ChE 311 - Chemical Reaction Engineering

Code and Name: ChE 311 – Chemical Reaction Engineering
Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:
- Elements of Chemical Reaction Engineering**,** H. Scott Fogler, 4th edition, Prentice-Hall, Upper Saddle River, NY, 2007
Other References:
- Levenspiel, O. , Chemical Reaction Engineering, 3 rd ed. New York, NY: Wiley, 1999.

Course Description:

Reaction kinetics: batch reactor system, CSTR reactor, tubular reactor, CSTR in series, reaction conversion and rate, adiabatic reaction, isothermal and non-isothermal reaction, catalytic reaction.

Pre-requisites: ChE 222 Chemical Engineering Thermodynamics II, GE 301 Numerical Methods in Engineering
Co-requisites: None

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

1. Calculate conversion in batch and flow systems for given reaction(s). (1)
2. Develop rate laws from mechanisms and experimental data (6)
3. Develop governing equation for designing the reactor based on a given constraints and conditions. (2)
4. Calculate and analyse product selectivity for systems involving multiple reactions. (1)
5. Calculate the volume of the reactor (1)
6. Operate several chemical engineering software such as polymath to solve problem with reaction. (6)

Topics to be covered:

- Mole balances
- Conversion and Reactor Sizing
- Rate Laws and Stoichiometry
- Isothermal Reactor Design
- Collection and Analysis of Rate Data
- Multiple Reactions
- Steady-state Non-Isothermal Reactor Design
- Catalysis and Catalytic Reactions

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.