

B.E. Semester: V
Department of Civil Engineering
Subject Name: Environmental Engineering – I (CV504-N)
Course Category: Program Course Core (PCC)

A. Objectives of the Course:

- To provide a coherent development to the students for the courses in sector of engineering like Water treatment, air pollution, noise pollution etc.
- To analyze the water sources and water characteristics
- To develop various water treatment process.
- To give an experience in the implementation of engineering concepts which are applied in field of water treatment process
- To present the foundations of many basic Engineering tools and concepts related Environmental Engineering

B. Teaching & Evaluation Scheme:

Teaching Scheme				Credit	Evaluation Scheme					Total Marks
L	T	P	Total		Theory		IE	CIA	Pra/Viva	
hrs	hrs	hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
3	0	2	5	4	3	70	30	20	30	150

C. Detailed Syllabus:

Module – I

1. Introduction:

Components of Environment, Types of Microbes, Growth and their Role in Environment

2. Quality and Quantity of Water:

Sources of Water, Assessment of Domestic and Industrial Requirement, Impurities in Water, Indian Standards for Drinking Water, Water Borne Diseases and their Control, Factors Affecting per Capita Demand, Waste and Losses, Variations in Demand, Design Periods, Population Forecasting Methods

3. Collection and Conveyance of Water:

Intakes, Types of Intakes, Design of Intakes, Conveyance of Water, Design of Pump and Rising Main

Module – II

4. Water treatment Process:

Water Supply Scheme, Plain Sedimentation, Aeration, Sedimentation Tank and its Design, Sedimentation with Coagulation, Types of Coagulants, Optimum Dose of Coagulants, Mixing Devices, Design of Flocculator, Theory of Filtration, Types of Filters and their Comparison, Design of Rapid Sand Filter, Washing of Filter, Methods of Disinfection, Methods of Removing Hardness

Module – III

5. Distribution System:

Layout of Distribution Networks, Methods of Water Distribution, Storage Capacity of ESR and Underground Service Reservoir

Module – IV

6. Air Pollution:

Definition, Composition of Atmospheric Air, Classification and Sources of Air Pollutants, Effects of Air Pollution on Human, Plant and Material, Air Pollution Control Methods, Equipment and Safety

7. Noise Pollution:

Measurement of Sound, Sources, Effects and Control of Noise Pollution

D. Lesson Planning:

Unit No	Title of the Unit	Minimum Hours	Weightage (%)
1	Introduction	04	05
2	Quality and Quantity of Water	04	10
3	Collection and Conveyance of Water	05	10
4	Water Treatment Processes	20	45
5	Distribution System	04	10

6	Air Pollution	05	15
7	Noise Pollution	03	05
Total:		45	100

E. List of Practical/Assignments:

Unit No	Title of the Unit
1	Introduction to Equipment, Standards, Sampling, Collection and Preservation of samples in Environmental Engineering Laboratory
2	Determination of pH and conductivity for water and wastewater
3	Determination of Acidity for water
4	Determination of Alkalinity for water
5	Determination of Hardness for water
6	Determination of Solids(suspended, dissolved and settleable)
7	Determination of residual chlorine for water
8	Determination of Dissolved solids for water
9	Determination of optimum dosage by jar test
10	Ambient air quality measurement using High Volume sampler
11	Measurement of noise at different sources using sound meter
12	Design of Tree type distribution network
13	Design of Water treatment units

F. Instructional method and pedagogy (Continuous Internal Assessment Scheme CIA):

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc
- Attendance is compulsory in lectures and practical which carries marks
- At regular intervals assignments will be given. Students should submit all assignments during given period
- Classroom participation and involvement in solving the problems in tutorial rooms carries marks
- Internal exam of 30 marks will be conducted as a part of mid semester evaluation.

- Experiments shall be performed in the field related to course contents
- The course includes a practical, where students have an opportunity to build an appreciation for the concept being taught in lectures

G. Students Learning Outcomes:

On the successful completion of this course

- The students will gain an experience in the implementation of water treatment process on engineering concepts which are applied in field Environmental Engineering.
- The students will get a diverse knowledge of environmental engineering practices applied to real life problems.
- The students will learn to understand the theoretical and practical aspects of environmental engineering along with the design and management applications

H. Recommended Study Materials:

a. Text book & Reference Books:

1. A.P. Sincero and G.A. Sincero, Environmental Engineering, Prentice Hall of India, New Delhi.
2. G.S. Birdie and J.S. Birdie, Water Supply and Sanitary Engineering, Dhanpat Rai Publishing Co. New Delhi.
3. H.C. Parkins, Air Pollution, McGraw-Hill Pub.
4. H.S. Peavy, D.R. Rowe and G. Tchbanoglous, Environmental Engineering, McGraw Hill International Edition.
5. J.A. Salvato, Environmental Sanitation, Wiley Interscience.
6. M.L. Davis and D.A. Cornwell, Introduction to Environmental Engineering,
7. S.K. Garg, Water Supply Engineering by Khanna Publisher
8. Punmia, B.C., Environmental Engg. Vol. - I & II, Laxmi Publications.
9. Chatterjee, A.K., Environmental Engg, Khanna Publishers.
10. Harrison, R.M., Pollution Control, Springer Us/rsc.
11. Water Supply and Treatment, Manual, Ministry of Works and Housing, New Delhi

b. Indian Standards:

1. IS 10500:2012 Drinking water
2. IS 1172:1993 Code of basic requirements for water supply, drainage and sanitation
3. IS 2065:1983 Code of practice for water supply in buildings

c. Web Materials:

1. <http://www.epa.gov>
2. <http://www.indiaenvironmentportal.org.in>
3. <http://nptel.iitm.ac.in>
4. <http://www.filtersource.com>
5. <https://dgserver.dgsnd.gov.in>
6. www.nesc.wvu.edu