

ChE 4133 Industrial Catalysis

Engineering elective for ChE program

Catalog Description: Heterogeneous catalysis from a practical perspective. Properties and manufacture of catalytic materials, industrially important catalytic reactions, and design of catalytic reactors.

Prerequisites: ChE 4063

Corequisites: n/a

Prerequisites by Topic: Chemical Kinetics and Reactor Design

Recent Textbook: “Heterogeneous Catalysis in Industrial Practice” by C.N. Satterfield

Other Required Material: None

Course Objectives: At the end of the course, students will:

1. Be able to determine physical properties of catalytic materials such as pore radius and surface area from experimental data,
2. Develop and use LHHW heterogeneous reaction kinetic models from experimental data,
3. Describe how catalytic materials are prepared,
4. Describe the chemical and catalytic properties of zeolites,
5. Be able to determine effectiveness factors for catalytic reactions under specific conditions, and
6. Explain the fundamental possessing aspects of at least one commercially important catalytic reaction.

Major Topics Covered in the Course: Physical properties of catalytic materials, adsorption phenomena, heterogeneous reaction kinetics, supported metal catalysts, catalyst manufacture, zeolites, diffusion and reaction in porous media, important industrial catalytic processes.

Class/Laboratory Schedule: Lecture sessions meet for two 75-minute sessions each week for 14 weeks.

Professional Component Contribution: This is an engineering science/design course.