GUJARAT TECHNOLOGICAL UNIVERSITY

ENVIRONMENTAL MANAGEMENT (18)

INDUSTRIAL WASTEWATER MANAGEMENT

SUBJECT CODE: 2731806

M.E. SEM-III

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	Examination Marks						Total Marks
				Theory Marks		Practical Marks				
L	T	P	C	ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	2	5	70	30	20	10	10	10	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment; OEP-Open Ended problem; AL-Active learning;

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	General: Industrial waters and wastewaters, cost of water pollution abatement as integral component of project, key reference to relevant Indian Standards	04	10
2	Disposal Standards: Various disposal sinks, effluent and stream standards; theories of water pollution and control: reduction of strength and volume, neutralization and proportioning, equalization suitability of control processes compatible with concentrations, environmental consideration for industrial location	06	14
3	CETP: Concept of Common Effluent Treatment Plant (CETP), pros and cons of CETP, case studies; Liquid toxic wastes: identification and quantification of toxic wastes, physico-chemical, bio-physical treatment processes for toxic wastes	06	14
4	Major industrial wastes: Origin, characterization, treatment; Recycling and reuse of wastewater: advanced wastewater treatments such as removal of refractory organics, nitrogen, phosphorus, fluoride and TDS, cost benefit ratios, removal and recovery of metals from industrial wastewater.	20	48
5	Waste minimization, waste exchange and cleaner production: definition of CP and terminology, the need of CP and its benefits, barriers to CP, planning and implementation, role of life cycle analysis in achieving CP goals.	6	14

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 &Eddy , Tata – Mcraw –hill edition.
4. Handbook of industrial pollution & control Vol. I & II by S.C. Bhatia CBS , Published & distributions
5. Wastewater treatment by M.N. Rao & A.K. Datta.
6. Relevant Indian Standards.

Course Outcome:

After learning the course the students should be able to:

1. Infer the standards for disposal of effluent in to different environmental sinks..
2. Justify the benefits of pollution control to the industry.
3. Categorize the strength and volume reduction techniques in industrial wastewater.
4. Devise the methods for pre and primary treatment of industrial wastewater.
5. Appraise the concept of Common Effluent Treatment Plant.
6. Exhibit the understanding of pollution control in major polluting industries.

List of Experiments :

1. List of Practicals
   - I. Characterization of waste water.
   - II. Determination of optimum lime dose for neutralization of acidic wastes.
   - III. Treatability studies for specific industrial wastes – Physico – Chemical treatment

Term work will comprise of assignments on the questions related to disposal standards for various sinks, CETP .

Design based Problems (DP)/Open Ended Problem:

Term paper on Industries including manufacturing process, identification and characterization of sources of waste water/ air pollution, treatment of waste water including waste minimization with flow diagram

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier I and Tier II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.