1/7/2025 DATE
☑ REQUIRED COURSE
☑ ELECTIVE COURSE

MSD DIVISION
☐ NEW COURSE
☑ REVISION

Lake Land College

Course Information Form

COURSE NUMBER:	CHM-243		TITLE: *(30 Characters Max)*		Organic Chemistry I						
SEM CR HRS:	4	Lecture:	4	Lab:	0				ECH:	4	
Course Level:	☑ Gen Ed/IAI ☐ Career/Technical ☐ Baccalaureate/Non-IAI ☐ Dev Ed/Not in Degree Audit			Clinical Practicum:	0	Work-based Learning:	0	WBL ECH:	0		
COURSE PCS #	11 - 40.0504		IAI Code		CHM 913			Contact Hours (Minutes/Week)			
Repeatable (Y/N):	N	Pass/Fail (Y/N):	N	Variable Credit (Y/N):	N	Min:		Max:		16 Wks	200	8 Wks	400
Prerequisites:	CHM-151										
Corequisites:	CHM-253										
Catalog Description: (40 Word Limit)	Fundamental introduction to organic chemistry, including a study of hydrocarbons and alcohols with spectroscopy, stereochemistry and reaction mechanisms.										

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Molecular structure and bonding theories	6			
Acid-base theories	6			
Alkanes: structure, conformations and nomenclature	6			
Physical organic chemistry (free radical halogenation)	5			
Isomerism: stereoisomers and chirality	6			
Alkyl halides and nucleophilic substitution	6			
Alkene synthesis: elimination reaction pathways	6			
Alkene and alkyne reactions: electrophilic addition to pi-bonds	9			
Synthesis and structure of alcohols and thiols	5			
Reactions of alcohols	5			
TOTAL	60	0	0	0

EVALUATION							
QUIZZES	☑	EXAMS	☑	ORAL PRES	☐	PAPERS	☐
LAB WORK	☐	PROJECTS	☐	COMP FINAL	☑	OTHER	☐

COURSE MATERIALS		
TITLE:	Organic Chemistry	
AUTHOR:	L. G. Wade and Jan William Simek	
PUBLISHER:	Pearson	
VOLUME/EDITION/URL:	9th	
COPYRIGHT DATE:	2017	

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		The student will be able to:
Molecular structure and bonding theories	6	1. Illustrate structural concepts such as atomic structure, Lewis structures, line structures, electronegativity, polarity, geometry and resonance structures. 2. Predict the role that hybrid orbitals and molecular orbitals play to explain observed bonding in molecules. 3. Classify molecules into major functional groups, including the four major classes of biomolecules.
Acid-base theories	6	1. Identify the three different behaviors of acids and bases. 2. Evaluate trends in acidity and basicity. 3. Predict the outcome of acid-base reactions. 4. Use curved arrow formalism. 5. Classify molecules into major functional groups.
Alkanes: structure, conformations and nomenclature	6	1. Use IUPAC Rules to name alkanes and cycloalkanes. 2. Examine line drawings, Newman projections and perspective drawings to illustrate various alkane conformations. 3. Distinguish between appropriate Haworth and chair structures for cyclohexane rings.

Physical organic chemistry (free radical halogenation)	5	1. Review the basics of kinetics, thermodynamics and equilibrium concepts as they pertain to the analysis of organic reactions. 2. Describe free radical halogenation reactions of alkanes. 3. Propose outcomes of free radical halogenations involving chlorine and bromine.
Isomerism: stereoisomers and chirality	6	1. Define chirality and optical activity. 2. Locate chiral centers. 3. Deduce R/S and E/Z. 4. Differentiate between enantiomers, diastereomers, meso compounds and constitutional isomers. 5. Draw stereoisomers, including Fischer projection form.
Alkyl halides and nucleophilic substitution	6	1. Demonstrate the use of IUPAC rules in the nomenclature of alkyl halides. 2. Implement the common/historical naming systems for alkyl halides. 3. Examine various trends in substitution chemistry. 4. Differentiate between SN1 and SN2 reaction pathways. 5. Integrate stereochemistry into the prediction of reaction outcomes. 6. Propose appropriate mechanisms for both substitution pathways.
Alkene synthesis: elimination reaction pathways	6	1. Use IUPAC rules to name alkenes. 2. Implement the common/historical naming systems for alkenes. 3. Examine various trends in elimination chemistry. 4. Differentiate between E2 and E1 pathways for alkene formation. 5. Integrate stereochemistry into the prediction of reaction outcomes. 6. Create a model that accurately describes the completion between substitution and elimination. 7. Propose mechanisms for both elimination pathways. 8. Forecast reaction outcomes considering the competition between substitution and elimination.
Alkene and alkyne reactions: electrophilic addition to pi-bonds	9	1. Examine the variety of reactions that involve electrophilic addition across the pi-bond(s) of both alkenes and alkynes. 2. Predict regiochemistry and stereochemistry outcomes of addition. 3. Distinguish between the addition pathways that involve cyclic transition states and those that do not. 4. Propose appropriate mechanisms for representative reactions. 5. Differentiate between alkynes and alkenes in addition to reactions. 6. Use IUPAC rules to name alkynes. 7. Implement the common/historical naming systems for alkynes.
Synthesis and structure of alcohols and thiols	5	1. Use IUPAC rules to name alcohols. 2. Implement the common/historical naming systems for alcohols. 3. Evaluate acidity trends for alcohols and thiols. 4. Predict outcomes for various alcohol synthesis reactions. 5. Propose mechanisms for organometallic and hydride reactions.
Reactions of alcohols	5	1. Examine the alcohol as a gateway functional group through the use of various reactions. 2. Construct relationships between alcohols and alkenes, alkynes, and carbonyl compounds. 3. Propose appropriate mechanism for representative reactions. 4. Organize and plan multistep synthetic schemes.
	60	

Outcomes*	At the successful completion of this course, students will be able to:

Course Outcome 1	Apply foundational concepts central to organic chemistry.
Course Outcome 2	Predict products of organic reactions.
Course Outcome 3	Deduce reaction mechanisms.
Course Outcome 4	Organize and develop multistep syntheses.
Primary Laker Learning Competency	Scientific Literacy: Students identify foundational science concepts and apply the scientific process to real-life situations.
Secondary Laker Learning Competency	Creative Thinking & Problem Solving: Students think creatively and solve problems by successfully combining knowledge in new ways.

**Course and program outcomes will be used in the software for outcomes assessment and should include at least 1 primary and 1 secondary Laker Learning Competency. Limit to 3-5.*