

ENVIRONMENTAL ENGINEERING

Course Objectives:

- Outline planning and the design of water supply systems for a community/town/city
- Impart understanding of importance of protection of water source quality and enlightens the efforts involved in converting raw water into clean potable water.
- Outline planning and the design of wastewater collection, conveyance and treatment systems for a community/town/city.
- Impart understanding of treatment of sewage and the need for its treatment.
- Effluent disposal method and realize the importance of regulations in the disposal of effluents in rivers.

Course Outcomes:

- Plan and design the water distribution networks.
- Selection of suitable method for water treatment.
- Plan and design the sewerage systems
- Analyze sewage and suggest suitable treatment system for sewage treatment
- Suggest a suitable disposal method with respect to effluent standards.

SYLLABUS

UNIT-I

Water Quantity Estimation: Water Requirements Estimation of water demand for a town or city, Per capita Demand and factors influencing it - Design Period, Factors affecting the Design period, Population Forecasting.

Distribution of Water: Requirements- Methods of Distribution system, Layouts of Distribution networks, Pressures in the distribution layouts, Design of Distribution network.

Sources of Water: Surface sources: Lakes, Rivers, Impounding Reservoirs - Groundwater sources of water: springs, Wells and Infiltration galleries. Comparison of sources with reference to quality, quantity and other considerations

UNIT-II

Collection and Conveyance of Water: Types of Intakes; Conveyance of Water:-Gravity and Pressure conduits.

Quality and Analysis of Water: Characteristics of water-physical, chemical and biological; analysis of water – physical, chemical and biological; W.H.O. Quality standards for drinking water

Treatment of Water: basic unit processes and operations for water treatment: Flowchart of water treatment plant, treatment methods: Plain sedimentation, sedimentation with coagulation, filtration, disinfection.

UNIT-III

Collection and Conveyance of Waste Water – Classification of sewerage systems- Estimation of sewage flow and storm water drainage ;design of sewers and storm drains

Pumping of wastewater: Pumping stations – location – components– types of pumps.

UNIT – IV

Sewage Characteristics: Analysis of wastewater - Physical, Chemical and Biological Examination-Measurement of BOD and COD - BOD equations.

Primary Treatment of sewage: Screens-grit chambers-grease traps– floatation– sedimentation – design of preliminary and primary treatment units.

UNIT – V

Suspended growth process: Activated Sludge Process, principles, designs

Attached Growth Process: Trickling Filters–mechanism of impurities removal- design

Anaerobic Processes: Septic Tanks and Imhoff tanks- working Principles and Design

Disposal of sewage: Effluent Discharge Standards; Tertiary Treatment Of Wastewater; Disposal By Dilution-Standards; Land Treatment-Standards; Sludge Disposal.

Text Books

1. Wastewater Engineering Treatment and Reuse, Metcalf & Eddy, Tata McGraw-Hill edition.
2. Industrial Water and Wastewater Management, K.V.S.G. Murali Krishna
3. Elements of Environmental Engineering, K. N. Duggal, S. Chand & Company Ltd. New Delhi, 2012.

References

1. Environmental Engineering, Howard S. Peavy, Donald R. Rowe, George Tchobanoglous – Mc-Graw-Hill Book Company, New Delhi, 1985
2. Wastewater Treatment for Pollution Control and Reuse, Soli. J Arceivala, Sham R Asolekar, Mc-Graw Hill, New Delhi; 3rd Edition
3. Environmental Engineering –II: Sewage disposal and Air Pollution Engineering, Garg, S. K., Khanna Publishers, 2003
4. Environmental Engineering, D. Srinivasan, PHI Learning Private Limited, New Delhi, 2011.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	3	1	1	1	1	3	2	3	2
CO2	3	3	2	3	2	3	3	1	1	1	1	3	2	3	2
CO3	3	3	2	3	2	3	3	1	1	1	1	3	2	3	2
CO4	3	3	2	3	2	3	3	1	1	1	1	3	2	3	2
CO5	3	3	2	3	2	3	3	1	1	1	1	3	2	3	2