

Course Outline for: CHEM 1050 Foundations of Organic and Biochemistry**A. Course Description:**

1. Number of credits: 3
2. Lecture hours per week: 2
Lab hours per week: 2
3. Prerequisites: CHEM 1020 or CHEM self-assessment eligibility
4. Corequisites: None
5. MnTC Goals: Goal 3 Natural Sciences

This one-term laboratory course, designed for students pursuing a nursing or allied health degree, builds on general chemistry concepts to provide an overview of organic and biochemistry with an emphasis on applications to the chemistry of the human body. Topics include solutions and body fluids, acid-base chemistry, relation between structure and reactivity for biochemical molecules, and metabolic pathways.

B. Date last reviewed/updated: May 2024**C. Outline of Major Content Areas:**

1. Solutions.
2. Energy Changes, Reaction Rates, and Equilibrium.
3. Acids, Bases, Salts and Buffers.
4. Introduction to Organic Molecules and Functional Groups.
5. Alkanes.
6. Alkenes and Aromatic Compounds.
7. Isomers and the Three-Dimensional Shape of Molecules.
8. Alcohols, Aldehydes and Ketones.
9. Carboxylic Acids and Esters.
10. Amines.
11. Carbohydrates.
12. Lipids.
13. Amino Acids, Proteins, and Enzymes.
14. Bioenergetics.
15. Carbohydrate, Lipid, and Protein Metabolism.

D. Course Learning Outcomes:

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

1. Employ lab techniques correctly using appropriate safety procedures. (Goal 3b,3c)
2. Accurately interpret lab data. (Goal 3b, 3c)
3. Clearly communicate lab results. (Goal 2a, 3c)
4. Solve quantitative problems involving solution concentrations. (Goal 3a)
5. Interpret the role of energy in chemical processes. (Goal 3a)
6. Describe properties of inorganic and organic compounds. (Goal 3a)

7. Recognize and draw structures of organic compounds. (Goal 3a)
8. Predict the products of chemical reactions. (Goal 3a)
9. Compare the roles of the three major categories of biomolecules in the human body. (Goal 3a)
10. Summarize metabolic processes in the body. (Goal 3a)
11. Apply knowledge of organic and biochemistry to real world issues. (Goal 2c, 3d)

E. Methods for Assessing Student Learning:

Methods for assessment may include, but are not limited to, the following:

1. Minimum of three exams
2. Additional methods of evaluation may include quizzes, homework and/or a lab practical exam
3. Laboratory experiments (at least 12 lab experiments, which will include the following topics):
 - a. Lab Safety
 - b. Dialysis and Osmosis
 - c. Salts and Buffers
 - d. Sugars and Starches
 - e. Amino Acids and Proteins
 - f. Enzymes
4. Comprehensive Final Exam

F. Special Information:

None