Instructor – James R. Horn, FW 432, 753-8654, jrhorn@niu.edu (note: j r horn)
Office Hours – Preferably by appointment, although I am often able to accommodate if you stop by my office

On-Line Blackboard Course Information: https://webcourses.niu.edu. Class slides and other useful material may be found on Blackboard.


Exams and Assignments

Exams – There will be three exams covering topics discussed in the course. Each exam will count as one-third of the exam grade. These examinations may take the form of a written exam or a take-home, open-book exam. The Exact dates and times will be arranged prior to each examination.

Weekly Assignments - There will be a variety of assignments (HW, small quizzes presentations, reading, literature critiques, etc.) throughout the semester. HW assignments should be submitted to the instructor or Blackboard (when electronic). In order for the assignments to graded and returned in a timely fashion, it is necessary that the documents be submitted on time. Late assignments will be accepted up to 5 days late at 4:00 p.m., but 10% of the total points will be deducted for each day the assignment is late.

Problem sets - One of the best ways to increase your understanding of the principles and concepts in biophysical chemistry comes from working exercises and reading relevant literature. Graded problem sets and quizzes provide effective feedback and incentive for staying current with the material. Students are welcome and encouraged to study with other students and to discuss problem sets; however, submitted documents should represent your individual effort.

Literature Critiques - These critiques will be used to help you learn to think and write critically about published work. Literature articles to be used must be approved by the instructor. The format to be used for the literature critiques is given at the end of this packet.

Scheduled Final Exam Day- Wednesday December 12, 8-9:50 a.m

Grading

Final grades will be based upon performance on assignments (problem sets, literature critiques, presentations, quizzes) and exams. Three exams will count for 50% of the final grade and assignments will count for 50% of the final grade. The initial grading scale is: 90-100%: A, 80-89%: B, 70-79%: C, 60-69%: D, Below 60%: F; however, final grade cutoffs are usually on a curve (i.e., scale will not be raised, but it may be lowered).

Any student who may need an accommodation due to a disability, please make an appointment to see me during my office hours, or when convenient. A letter from Disability Support Services authorizing your accommodations is usually needed before accommodations can be granted.
LECTURE SCHEDULE
The topics listed below are a guide of the anticipated order and content of the presentations. Please note that the schedule of topics here may be adjusted during the semester.

<table>
<thead>
<tr>
<th>Class Week</th>
<th>Topic</th>
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| 8/27       | M: Introduction  
             | W: Structure and Properties of Amino Acids and Polypeptides  
             | F: - Protein Tertiary Structure: Sequence and Structural Homology  
             |          | - Predicting Protein Structure from Sequence |
| 9/3        | M(NC): Molecular Structure from X-Ray Diffraction (Electronic Class)  
             | W: From Diffraction Data to Molecular Models  
             | F: What do Models say (and not say) about function? |
| 9/10       | M: Principles of NMR Spectroscopy  
             | W: Deriving Structural Information from NMR Spectroscopy |
| 9/17       | M: Spectroscopy  
             | W: - Absorbance  
             | F: - Circular Dichroism  
             |          | - Fluorescence |
| 9/24       | M(NC): Monday: No class Gibbs  
             | W: Overview of Intermolecular Interactions in Biological Pathways |
| 10/1       | M: Use of Spreadsheets and Simulations  
             | W: Principles of Equilibrium Studies of Ligand binding  
             | F: |
| 10/8       | M: Stoichiometry of Ligand Binding & Stoichiometric Titrations  
             | W: Basic Principles of Parameter Estimation, Model fitting, & Data Analysis  
             | F: Parameter Estimation with Nonlinear Least Squares Analysis |
| 10/15      | M: Chemical thermodynamics  
             | W: Allosteric Systems & Anti-cooperativity  
             | F: Using of statistical mechanics in modeling binding (MWC and KNF)  
             |          | Kinetics of binding  
             |          | - Surface Plasmon Resonance |
| 10/22      | M: Titration Calorimetry- Theory and Application  
             | W: Titration Calorimetry  
             | F: Properties of binding curves |
| 10/29      | M: Linkage in binding  
             | W: Measuring linked proton Binding using ITC  
             | F: |
| 11/5       | M: Protein Stability-  
             | W: - Two-state theory  
             |          | - Ensemble Properties of Proteins  
             |          | - Multi-State transitions and cooperativity |
| 11/12      | M: Chemical Denaturation of Proteins  
             | W: Thermal Denaturation of Proteins  
             |          | Differential Scanning Calorimetry |
| 11/19      | M: “Buffer”/Presentations |
**CHEMISTRY 675 - COURSE OBJECTIVES**

Principles and techniques will be covered for investigating fundamental properties governing the function of key biological molecules. This will include examining aspects of protein structure, thermodynamics, kinetics and their interactions. Principles and techniques will be illustrated with examples from the scientific literature. Critical thinking skills will be developed through evaluation of the literature and design of experiments.

**Other Useful Textbooks (not required)**


*Biophysical Chemistry by Cantor & Schimmel* (3 volume set), W.H. Freeman, Co., 1980

*Binding and Linkage by Wyman and Gill*, University Science Books, 1990