

Environmental Engineering-II

Course Code CE-341	Credit Hours 2-1
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Course Description

This course provides a wide range of environmental engineering related knowledge. It deals with the overall perspective of various environmental engineering issues both at the domestic as well as at the community level, and the skills required to evaluate, analyze and solve the environmental engineering related problems, by learning the design skills of water and wastewater treatment units. The laboratory practical are merged with the theory, in such a way that it helps the students to understand various pollution problems, and enhance their analytical and environmental engineering problems investigation techniques.

Text Book:

1. "Unit Operation and Process in Environmental Engineering", 2nd Edition, by Tom D Reynold
2. "A Text Book of Environmental Engineering", 2018 Edition by Arshad.

Reference Book:

1. "Water Supply and Sewage", 5th Edition by E.W.Steel

Prerequisites :

CE-339 Environment Engineering-1.

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
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1 - 2	Conventional water and wastewater treatment processes, criteria for selecting a treatment process
3 - 4	Fundamentals of water and wastewater treatment and designing, important design parameters, mass-loading factor, reaction rates, reactors or treatment units, important design parameters etc.
5 - 6	Designing of pre-requisites units (screening chamber, grit chamber, skimming tank etc)
7 - 10	Primary treatment (sedimentation tank design), design of rapid-mix basin, design of slow-mix basin, lime-soda water softening process.
11	Secondary treatment of water, concept of biological wastewater treatment of wastewater, classification of biological wastewater treatment processes, etc.
12	Determination of bio-kinetic coefficients for biological treatment processes
13 - 15	Design of an activated sludge process, design of UASB reactor (anaerobic digestion). Design of trickling filter (or percolating filter), design of an oxidation ponds (or wastes stabilization ponds)
16	Advanced treatment options for water and wastewater, sludge treatment and disposal
17-18	End Semester Exam

Practical

Experiment No	Description
1	Determination of pH/ Temperature/Turbidity
2	Determination of Chlorides by Argentometric Method
3	Determination of Color, by Colorimeter
4	Determination of TS/TDS/TSS using Gravimetric Method
5	Determination of TFS and TVS using Gravimetric Method
6	Determination of Sulfates using Spectrophotometer
7	Determination of Nitrates using Spectrophotometer
8	Determination of Total Hardness by EDTA Method
9	Determination of Total Alkalinity
10	Determination of Optimum Coagulant Dosage, by Jar Test
11	Determination of BOD by Dilution Method
12	Determination of COD by Open Reflux Method
13	Determination of Total Coliform by MPN Technique