

12/12/2024

DATE

MSD DIVISION



REQUIRED COURSE

☐ NEW COURSE

ELECTIVE COURSE

☒ REVISION

Lake Land College

Course Information Form

COURSE NUMBER:	CHM-254	TITLE: (30 Characters Max)		Organic Chemistry Laboratory II				
SEM CR HRS:	1	Lecture:	0	Lab:	3	ECH:	3	
Course Level:	<input checked="" type="checkbox"/> Gen Ed / IAI <input type="checkbox"/> Career/Technical <input type="checkbox"/> Baccalaureate /Non-IAI <input type="checkbox"/> 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:	
Prerequisites:	CHM-243 and CHM-253							
Corequisites:	CHM-244							
Catalog Description: (40 Word Limit)	Laboratory experiments in organic chemistry with a focus on multi-step synthesis.							

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Williamson ether synthesis		3		
Diels-Alder		3		
Vanillin bromination		3		
Wittig reaction		3		
Anhydride hydrolysis		3		
Fischer esterification		3		
Benzylic acid synthesis		3		
Lactone formation (unexpected)		9		
Carbonyl condensation		3		
NMR spectroscopy		12		
TOTAL	0	45	0	0

EVALUATION

QUIZZES <input checked="" type="checkbox"/>	EXAMS <input checked="" type="checkbox"/>	ORAL PRES <input type="checkbox"/>	PAPERS <input type="checkbox"/>
LAB WORK <input checked="" type="checkbox"/>	PROJECTS <input type="checkbox"/>	COMP FINAL <input checked="" type="checkbox"/>	OTHER <input type="checkbox"/>

COURSE MATERIALS

TITLE:	Operational Organic Chemistry
AUTHOR:	John W. Lehman
PUBLISHER:	Pearson / Prentice Hall
VOLUME/EDITION/URL:	4th edition
COPYRIGHT DATE:	2009

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		<i>The student will be able to:</i>
Williamson ether synthesis	3	1. Use a reflux as a reaction technique. 2. Conduct acid-base extractions. 3. Perform a recrystallization. 4. Infer reaction success from IR and melting point data.
Diels-Alder	3	1. Use a fractional distillation to crack a diene. 2. Complete a Diels-Alder reaction. 3. Utilize NMR and IR to deduce product structure.
Vanillin bromination	3	1. Execute and SEAr reaction on vanillin. 2. Perform a recrystallization. 3. Determine the site of reaction using J-values. 4. Validate pre-reaction predictions.
Wittig reaction	3	1. Demonstrate a common nucleophilic addition reaction. 2. Conduct an organic extraction. 3. Determine stereochemistry melting point. 4. Utilize NMR and IR to deduce product structure.
Anhydride hydrolysis	3	1. Demonstrate the reactivity of anhydrides. 2. Utilize NMR and IR to deduce product structure.

Fischer esterification	3	1. Use a reflux as a reaction technique. 2. Operate a rotary evaporator. 3. Utilize NMR and IR to deduce product structure.
Benzyllic acid synthesis	3	1. Use a reflux as a reaction technique. 2. Use decolorizing agents and filter aid. 3. Assess the success of a rearrangement using NMR data.
Lactone formation	9	1. Predict the normal outcome of alkene bromination. 2. Conclude that alkene bromination did not happen. 3. Construct a product structure from IR and NMR data. 4. Formulate a hypothesis as to why a lactone forms. 5. Recommend an alternate route to achieve alkene bromination.
Carbonyl condensation	3	1. Demonstrate microscale reaction techniques. 2. Investigate the challenges of a crossed aldol. 3. Deduce reaction success and purity from IR and NMR data.
NMR spectroscopy	12	1. Interpret proton and carbon NMR spectra. 2. Identify unknowns using tandem NMR and IR data. 3. Formulate experimental conclusions using NMR evidence. 4. Operate a 60 MHz NMR spectrometer.
45		

Outcomes*	At the successful completion of this course, students will be able to:
Course Outcome 1	Employ basic lab techniques such as reflux, distillation, recrystallization, extraction, and separation of organic molecules.
Course Outcome 2	Report detailed observations and results in a "research style" lab notebook.
Course Outcome 3	Assess physical data to formulate scientific conclusions.
Course Outcome 4	Use modern instrumentation.
Course Outcome 5	Plan and perform a multi-step synthesis.
Course Outcome 6	Produce a written ACS Publication style report.
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.