Course Outline

2026-2027 Catalog

CHEM 52 - Elementary Organic and Biochemistry

Catalog Description

Transfer Status: CSU/UC

Prerequisite: CHEM 51

Unit(s): 4.00

Lecture: 51.00 Contact hours/102.00 Out of class hours/153.00 Total hours/3.00 Unit(s)
Lab: 51.00 Contact hours/0.00 Out of class hours/51.00 Total hours/1.00 Unit(s)
Total: 102.00 Contact hours/102.00 Out of class hours/204.00 Total hours/4.00 Unit(s)

Course Description: This course is a survey of organic and biochemistry for nursing majors and other allied health fields. Topics include general organic chemistry and biological chemistry as they apply to living systems. The laboratory component will support the course topics including both qualitative and quantitative experiments, and analysis of data. Graded only. (C-ID CHEM 102).

Objectives

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

1. Draw and name structures containing common mono-functional organic molecules and differentiate functional groups when they appear in an organic structure, relate the physical and chemical properties of compounds containing these groups with the structure of each functional classification.
2. Distinguish roles of four major classes of bio-molecules in living cells.
3. Compare and contrast the processes of DNA replication and transcription, RNA translation, and common types of mutations.
4. Demonstrate knowledge of major biochemical components in metabolism.

Course Content

Topic Titles / Suggested Time Topic

Lecture

Topics	Lec Hrs
Hydrocarbons	9.00
Alcohols, ethers and thiols	6.00
Aldehydes and ketones	3.00
Carboxylic acids	2.00
Amines	3.00
Esters and amides	1.00
Carbohydrates	6.00
Proteins	9.00
Lipids	3.00
Nucleic acids	6.00
Metabolism	3.00
Total Hours:	**51.00**

Lab

Topics	Lab Hrs
Exercises on Chemical Structure and Bonding for Organic and Biological Molecules	9.00
Physical Properties and Chemical Reactivity of Organic Functional Groups	18.00
Isolation and Characterization of Natural Products	6.00
Physical Properties and Chemical Reactivity of Biological Molecules	12.00
Synthesis and Analysis of Organic and Biological Compounds	6.00
Total Hours:	**51.00**

Methods of Instruction

A. Collaborative Group Work
B. Demonstrations
C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
D. Instructor Demonstrations
E. Laboratory Experiments

F. Lecture
G. Problem-Solving Sessions
H. Reading Assignments

Methods of Evaluation

A. Exams/Tests
B. Quizzes
C. Homework
D. Lab Projects
E. Final Examination
F. Written Assignments
G. Written Examinations
H. Examinations
I. Laboratory Reports and Exercises

Examples of Assignments

Reading Assignments

1. Read the textbook section on esters to prepare for a lecture discussion of ester-forming reactions and a laboratory experiment involving an esterification reaction.
2. Read the textbook section on chirality to prepare for a lecture activity and laboratory exercise on stereoisomerism.

Writing Assignments

1. In a few sentences, use chemical principles to explain the aqueous solubility of carbohydrates, lipids, and protein isolated from milk in a laboratory experiment.
2. Predict the major organic product(s) expected to result from a given alkene substrate and several given chemical reagents.

Out-of-Class Assignments

1. Identify the correct charge state of amino acid residues at physiological pH values.
2. Identify the functional groups present in a series of given organic molecules.

Recommended Materials of Instruction

McMurry, J., Ballantine, D., Hoeger, C., Peterson, V. (2017). Fundamentals of General, Organic and Biological Chemistry. *Pearson Education, Inc. New York City, NY, 8th.* 9780134218328.
Vickery, JC. (2022). Laboratory Manual for Chemistry 52. *Butte College, 2022.* N/A.

Other Learning Materials
Molecular model kit

Minimum Qualifications

Chemistry (Masters Required)

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