

**Course Information**

<b>Course Title</b>	Organic Chemistry I
<b>Course Prefix, Num. and Title</b>	CHEM 2423
<b>Division</b>	Math & Physical Sciences
<b>Department</b>	Chemistry
<b>Course Type</b>	Academic General Education Course (from ACGM, but not WCJC Core)
<b>Course Catalog Description</b>	Fundamental principles of organic chemistry will be studied, including the structure, bonding, properties, and reactivity of organic molecules; and properties and behavior of organic compounds and their derivatives. Emphasis is placed on organic synthesis and mechanisms. Topics include the study of covalent and ionic bonding, nomenclature, stereochemistry, structure and reactivity, reaction mechanisms, functional groups, and synthesis of simple molecules. Laboratory activities will reinforce these principles and include methods for the purification and identification of organic compounds. This course is intended for students in science or pre-professional programs.
<b>Pre-Requisites</b>	Chemistry 1412 with a grade of "C" or better
<b>Co-Requisites</b>	None

**Semester Credit Hours**

<b>Total Semester Credit Hours (SCH): Lecture Hours:</b>	4:3:4
<b>Lab/Other Hours</b>	
<b>Equated Pay Hours</b>	5.4
<b>Lab/Other Hours Breakdown: Lab Hours</b>	4
<b>Lab/Other Hours Breakdown: Clinical Hours</b>	0
<b>Lab/Other Hours Breakdown: Practicum Hours</b>	0
<b>Other Hours Breakdown</b>	0

**Approval Signatures**

<b>Title</b>	<b>Signature</b>	<b>Date</b>
<b>Prepared by:</b>		
<b>Department Head:</b>		
<b>Division Chair:</b>		
<b>Dean/VPI:</b>		
<b>Approved by CIR:</b>		

## Additional Course Information

**Topical Outline:** Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

Lecture Outline:

1. Structure and Bonding
2. Polar Covalent Bonds; Acids and Bases
3. Organic Compounds: Alkanes and Their Stereochemistry
4. Organic Compounds: Cycloalkanes and Their Stereochemistry
5. Stereochemistry at Tetrahedral Centers
6. An Overview of Organic Reactions
7. Alkenes: Structure and Reactivity
8. Alkenes: Reactions and Synthesis
9. Alkynes: An Introduction to Organic Synthesis
10. Organohalides
11. Reactions of Alkyl Halides: Nucleophilic Substitutions and Eliminations
12. Structure Determination: Mass Spectrometry and Infrared Spectroscopy
13. Structure Determination: Nuclear Magnetic Resonance Spectroscopy
14. Conjugated Compounds and Ultraviolet Spectroscopy
15. Benzene and Aromaticity
16. Chemistry of Benzene: Electrophilic Aromatic Substitution

Laboratory Outline:

Syllabus, Introduction, and Safety

Lab Orientation/Keeping a Lab Notebook

1. Review of General Chemistry and Introduction to Organic Chemistry
2. Determination of Melting and Boiling Point
3. Fractional Distillation
4. Extraction
5. Recrystallization
6. Thin-Layer Chromatography
7. UV-Vis
8. Infrared Spectroscopy
9. Gas Chromatography
10. Final Project Sessions (2 class periods)

### Course Learning Outcomes:

**Learning Outcomes – Upon successful completion of this course, students will:**

Lecture:

1. Classify organic compounds by structure, molecular orbitals, hybridization, resonance, tautomerism, polarity, chirality, conformation, and functionality.
2. Identify organic molecules using appropriate organic nomenclature.
3. Describe the principle reactions for syntheses of molecules, ions, and radicals.
4. Describe organic reactions in terms of radical and ionic mechanisms.
5. Describe the use of spectroscopic data to determine the structure of organic molecules.
6. Formulate appropriate reaction conditions for the synthesis of simple organic molecules.

#### Laboratory:

7. Perform chemical experiments, analysis procedures, and waste disposal in a safe and responsible manner.
8. Utilize scientific tools such as glassware and analytical instruments to collect and analyze data.
9. Identify and utilize appropriate separation techniques such as distillation, extraction, and chromatography to purify organic compounds.
10. Record experimental work completely and accurately in laboratory notebooks, and communicate experimental results clearly in written reports.
11. Demonstrate a basic understanding of stereochemistry.
12. Classify organic compounds by structure, molecular orbitals, hybridization, resonance, tautomerism, polarity, chirality, conformation, and functionality in laboratory reports.
13. Identify organic molecules using appropriate organic nomenclature in laboratory reports.
14. Perform organic syntheses of molecules.
15. Describe organic reactions in terms of radical and ionic mechanisms in laboratory reports.
16. Use spectroscopic data to determine the structure of organic molecules.
17. Formulate appropriate reaction conditions for the synthesis chirality, determine the structure of organic molecules.

#### Methods of Assessment:

Outcomes assessed by:

Class work, homework assignments, quizzes and/or exams, posters/graphs/charts, oral

Lab outcomes assessed by:

Data entries, lab reports, lab quizzes, homework assignments and/or lab final exam questions

#### Required text(s), optional text(s) and/or materials to be supplied by the student:

- Karty, Joel (2018). Organic Chemistry. Principles and Mechanisms, 2nd Edition, by W.W. Norton and Co; (ISBN: 978-0-393-63075-6).
- It is recommended to obtain a Molecular Model Kit for Organic Chemistry.
- Scientific calculator (with logarithms and exponent functions)
- Labs are posted in Blackboard and must be printed prior to class.

#### Suggested Course Maximum:

Lecture: 24, Lab: 24

#### List any specific or physical requirements beyond a typical classroom required to teach the course.

Chemistry laboratory classroom required for the lab component.

**Course Requirements/Grading System:** Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

Lecture average:	Exam average (3-4 exams)	30-55%
	Other (homework, quizzes, projects)	0-25%
Lab average:	(based on lab average below)	25%
Final exam average:	(includes at least 50% comprehensive material)	20-25%
		100% total

Lab Average*:	Lab notebooks	20-75%
	Other (lab reports, exercises, quizzes)	25-80%
	Lab final	10-20%
		100% lab total

\*Department policy: A student must earn a 60% laboratory grade or greater in order to pass the course.

The overall course grade is assigned as specified by the college:

A = 90–100

B = 80–89

C = 70–79

D = 60–69

F = below 60

### Curriculum Checklist:

**Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.

**Administrative WCJC Core Course.** Attach the Core Curriculum Review Forms

Critical Thinking

Communication

Empirical & Quantitative Skills

Teamwork

Social Responsibility

Personal Responsibility

**WECM Course** -If needed, revise the Program SCANS Matrix and Competencies Checklist