



SAN DIEGO STATE
UNIVERSITY

Bioanalytical Chemistry CHEM750

Fall 2023
Schedule# 11708

Course Information

- Class Days: Monday & Wednesday
- Class Time: 7:00-8:15 pm
- Class Location: GMCS 308
- Instructor: Dr. Youngkwang Lee
- Email: youngkwang.lee@sdsu.edu
- Office Hours Times: Appointment required (Monday & Wednesday 9:00-10:00 am)
- Office Hours Location: EIS17 (lower level)

Course Overview

The course is designed for graduate students and well-prepared undergraduates in chemistry, biochemistry, biophysics and biology. Its aim is to introduce a broad range of analytical methods with a focus on the characterization and manipulation of macromolecules and their associated processes. The course also includes discussion of high-throughput drug discovery and molecular diagnostic technologies. Detailed topics to be covered are shown below. We will discuss how various analytical methods contribute to answering unresolved scientific questions, sometimes yielding conflicting outcomes that lead to further study to reconcile those discrepancies. We will also explore evolution of scientific questions and methods as we embark on a journey through the history of Ras.

Student Learning Objectives

- Describe the principles underlying various analytical methods in chemistry and biochemistry.
- Critically evaluate scientific reports based on advantage and limitations of methods implemented.
- Interpret and Integrate results from multiple relevant scientific reports, and propose the best current conclusions on unresolved scientific questions.
- Able to choose appropriate analytical methods for their own research.
- Describe key contributions to the field of bioanalytical and biophysical chemistry from scientist with diverse backgrounds

Enrollment Information

- Prerequisites: none

Course Materials

- The course does not require textbooks but the following optional textbooks could be helpful.
 - Principles of Instrumental Analysis, 7th edition by Skoog
 - Molecular Driving Forces by K. Dill
 - Molecules of Life by J. Kuriyan
 - Methods in Molecular Biophysics by J. Zaccai
 - Principles of Fluorescence Spectroscopy, 3rd edition by Lakowicz
- The list of research articles associated with each topic will be provided.

Course Structure and Conduct

- The course consists of three learning modules that span 15 weeks.
- The course involves frequent lecture-discussion to reflect the learning state of students into the class teaching.
- There will be quizzes and/or assignments that will be posted at least a week ahead.
- Students will be presenting a research paper, and they will critique research ideas and data at the end of semester.
- The course may be video recorded except student presentations.
- Students are expected to attend all lectures.

Course Assessment and Grading

- Homeworks and problem sets (60%)
- Presentation (40%)

Lecture Topics

Energetics of Intermolecular Interactions

Structure and dynamics

- Fluorescence spectroscopy and microscopy
- Fluorescence anisotropy
- Single-molecule detection
- Superresolution microscopy

Thermodynamics

- Calorimetry
- Surface plasmon resonance
- Biolayer interferometry

Molecular diagnostics

High-throughput drug screening

Students with Disabilities

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473.

To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.

Academic Honesty

The University adheres to a strict [policy regarding cheating and plagiarism](http://www.sa.sdsu.edu/srr/conduct1.html). These activities will not be tolerated in this class. Become familiar with the policy (<http://www.sa.sdsu.edu/srr/conduct1.html>). Any cheating or plagiarism will result in failing this class and a disciplinary review by Student Affairs.

Examples of Plagiarism include but are not limited to:

- Using sources verbatim or paraphrasing without giving proper attribution (this can include phrases, sentences, paragraphs and/or pages of work)
- Copying and pasting work from an online or offline source directly and calling it your own
- Using information you find from an online or offline source without giving the author credit

- Replacing words or phrases from another source and inserting your own words or phrases
- Submitting a piece of work you did for one class to another class

If you have questions on what is plagiarism, please consult the [policy](http://www.sa.sdsu.edu/srr/conduct1.html) (<http://www.sa.sdsu.edu/srr/conduct1.html>) and this [helpful guide from the Library](http://infodome.sdsu.edu/infolit/exploratorium/Standard_5/plagiarism.pdf): (http://infodome.sdsu.edu/infolit/exploratorium/Standard_5/plagiarism.pdf).

Turnitin

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. You may submit your papers in such a way that no identifying information about you is included. Another option is that you may request, in writing, that your papers not be submitted to Turnitin.com. However, if you choose this option you will be required to provide documentation to substantiate that the papers are your original work and do not include any plagiarized material.

Land Acknowledgement

For millennia, the Kumeyaay people have been a part of this land. This land has nourished, healed, protected and embraced them for many generations in a relationship of balance and harmony. As members of the San Diego State University community, we acknowledge this legacy. We promote this balance and harmony. We find inspiration from this land, the land of the Kumeyaay.

Diversity and Inclusion

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.