

Course discipline/number/title: CHEM 1118: General, Organic and Biological Chemistry II

A. CATALOG DESCRIPTION

1. Credits: 4
2. Hours/Week: 3 lecture, 2 lab
3. Prerequisites (Course discipline/number): CHEM 1117 or CHEM 1128 (May be concurrent with CHEM 1128 with instructor permission.)
4. Other requirements: None
5. MnTC Goals (if any): NA

B. COURSE DESCRIPTION: This course is a survey of organic and biological chemistry. After a brief review of general chemistry concepts, organic chemistry topics related to biological systems will be discussed. The structure and reactivity of carbohydrates, lipids, proteins and nucleic acids will be described along with the cellular metabolism of these compounds.

C. DATE LAST REVISED (Month, year): March, 2022

D. OUTLINE OF MAJOR CONTENT AREAS:

1. General Chemistry Review
 - a) Periodic table
 - b) Chemical bonding
 - c) Equilibrium
 - d) Acids and bases
2. Organic Chemistry
 - a) Functional groups
 - b) Nomenclature
 - c) Isomerism
 - d) Biochemical reaction types
3. Structure and Function of Biomolecules
 - a) Carbohydrates
 - i. Nomenclature of monosaccharides and glycosidic bonds
 - ii. Reactivity as reducing sugars
 - b) Lipids
 - i. Lipid composition of cell membranes
 - ii. Cholesterol function and transport
 - c) Proteins
 - i. Amino acids and peptide bonding
 - ii. Levels of protein structure
 - d) Enzymes and factors that influence activity
 - e) Nucleic Acids
 - i. Replication
 - ii. Transcription
 - iii. Translation
4. Metabolism
 - a) Digestion
 - b) Catabolism and Anabolism of carbohydrates, lipids, and proteins
5. Medical or Recent Biochemistry Topics

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Communicate using the tools and terminology of organic and biological chemistry.
2. Use fundamental chemical principles to describe biological processes.
3. Apply organic and biological chemistry to medical and technological topics.

F. LEARNING OUTCOMES (MNTC): NA

- G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include, but are not limited to:
1. Homework, essays, exams, and a cumulative final exam
 2. Laboratory quizzes and/or worksheets

- H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s):
Communication. Students will communicate appropriately for their respective audiences.

Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

- I. SPECIAL INFORMATION (if any):

The initial lab session explains and familiarizes the student with general safety equipment in the lab and requires students to map all safety equipment in the lab. During the pre-lab discussion, the hazardous characteristics of the chemicals used during the lab are discussed. The students will be instructed on the proper disposal of all products. The instructor directs all students to wear necessary eye protective equipment while working in a situation where there is a potential danger of eye damage. Students with special needs and concerns (i.e., people with allergies, pregnant females, sufferers of diseases which lower the effectiveness of their immune system) may wish to make this known to the instructor so that any chemical which might affect your situation can be avoided. A copy of Safety Data Sheets (SDS) for chemicals used is available.