

CHM 511: Advanced Analytical Chemistry I Spring Term, 2025

Instructor: Jay (Jiyeon) Kim
Office: Room 374D, Beaupre
Office hours: Request by email, meeting in person or Zoom meeting. (not available 9-12th in March)
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Lecture: T/TH, 9:30 am-10:45 am
Room 215, Beaupre, or online class during the emergency such as COVID.
Class materials will be posted in the Brightspace for each class.

Textbook: Electrochemical Methods, 2nd Ed., by A. J. Bard and L. R. Faulkner
John Wiley & Sons, Inc., 2001.

Goals: To understand the fundamental of electrochemistry and the application of electrochemical methods to chemical problems with emphasis on quantitative interpretation of electrochemical results. Note that topics such as electron transfer reaction, interfacial structure, interfacial potential, and diffusion process, which are repeatedly discussed in this course, are important in many scientific fields.

Topics: (Topics could be adjusted depending on the schedule)

1. Introduction and Overview of Electrochemical Methods (Ch. 1)
2. Potentials and Cell Thermodynamics (Ch. 2)
3. Kinetics of Electrode Reactions (Ch. 3)
4. Mass Transfer (Ch. 4)
5. Controlled Potential Methods (Ch. 5)
6. Linear Sweep and Cyclic Voltammetry (Ch. 6)
7. Double Layer Structure and Adsorption (Ch. 13)
8. Electroactive Layers and Modified Electrodes (Ch. 14)
9. Analysis of Electrode Reaction Mechanisms (Ch. 12)
10. Ultramicroelectrodes and Scanning Electrochemical Microscopy (Ch. 16)
11. Single-particle electrochemistry (Ch. 19 in 3rd edition)

Examination: **A take-home midterm examination including COMSOL simulation work will be scheduled during spring break in March.** A final examination will be given in Beaupre 215 at **8-11 am on May 6th under the normal schedule.** **Depending on the situation related with COVID pandemic or other emergency, a final exam can be replaced with a take-home exam.**

Spring break: 9-15th, March.

Problem Sets: Some problems at the end of each chapter in the textbook will be assigned during the course, and posted on the Brightspace. Under the normal situation, they will be collected and graded. Depending on the situation related with COVID or other emergency, photocopy will be collected by email. Penalty for late submission will be exerted (50 % deducted for 1 week delay, zero point for 2 week delay)

Illness Accommodations:

Reasonable accommodations for illness consistent with URI policies, including for precautionary self-isolation that you alert me to in advance, will be made. This may include an alternative assignment, and Zoom link for class.

Academic Honesty:

Academic dishonesty in any form is considered a serious offence, and disciplinary action will be taken immediately. The URI policy on academic honesty is detailed in the student handbook (available online), and it is summarized below:

Students are expected to be honest in all academic work. A student's name on any written work, including assignments, lab reports, papers, or exams, shall be regarded as assurance that the work is the result of the student's own thought and study. Work should be stated in the student's own words, properly attributed to its source. Students have an obligation to know how to quote, paraphrase, summarize, cite and reference the work of others with integrity. The following are examples of academic dishonesty.

- *Using material, directly or paraphrasing, from published sources (print or electronic) without appropriate citation*
- *Claiming disproportionate credit for work not done independently*
- *Unauthorized possession or access to exams*
- *Unauthorized communication during exams*
- *Unauthorized use of another's work or preparing work for another student*
- *Taking an exam for another student*
- *Altering or attempting to alter grades*
- *The use of notes or electronic devices to gain an unauthorized advantage during exams*
- *Fabricating or falsifying facts, data or references*
- *Facilitating or aiding another's academic dishonesty*
- *Submitting the same paper for more than one course without prior approval from the instructors.*

When there is an allegation of academic dishonesty, the instructor may:

- *Fail the student for the assignment, or recommend that the student fail the course.*

Note that all submitted work must be completed by each student in his or her own words: shared text is not permitted.

Anti-Bias Statement: We respect the rights and dignity of each individual and group. We reject prejudice and intolerance, and we work to understand differences. We believe that equity and inclusion are critical components for campus community members to thrive. If you are a target or a witness of a bias incident, you are encouraged to submit a report to the URI Bias Response Team at www.uri.edu/bri. There you will also find people and resources to help.

The University of Rhode Island occupies the traditional homelands of the Narragansett Nation. What is now the state of Rhode Island occupies the traditional homelands and waterways of the Narragansett Nation and the Niantic, Wampanoag and Nipmuc Peoples. We honor and respect the enduring and continuing relationship between these nations and this land by teaching and learning more about their histories and present-day communities, and by becoming stewards of the land we too inhabit. In addition, let us acknowledge the violence of conquest, war, and dispossession and of enslavement endured by Black and Indigenous communities in what is now the United States. Their contemporary efforts to endure in the face of colonialism must be acknowledged, respected and supported.