



GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721702

Semester – II

Subject Name: INDUSTRIAL WATER AND WASTEWATER TREATMENT

Type of course: Environmental Engineering and Technology

Prerequisite: Basic Knowledge of water and wastewater parameters & Basic concepts regarding water and wastewater treatment units

Rationale: To provide knowledge related to requirement of industrial water and wastewater treatment technologies and its design

Teaching and Examination Scheme:

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

Content:

Sr.No.	Topics	Hours
1	Introduction and Standards: Sources of Pollution: Physical, Chemical, Organic and Biological properties of Industrial Wastes , Differences between industrial and municipal waste waters , Industrial wastewater and environmental impacts, Regulatory requirements for treatment of industrial wastewater ,Toxicity of industrial effluents, Quality and quantity of industrial wastes, Treatment of water for cooling and Heating and steam generation. Difference between Criteria & Standards, Stream Standards, Effluent Standards, and Relevant Indian Standards for Disposal in to different Sinks.	10 hrs
2.	Flow Measurements, Characterization and Treatability Studies of Industrial Wastewater: Measurement of Flow, Collection and Preservation of Samples, Nature and characteristics of industrial wastewater.	4 hrs
3.	Waste Reduction: Methods of volume reduction, Strength reduction, Neutralization, Equalization and proportioning as related to Industrial waste treatment, Radio Active Waste and Treatment.	8 hrs
4.	Pollution Control in Industries: Origin, Characteristics and Treatment of major Industrial waste -Textile mill waste, Dairy waste, Sugar mill waste, fertilizer plant waste, pulp & paper Tannery waste, petrochemical Complex Wastes, Pharmaceutical wastes, Vegetable and Food Industry, Dye Industry.	10 hrs
5.	Effluent treatment and Sludge Management: Individual and Common Effluent	10 hrs



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	Treatment Plants , Joint treatment of industrial and domestic wastewater, Zero effluent discharge systems, Quality requirements for Wastewater reuse , Industrial reuse , Present status and issues Disposal on water and land, Residuals of industrial wastewater treatment, Quantification and characteristics of Sludge , Thickening, digestion, conditioning, dewatering and disposal of sludge	
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Reference Books:

1. Industrial Water Pollution by Nelson L. Nemerow - Addison Wesley Pub. Co.
2. Treatment of Industrial Waste by E.B. Besselièvre and M. Schwartz - McGraw Hill, Kega Kusha Ltd. Publication (latest), International Student Edition
3. Industrial water Quality W. W. Eckenfelder, Jr. Davis L. Fford, Andrew Englande McGraw Hill Publishing Co. (2009 ed)
4. Water Quality and Treatment Hand Book of Public Water Supplies by AWWA - McGraw Hill
5. Industrial Waste Treatment by Gurnham
6. Industrial waste water treatment by A.D. Patwardhan by PHI learning Private Ltd.

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Distinguish between the quality of domestic and industrial water requirements and Wastewater quantity generation	10%
CO-2	Understand the industrial process, water utilization and waste water generation.	40%
CO-3	Impart knowledge on selection of treatment methods for industrial wastewater.	30%
CO-4	Acquire the knowledge on operational problems of common effluent treatment plants.	10%
CO-5	Able to project the quantities of water and wastewater and its collection and conveyance methods	10%

List of Experiments:

1. Collection of data on Industries located in around the City.
2. Collection field data of one industry in detail related to its water requirement and waste water generation and treatment facility with the industry.



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3. Treatability study of an industrial effluent
4. Field visit of common effluent treatment plant
5. Field visit of Different Industries.
6. Report Preparation of Industrial area or on Specific most polluting Industry
7. Preparation of Graduate Report.

List of Open Source Software/learning website:

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