COURSE PLAN

COURSE / CODE: WASTEWATER ENGINEERING / SKAB 2922

COURSE LEARNING OUTCOMES

By the end of the course, students should be able to :

1. **Describe** the basic concept of microbiology, wastewater characteristics, sewer system and able to **explain** the concept of wastewater treatment and sludge treatment system (CLO 1; PLO 1)
2. **Solve** problems related to wastewater parameters and **design** unit processes in sewage treatment system (CLO 2; PLO 3)
3. Produce report or presentation related to current environmental issues (CLO 3; PLO 12)

LECTURE PLANNING

WEEK	LECTURE	TOPIC / CONTENT	DATE
1	1 2	Introduction Environmental Microbiology – Types and Classes	
2	3 4	Environmental Microbiology – Metabolism and Biological Growth in Wastewater Treatment Wastewater – Types, Characteristics – SS	
3	5 6	Wastewater - Characteristics – BOD Wastewater - Characteristics – COD	
4	7 8	Discharge Standards & Sewerage Act Wastewater Quantity	
5	9 10	Sewer System **Test 1**	9 October 2018
6	11 12	Introduction to Sewage Treatment System Preliminary Treatment	
7	13 14	Primary Treatment – Primary Clarifier Design Introduction to Secondary Treatment	
8	15 16	Activated Sludge – Principles and Concept Conventional Activated Sludge – Design	
9		**MID SEMESTER BREAK**	6 - 8 November 2018
10	17 18	Conventional Activated Sludge – Design Extended Aeration – Design	
11	19 20	Sequencing Batch Reactor Trickling Filters - Principles and Concept	
12	21 22	Trickling Filters – Biological Tower Design Waste Stabilization Pond – Principles and Concept	
13	23 24	Waste Stabilization Pond – Design Site Visit to Sewage Treatment Plant	
14	25 26	Aerated Lagoon – Principles, Concept and Design **Test 2**	11 December 2018
15	27 28	Sludge – Sources and Quantity Sludge Treatment and Disposal	
16-18		**REVISION WEEK AND FINAL EXAMINATION**	

DISTRIBUTION OF MARKS

1.	Assignment	10 %
2.	Test 1 (1 hour)	20 %
3.	Test 2 (1 hour)	20 %
4.	Final Examination (2 hours)	40 %
5.	Generic Skill (Life Long Learning)	10 %
	TOTAL	100 %

BASIC REFERENCES

1. Warren Viessman, Jr., Mark J. Hammer, Elizabeth M. Perez, and Paul A. Chadik (2009) Water Supply and Pollution Control, 8th Ed. Pearson Education
2. Hammer, M.J. (2005) *Water and Wastewater Technology*, 5th Ed., Pearson Education South Asia Ltd
3. Metcalf & Eddy., (2003) *Wastewater Engineering: Treatment and Reuse*, 4th Ed., Mc Graw-Hill
4. Code of Practice for Design and Installation of Sewerage System (MS1228), 1991