

B.E. (Civil) Semester: V

Subject Name: ENVIRONMENTAL ENGINEERING- I (CV502)

A. Course Objective:

- 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 /Examination Scheme

Teaching scheme				Total Credit	Evaluation Scheme					Total
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract/ Tut.	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
03	00	02	05	04	03	70	30	20	30	150

C. Detailed Syllabus:

Module I

- **Introduction:** Components of environment, Types of microbes, Growth and their role in environment.
- **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
- **Collection and Conveyance of Water:** Intakes, types of intakes, design of intakes, conveyance of water, design of pump and rising main

Module II

- **Water treatment Process:** Water supply scheme, plain sedimentation, aeration, sedimentation tank & 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

- **Distribution System:** Layout of distribution networks, methods of water distribution, storage capacity of ESR, and underground service reservoir.

Module IV

- **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

Module V

- **Noise Pollution:** Measurement of sound, Sources, Effects and control of noise pollution.

D. Lesson Planning

Sr. No.	Unit	Minimum Hours	Weightage
1.	Introduction	04	5%
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	5%
Total Hours		45	100%

E. List of Experiments/Design:

Experiment No.	Name of Experiment	No of turns
1.	Introduction to Equipment, Standards, Sampling, Collection and Preservation of samples in Environmental Engineering Laboratory	1
2.	Determination of pH and conductivity for water and wastewater	1
3.	Determination of Acidity for water	1
4.	Determination of Alkalinity for water	1

5.	Determination of Hardness for water	1
6.	Determination of Solids(suspended, dissolved and settleable)	1
7.	Determination of residual chlorine for water	1
8.	Determination of Dissolved solids for water	1
9.	Determination of optimum dosage by jar test	1
10.	Ambient air quality measurement using High Volume sampler	1
11.	Measurement of noise at different sources using sound meter	1
12.	Design of Tree type distribution network	1
13.	Design of Water treatment units	3

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:

- The students will gain an experience in the implementation of environmental Engineering on engineering concepts which are applied in field.
- 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. 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. 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