



**TRINITY**  
MEDICAL SCIENCES  
UNIVERSITY

SCHOOL OF  
BIOMEDICAL SCIENCES

## **ORGANIC CHEMISTRY I**

### **CHEM 210**

#### **Course Description**

This course covers basic principles of structure and nomenclature of organic compounds, both aliphatic and aromatic. It emphasizes the principles of chemical reactions of organic compounds and the synthesis or degradation of bio-molecules in human metabolism. Saturated hydrocarbons, unsaturated hydrocarbons, synthesis, properties and reactions of alcohols, identification of functional groups, hybridization of hydrocarbons, stereochemistry cis-trans isomerism and addition reactions are covered. Molecular structure of hydrocarbons and their isomers will be demonstrated by using molecular model kit. Aspects of biological applications related to purification/separation, physical characterization, reaction types, and synthesis of organic compounds are included.

**Credit: 3 credits**

**Repeatable: No**

#### **Course Structure**

The course will be presented in different formats: Lectures with PowerPoint, self-directed learning, discussions and student assignments etc.

#### **Competencies**

This course emphasizes competencies to enhance skills for a future health care professional.

- Knowledge
  - **Demonstrate content knowledge and skills in foundational courses required by biomedical professionals**
  - **Demonstrate information literacy**
  - Demonstrate quantitative reasoning
  - **Demonstrate longitudinal learning through coursework**
- Critical Thinking
  - **Develop the skills of self-reflection and peer assessment to improve personal performance.**
  - **Demonstrate the ability to analyze literature and written material**
  - **Demonstrate the ability to distinguish between well-reasoned and poorly reasoned arguments**
- Communication Skills
  - **Demonstrate effective presentation skills to faculty and peers.**
  - **Demonstrate effective listening skills**
  - **Demonstrate effective written communication**

## Objectives:

Upon completion of CHEM 210 course, the student should be able to describe:

- Basic concepts relating to the periodic table (Divisions, trends of elements, their behavioral pattern and practical applications).
- Electron configuration of elements: Method of writing electron configuration, Application and interpretation of specific rules in their writing.
- Basic concept of Bonding, types of bonds with practical examples and their applications to biological processes.
- Writing and interpretation of Lewis Dot structure of elements.
- General concept regarding the structure and identification of functional group/s of organic compounds.
- Formal charge of atom/s.
- Energy: Potential and kinetic energy. Emphasis on practical examples of exothermic and endothermic reactions in a biological system.
- Concept of Hydrocarbons: Saturated and unsaturated. Their structural and functional differences.
- Nomenclature (I.U.P.A.C), Physical and chemical properties and synthesis of alkanes, alkenes and alkynes
- Reaction Mechanisms of alkanes, alkenes and alkynes with a biological application: Addition and Substitution reactions
- Alcohols: Structure, Classification (Primary, secondary and tertiary), Physical properties, Synthesis and reactivity.
- Oxidation of both primary and secondary alcohols.
- Alkyl- halides: Structure, classification, synthesis and reactivity.
- Stereochemistry: Concept, Classification, identification of Chiral and Achiral centers. Isomers: Stereoisomers and their practical identification. Identification of chiral and achiral drugs.
- Hybridization of Hydrocarbons: Concept and classification with practical examples.
- Resonance structure: Concept, drawing and interpretation.

**Schedule:** Dates and times to be posted at the beginning of the term on the online calendar.

## Course Topics/Outline

Activity #	Lecture Topics
Week1	Introduction to Organic chemistry, Structure of organic compounds and the Periodic table
Week 2	Electron configuration of elements, rules and their interpretations
Week 3	Bonding, classification and their respective influence on chemical reactions, <b>Quiz 1</b>
Week 4	Functional Groups, Formal Charge determination, Lewis dot structure and Energy
Week 5	Hydrocarbon: alkanes, alkenes and alkynes, <b>Quiz 2</b>
Week 6	Review of materials from week 1 to week 5
Week 7	<b>Mid-Term Examination</b>
Week 8	Alcohols
Week 9	Alkyl- halide, <b>Quiz 3</b>

Week 10	Stereochemistry
Week 11	Hybridization of hydrocarbons
Week 12	Resonance
Week 13	Review of materials from week 8 to 13
Week 14	<b>End of Term Examination</b>

### Assignments:

Students are given generalized research topic based on course outline and class objectives.

### Textbooks and Reference Materials:

#### Required Texts

Frederick A. Bettelheim, William H. Brown, Mary K. Campbell, Shawn O. Farrell, Omar J. Torres. Introduction to General, Organic and Biochemistry. 11<sup>th</sup> edition. Publisher: Cengage Learning.

#### Recommended Text

Francis A Carey, Robert M. Giuliano. Organic chemistry. 10<sup>th</sup> Edition. Publisher: McGraw-Hill Education.

**Evaluation:** Students are evaluated by three quizzes, a midterm exam, a final exam, assignments and their attendance.

Points:

	Points*
Assignments	10%
Quizzes	25%
Mid Term	30%
Final exam	30%
Attendance	5%
Total points	100%

\*Points are approximate and may be adjusted during the term. Students will be notified of changes.

**Grade:**

Percent of Points	Letter Grade
95-100%	A(h)
90-94%	A
85-89%	B+
80-84%	B
75-79%	C+
70-74%	C
<70%	F

**Attendance:**

Students are expected to attend at least 80% of all scheduled learning activities. Attendance in the class will be recorded. Students attended 80% or more will be awarded with 5% on total scoring system. Please note that absences due to illness or misadventure will be factored into the 20% of allowable absences if informed respective faculty or the Dean of Students.

**Policies:**Professional Demeanor

The student should be thoughtful and professional when interacting with faculty and other students. Inappropriate behavior includes the use of offensive language, gestures, or remarks with sexual overtones. Students should maintain a neat and clean appearance, and dress in attire that is generally accepted as professional.

Honesty

Students are expected to demonstrate honesty and integrity in all aspects of their education and in their interactions with faculty, administration, physicians, patients, and fellow students. They will not cheat, plagiarize, or assist others in the commission of these acts.

**Faculty and Office Hours:**

Dr. Eric Audain, Assistant Professor

Students normally schedule appointments by email.