UNIVERSITI TEKNOLOGI MARA

CMT565: WATER AND WASTEWATER TECHNOLOGY

Course Name (English)	WATER AND WASTEWATER TECHNOLOGY APPROVED
Course Code	CMT565
MQF Credit	4
Course Description	The course deals with the characterization of water and wastewater; sampling and preservation; measurement of water flowrate; physical, chemical and biological methods of treatment of water and wastewater; treatment of boiler feed water and cooling tower water as well as environmental impact assessment. The students will have hand-on experiences in the laboratory and acquire further information through field visit or class assignment.
Transferable Skills	Knowledge in performing water and wastewater quality testing
Teaching Methodologies	Lectures, Lab Work, Field Trip
CLO	CLO1 Discuss the concept of water and waste water quality CLO2 Describe various treatment technologies for water and wastewater CLO3 Categorize the application and problems associated with water and waste water in industries CLO4 Perform water and waste water quality tests on industrial effluents and surface waters, and report experimental findings
Pre-Requisite Courses	No course recommendations

Topics
1. Characterization of Water and Wastewater 1.1) Physical parameters 1.2) Chemical parameters.
2. Characterization of Water and Wastewater 2.1) Biological parameters 2.2) Water quality index
3. Sampling and Preservation 3.1) Types of sample. 3.2) Storage and labeling of samples.
4. Measurement of flowrate 4.1) Weir. 4.2) Parshall flume.
5. Water treatment 5.1) Introduction to water treatment 5.2) Aeration 5.3) Coagulation and flocculation. 5.4) Filtration
6. Water treatment 6.1) Water Hardness 6.2) Disinfection
7. Basic biochemistry and microbiology 7.1) Metabolic processes 7.2) Microorganisms in water role in the natural environment. 7.3) Classification of bacteria

8. Municipal wastewater treatment 8.1) Introduction to municipal wastewater treatment. 8.2) Primary treatment
9. Municipal wastewater treatment 9.1) Secondary treatment 9.2) Tertiary treatment
10. Industrial wastewater treatment 10.1) Suspended and attached growth systems of microorganisms. 10.2) Reaction kinetics for the growth of microorganisms and food utilization. 10.3) General description of the process of an activated sludge
11. Industrial wastewater treatment 11.1) Application of reaction kinetic in activated sludge. 11.2) Configurations of activated sludge process 11.3) The operational problems of activated sludge process
12. Industrial wastewater treatment 12.1) Oxidation pond 12.2) Sequencing batch reactor 12.3) Attached growth systems 12.4) Wetland treatment system
13. Industrial wastewater treatment 13.1) Nutrient removal: Oxidation ditch 13.2) Anaerobic digestion
14. Boiler and cooling tower feed water 14.1) Issues in boiler operation. 14.2) Issues in cooling tower operation. 14.3) Treatment of the feedwater

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Group Project	n/a	10%	CLO3
Lab Exercise	n/a	30%	CLO4
Writing Test	n/a	20%	CLO2

Reading List	This Course does not have any book resources
Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources