



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-6 (B. Tech.)

Subject: Environmental Engineering–BETCV16327

Type of Course: Professional Core

Prerequisite: Knowledge of Environmental Science

Rationale: Drinking water is one of the basic needs of the human being; this subject helps the civil engineer in planning of a water supply scheme that can provide potable water to the community. Also, to maintain the general hygiene in the habitation, proper handling and disposal of sewage and solid waste is important. This subject helps the civil engineer in dealing with the issues related to collection, treatment and disposal of sewage and solid waste and to understand effect of noise and air pollution and its control measures.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
4	0	2	5	60	30	10	20	30	150

Legends: CI-Classroom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.



Course Content:

Sr.No.	Course Content	Hrs.	% Weightage
1	Water Supply scheme/System Components and layout of water supply scheme, Sources of water, Types of water demand, Estimation of quantity of water required, Collection and conveyance of water, Quality characteristic of drinking water, drinking water standard, Water borne diseases Water, Treatment processes: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes.	16	25%
2	Sewage: Characteristics, Treatment and Disposal Physical, chemical and biological characteristics of sewage, Methods of sewage disposal, Indian standards for disposal of sewage, Self-purification capacity of river, Unit operations and unit processes in sewage treatment, Layout of sewage treatment plant, Preliminary, Primary treatment of sewage, Aerobic and anaerobic biological treatment.	16	25%
3	Collection of sewage and House Drainage Type of sewerage systems: combined and separate, Quantity of Sewage, Sewage flow variations. Conveyance of sewage Sewer appurtenances. Principles of house drainage, Pipes and traps, Classification of traps: nahn trap, gulley trap, interception trap, grease trap, Sanitary fitting.	10	15%
4	Solid Waste Management Quantity, composition and characteristics of solid wastes, Classification of solid wastes. Hazardous solid wastes, Biomedical solid wastes, Factors affecting the generation rate. Onsite handling, storage and processing, Collection services, Types of collection systems, Transfer stations, Solid waste processing techniques, Disposal of solid waste.	10	20%
5	Air and noise pollution Classification and sources of air pollutants. Air quality standards, Effects of air pollution on human, plant and material, Basic Air pollution control methods, Noise pollution: definition, measurement, standards, sources, effect and control measure.	08	15%

Continuous Assessment:

Sr. No.	Active Learning Activities	Marks
1	Case Study Analysis on water pollution: Students (In groups) will be assigning real case of water pollution by Faculty. Student will discover cause, effect, and mitigation of the same. Prepare Power point presentation on that and upload to GMIU portal.	10



2	Collection Services & Systems of solid waste management Students will select an area and design a door-to-door collection system for a particular area assign by faculty and prepare a Flow Chart of the same. illustrate primary methods of collection transfer, transport, disposal. Prepare a Flowchart In PDF and upload it on the GMIU Web portal.	10
3	Effects of Air & Noise Pollution Analyze various air pollution problems in society. make a detailed report of possible remedial methods and required actions and upload them on GMIU portal.	10
TOTAL		30

Suggested Specification table with Marks(Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage %	15%	30%	30%	10%	10%	5%

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course, the students should be able to:

CO1	Determine the quantity and quality of water required for public water supply
CO2	Interpret the effect of wastewater characteristics on human health and environment
CO3	Design different units of water and sewage treatment plant
CO4	Classify solid waste and interpret the components of solid waste management system.
CO5	Analyze the effects of air and noise pollution on human and environment and develop its remedial measures.

List of Practical

Sr. No.	Descriptions	Unit No.	Hrs.
01	Physical Characterization of water: Turbidity, Conductivity, pH	01	04
02	Analysis of solids content of water: Dissolved, Settleable, suspended, total, volatile, inorganic etc.	01	04
03	Determination of Alkalinity and acidity	01	04
04	Determination of Hardness: total hardness, calcium and magnesium hardness	01	04
05	Determination of Chlorides	01	02
06	Determination of Optimum coagulant dose: Jar Test	01	02
07	Chemical Oxygen Demand (COD)	02	02



08	Dissolved Oxygen (D.O) and Biochemical Oxygen Demand (BOD)	02	04
09	Determination of residual chlorine in water	02	02
10	Bacteriological quality measurement: MPN,	05	02
TOTAL			30

Instructional Method:

The course delivery method will depend up on the requirement of content and need of students. The teacher in addition to conventional teaching method by blackboard, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode in struction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.

The internal evaluation will be done on the basis of Active Learning Assignment.

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

Reference Books:

- [1] H.S. Peavy, D.R. Rowe and G. Tchobanoglous, Environmental Engineering, McGraw Hill international Edition
- [2] M. L. Davis, Water and waste water Engineering, Mc Graw Hill education (India).
- [3] Metcalf and Eddy, Wastewater Engineering: Treatment, disposal Reuse, Tata-McGraw Hill education (India).
- [4] Integrated Solid Waste Management, Tchobanoglous, Theissen & Vigil, McGraw Hill Publication
- [5] S.K. Garg, Environmental engineering Vol. I & II, Khanna Publication
- [6] Manual on Water Supply and Treatment, Ministry of Urban Development, New Delhi
- [7] Manual on Sewerage and Sewage Treatment Systems, Part A, B and C. Central Public Health

