

Course Outline

Chemistry 4494B / 9494B

BIOPHYSICAL CHEMISTRY – 2025

Instructor: Lars Konermann; B&G 2016

Lectures: Monday, Wednesday & Friday 10:30-11:20, CHB-115

Outline: An overview of the physical principles underlying the structure, function, and dynamics of biological systems, with focus on proteins and biomembranes. Topics to be covered include: Selected applications of thermodynamics and statistical mechanics; inter- and intramolecular (noncovalent) interactions; protein folding; spectroscopic properties of biopolymers.

Prerequisite: Chemistry 2274A or the former Chemistry 2374A.

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Advisors) to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Evaluation:

Problem assignments:	12% (there will be ~7 assignments)
In-class test 1:	24% (Fri, Feb 7, 10:30 AM – 11:15 PM)
In-class test 2:	24% (Wed, Mar 5, 10:30 AM– 11:15 PM)
Final exam:	40% (date & time TBA)

There will be no "make-up" tests or "make-up" assignments. If you miss a test or assignment with a valid excuse, your overall mark will be based on the other course components with appropriate re-weighting.

If you miss a test or assignment: Contact the Academic Advising Office of your Faculty of Registration and request academic consideration.

Exception: You are allowed to miss one assignment without an excuse. For students that complete all assignments, the assignment with the lowest mark will be dropped.

Literature: *Detailed lecture notes will be provided.*

There is no text for this course. The lecture notes will contain all the information required for assignments and exams. Nonetheless, the following books may be helpful:

- van Holde, Johnson & Ho "Principles of Physical Biochemistry" 2nd edition, 2006.
- Dill & Bromberg "Molecular Driving Forces", 2nd Edition Garland Science, New York, 2010.
- Tinoco et al. "Physical Chemistry: Principles and Applications in Biological Sciences", 4th edition Prentice Hall, Upper Saddle River, 2002.
- Creighton "Proteins", 2nd edition, Freeman, New York, 1993.
- Fersht "Structure and Mechanism in Protein Science", Freeman, New York, 1999.
- ... as well as standard physical chemistry texts such as Atkins, Noggle, etc.

Learning Outcomes

Upon completion of this course, students will be able to:

- Understand the properties of various amino acids;
- Apply concepts of statistical mechanics to simple biological systems;
- Understand how different types of molecular interactions govern native protein structures, and how environmental changes can trigger folding or unfolding;
- Apply physicochemical concepts that govern the formation of protein-ligand interactions.
- Interpret data obtained by various spectroscopic and calorimetric techniques.

Use of Electronic Devices

On tests and exams, only basic scientific calculators are allowed; all other devices (cell phones, laptops, tablets, cameras, etc.) are prohibited.

Religious Accommodation

When conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the writing of the test). Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays: <https://www.edi.uwo.ca>.

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

Academic Policies

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Support Services

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at http://academicsupport.uwo.ca/accessible_education/index.html if you have any questions regarding accommodations.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>.