

# GUJARAT TECHNOLOGICAL UNIVERSITY

## ENVIRONMENTAL MANAGEMENT (18) TREATMENT PROCESS DESIGN AND DRAWING SUBJECT CODE: 2721802 SEMESTER: II

**Type of course:** Design and Drawing

**Prerequisite:** Basic concepts and equations regarding water, wastewater treatment and air pollution & control equipments.

**Rationale:** Designing of treatment units and its detailed drawing

**Teaching and Examination Scheme:**

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

**Content:**

Sr. No.	COURSE CONTENT	Total Hrs	% Weightage
1.	<b>Flow measuring devices</b>	2	4.76
2.	<b>Design of Water and wastewater treatment units</b>		
	Preliminary units: 1.Screen 2.Grit chamber	6	14.3
	Primary units: 1.Flow equalization 2.Clariflocculator 3.Tube settler 4.Rapid sand filter 5. Plain sedimentation tank	10	23.8
	Secondary units: 1.Activated sludge process 2. Rotating biological contractor 3.Upflow anaerobic sludge blanket reactor 4.Sludge digester	12	28.57
3.	<b>Design of Air pollution control equipment</b> 1. Gravity settling chamber 2. Bag filter 3. Cyclone separator 4. Venturi scrubber 5. Electrostatic precipitator 6. Absorption tower	12	28.57

## Reference Books:

1. Waste Water Treatment, disposal & reuse - Metcalf & Eddy
2. Wastewater treatment plant: By Qasim
3. Waterworks Engineering: By Qasim
4. Biological Process Design for Wastewater Treatment: By Benefield and Randall
5. Manual on Sewage Collection and Treatment
6. Manual on Water Supply and Treatment

## Course Outcomes:

After learning the course the students should be able to:

1. Choose the flow measuring device and treatment process problem gain and compare the alternatives.
2. Prepare a layout of treatment plant and its hydraulic profile.
3. Design the conventional and advanced treatment processes for treatment of water and wastewater.
4. Design the air pollution control equipments.
5. Prepare a detailed working drawing of designed units.

**List of Experiments and Open Ended Problems:** Term work will comprise of

[A] Assignments on the questions related to Volume reduction, strength reduction, equalization and sketches and description of

- i. Conventional & modification of Activated Sludge Process,
- ii. Types of aeration devices
- iii. Types of mixing devices
- iv. Flow measuring devices
- v. Filtration systems

[B] Detailed design and drawing of treatment units like clarifloculator, ASP, Trickling filter, Screen, UASB, RSF, Plant hydraulics.

**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.