SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956
Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF CIVIL ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement of Semester
16CE7E01	ENVIRONMENTAL ENGINEERING	VII	Civil Engineering	5	2021-2022	4/10/2021

COURSE OUTCOMES

1	Define the sewerage systems. [K1]
2	Determine Characterization of Sewage. [K3]
3	Develop appropriate appurtenances in the Sewarage Systems [K6]
4	Design suitable treatment flow for Sewage treatment. [K3]
5	Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river. [K4]
6	Observe Bio - Solids (Sludge) management practices. [K1]

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
I	Define the sewerage systems. [K1]	1.1	systems of sanitation	T1,T2	1	Chalk, Board, Ppt
		1.2	Relative merits & demerits	T1,T2	1	
		1.3	Collection and conveyance of waste water	T1,T2, R1	1	
		1.4	Sewerage - classification of sewerage systems	T1,R1, R2	1	
		1.5	Estimation of sewage flow and storm water drainage	T1,T2, R1	1	
		1.6	Fluctuations - types of sewers – Hydraulics of sewers and storm drains	T1,T2, R1,R2	1	
		1.7	Design of sewers	T1,R1	1	
		1.8	Appurtenances in sewerage	T1,R1	1	
		1.9	Cleaning and ventilation of sewers.	T1,T2	1	
		1.10	Systems of sanitation	T1,T2	1	
		1.11	Relative merits & demerits	T1,R1,	1	

				R2		
Content beyond Syllabus (if needed)			Design criteria of storm water drainage	T1	1	
					12	
II	Determine Characterization of Sewage. [K3]	2.1	Pumping of wastewater:	T1,T2	1	Chalk, Board, Ppt
		2.2	Pumping stations location	T1,T2, R1	1	
		2.3	Components	T1,T2, R1,R2	1	
		2.4	Types of pumps and their suitability with regard to wastewaters.	T1,R1	1	
		2.5	House Plumbing:	T1,T2	1	
		2.6	Systems of plumbing Design of building drainage	T1,T2	1	
		2.7	Sanitary fittings and other accessories	T1,T2	1	
		2.8	One pipe and two pipe systems	T1,T2, R1	1	
		2.9	Design of building drainage	T1,T2	1	
		2.10	Pumping stations location	T1,T2	1	
		2.11	Components	T1,T2	1	
Content beyond Syllabus (if needed			Types of sanitary fittings	T1,R1	1	
				Total	12	
III	Develop appropriate appurtenances in the Sewarage Systems [K6]	3.1	Sewage characteristics	T1,T2, T3	1	Chalk, Board, Ppt
		3.2	Sampling and analysis of wastewater	T1,T2	1	
		3.3	Physical, Chemical	T1,T2	1	
		3.4	Biological Examination	T1,T2	1	
		3.5	Measurement of BOD	T1,R1	1	Chalk, Board, Ppt
		3.6	COD - BOD equations.	T1,R1	1	
		3.7	Treatment of sewage	T1,T2	1	
		3.8	Primary treatment	T1,T2	1	
		3.9	Screens-grit chambers	T1,T2	1	
		3.10	Grease traps-floatation	T1,T2	1	
		3.11	Sedimentation- design of preliminary and primary treatment units	T1,T2	1	
Content beyond Syllabus (if needed)			**Types of Screens**	T1	1	
				Total	12	
IV	Design suitable treatme	4.1	Secondary treatment:	T1,T2	1	Chalk, Board, Ppt
		4.2	Aerobic and anaerobic treatment process	T1,R1	1	
		4.3	Comparison. Suspended growth process:	T1	1	

	nt flow for Sewage treatme nt. [K3]		Activated			
		4.4	Sludge Process, principles, designs, and operational problems,	T1,T2	1	
		4.5	Modifications of Activated Sludge Processes,	T1,R1	1	
		4.6	Oxidation ponds, Aerated Lagoons.	T1,T2	1	
		4.7	Attached Growth Process: Trickling Filters	T1,R1	1	
		4.8	Mechanism of impurities removal	T1,T2	1	
		4.9	Classification	T1,T2	1	
		4.10	Designoperation and maintenance problems.	T1,T2	1	
		4.11	RBCs, Fluidized bed reactors.	T1,R2	1	
Content beyond Syllabus (if needed)			**Chlorination methods**	T1,T2	1	
				Total	12	
V	Identify the critical point of pollutio n in a river for a specific amount of pollutan t disposal into the river. [K5]	5.1	Miscellaneous Treatment Methods: Nitrification and Denitrification	T1,T2	1	Chalk, Board, Ppt
		5.2	Removal of Phosphates	T1,T4	1	
		5.3	UASBMembrane reactors	T1,T2	1	
		5.4	Integrated fixed film reactors	T1;R1	1	
		5.5	Anaerobic Processes: Septic Tanks	T1,T2	1	
		5.6	Imhoff tanks	T1,T4	1	
		5.7	Working Principles and Design	T1	1	
		5.8	Disposal of septic tank effluent	T1,T2,R3	1	
		5.9	Nitrification and Denitrification	T1,T2	1	
		5.10	Integrated fixed film reactors	T1,T2	1	
		5.11	Working Principles and Design	T4	1	
Content beyond Syllabus (if needed)			**Types of integrated fixed film reactors**	T1	1	

				Total	12	
VI	Observe Bio - Solids (Sludge) management practices. [K1]	6.1	Bio-solids (Sludge) management: Characteristics	T1,T2	1	Chalk, Board, Ppt
		6.2	Handling and treatment of sludge	T1	1	
		6.3	thickening	T4,T,R2	1	
		6.4	Anaerobic digestion of sludge.	T1, R3	1	
		6.5	Disposal of sewage:	T1	1	
		6.6	Methods of disposal	T3, R2	1	
		6.7	Disposal into water bodies Oxygen Sag Curve	T1,T,R2	1	
		6.8	Disposal on landsewage sickness	T1,T2	1	
		6.9	Handling and treatment of sludge	T3,R2	1	
		6.10	Methods of disposal	T1,T2,R3	1	
Content beyond Syllabus (if needed)		6.11	Anaerobic digestion of sludge.	T1,T4, R3	1	
			Analysis of oxygen sag curve	T1,T2, R2	1	
				Total	12	
				CUMULATIVE PROPOSED PERIODS	72	

Text Books:	
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Metcalf & Eddy, Wastewater Engineering Treatment and Reuse, Tata McGraw-Hill edition.
2	K.N. Duggal, Elements of Environmental Engineering, S. Chand & Company Ltd. New Delhi, 2012.
3	Howard S. Peavy, Donald R. Rowe, Environmental Engineering, Teorge George TchobanoglusMc-Graw-Hill Book Company, New Delhi, 1985.
Reference Books:	
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Garg, S.K, Environmental Engineering -II: Sewage disposal and Air Pollution Engineering, Khanna Publishers.
2	Dr. P.N. Modi & Sethi. Sewage treatment and disposa
3	Ruth F. Weiner and Robin Matthews, Environmental Engineering, 4th Edition Elsevier, 2003.
Web Details	
1	**https://www.google.com/search?q=systems+of+sanitation&rlz=1C1CHWL_enIN983IN984&oq=systems+of+sanitation+&aqs=chrome..69i57j0i512l3j0i22i30.1421j0j15&sourceid=chrome&ie=UTF-8**
2	**https://www.google.com/search?q=Aerobic+and+anaerobic+treatment+process&newwindow=1&rlz=1C1CHWL_enIN983IN984&sxsrf=AOaemvL0G12K8gJPan1rQ2Uzovjr RG95vA%3A1639585186596&ei=ohW6YafmI4qK4-EP9dK-kA4&ved=**

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		Name	Signature with Date
i.	Faculty	Mr. RAJIV . S . R	31/10/21
ii.	Course Coordinator	Mr. RAJIV . S . R	31/10/21
iii.	Module Coordinator	Mr. A. VENKATA KRISHNA	4/10/21
iv.	Programme Coordinator	Mr. G.V.L.N MURTHY	

Principal