowledge of wastewater treatment technologies

Rationale: Satisfying the standards for disposal of treated effluents in various sinks requires that the industrial wastewater to be given more exhaustive treatment. Hence this subject aims to give knowledge to the students regarding industrial wastewater treatment and disposal standards.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	**Water Quality Standards for industrial use:** Relevant Indian Standards for use of water in Textiles, Paper industry, chemical, Pharmaceutical, soft drink, boiler feed water, cooling tower, problems of silica, scaling & corrosion, caustic embitterment, benefits of pollution control	04
2	**Standards for disposal into different Sinks:** Difference between criteria & standards, Stream standards, effluent standards, relevant Indian standards for disposal in to different sinks	04
3	**Concepts of disposal of wastewater into different sinks:** Disposal into river, lake, oceans	08
4	**Oil Pollution and its removal technologies:** Introduction, nature and effects of oil and grease, sources of oily waste Removal techniques of oily waste: oil skimmers, oil and grease traps, oil separators, floatation units	06
5	**Volume & Strength reduction in industrial wastewater:** Measures for volume reduction & Strength Reduction	04
6	**Pre and Primary treatment for industrial wastewater:** Equalization & proportioning, Neutralization, Heavy metals removal.	04
7	**Common Effluent Treatment plants:** Need, concept and treatment technologies	04

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8	**Treatment for strong industrial waste:** Incineration, Evaporation: Natural & forced evaporation.	**02**
9	**Pollution Control in Industries:** Manufacturing process, Identification & characterization of sources of wastewater, treatment of wastewater including recycling & reuse concepts in, pharmaceutical industry, Diary industry, sugar industry, starch industry, fertilize industry, tannery, pulp & paper industry, dye & dye intermediate.	**06**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	30	20	20	10	

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from abovetable.

Reference Books:

1. Industrial Water pollution by Nelson L. Nemerow
2. Industrial water pollution by W. Wesley Eckenfelder –Mcgraw-Hill International edition
3. Wastewater Engineering, Treatment & Reuse by Metcalf & edition Tata – Mcraw –Hill edition.
4. Handbook of Industrial Pollution & Control Vol. I & II by S.C. Bhatiya CBS , Published & distributions
5. Wastewater Treatment by M.N. Rao & A.K. Datta.
6. Relevant Indian Standards.

Course Outcomes:

Sr. No.	CO statements	Marks % Weightage
CO-1	Relate the benefits of water pollution control to the industries.	10
CO-2	Discuss the disposal standards for various environmental sinks and fate & transport of pollutant discharged into it.	30
CO-3	Recommend the various waste reduction techniques as well treatment of specific industrial pollutant.	35
CO-4	Explain the concept of Common effluent treatment plant and treatment of string industrial waste.	12
CO-5	Propose the water pollution control strategies in major water polluting industries.	13

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List of Experiments:

1. Characterization of wastewater from different industries.
2. Color removal using different adsorption materials.
3. Treatment of high COD waste using advanced oxidation processes.
4. Treatability study of given wastewater samples.
5. Presentation on manufacturing process, waste generation sources, characteristics of wastewater, treatment of wastewater for given industries.