



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Master of Engineering**

**Subject Code: 3731802**

**Semester – III**

**Subject Name: Industrial Wastewater Management**

**Type of course:** Applied Science

**Prerequisite:** Knowledge of industrial wastewater and its characteristics

**Rationale:** To achieve control of water pollution and to prevent the natural water bodies from being degraded by industrial pollution, it is necessary to treat and dispose industrial waste water in techno economically viable manner.

**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	0	3	70	30	0	0	100

**Content:**

Sr. No.	Content	Total Hrs
1	<b>Standards for disposal into different Sinks:</b> Criteria & Standards for disposal of wastewater, Stream standards, effluent standards, and relevant Indian standards for disposal into different sinks, costs of pollution control, load based & concentration based effluent standards, Gross polluting industries.	02
2	<b>Disposal of wastewater into different sinks:</b> Selection criteria, assimilative capacity of various disposal sinks such as river, lake, oceans, estuary , sewer & land for specific type of water pollutants	10
3	<b>Volume &amp; Strength reduction methods for Industrial wastewater:</b> Different methods of volume reduction and strength reduction and their application in industries, Equalization & proportioning, Neutralization, Heavy metals removal.	04
5	<b>Common waste treatment facilities</b> Need of CETP , concept and treatment technologies at CETP & challenges	02



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6	<b>Management of wastewater in industries:</b> Manufacturing process, Identification & characterization of sources of wastewater, treatment of wastewater including recycling & reuse concepts in cotton-textile industry, bulk drug industry, food industry, sugar industry, starch industry, fertilize industry, tannery, pulp & paper industry, pesticide industry, dye & dye intermediate.	14
7	<b>Management of strong industrial wastewater:</b> Incineration, Spray dryer, Evaporation: Natural & forced evaporation.	02
8	<b>Oil Pollution control:</b> Sources of oil pollution in industries. Effects of oil pollution, treatment and removal techniques	04

**Suggested Specification table with Marks (Theory): (For BE only)**

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
5	25	30	10	-	-

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create 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 above table.

## 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.



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## Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1		
CO-2		
CO-3		
CO-4		

## List of Open Source Software/learning website:

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