

**Department of Chemistry**  
**The University of Texas at El Paso**  
Biophysical Chemistry

**CHEM 4335/5359/6359 (CRN 27301/28114/28115)**

Spring Term, 2021

Instructor: Prof. Lela Vuković, Office: CCSB 2.0308

Classroom: Online

Email: Lvukovic@utep.edu

Phone: (915) 747-7551

Lectures will be held online on Tuesdays and Thursdays from 1:30 PM – 2:50 PM. Office hours will be held by appointment; in case of changes, the class will be informed in time.

### *Course Description*

The objective of this course is to explain the biological phenomena inside the cell in terms of the fundamental physical laws that govern biomolecular structure, dynamics and self-organization. This is a descriptive course with some mathematical concepts. The course will introduce force, time and energies at the nanometer scales as occurring on the molecular level inside cells. We will cover the Boltzmann distribution, relevant hydrodynamics phenomena, diffusion, Brownian motion as relevant to biomolecules, protein, DNA, and RNA structure, dynamics and function, chemical kinetics, and how to describe flexible polymeric molecules.

### *Textbook:*

Lecture notes will be essential. Reference textbook for basic physical chemistry: Thomas Engel, Philip Reid, 3<sup>rd</sup>. Edition; *Pearson*. There may be additional handouts, for which the information will be provided. **No handouts I provide should be distributed outside of class or online.**

### *Grading:*

The grade for this course will be determined by homework (10% - turned in, yes or no), two exams (30% each) and an in-class presentation every student will make to the class towards the end of the course (30%).

Each exam will build upon the previous one, and all material covered will be considered for each exam. (i.e. you should be aware that Exam 2 may include content covered for Exam 1).

### ***Syllabus (tentative)***

1. Force, time and energies at the nanometer scales
2. Introduction to statistical mechanics
3. Hydrodynamic Drag, Brownian Motion and Diffusion
4. Elementary molecular biology
5. Properties of polymers (long flexible molecules)
6. Protein folding
7. Chemical kinetics
8. Properties of biofilaments (if time)

*Course Drop Policy:* Drop date deadline is of April 1st, 2021.

All grades of Incomplete must be accompanied by an Incomplete Contract that has been signed by the instructor of record, student, departmental chair, and the dean. Although UTEP will allow a maximum of one year to complete this contract, the College of Science requests it be limited to month based upon completion data. A grade of Incomplete is only used in extraordinary circumstances confined to a limited event such as a missed exam, project, or lab.

*Disability* If you believe you may qualify for special accommodations due to disability contact the Disabled Student Services Office: <http://sa.utep.edu/dsso>; 915-747-5148.