Common 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 high school chemistry within the past 2 academic years
4. Co-requisites: none
5. MnTC Goals : Goal 3: Natural Sciences

This one-term laboratory course, designed for non-majors, 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, metabolic pathways and applications of nuclear chemistry.

B. Date last reviewed: Spring 2018

C. Outline of Major Content Areas

a. Solutions
b. Energy Changes, Reaction Rates, and Equilibrium
c. Acids, Bases, and Salts
d. Introduction to Organic Molecules and Functional Groups
e. Alkanes
f. Unsaturated Hydrocarbons
g. Organic Compounds that Contain Oxygen
h. The Three-Dimensional Shape of Molecules
i. Aldehydes and Ketones
j. Carboxylic Acids and Esters
k. Amines
l. Carbohydrates
m. Lipids
n. Amino Acids, Proteins, and Enzymes
o. Digestion and the Conversion of Food into Energy
p. Carbohydrate, Lipid, and Protein Metabolism
q. Nuclear Chemistry in Medicine

D. Course Learning Outcomes

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

1. Perform lab techniques correctly using appropriate safety procedures. (Goal 3b,3c)
2. Analyze lab data. (Goal 3b, 3c)
3. Communicate lab results. (Goal 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. Discuss 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. Relate your knowledge of Organic and Biochemistry to real world issues. (Goal 3d)

E. Methods for Assessing Student Learning

Students will be evaluated using exams/quizzes and laboratory reports. Additional assessment methods are at the discretion of the instructor and may include homework, special projects, group work, and a semester long capstone project that will include both written and oral components.

F. Special information

a. Requirements
   i. Reading assignments, questions and problems from the textbook: *General, Organic, and Biochemistry, 3rd Edition*, by Janice Smith
   ii. Completion of all laboratory experiments, with the following exception:
      1. One lab may be missed. This will result in a reduction of one full letter grade for the course.

b. Grades
   i. A – 90%
   ii. B – 80%
   iii. C – 70%
   iv. D – 55%