

GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Department of Computer Science and Engineering

Academic Year: **2017-18**

Semester: **EVEN**

COURSE PLAN

Semester: **VI**

Subject Code& Name: **10CV61&Environmental Engineering- I**

Name of Subject Teacher: **SREEVIDYA RAMAN. S**

Name of Subject Expert (Reviewer): **K. PRABHAKAR**

For the Period: From: 6-02-12 to 2-06-17

Details of Book to be referred:

Text Books	<ol style="list-style-type: none"> 1. Water supply Engineering –S.K.Garg, Khanna Publishers 2. Environmental Engineering I –B C Punima and Ashok Jain 3. Manual on Water supply and treatment –CPHEEO, Ministry of Urban Development, New Delhi
Reference Books	<ol style="list-style-type: none"> 1. Hammer, M.J., (1986), Water and Wastewater Technology –SI Version, 2nd Edition, John Wiley and Sons. 2. Karia, G.L., and Christian, R.A., (2006), Wastewater Treatment – Concepts and Design Approach, Prentice Hall of India Pvt. Ltd., New Delhi. 3. Metcalf and Eddy, (2003), Wastewater Engineering, Treatment and Reuse , 4th Edition, Tata McGraw Hill Edition, Tata McGraw Hill Publishing Co. Ltd.
Lecture Notes	L1- prepared lecture notes

Lecture NO	Topic Planned	Practical Applications & Brief objectives	Book referred with Pg No.	Planned Date	Executed Date	Deviation Reasons thereof	How Made Good / Reciprocate arrangement	Remarks by HOD	
1.	Unit – 1 INTRODUCTION Human activities and environmental pollution. Water for various beneficial uses and quality requirement	Objectives 1. Usage of water for domestic and industrial activity, the outcome will be form of effluent 2. To devise cost effective water collection and distribution systems. Application 1. Minimize water pollution 2. Apply empirical formula in calculating water demand. Outcome They understand the importance of maintaining the quality and also the quantity of environment.	T1-1	7-2-17	ii				
2.	Need for protected water supply		T1-1,2	8-2-17					
3.	DEMAND OF WATER Introduction, types of water demands- domestic demand in detail.		T1-7	8-2-17					
4.	Institutional and commercial, public uses, fire demand		T1-7	9-2-17					
5.	Per capita consumption – factors affecting per capita demand		T1-14	10-2-17					
6.	Population forecasting, different methods Arithmetic mean		T1-27	10-2-17					
7.	Geometric mean Method, Incremental increase Method		T1-28	14-2-17					
8.	Merits & demerits of population forecasting, variations in demand of water		T1-30	15-2-17					
9.	Fire demand – estimation by Kuichling's formula, Freeman formula & national board of fire underwriters formula		T1-11	15-2-17					

10.	Peak factors, design periods & factors governing the design periods		T1-24	16-2-17				
11.	UNIT TEST			17-2-17				
12.	Unit – 2 SOURCES: Surface suitability with regard to quality and quantity.	Objective To identify and recognize the potential sources of water and intake structure Application To design the intake structure used for collection and conveyance of the water Outcome Attain brief knowledge on sources of water and intakes	T2-32	17-2-17				
13.	subsurface sources – suitability with regard to quality and quantity		T2-33	21-2-17				
14.	COLLECTION AND CONVEYANCE OF WATER: Intake structures- different types of intakes;		T1-202	22-2-17				
15.	Canal intake structures		T1-212	22-2-17				
16.	Reservoir and river intake structures, factor of selection and location of intakes.		T1-204	23-2-17				
17.	Pumps- Necessity, types – power of pumps; factors for the selection of a pump.		T2-427	28-2-17				
18.	Pipes – Design of the economical diameter for the rising Main		L1	1-3-17				
19.	Nomograms – use; Pipe appurtenances.		L1	1-3-17				
20.	TUTORIAL- Case study			2-3-17				
21.	Revision / Unit Test			3-3-17				

22.	Unit – 3 QUALITY OF WATER: Objectives of water quality management. wholesomeness & palatability	Objectives 1. To treat the water to meet the local regulations 2. Techniques involved in sampling Application To know the water quality before and after treatment Outcome Knowledge about water quality Standards and its permissible limits	T1-321	3-3-17				
23.	Water quality parameters – Physical, chemical and Microbiological.		T1-322	4-3-17				
24.	Sampling of water for examination- Grab and composite		L1	7-3-17				
25.	Water quality analysis (IS: 3025 and IS: 1622) using analytical and instrumental techniques.		T1-355	8-3-17				
26.	Drinking water standards BIS & WHO guidelines.		T1-356	8-3-17				
27.	Water borne diseases. Health significance of Fluoride, Nitrates and heavy metals like Mercury, Cadmium, Arsenic etc. and toxic / trace organics.		T1-359	14-3-17				
28.	TUTORIAL- Case study		15-3-17					
29.	Revision / Unit Test		15-3-17					
30.	Unit - 4 WATER TREATMENT: Introduction, Objectives – Treatment flow-chart.	Objectives To learn about water treatment process and types of treatment Application Designing the water treatment plant for meet the requirement Outcomes Practical knowledge about treatment plant	T1-228	16-3-17				
31.	Aeration- Principles, types of Aerators.		T1-229	17-3-17				

32.	Theory of Sedimentation, settling tanks & types,		T1-238	17-3-17				
33.	design of sedimentation		T1-263	21-3-17				
34.	Coagulant aided sedimentation, jar test		T1-266	22-3-17				
35.	chemical feeding, flash mixing, and clariflocculator		T1-272	22-3-17				
36.	TUTORIAL- Case study			23-3-17				
37.	Revision / Unit Test			24-3-17				
38.	Unit – 5 FILTRATION: Mechanism and theory of filtration	Objective To learn about filtration process and types Application To remove the suspended and colloidal particles in the treated water Outcome Understand the methods available to reduce pollution	T2-311	28-3-17				
39.	Slow sand filters construction & operation		T2-314	30-3-17				
40.	rapid sand construction & operation		T2-320	31-3-17				
41.	Pressure filters construction & operation		T2-353	1-4-17				
42.	Back washing of filters.		T2-357	4-4-17				
43.	Operational problems in filters.		T2-359	5-4-17				
44.	TUTORIAL- Case study			5-4-17				

45.	Revision / Unit Test			6-4-17				
46.	Unit – 6 DISINFECTION Theory of disinfection, types of disinfection	Objective 1.To learn about disinfection process and types 2. To learn the process of water softening Application To remove micro-organism in the treated water Outcome Understand the methods available to reduce pollution	T2-363	7-4-17				
47.	Chlorination and types of Chlorination		T2-366	7-4-17				
48.	Chlorine demand, residual chlorine, use of bleaching powder		T2-367	11-4-17				
49.	UV irradiation treatment – treatment of swimming pool water		T2-364	12-4-17				
50.	SOFTENING – definition, methods of removal of temporary hardness		T2-394	12-4-17				
51.	Removal of permanent hardness by lime soda process, zeolite process RO & Membrane technique		T2-402,405	13-4-17				
52.	TUTORIAL- Case study			20-4-17				
53.	Revision / Unit Test			21-4-17				
54.	Unit – 7 MISCELLANEOUS TREATMENT: Removal of color, taste and odour		T1-520	21-4-17				
55.	adsorption technique, fluoridation and defluoridation		Objectives Further removal of chemical, metals etc to make the water portable Application Treatment methods to remove impurities in water	T2-417,418	2-5-17			

		Outcome Understand the methods available for effective treatment to meet the IS 10500:2012 requirement						
56.	DISTRIBUTION SYSTEMS: System of supply, Service reservoirs and their capacity determination		T2-504	3-5-17				
57.	Methods of layout of distribution systems.		T2-554	3-5-17				
58.	TUTORIAL- Case study			4-5-17				
59.	Revision / Unit Test			5-5-17				
60.	Unit - 8 MISCELLANEOUS: Pipe appurtenances, various valves	Objectives To make the design effective in distribution mains Application Use of fire hydrants for asset protection Outcomes To build an effective design of fire hydrants	L1	5-5-17				
61.	Type of fire hydrants, pipefitting, Layout of water supply pipes in buildings.		L1	6-5-17				
62.	TUTORIAL- Case study			9-5-17				
63.	Revision / Unit Test			10-5-17				

Prepared By: _____
(Faculty)
Date & Sign _____

Reviewed by: _____
(Sub. expert)
Date & Sign _____

Approved by: _____
(HOD)
Date & Sign _____

Approved by: _____
(Principal/ Acad. Co)
Date & Sign _____