



Department of Chemical Engineering		LP: CH 18006
		Rev. No: 00
B.E/B.Tech/M.E/M.Tech : <u>Chemical Engineering</u>	Regulation: 2018A	Date:
PG Specialisation : Not Applicable		04.01.2024
Sub. Code / Sub. Name : CH18006 WASTE WATER TREATMENT		
Unit : I		

Unit Syllabus:

Terminology – Regulations – Health and Environment Concerns in wastewater management – Constituents in wastewater inorganic – Organic and metallic constituents.

Objective: To understand regulations, constituents, health and environment Concerns in wastewater management

Session No *	Topics to be covered	Ref	Teaching Aids
1	Terminology involved in waste water treatment	1-Ch 1-Pg.no:2-3	PPT,BB
2	Impact of regulations in waste water engineering	1-Ch 1-Pg.no:2-3	PPT,BB
3	Health and Environment Concerns in wastewater management	1-Ch 1-Pg.no:7	PPT,BB
4	Waste water Characteristics	1-Ch 1-Pg.no:9-10	PPT,BB
5	Waste water constituents	1-Ch 2-Pg.no:27-29	PPT,BB
6	Inorganic metallic constituents	1-Ch 2-Pg.no:57-64	PPT,BB
7	Metallic constituents	1-Ch 2-Pg.no:77-78	PPT,BB
8	Aggregate organic constituents	1-Ch 2-Pg.no:80-81	PPT,BB
9	Individual organic constituents	1-Ch 2-Pg.no:99-102	PPT,BB

Content beyond syllabus covered (if any): Waste utilization from Pharmaceutical Industry

* Session duration: 50 minutes



Sub. Code / Sub. Name: CH18006 WASTE WATER TREATMENT

Unit : II

Unit Syllabus :

Components of wastewater flows – Analysis of Data – Reactors used in wastewater treatment – Mass Balance Analysis – Modeling of ideal and nonideal flow in Reactors – Process Selection.

Objective: To understand principle about various reactors in waste water treatment

Session No *	Topics to be covered	Ref	Teaching Aids
10	Components of waste water flows	1-Ch 3 - Pg.no:153-154	PPT,BB
11	Waste water sources and flow rates	1-Ch 3 - Pg.no:154-155	PPT,BB
12	Statistical analysis of flow rates	1-Ch 3 - Pg.no:170-171	PPT,BB
13	Analysis of waste water flow rate data	1-Ch 3 - Pg.no:178-180	PPT,BB
14	Mass balance analysis	1-Ch 4 - Pg.no:222-225	PPT,BB
15	Modeling Ideal flow in reactors	1-Ch 4 - Pg.no:226-227	PPT,BB
16	Modeling non ideal flow in reactors	1-Ch 4 - Pg.no:229-233	PPT,BB
17	Modeling treatment process kinetics	1-Ch 4 - Pg.no:269-270	PPT,BB
18	Introduction to process selection	1-Ch 4 - Pg.no:297-301	PPT,BB

Content beyond syllabus covered (if any): Application of biotechnology for industrial waste treatment

* Session duration: 50 mins



Sub. Code / Sub. Name: CH18006 WASTE WATER TREATMENT

Unit : III

Unit Syllabus:

Role of unit processes in wastewater treatment chemical coagulation – Chemical precipitation for improved plant performance chemical oxidation – Neutralization – Chemical Storage.

Objective: To understand the role of unit processes in waste water treatment

Session No *	Topics to be covered	Ref	Teaching Aids
19	Role of unit processes in wastewater treatment	1-Ch 6 - Pg.no:475-478	PPT,BB
20	Fundamentals of chemical coagulation	1-Ch 6 - Pg.no:478-486	PPT,BB
21	Chemical precipitation for improved plant performance	1-Ch 6 -Pg.no: 493-499	PPT,BB
22	Chemical precipitation for phosphorous removal	1-Ch 6 -Pg.no: 500-507	PPT,BB
23	Comparison of chemical Phosphorous removal process	1-Ch 6 -Pg.no: 508-509	PPT,BB
24	Chemical oxidation	1-Ch 6 -Pg.no: 517-524	PPT,BB
25	Chemical neutralization, scale control and stabilization	1-Ch 6 -Pg.no: 526-532	PPT,BB
26	Chemical storage	1-Ch 6 -Pg.no: 532-533	PPT,BB
27	Feeding Piping and control systems	1-Ch 6 -Pg.no: 533-540	PPT,BB

Content beyond syllabus covered (if any): Implementation of industrial ecology for industrial hazardous waste management

* Session duration: 50 mins



Sub. Code / Sub. Name: CH18006 WASTE WATER TREATMENT

Unit : IV

Unit Syllabus:

Overview of biological Treatment – Microbial metabolism – Bacterial growth, Aerobic biological oxidation – Anaerobic fermentation and oxidation – Trickling filters – Rotating biological contractors – Combined aerobic processes – Activated sludge film packing.

Objective: To understand the overview of various biological treatment methods.

Session No *	Topics to be covered	Ref	Teaching Aids
28	Overview of biological waste water treatment.	1-Ch 7 -Pg.no: 547-551	PPT,BB
29	Introduction to Microbial metabolism	1-Ch 7 -Pg.no: 563-565	PPT,BB
30	Bacterial growth and energetics	1-Ch 7 -Pg.no: 565-580	PPT,BB
31	Anaerobic fermentation and oxidation	1-Ch 7 -Pg.no: 629-633	PPT,BB
32	Introduction to Trickling filters	1-Ch 9 -Pg.no: 890-922	PPT,BB
33	Rotating biological contractors	1-Ch 9 -Pg.no: 930-937	PPT,BB
34	Combined aerobic processes	1-Ch 9 -Pg.no: 940-943	PPT,BB
35	Design considerations for combined trickling filter activated sludge systems.	1-Ch 9 -Pg.no:944	PPT,BB
36	Activated sludge with fixed film packing.	1-Ch 9 -Pg.no: 952-955	PPT,BB

Content beyond syllabus covered (If any): Bioassay of industrial and waste pollutants.



Sub, Code / Sub. Name: CH18006 WASTE WATER TREATMENT

Unit : V

Unit Syllabus :

Technologies used in advanced treatment – Classification of technologies Removal of Colloids and suspended particles – Depth Filtration – Surface Filtration – Membrane Filtration Adsorption – Ion Exchange – Advanced oxidation process.

Objective: To understand the technologies used in advanced treatment.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Technologies used in advanced treatment	1-Ch 11 -Pg.no: 1037-1038	PPT,BB
38	Classification of technologies Removal of Colloids and suspended particles	1-Ch 11 -Pg.no: 1038-1044	PPT,BB
39	Depth Filtration	1-Ch 11 -Pg.no: 1044-1057	PPT,BB
40	Surface Filtration	1-Ch 11 -Pg.no: 1098-1103	PPT,BB
41	Membrane Filtration Adsorption	1-Ch 11 -Pg.no: 1104-1135	PPT,BB
42	Application of absorption in waste water treatment	1-Ch 11 -Pg.no: 1138-1161	PPT,BB
43	Gas stripping	1-Ch 11 -Pg.no: 1162-1178	PPT,BB
44	Introduction to ion exchange process	1-Ch 11 -Pg.no: 1180-1196	PPT,BB
45	Advanced oxidation process	1-Ch 11 -Pg.no: 1196-1202	PPT,BB

Content beyond syllabus covered (if any): Treatment of textile wastes

* Session duration: 50 mins



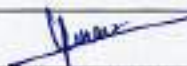
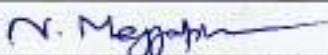
Sub Code / Sub Name: CH18006 WASTE WATER TREATMENT

TEXTBOOKS:

1. Wastewater Engineering Treatment and Reuse: McGraw Hill, G. Tchobanoglous, FI Biston, 2002.
2. Industrial Wastewater Management Treatment and Disposal by Wastewater McGraw Hill Third Edition 2008.

REFERENCES:

1. Rumana Riffat, Fundamentals of Wastewater Treatment and Engineering, CRC Press, Taylor Francis group, 2012

	Prepared by	Approved by
Signature		
Name	Dr.G.Manikandan	Dr N. MEYYAPPAN
Designation	Assistant Professor	Professor & Head / CH
Date	04.01.2024	04.01.2024
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD