

CHM 271 Biochemical Principles

COURSE DESCRIPTION:

Prerequisites: CHM 252 with a C or better.

Corequisites: None

This course covers fundamental principles of biochemistry. Topics include structures, properties, reactions, and mechanisms of biomacromolecules including amino acids, peptides, proteins, carbohydrates and nucleic acids, enzymatic metabolic pathways, and biochemical genetics. Upon completion, students should be able to demonstrate an understanding of fundamental biochemical processes. Course Hours Per Week: Class, 3. Lab, 0. Semester Hours Credit, 3.

LEARNING OUTCOMES:

Upon completing requirements for this course, the student will be able to:

1. Distinguish between the major biomacromolecules and know key distinguishing structures and reactions.
2. Explain the key processes of biochemical genetics and how this leads to proper protein function.
3. Demonstrate an understanding of the different metabolic processes that cells use to generate ATP.

OUTLINE OF INSTRUCTION:

- I. Biomacromolecules
 - A. Water, pH, and Buffers
 - i. Including basics of pKa and Henderson-Hasselbalch equation
 - B. Carbohydrates
 - C. Lipids
 - D. Nucleic Acids
 - E. Amino Acids
- II. Biochemical Genetics
 - A. DNA structure, function, and maintenance
 - B. Transcription
 - C. Translation
- III. Peptides, Proteins, and Enzymes
 - A. Levels of protein structure
 - i. Primary, secondary, tertiary and quaternary structures
 - ii. Folding
 - iii. Post translational modifications
 - iv. Enzymatic activity and inhibition (including Michaelis-Menten kinetics)
- IV. Enzymatic Metabolic Pathways
 - A. Means of ATP production from:
 - i. Carbohydrates

- ii. Lipids
- iii. Amino acids

REQUIRED TEXTBOOKS AND MATERIALS:

To be selected by the Instructor/Discipline Chair.