1/7/2025	DATE	MSD	DIVISION
☑	REQUIRED COURSE	☐	NEW COURSE
☑	ELECTIVE COURSE	☑	REVISION

Lake Land College

Course Information Form

COURSE NUMBER:	CHM-244		TITLE: *(30 Characters Max)*		Organic Chemistry II							
SEM CR HRS:	4	Lecture:	4		Lab:	0				ECH:	4	
Course Level:	☑ Gen Ed / IAI; ☐ Baccalaureate/Non-IAI	☐ Career/Technical; ☐ Dev Ed/ Not in Degree Audit		Clinical Practicum:		0	Work-based Learning:	0		WBL ECH:	0	
COURSE PCS #	11 - 40.0504		IAI Code		CHM 914		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-243											
Corequisites:	CHM-254											
Catalog Description: (40 Word Limit)	This course is a continuation of Organic Chemistry I (CHM 243) with a focus on aromatic chemistry, carbonyl functional groups and biomolecules.											

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Ethers and epoxides	4			
Conjugated systems	5			
Aromaticity	4			
Aromatic molecule reactions	6			
Aldehydes and ketones	7			
Amines	6			
Carboxylic acids	4			
Acid derivatives	5			
Alpha-carbonyl chemistry	7			
Carbohydrates	6			
Amino acids and proteins	6			
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:	Norton	
VOLUME/EDITION/URL:	9th edition	
COPYRIGHT DATE:	2017	

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		The student will be able to:
Ethers and epoxides	4	1. Use IUPAC rules in the nomenclature of ethers and epoxides. 2. Implement the common/historical naming systems for ethers and epoxides. 3. Distinguish between relative reactivity differences of ethers compared to epoxides. 4. Demonstrate the synthesized ethers and epoxides. 5. Compare and contrast the various ways of opening an epoxide.
Conjugated systems	5	1. Integrate MO Theory into the recognition of conjugation. 2. Predict the outcomes of electrophilic addition to dienes. 3. Integrate kinetic vs thermodynamic control concepts into diene addition reactions. 3. Predict the outcomes of Diels-Alder reactions. 4. Implement reactivity criteria to Diels-Alder outcomes. 5. Propose mechanisms for addition and Diels-Alder reactions.

Aromaticity	4	1. Demonstrate knowledge of the criteria for determining aromaticity. 2. Judge molecular structures for the assignment of aromaticity. 3. Use IUPAC rules to name aromatics. 4. Implement the common/historical naming systems for aromatics.
Aromatic molecule reactions	6	1. Predict the outcomes of SEAr on unsubstituted benzene rings. 2. Examine rings for directive effects in the reactions of mono- and multisubstituted benzenes. 3. Compare the SNAr pathways to the SEAr pathway. 4. Predict the side chain reactions on aromatic rings. 5. Organize larger aromatic synthetic schemes. 6. Propose mechanisms for aromatic substitutions.
Aldehydes and ketones	7	1. Use IUPAC rules to name aldehydes and ketones. 2. Implement the common/historical naming systems for aldehydes and ketones. 3. Predict outcomes for reactions that produce aldehydes and ketones from other functional groups. 4. Predict the outcome of nucleophilic addition reactions. 5. Predict the outcome of redox reactions centered at the carbonyl carbon. 6. Propose mechanisms for select nucleophilic addition reactions. 7. Organize and plan multistep synthesis schemes.
Amines	6	1. Use IUPAC rules to name amines. 2. Implement the common/historical naming systems for amines. 3. Deduce relative amine basicity following general trend guidelines. 4. Predict outcomes for reactions that produce amines from other functional groups. 5. Predict the outcome of reactions of the amine functional group. 6. Propose mechanisms for select amine reactions. 7. Organize and plan multistep synthesis schemes.
Carboxylic acids	4	1. Use IUPAC rules to name of carboxylic acids. 2. Implement the common/historical naming systems for carboxylic acids. 3. Deduce relative acid acidity following general trend guidelines. 4. Predict outcomes for reactions that produce carboxylic acids from other functional groups. 5. Predict the outcome of reactions of nucleophilic acyl substitution reactions. 6. Propose mechanisms for select nucleophilic acyl substitution reactions. 7. Organize and plan multistep synthesis schemes.
Acid derivatives	5	1. Use IUPAC rules to name acid derivatives. 2. Implement the common/historical naming systems for acid derivatives. 3. Deduce the relative reactivity of acid derivatives. 4. Predict outcomes for reactions that transform one derivative to another. 5. Integrate nucleophilic acyl substitution concepts into reaction outcome predictions. 6. Propose mechanisms for select nucleophilic acyl substitution reactions. 7. Organize and plan multistep synthesis schemes.

Alpha-carbonyl chemistry	7	1. Differentiate between acidic and basic formation of enols and enolates. 2. Demonstrate alpha substitution reactions on aldehydes, ketones and esters. 3. Predict the outcomes of various alpha carbonyl condensation reactions. 4. Integrate alpha carbon chemistry to the synthesis of complex organic molecules. 5. Apply alpha carbon chemistry to the synthesis of complex organic molecules.
Carbohydrates	6	1. Define what makes a molecule a carbohydrate. 2. Classify carbohydrates based on functional group, carbon chain length and structure. 3. Predict outcomes of basic reactions of carbohydrates. 4. Distinguish the structure of the carbohydrate portion of DNA/RNA, the structures of the nitrogenous bases and the phosphate linkages.
Amino acids and proteins	6	1. Recall the names and structures of the 20 natural amino acids. 2. Describe how amino acids make up proteins and the basics of protein structure. 3. Deduce the sequence of a protein chain. 4. Construct a protein or peptide using bench reactions. 5. Examine the basics of how proteins and amino acids function in biological systems.
	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.*