Course Outline

## Chemistry 4494A / 9494A

# BIOPHYSICAL CHEMISTRY – 2020

*Instructor:* Lars Konermann; B&G 2016

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

All lectures will be in online format, and they will be posted on OWL.

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 2374A (Thermodynamics)

*Evaluation:*

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| Problem assignments: | 12% |
| In-class test 1: | 24% (Wednesday, October 7, 10:30 – 11:20) |
| In-class test 2: | 24% (Wednesday, October 28 , 10:30 – 11:20) |
| 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 one of the counselors in the Dean's office and provide your documentation to *them*. The Dean's office will then contact the course instructor.

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.

**The fine print (The UWO Registrar requires us to include the following statements):**

**Scholastic Offences**
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 UWO Academic Handbook.

**Accessibility Statement**
Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

**Prerequisites and Antirequisites**
Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will 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. For details specific to this course, please consult the UWO Academic Calendar.

**Support Services**
Learning-skills counsellors at the Student Development Centre (http://www.sdc.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

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

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

The website for Registrarial Services is http://www.registrar.uwo.ca.