

College of Engineering

Department of Civil Engineering

جامعة  
الملك سعود  
King Saud University



## CE 509 Biological Treatment Processes

<b>Credit and Contact hours</b>	3/ 3 (Lectures), 0 (Tutorials), 0 (Laboratory)	
<b>Required, or Elective</b>	Required for a MSCE degree	
<b>Course Description</b>	Kinetics of biological growth. Modeling of suspended and attached growths. Aerobic treatment processes: Trickling filters, rotating biological contactors, activated sludge, Aerated lagoons and stabilization ponds. Sludge treatment.	
<b>Prerequisites or Co-requisites</b>	None	
<b>Course Learning Outcomes</b>	Students completing this course successfully will be able to	
	<b>Course Learning Outcomes</b>	<b>Related Program Outcomes</b>
	<b>CLO1:</b> Recognize fundamental and advanced concepts of microbiology in biological treatment processes of wastewater.	<b>K1</b>
	<b>CLO2:</b> Recognize the practical design, operation and monitoring of biological wastewater treatment systems.	<b>K1</b>
	<b>CLO3:</b> Apply fundamental and advanced concepts of microbiology in real-life biological treatment processes of wastewater projects.	<b>S1</b>
	<b>CLO4:</b> Determine and analyze quantity and quality characteristics of wastewaters.	<b>S1</b>
	<b>CLO5:</b> Design and compute the dimensions of biological treatment units in real-life projects.	<b>C2</b>
	<b>CLO6:</b> Design and critically assess different wastewater treatment systems and configurations performing biological organic matter, nitrogen as well as phosphorus removal.	<b>C2</b>

<b>Student Outcomes related to this Course</b>	<p><b>K1.</b> Recognize advanced engineering knowledge, concepts and techniques to identify, interpret and analyze complex and real-life engineering problems.</p> <p><b>S1.</b> Provide solution for complex and real-life engineering problems through critical thinking and using modern engineering tools and identify its impact on social and ethical issues.</p> <p><b>C2.</b> Design novel advanced Civil Engineering systems and evaluate its performance and effectiveness for engineering practice and its impact on society.</p>															
<b>Topics Covered</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%; text-align: center;">List of Topics</th> <th style="width: 20%; text-align: center;">Related CLOs</th> </tr> </thead> <tbody> <tr> <td>1. Characterization and measurement of Wastewater Pollutants.</td> <td style="text-align: center;">CLO4</td> </tr> <tr> <td>2. Biological Treatment Processes</td> <td style="text-align: center;">CLO1</td> </tr> <tr> <td>3. Concepts of Biological Treatment Design, Operation and Monitoring.</td> <td style="text-align: center;">CLO2</td> </tr> <tr> <td>4. Advanced concepts of microbiology in real-life biological treatment processes of wastewater projects</td> <td style="text-align: center;">CLO3</td> </tr> <tr> <td>5. Compute the dimensions of biological treatment units in real-life projects.</td> <td style="text-align: center;">CLO5</td> </tr> <tr> <td>6. Design different wastewater treatment systems used in treating biological organic matter, nitrogen as well as phosphorus.</td> <td style="text-align: center;">CLO6</td> </tr> </tbody> </table>		List of Topics	Related CLOs	1. Characterization and measurement of Wastewater Pollutants.	CLO4	2. Biological Treatment Processes	CLO1	3. Concepts of Biological Treatment Design, Operation and Monitoring.	CLO2	4. Advanced concepts of microbiology in real-life biological treatment processes of wastewater projects	CLO3	5. Compute the dimensions of biological treatment units in real-life projects.	CLO5	6. Design different wastewater treatment systems used in treating biological organic matter, nitrogen as well as phosphorus.	CLO6
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<b>Textbook(s) and Other Required Material</b>	<p>1. Metcalf/Eddy: Wastewater Engineering: Treatment and Reuse, 4th edition, McGraw Hill, Boston, MA.</p>															
<b>Grading System</b>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Assignments</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>Project Work</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>Midterm Exam</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>Final Exam</td> <td style="text-align: right;">40%</td> </tr> </table>		Assignments	20%	Project Work	20%	Midterm Exam	20%	Final Exam	40%						
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<b>Instructors</b>	<p>Dr. Mohab Amin 2A60 maamin@ksu.edu.sa</p>															
<b>Date of Review</b>	<p>February, 2021</p>															