

GUJARAT TECHNOLOGICAL UNIVERSITY

ENVIRONMENTAL ENGINEERING (17) TREATMENT PROCESS DESIGN AND DRAWING SUBJECT CODE: 2731703 M.E. SEM-III

Type of course: Design and Drawing

Prerequisite: Basic Concepts and equations regarding water, wastewater treatment and air pollution & Control equipment's

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)	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	Combination of Unit Processes: Study of fundamental factors affecting choice of treatment units and combination of unit processes into integrated plant.	04	10
2	Design of water supply system: Design of Flow measuring device, Source yield, Collecting system design, Transportation system design, Treatment units for surface and ground water sources by physiochemical processes.	10	24
3	Special design units : Special design units for specific water treatment for Ion exchange, Reverse Osmosis, Electro dialysis	10	24
4	Design of Waste water system: Collecting system, Transportation system, Treatment units by conventional methods of physiochemical and biological processes and detailed drawings of units designed thereof. This may include Screen, grit chamber, flow equalization, clariflocculator, Rapid sand filter, plain sedimentation tank, activated sludge process, Rotating biological contactor, Up flow sludge blanket reactor and digesters	18	42

Reference Books:

1. WPCF (USA), Waste Water Treatment Plant Design Manual of Practice
2. Schroeder, Water & Waste Water Treatment, McGraw Hill
3. S. J. Arceivala, Waste Water Treatment & Disposal Marcel Dekker
4. Ministry of Urban Development, Manual of Water Supply, latest Ed. Manual of Waste Water Treatment

5. Treatment Disposal Reuse, waste Water Engg., Metcalf Eddy Incorporation Waste Water Engineering Disposal & Reuse, McGraw Hill
6. Qasim, Wastewater treatment Plant
7. Qasim ,Waterworks Engineering
8. Benefield and Randall,Biological Process Design for wastewater Treatment

Course Outcome:

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. 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 s

- 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.