

**DRAFT 7.7.23: CHEM 6530 – 7 weeks**  
**Kinetics**  
**Lecture MWF 11:30 AM – 12:25 PM**  
**Evans lab 2003**

**Instructor:** Heather C. Allen, Newman and Wolfrom, Room 3105, [allen@chemistry.ohio-state.edu](mailto:allen@chemistry.ohio-state.edu)  
**Teaching Assistant:** Gwen Gattermeir, [gattermeir.1@buckeyemail.osu.edu](mailto:gattermeir.1@buckeyemail.osu.edu)

**Office Hours**

*Gwen: 1-2pm Mondays and Wednesdays (see [link](#) in Carmen Announcements)*

*Dr. Allen: 12:30-1:30 Fridays, and by appointment (in 3105 Newman and Wolfrom)*

**Objective:** *Kinetics* provides a microscopic view of chemical reactions and is concerned with the rate of a chemical reaction as it approaches equilibrium.

**Recommended text:**

*Peter Atkins, Molecular Thermodynamics and Kinetics, 11th ed.*

(Other resource: T. Engel & P. Reid, *Thermodynamics, Statistical Thermodynamics, and Kinetics*)

**Course topics:**

Week	Topics
1	Fundamentals of Kinetics, order, rates, rate constants, reaction mechanisms and elementary steps
2	Complex reaction kinetics: reversible, reversible reactions at equilibrium, pseudo first and second order reactions
3	Complex reaction kinetics: irreversible reactions, consecutive and parallel reactions
4	Approximation methods, Arrhenius equation, temperature effects, catalysis
5	Kinetics applications and related topics
6	Kinetics applications, Student presentations
7	Student presentations

**Homework & Student Presentations**

Homework (HW) assignments are assigned on a Fridays and due the following Wednesday. It is assumed that students will thoroughly work through each problem for full credit in addition to providing the correct answer. **Retakes of the HW may be allowed, although HW questions may be changed given that the HW answer keys may have been posted.** (If you work in a group, add the names of your group members to your paper below your name; however, each student must hand in their own HW.)

**The student presentation** consists of a 3-minute presentation covering a kinetics journal article (preapproved by date to be determined) describing the kinetics approach and outcome. *Presentations are meant to engage students in the study of kinetics within an area of research interest.*

**Grading**

Homework                      25%

Midterm 25%

Student Presentations 15%

*Extra Credit Points: Students should participate in questions after each Student Presentation*

Final Exam 35%

### **Learning outcomes**

- Students can extract rates of reactions from the temporal change of concentration.
- Students can distinguish between empirical rate phenomena, and chemical mechanisms and elementary steps.
- Students can derive complex rate equations from knowledge of the reaction mechanism.
- Given several common rate laws, students can predict concentrations of reactants and products of chemical reactions as a function of elapsed time.
- For complex reaction without known closed form solutions, students can apply common approximation schemes such as the steady state assumption.
- Students are prepared to connect the theoretical framework of kinetics to laboratory experiments.

### **Diversity Statement**

The Department of Chemistry and Biochemistry promotes a welcoming and inclusive environment for all students and staff, regardless of race, gender, ethnicity, national origin, disability or sexual orientation. There is no tolerance for hateful speech or actions. All violations of this policy should be reported to the OSU Bias Assessment and Response Team (BART, [studentaffairs.osu.edu/bias](http://studentaffairs.osu.edu/bias)). The Department encourages diversity at all levels, particularly among the next generation of scientists. Students are encouraged to participate in organizations that provide support specifically for science and engineering students who are African-American, Hispanic, Asian, disabled, LGBTQ+ or women. These organizations are listed on the Colleges of Arts and Sciences ([artsandsciences.osu.edu/stem-organizations](http://artsandsciences.osu.edu/stem-organizations)) and Engineering ([engineering.osu.edu/studentorgs](http://engineering.osu.edu/studentorgs)) web sites.

### **Students with Disabilities**

“Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614-292-3307, [sllds@osu.edu](mailto:sllds@osu.edu); [sllds.osu.edu](http://sllds.osu.edu).”

### **Academic Misconduct**

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations.

Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student

Conduct <https://studentconduct.osu.edu/documents/codestudentconduct-effective-august-1-2019.pdf>.