



University of Management & Technology

School of Science

Department of Life Sciences

Water and Wastewater Treatment

Lecture Schedule	Wednesday & Saturday	Semester	Spring 2021
		Credit Hours	3
Instructor	Mr. Rana Muhammad Kamran Shabbir	Contact	kamran.shabbir@umt.edu.pk
Office	New Faculty Halls, Main Building North Block Old Smoke Area	Office Hours	See office window
Course Description	<p>This course examines current applications of biotechnology to environmental quality evaluation, monitoring, and remediation aquatic environments. Topics include techniques for the characterization of wastewaters; fundamental understanding of many of the existing unit operations and processes used for wastewater treatment, especially those processes used for the biological removal of nutrients; implementation of several newer technologies (e.g. UV disinfection, membrane filtration, and heat drying); concern for the long term health and environmental impacts of wastewater constituents; advanced wastewater treatment and risk assessment for water reuse applications.</p>		
Expected Outcomes	<p>On successful completion of the course students will be able to</p> <ol style="list-style-type: none">1. Explain fundamental water chemistry2. Describe biotechnological solutions to address environmental issues including pollution and water recycling3. Identify the parameters that characterize the constituents found in potable water and wastewater		

	<ol style="list-style-type: none"> 4. Recognise the common physical, chemical and biological unit operations encountered in treatment processes 5. Illustrate the fundamentals of water and wastewater treatment; 6. Discuss water quality data 7. Characterise water and wastewater
Textbook (s)	<ol style="list-style-type: none"> 1. Bitton G, 2011. Wastewater Microbiology. 4 th Edition; Wiley-Blackwell. 2. Metcalf and Eddy, 2003. Wastewater Engineering: Treatment, Disposal, and Reuse. 4 th Edition; McGraw-Hill.
Grading Policy	<ul style="list-style-type: none"> • Quizzes & Assignment(s): 25% • Presentation: 5% • Midterm: 30% • Final Exam: 45%

Course Schedule

Week	Lecture #	TOPICS
1	1 2	<ul style="list-style-type: none"> • Water and wastewater sources and characteristics
2	1 2	<ul style="list-style-type: none"> • Drinking water treatment process
3	1 2	<ul style="list-style-type: none"> • Industrial effluent treatment process; Novel treatment processes and recycling technology
4	1 2	Theory and application of commonly used processes Sedimentation Coagulation Filtration Disinfection
5	1 2	Gas transfer Activated sludge Trickling filters Oxidation ponds Sorption Sludge stabilization and disposal
6	1 2	Process combinations to produce treatment systems
7	1 2	Utilization and management of waste

8	1 2	<p>Role of microorganisms in waste treatment</p> <ul style="list-style-type: none"> • Effluent Disposal
9	1 2	<ul style="list-style-type: none"> • Pathogens and parasites in domestic water • Midterm
10	1 2	<ul style="list-style-type: none"> • Utilization and management of waste • Sludge treatment
11	1 2	<ul style="list-style-type: none"> • Solid waste Management
12	1 2	<ul style="list-style-type: none"> • Wetlands
13	1 2	<ul style="list-style-type: none"> • Phytoremediation
14	1 2	<ul style="list-style-type: none"> • Bioremediation
15		<ul style="list-style-type: none"> • Final term