

Course	CE 46500 – Water and Wastewater Engineering
Type of Course	Required
Catalog Description	The underlying principles and design techniques related to water and wastewater collection, transport, quality and treatment including physical, chemical, and biological unit processes.
Credits	3
Contact Hours	3
Prerequisite Courses	CE 36600 – Environmental Engineering Laboratory
Corequisite Courses	
Prerequisites by Topics	Fundamental knowledge of Environmental Engineering and water sample analyses
Textbook and Other Supplemental Materials	M. Hammer and M. Hammer Jr., <i>Water and Wastewater Technology</i> , Prentice Hall, 2011.
Course Objectives	To apply knowledge of mathematics, physics, chemistry, and microbiology to solve and analyze engineering problems related to water and wastewater collection, transport, quality and treatment. To use the fundamental principles of mass balance, chemical kinetics and equilibrium to design water or wastewater reactors to achieve a desirable treatment goal.
Course Outcomes	Students who successfully complete this course will be able to: <ol style="list-style-type: none">1. Select or construct appropriate treatment schemes to remove certain pollutants present in water or wastewater. [1,2,7]2. Design a water or wastewater treatment component. [1,2,6,7]3. Balance chemical reactions and use balanced reactions to determine the distribution of species at equilibrium. [1]4. Develop a mass balance expression for contaminants under different case scenarios and design a simple system to meet desired needs. [1,2]

5. Learn how to characterize source water, and the best available technologies (BAT) for physical and chemical treatment of drinking water. [1,2,7]
6. Learn how to characterize wastewater, and the BAT for physical, chemical and microbiological treatment of wastewater. [1,2,7]
7. Understand selected contemporary global water and wastewater issues such as water shortage, wastewater reuse and emerging contaminants. [4,7]

Lecture Topics

1. Introduction to Water Pollution
2. Aqueous Chemistry
3. Microbiology
4. Water Distribution System
5. Drinking Water Treatment
6. Wastewater Flows and Characteristics
7. Wastewater Collection Systems
8. Wastewater Treatment
9. Wastewater Systems Capacity and Management Review
10. Advanced Wastewater Treatment
11. Water Reuse
12. Selected Contemporary Environmental Issues

Computer Usage

Low

Laboratory Experience

Low

Design Experience

High

Coordinator

Dong Chen, Ph.D., P.E.

Date

16 July 2018