

University of Arkansas – Fort Smith
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General Syllabus

CHEM 4203 Biophysical Chemistry

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 0

Prerequisites: CHEM 2703 Organic Chemistry I and PHYS 2823 College Physics II or PHYS 2923 University Physics II

Effective: 2018~2019

I. Course Information

A. Subject Matter

Explores traditional physical chemistry subject matter from a biochemistry perspective. Topics will include thermodynamics, chemical and enzyme kinetics, solutions of macromolecules, chemical equilibria, transport and signaling processes, and bioenergetics.

B. Additional Information

This course is primarily directed toward students of biochemistry, but is also intended for students in physics, biology, and engineering.

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, the student will be able to:

1. Apply theories of thermodynamics to biochemical molecules.
2. Apply theories of kinetics to biochemical molecules.
3. Evaluate free energy and equilibrium theories.
4. Apply equilibrium theories to acid-base theory, biochemical solutions, and biochemical reactions.
5. Apply oxidation reduction theories to biochemical processes.
6. Analyze and interpret kinetics associated with biochemical processes including enzyme and ligand binding processes.
7. Apply concepts of quantum mechanics to biochemical molecules.
8. Evaluate theory of spectroscopy techniques as they apply to biochemistry.

B. University Learning Outcomes

Biophysical Chemistry enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills: Students will identify a problem or issue and will research, evaluate, and compare information from varying sources in order to evaluate authority, accuracy, recency, and bias relevant to the problems/issues. Students will generate solutions/analysis of problems/issues evaluated and will assess and justify the solutions and/or analysis.

Communication Skills (written and oral)

Students will communicate proficiently. Students will compose coherent documents appropriate to the intended audience and effectively communicate orally in a public setting.

Ethical Decision Making

Students will model ethical decision-making processes. Students will identify ethical dilemmas and affected parties and will apply ethical frameworks to resolve a variety of ethical dilemmas.

Global & Cultural Perspectives

Students will reflect upon cultural differences and their implications for interacting with people from cultures other than their own. Students will demonstrate understanding or application of their discipline in a global environment and will demonstrate how their discipline impacts or is impacted by different cultures.

III. Major Course Topics

- A. Equilibrium in biochemistry.
- B. Kinetics in biochemistry.
- C. Thermodynamics in biochemistry.
- D. Structure of biomolecules.
- E. Techniques used in analysis of biomolecules.