

ENVIRONMENTAL ENGINEERING

VII Semester: CE																										
Course Code	Category	Hours / Week			Credits	Maximum Marks																				
ACEB22	CORE	L	T	P	C	CIA	SEE	Total																		
		3	-	-	3	30	70	100																		
Contact Classes: 45		Tutorial Classes: Nil		Practical Classes: Nil		Total Classes: 45																				
<p>I. COURSE OVERVIEW: Environmental Engineering is a very popular discipline of engineering that deals with the issues related to the environment. The Environmental Engineers devote themselves finding out renewable sources of energy and solutions to curb pollution and other environmental issues. They work for the sustainable development of the earth and its living organisms. They also make devices for waste and water management in rural and urban areas, improved sanitation system, to stop the water-borne diseases. They study the effects of technological growth on environment such as: the effects of global warming, pollution, reason for shortage of rainfall, acid rain etc. In short, the Environmental Engineers are constantly engaged in maintaining the health of the earth and the living creatures on it; this course also cover the study of construction of oxidation pond, sludge digestion tank, skimming tanks, grit chambers, sedimentation tanks and designing of septic tanks and soak pits.</p> <p>II. OBJECTIVES: The course should enable the students to:</p> <p>I The quality and quantity of drinking water standards and know the demand of water for a particular community</p> <p>II The basic standards of water and study the procedure for determination</p> <p>III The conventional process of water and waste water treatment methods, and know the distribution system</p> <p>IV Ultimate disposal methods of wastewater, self-purification of rivers, sewage farming.</p> <p>III. COURSE OUTCOMES: After successful completion of the course, students should be able to:</p> <p>CO 1 Choose an appropriate method of population forecast for ensuring quantity of water to meet future demand. Remember</p> <p>CO 2 Estimate the quantity of water for designing adequate distribution system and supply. Apply</p> <p>CO 3 Make use of different solid waste management techniques for disposing solid waste without polluting environment. Understand</p> <p>CO 4 Utilize the integrated waste management systems effectively for reducing impact of pollutions on human health and environment. Understand</p> <p>CO 5 Develop an effective sewerage system for decomposing and disposing solid waste without causing harm to human inhabitants and environment. Apply</p> <p>CO 6 Identify a suitable method of wastewater treatment for improving the quality of water. Understand</p> <p>IV. SYLLABUS:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">MODULE - I</td> <td style="width: 65%;">WATER QUALITY, DEMAND AND SUPPLY</td> <td style="width: 20%; text-align: right;">Classes: 09</td> </tr> <tr> <td colspan="3">Protected water supply, population forecasts, design period, water demand, types of demand, factors affecting fluctuations, fire demand, storage capacity, water quality and testing. Drinking water standards. Sources of water supply - intakes, infiltration galleries.</td> </tr> <tr> <td>MODULE - II</td> <td>WATER TREATMENT AND DISTRIBUTION</td> <td style="text-align: right;">Classes: 09</td> </tr> <tr> <td colspan="3">Types of layouts of distribution systems, design of distribution systems using Hardy Cross and equivalent pipe methods. Components of Water Supply System - Service reservoirs, joints, valves - sluice valves, air valves, scour valves and check valves, water meters, laying and testing of pipe lines, pump house.</td> </tr> <tr> <td>MODULE - III</td> <td>SOLID WASTE MANAGEMENT</td> <td style="text-align: right;">Classes: 09</td> </tr> <tr> <td colspan="3">Solid Waste Management - Municipal Solid Waste (MSW), Composition and various chemical and physical parameters of MSW. Types of MSW: waste from commercial establishments and other urban areas, solid waste from construction</td> </tr> </table>									MODULE - I	WATER QUALITY, DEMAND AND SUPPLY	Classes: 09	Protected water supply, population forecasts, design period, water demand, types of demand, factors affecting fluctuations, fire demand, storage capacity, water quality and testing. Drinking water standards. Sources of water supply - intakes, infiltration galleries.			MODULE - II	WATER TREATMENT AND DISTRIBUTION	Classes: 09	Types of layouts of distribution systems, design of distribution systems using Hardy Cross and equivalent pipe methods. Components of Water Supply System - Service reservoirs, joints, valves - sluice valves, air valves, scour valves and check valves, water meters, laying and testing of pipe lines, pump house.			MODULE - III	SOLID WASTE MANAGEMENT	Classes: 09	Solid Waste Management - Municipal Solid Waste (MSW), Composition and various chemical and physical parameters of MSW. Types of MSW: waste from commercial establishments and other urban areas, solid waste from construction		
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activities, biomedical wastes. MSW management: Collection, transport, treatment and disposal of MSW. Effects of solid waste on environment: effects on air, soil, water surface and ground health hazards.

Disposal of solid waste-segregation, reduction at source, recovery and recycle. Disposal methods- Integrated solid waste management. Hazardous waste: Types and nature of hazardous waste as per the HW Schedules of regulating authorities.

MODULE - IV	SEWAGE TREATMENT AND DISPOSAL	Classes: 09
<p>Characteristics of sewage, cycles of decay, decomposition of sewage, examination of sewage, B.O.D. and C.O.D. equations. Sewage and Storm water estimation - shapes and materials, design of sewers. Sewer appurtenances - manhole, inverted siphon, catch basins, flushing tanks, ejectors, pumps and pump houses. House drainage components requirements - sanitary fittings, traps, one pipe and two pipe systems of plumbing, ultimate disposal of sewage.</p>		
MODULE - V	OVERVIEW OF WASTEWATER TREATMENT	Classes: 09
<p>Lay out and general outline of various units in a Waste Water Treatment Plant – Steps involved in Primary Secondary, and Tertiary treatment of waste water. Sludge digestion tanks, factors effecting design of sludge digestion tank, sludge disposal by drying, septic tanks working principles and design - soak pits.</p>		
Text Books:		
<ol style="list-style-type: none"> 1. S.K. Garg, “Environmental Engineering”, Vol. I., Khanna Publishers, 20th Edition, 2011. 2. Birdie, G.S. and Birdie, “Water Supply and Sanitary Engineering”, Dhanpat Rai& Sons, 1992. 3. Duggal, K.N. “Elements of Environmental Engineering”, S.Chand & Co, 2002. 4. Punmia B.C, Ashok Jain & Arun Jain, “Water Supply Engineering”, Laxmi Publications, Pvt. Ltd., New Delhi, 2004. 5. Solid waste management shabana Yasmin, Global research publications, 1st Edition, 2013. 6. Solid and Liquid waste management, Vasudevan Rajaram, Faisal Zia siddiqui, PHI Learning ,2013 		
Reference Books:		
<ol style="list-style-type: none"> 1. Metcalf and Eddy, “Waste Water Engineering, Collection, Treatment and Disposal”, Tata McGraw Hill, Inc., New York, 2. H.S. Peavy and D.R. Rowe, “Environmental Engineering”, 2nd Edition, Mc.Graw Hill Publishing 		
Web References:		
<ol style="list-style-type: none"> 1. https://www.youtube.com/watch?v=pl8Isc7Xiv8 2. https://www.youtube.com/watch?v=8MJ4qd9A9T0 3. https://www.youtube.com/watch?v=I1E0RdHw9gU 4. https://www.youtube.com/watch?v=gxgpK1EUZns 		
E-Text Books:		
<ol style="list-style-type: none"> 1. https://easyengineering.net/sewage-waste-disposal-and-air-pollution-engineering-by-santosh-kumar-garg/ 2. http://www.e-booksdirectory.com/details.php?ebook=7400re 		