III Year-II Semester
(20CE6321) Industrial Waste Management

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

Pre- Requisites: Fundamentals of Environmental Engineering

Course Objectives:
The course will address the following

- Enables the student to distinguish between the quality of domestic and industrial water requirements and waste water quantity generation.
- To impart knowledge on selection of treatment methods for industrial waste waters.
- To know the common methods of treatment in different industries.
- To acquire knowledge on operational problems of common effluent treatment plant.

UNIT–I:
Basic theories of Industrial Wastewater Management: Waste water characterization-Toxicity of industrial effluents-Treatment of waste water-unit operations and processes-Volume and Strength reduction –Neutralization–Equalization and proportioning-recycling, reuse and resources recovery

UNIT–II:
Process and Treatment of specific Industries-1: Manufacturing Process and origin, characteristics, effects and treatment methods of liquidwastefromSteelplants,Fertilizers,Textiles,PaperandPulpindustries and Oil Refineries.

UNIT–III:
ProcessandTreatmentofspecificIndustries-2: Manufacturing Process and origin, characteristics, effects and treatment methods of liquid waste from Tanneries, Sugar Mills, Distillers, Dairy and Pharmaceutical Plants.

UNIT–IV:
Industrial waste water disposal management: discharges into Streams, Lakes and oceans and associated problems, Land treatment-Common Effluent Treatment Plants: advantages and suitability, Limitations and challenges.

UNIT–V:
Advanced waste water treatment: Use of Municipal waste water in Industries–- Adsorption, Reverse Osmosis, Ion Exchange, Ultra filtration, Freezing, elutriation, Removal of Iron and Manganese, Removal of Colour and Odour.

Course Outcomes:

S.No	Course Outcomes	BTL
1	Suggest low cost techniques for Volume and Strength reduction of any industrial wastewaters.	L5
2	Suggest waste treatment methods for Steel plants, Fertilizers, Textiles, Paper and Pulp industries and Oil Refineries.	L5
3	Suggest waste treatment methods for Tanneries, Sugar Mills, Distillers, Dairy and Pharmaceutical Plants.	L5
4	Suggestwastewater disposal method for any industrial wastewaters.	L5
5	Suggest advanced wastewater treatment method for industrial wastewaters	L5

Correlation of Cos with POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	3	1	1	1	1	3	2	3	2
CO2	3	3	2	3	2	3	3	1	1	1	1	3	2	3	2
CO3	3	3	2	3	2	3	3	1	1	1	1	3	2	3	2
CO4	3	3	2	3	2	3	3	1	1	1	1	3	2	3	2
CO5	3	3	2	3	2	3	3	1	1	1	1	3	2	3	2

Text Books:

1. Wastewater Treatment by M.N. Rao and A.K. Dutta, Oxford & IBH, New Delhi.
2. Industrial Waste water Treatment by KVSG Murali Krishna.
3. Industrial Wastewater treatment by A.D. Patwardhan, PHI Learning,Delhi.
4. Wastewater Treatment for Pollution Control and Reuse, by Soli. J Arceivala, Shyam RA Solekar, Mc-Graw Hill, New Delhi;3r^{d} Edition.

Reference Books:

1. Industrial Water Pollution Control by W.Wesley Eckenfelder, Mc-Graw Hill,Third Edition
2. Waste water Engineering by Metcalf and Eddy Inc.,Tata McGraw Hill Co., New Delhi
3. Waste water Treatment-Concepts and Design Approach by G.L. Karia & R.A. Christian, Prentice Hall of India.