


College of Engineering Department of Civil Engineering		
CE 506 Environmental Chemistry		
Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)	
Required, or Elective	Elective	
Course Description	<p>The course provides comprehensive coverage of the chemistry of natural and polluted waters and on the applied chemistry of water and wastewater treatment. The course covers dilute aqueous solution chemistry of acid-base reactions, chemical kinetics, equilibrium principles, complex formation, precipitation and dissolution reactions, and oxidation-reduction reactions. These fundamental chemical principles are applied to the natural and polluted water, water, and wastewater treatment processes.</p>	
Prerequisites or Co-requisites	None	
Course Learning Outcomes	Students completing this course successfully will be able to:	
	Course Learning Outcomes (CLOs)	Related Student Outcomes (SO)
	CLO1. Recognize oxidation/reduction reactions and precipitation/dissolution of minerals and amorphous solids in waters and predict equilibrium tendencies. K1	SO1
	CLO2. Conduct water chemistry-related experiments according to established procedures, as well as analyze and evaluate the results. S1	SO2
	CLO3. Apply chemical principles techniques to identify, analyze, develop, and solve advanced water and wastewater treatment problems. S1	SO2
	CLO4. Prepare and create professional and ethical written technical reports, including design and implementation plans, and present the work. V1	SO6
Student Outcomes related to this Course	<p>SO 1 Recognize advanced engineering knowledge, concepts, and techniques to identify, interpret, and analyze complex and real-life engineering problems.</p> <p>SO 2 Provide solutions for complex and real-life engineering problems through critical thinking and the use of modern engineering tools, and identify their impact on social, global, cultural, environmental, safety, and economic factors.</p> <p>SO 6 Demonstrate scientific integrity, ethical responsibility, and academic values in scientific publications, research projects, and thesis work.</p>	

Topics Covered	List of Topics		Related CLOs
	1. Introduction and review of general chemistry		CLO 1,2,3
	2. Chemical kinetics		CLO 1
	3. Chemical equilibrium		CLO 1,2
	4. Acid-base chemistry		CLO 1,2,3
	5. Coordination chemistry		CLO 3
	6. Precipitation and dissolution		CLO 1,2,4
	7. Oxidation-reduction reactions		CLO 1,3,4
Textbook(s) and Other Required Material	<ul style="list-style-type: none"> • Required textbook Vernon L. Snoeyink (1980) Water chemistry, New York: Wiley. • The Water Chemistry Laboratory Manual by D. Jenkins, V. 1. Snoeyink, J. F. Ferguson, and J. O. Leckie, 3rd ed" John Wiley & Sons, Inc., New York, 1980 • Mark M. Benjamin (2015) Water Chemistry: Waveland Press, Incorporated. • Werner Stumm, James J. Morgan (1996) Aquatic chemistry: chemical equilibria and rates in natural waters, New York: Wiley. 		
Grading System	Assignments	20%	
	Projects	20%	
	Mid-term exam	20%	
	Final exam	40%	
Instructors	Dr. Yazeed Saud Algurainy / Dr. Faris M Munshi		
Date of Review	November, 2024		