



Lahore University of Management Sciences

Chem430 – Organic Chemistry Lab-2

Fall 2023-24

To understand how to navigate course outlines, consult: How to Use a Course Outline (<http://surl.li/gpvuw>)

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Secretary/TA	TBA
TA Office Hours	
Course URL (if any)	
Support Services	LUMS offers a range of academic and other services to support students. These are mentioned below, and you are encouraged to use these in addition to in-class assistance from course staff. For a complete list of campus support services available for you click here (https://advising.lums.edu.pk/#supportservices)

Course Basics				
Credit Hours	02			
Lecture(s)	Nbr of Lec(s) Per Week	01	Duration	50 min each
Recitation/Lab (per week)	Nbr of Lec(s) Per Week	01	Duration	3-4 h
Tutorial (per week)	Nbr of Lec(s) Per Week		Duration	

Course Distribution	
Core	Chemistry Major
Elective	
Open for Student Category	
Close for Student Category	

COURSE DESCRIPTION
The organic chemistry Lab 2 course is designed for advanced level undergraduate students who have already taken at least 6 credits hours of organic chemistry theory courses along with the Organic Chemistry Lab 1 course. In this lab course, they will witness a practical realization of theoretical concepts previously articulated in their theory courses. The lab will high light the new and emerging technologies pertinent to broader aspects of sustainability, environmental friendliness, and health. More specifically they will have hands on training on the application of greener chemical reactions to build materials that may have applications in health, technology, and environmental remediation. The experiments are particularly designed to provide rigorous practice of important separation techniques like extraction, chromatography, distillation, rotary evaporation, recrystallization, and characterization techniques like NMR, GCMS, and IR spectroscopy. The experiments are intentionally designed to intellectually challenge the students so that they are infused with an inquiry-based reasoning and learning.

COURSE PREREQUISITE(S)	
<ul style="list-style-type: none">•••	Chem 230

COURSE OBJECTIVES	
<ul style="list-style-type: none">•	To familiarize and to provide hands on experience of using emerging technologies pertinent to organic chemistry such as conducting reactions under inert environment, environment friendly green chemistry, click chemistry, controlled polymerization etc.



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Learning Outcomes	
<ul style="list-style-type: none">•••	<p>At the end of this course, the participating students will be able to:</p> <p>Apply various techniques such as conducting reactions under inert environment, chromatographic analysis and purification, solvent-solvent extraction, recrystallization, and spectroscopic characterization.</p> <p>Experimentally demonstrate the concept of green chemistry by utilizing environment-friendly reaction conditions to synthesize useful material.</p> <p>Equip themselves with the skills of scientific writing and independently carrying out their future research assignment</p>
Grading Breakup and Policy	
Lab reports:	40%
Lab Participation/performance:	30%
Pre-Lab Activities:	15%
Post-Lab Quiz:	15%

Examination Detail	
Midterm Exam	No
Final Exam	No

Campus supports & Key university policies
<p>Campus Supports</p> <p>Students are strongly encouraged to meet course instructors and TA's during office hours for assistance in course-content, understand the course's expectations from enrolled students, etc. Beyond the course, students are also encouraged to use a variety of other resources. (Instructors are also encouraged to refer students to these resources when needed.) These resources include Counseling and Psychological Services/CAPS (for mental health), LUMS Medical Center/LMC (for physical health), Office of Accessibility & Inclusion/ OAI (for long-term disabilities), advising staff dedicated to supporting and guiding students in each school, online resources (https://advising.lums.edu.pk/advising-resources), etc. To view all support services, their specific role as well as contact information click here (https://advising.lums.edu.pk/#supportservices).</p> <p>Academic Honesty/Plagiarism</p> <p>LUMS has zero tolerance for academic dishonesty. Students are responsible for upholding academic integrity. If unsure, refer to the student handbook and consult with instructors/teaching assistants. To check for plagiarism before essay submission, use similarity@lums.edu.pk. Consult the following resources: 1) Academic and Intellectual Integrity (http://surl.li/gpvwb), and 2) Understanding and Avoiding Plagiarism (http://surl.li/gpvwo).</p> <p>LUMS Academic Accommodations/ Petitions policy</p>



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Long-term medical conditions are accommodated through the Office of Accessibility & Inclusion (OAI). Short-term emergencies that impact studies are either handled by the course instructor or Student Support Services (SSS). For more information, please see Missed Instrument or 'Petition' FAQs for students and faculty (<https://rb.gy/8sj1h>)

LUMS Sexual Harassment Policy

LUMS and this class are a harassment-free zone. No behavior that makes someone uncomfortable or negatively impacts the class or individual's potential will be tolerated.

To report sexual harassment experienced or observed in class, please contact me. For further support or to file a complaint, contact OAI at oai@lums.edu.pk or harassment@lums.edu.pk. You may choose to file an informal or formal complaint to put an end to the offending behavior. You can also call their Anti-Harassment helpline at 042-35608877 for advice or concerns. *For more information: Harassment, Bullying & Other Interpersonal Misconduct: Presentation* (<http://surl.li/gpvwt>)

COURSE OVERVIEW

Week/ Lecture/ Module	Topics	Recommended Readings	Objectives/ Application
Experiment 1	Synthesis of creatine monohydrate: An organic energizing drug	Lab manual	
Experiment 2	An environmentally benign synthesis of adipic acid: An example of phase transfer catalysis	Lab manual	
Experiment 3	Microwave assisted synthesis of natural insecticide on basic montmorillonite K10 clay	Lab manual	
Experiment 4	Synthesis and phase transition behavior of liquid crystalline material: N-(p-methoxybenzylidene)-p-butylaniline	Lab manual	
Experiment 5	Synthesis of ionic liquids with tunable physical states	Lab manual	
Experiment 6	A green electrophilic aromatic substitution: Directing effects of substituents	Lab manual	
Experiment 7	Comparing amide-forming reactions using green chemistry matrices	Lab manual	
Experiment 8	Synthesis of m-terphenyls: An example of C-C bond formation by using Grignard reagent	Lab manual	
Experiment 9	Atom transfer radical polymerization (ATRP): A useful polymerization technique	Lab manual	
Experiment 10	Click Chemistry: A modern approach towards efficient synthesis of 1,2,3-triazole heterocycles	Lab manual	
Experiment 11	Synthesis of N-acryloyl ornithine: An acrylamide monomer	Lab manual	
Experiment 12	Synthesis of α -aminomethylphosphonic acids by Mannich-type reaction	Lab manual	

Textbook(s)/Supplementary Readings

- Lab Manual Organic Lab 2: 2023 edition
- Vogel's Textbook of Practical organic chemistry, by Brian S Furniss, Antony J Hannford, Peter W G Smith, and Austin R Tatchell
- ACS Styl guide
- <http://chem.wayne.edu/rigby/writing.html>