

**CHEM 60 Course Outline as of Fall 2024****CATALOG INFORMATION**

Dept and Nbr: CHEM 60 Title: GEN ORG BIOL CHEM

Full Title: General, Organic and Biological Chemistry

Last Reviewed: 5/9/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	5.00	Lecture Scheduled	4.00	17.5	Lecture Scheduled	70.00
Minimum	5.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	7.00		Contact Total	122.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 140.00

Total Student Learning Hours: 262.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

In this course, students will study basic concepts of general, organic and biological chemistry.

This course is appropriate for nursing and related majors that require one semester of chemistry.

**Prerequisites/Corequisites:****Recommended Preparation:**

Eligibility for MATH 150 or equivalent AND eligibility for ENGL 100 OR EMLS 100 (formerly ESL 100)

**Limits on Enrollment:****Schedule of Classes Information:**

Description: In this course, students will study basic concepts of general, organic and biological chemistry. This course is appropriate for nursing and related majors that require one semester of chemistry. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Eligibility for MATH 150 or equivalent AND eligibility for ENGL 100 OR EMLS 100 (formerly ESL 100)

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>		Effective:	Inactive:
	C	Natural Sciences	Fall 1981	
<b>CSU GE:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	B1	Physical Science	Fall 2016	
	B3	Laboratory Activity		
<b>IGETC:</b>	<b>Transfer Area</b>		Effective:	Inactive:
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 1981	Inactive:
<b>UC Transfer:</b>		Effective:		Inactive:

**CID:**

**Certificate/Major Applicable:**

Major Applicable Course

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Recognize and apply the underlying chemical foundations of medicine and life.
2. Correlate microscopic and macroscopic behavior of matter.
3. Solve quantitative problems relating to chemical principles.
4. Safely use basic equipment to observe and measure chemical and physical properties in the laboratory.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Recognize the structures and functional groups of lipids, carbohydrates, proteins, and nucleic acids.
2. Demonstrate a basic understanding of organic reactions.
3. Recognize the importance of chemistry in health care and society.
4. Explain bulk properties of gases from a molecular scale perspective.
5. Relate intermolecular forces to physical properties of substances.
6. Draw Lewis structures and relate them to isomerism and molecular geometry.
7. Calculate quantities related to concentrations of solutions.
8. Use moles and mole ratios to calculate quantities in reactions.
9. Assemble and handle appropriate lab equipment effectively and safely.
10. Develop skills of observation, recordkeeping, and lab notebook maintenance.
11. Interpret observations using chemical principles.

### **Topics and Scope:**

Lecture-Related Topics & Scope:

- I. Atomic Theory

- A. Structure of the atom
- B. Organization of the periodic table
- C. Ions
- D. Mole concept
- II. Laboratory Measurements and Calculations
- III. Chemical Bonding and Molecular Structure
  - A. Ionic compounds
  - B. Covalent compounds
  - C. Organic structures and functional groups
  - D. Isomerism and stereochemistry
- IV. Chemical Reactions
  - A. Balancing reactions
  - B. Basic organic reactions
  - C. Simple acid-base reactions
  - D. Le Chatelier's principle
  - E. Reaction mechanisms and associated energy changes
- V. Matter at the Sub-microscopic Level
  - A. Gases, liquids, and solids
  - B. Qualitative atomic theory of gases
  - C. Intermolecular forces
- VI. Solutions
  - A. Measures of concentration
  - B. Diffusion, osmosis, and dialysis
  - C. pH and buffers
- VII. Biological Molecules
  - A. Lipids
  - B. Carbohydrates
  - C. Amino acids and peptides
  - D. Proteins
  - E. Nucleic acids
- VIII. Metabolism

**Lab-Related Topics & Scope:**

Lab material will be chosen each semester to supplement or reinforce most of the topics above, and may include:

- I. Measurements, Metric System, and Conversions
- II. Lewis Structures and Molecular Geometry
- III. Reactions and Observations
- IV. Gases
- V. Stoichiometry
- VI. Diffusion, Osmosis, and Dialysis
- VII. Solutions
- VIII. Lipids
- IX. Acids, Bases, and Buffers
- X. Carbohydrates
- XI. Amino Acids
- XII. Enzymes
- XIII. Lab Skill Evaluation

**Assignment:**

- 1. Reading (1-2 chapters per week)

2. Homework assignments (0-16)
3. Laboratory reports (11-16)
4. Exams (3-5) and final exam
5. Quiz(zes) (0-8)

All topics are covered in the lecture and lab portions of the course.

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Laboratory reports	Writing 20 - 35%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework assignments	Problem solving 0 - 15%
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**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%
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**Exams:** All forms of formal testing, other than skill performance exams.

Quiz(zes) and exams	Exams 60 - 75%
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**Other:** Includes any assessment tools that do not logically fit into the above categories.

Class and laboratory participation	Other Category 0 - 5%
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### Representative Textbooks and Materials:

General, Organic and Biological Chemistry. 4th ed. Frost, Laura and Deal, Todd. Pearson. 2020.  
Chemistry: An Introduction to General, Organic, and Biological Chemistry. 13th ed. Timberlake, Karen. Pearson. 2017 (classic).

General, Organic, and Biological Chemistry: An Integrated Approach. 4th ed. Raymond, Kenneth. Wiley. 2013 (classic).

General, Organic, and Biochemistry. 10th ed. Denniston, Katherine, Topping, Joseph and Quirk, Danae. McGraw Hill. 2020.

### Laboratory Materials:

Instructor prepared materials

Chemistry 60 Laboratory Manual. Ormcen, Tatjana. Arbor Crest. 2014 (classic).