

ECH 6506
Chemical Engineering Kinetics
Spring 2021

Instructor: Jason F. Weaver (weaver@che.ufl.edu)
Room 331 Chemical Engineering Building, Phone No. 392-0869

Class hours: MWF 12:50-1:40 (period 6)

Location: on-line

Office hours: TBD

Grader: TBD

Grading: Exam I: 50%, Exam II: 50%

Textbook: "Chemical Kinetics and Dynamics", 2nd ed., J.I. Steinfeld, J.S. Francisco and W.L. Hase, Prentice-Hall, 1999.

Website: <http://elearning.ufl.edu/>

Topics

1. Macroscopic Kinetics
 - reaction rate and rate equations
 - elementary reactions
 - complex reactions
 - pseudo steady-state approximation
 - example mechanisms (e.g. chain reactions)
 - thermal rate coefficient
 - general definition of activation energy

2. Molecular Collisions and Microscopic Kinetics
 - Maxwell-Boltzmann distribution of molecular speed and energy
 - kinetic theory of collisions
 - reaction cross section
 - electronic potential energy
 - molecular vibrations (normal modes of vibration)
 - classical scattering theory
 - reaction dynamics

3. Statistical Theories of Reaction Rates
- review of statistical mechanics
 - transition state theory
 - unimolecular reactions

Supplemental textbooks

“Chemical Kinetics”, 3rd ed., K.J. Laidler, New York: Harper and Row, 1987.

“Chemical Kinetics”, R.W. Weston, Jr. and H.A. Schwarz, Englewood Cliffs, NJ, Prentice-Hall, 1972.