CE 5230: Physical-Chemical Treatment Processes

Advanced engineering analysis of modern treatment technology with a compelling, fun-to-learn presentation.

Perfect for environmental engineers seeking to advance in the field and learn about the latest advances in the field. Pre-requisite coursework waivers may be available for those with industry experience.

Course Outcomes

1. Explain how important physical-chemical processes water and wastewater treatment integrate in a unit process treatment train
2. Analyze reactors through the application of a conservation of mass
3. Determine how residence time distribution impacts a reactor's performance
4. Balance redox reactions relevant for disinfection and advanced oxidation processes
5. Explain the fundamentals of adsorbents and adsorbates to sorption mechanisms
6. Determine how filter design impacts particle removal efficacy
7. Demonstrate the design fundamentals of membrane process flows
8. Take water pollution by the scruff of the neck and knock it out!

Course Topics

- Mass balances
- Principles and design of physical-chemical unit processes
- Ideal and realistic reactors
- Heterogeneous processes including sorption, precipitation, and dissolution
- Redox and disinfection

- Flocculation/coagulation
- Gravity separations
- Filtration
- Membrane processes

Actual Student Reviews:

- "One thing I like about this course is that it is very engaging and we can always ask questions!"
- "Clearly, [the instructor] knows how to teach effectively despite being in an R1 institution."*
- "The material was very structured/organized which made it easy to follow."
- "One of the best professors I have had at ISU."

*This one's a bit of a left-handed compliment, but sure.