



## ChE 453 - Water and Wastewater Treatment

**Code and Name:** ChE 453: Water and Wastewater Treatment

**Credit Hours:** 3 (Lecture: 3, Tutorial: 1)

**Textbook:**

- Water and Wastewater Engineering: Design Principles and Practice, Mackenzie L. Davis, Wef press, 2010

**Other References:**

- MWH's water treatment: principals and design, Jhon C. Crittenden et al., 3rd Ed., John Wiley & Sons, Inc., 2012

**Course Description:**

This course is an overview of engineering approaches to protecting water quality with an emphasis on fundamental principles. Theory and conceptual design of systems for treating municipal wastewater and drinking water is discussed, Physical, chemical, and biological processes are presented, including sedimentation, filtration, biological treatment, disinfection, and sludge processing. Finally, there is discussion of engineered and natural processes for wastewater treatment.

**Pre-requisites:** CHE 326: Mass Transfer

**Co-requisites:** None

**Course Learning Outcomes:**

With relation to ABET Student Outcomes (SOs: 1-7)

1. Recognize the different water pollution sources (1)
2. Describe the different methods for treatment water and wastewater (4)
3. Design and develop different waste water treatment unit/system (1)
4. Outline the importance of water treatment in the modern life (4)
5. Recall the fundamental of unit operation, mass transfer, and chemical reaction engineering to be applied in water treatment (1)

**Topics to be covered:**

- The Design And Construction Processes
- General Water Supply Design Considerations Flow through beds of solids
- Chemical Handling And Storage Settling
- Chemical Oxidation and Reduction
- Coagulation and Flocculation Introduction,
- Properties of Particulate Solids
- Gravity Separation
- Granular Filtration
- Membrane Filtration
- Disinfection
- Disinfection/Oxidation By-products

**Grading Policy:**

The grading for the course are 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, homework, and projects for the remaining 20% that is modified by the course instructor.

