



Jordan University of Science and Technology
Faculty of Pharmacy
Pharmacy Department

PHAR721 Advanced Pharmaceutical Organic Chemistry - JNQF Level: 9

First Semester 2024-2025

Course Catalog

3 Credit Hours. The aim of this course is to provide students with advanced knowledge of numerous aspects of organic chemistry, as it applies to modern medicinal chemistry. Topics include types and classification of reaction mechanisms with emphasis on some related reactions. Furthermore, the course covers various chemical reactions involving enolates and other carbon nucleophiles, organometallic compounds of group I and II metals as well as transition metals. The course also covers the fundamentals of heterocyclic compounds including properties, synthesis, and reactions of aliphatic and aromatic heterocycles with emphasis on five-membered, six-membered, and fused heterocycle.

Teaching Method: On Campus

Text Book

Title	Advanced Organic Chemistry
Author(s)	David E. Lewis
Edition	1st Edition
Short Name	Textbook
Other Information	2016

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref#2	Advanced Organic Chemistry Part A: Structure and Mechanisms	Francis A. Carey, Richard J. Sundberg	5th Edition	2007
Ref#3	Advanced Organic Chemistry Part B: Reactions and Synthesis	Francis A. Carey, Richard J. Sundberg	5th Edition	2007
Ref# 4	Molecular Orbitals and Organic Chemical Reactions	Ian Fleming	1st Edition	2010

Instructor

Name	Dr. Buthina Al-Oudat
Office Location	P1 L1
Office Hours	
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Class Schedule & Room

Section 1:
 Lecture Time: Mon, Wed : 10:00 - 11:30
 Room: P1102

Tentative List of Topics Covered

Weeks	Topic	References
Week 1	Introduction	1.1 - 1.4 From Textbook
Week 2	Orbitals and Reactivity	Chapter 4 From Textbook
Week 3	Frontier Orbitals and Chemical Reactions	Chapter 5 From Textbook
Week 4	Reactive Intermediates: Carbocations	Chapter 9 From Textbook
Week 5	Nucleophilic Substitution	4.1.1, 4.1.2, 4.2.1, 4.2.2 From Ref#2
Week 6	Polar Addition and Elimination Reactions	5.1, 5.2, 5.3, 5.5, 5.7.1, 5.9.1, 5.9.2, 5.10. From Ref#2
Week 7	Radical Reactions and Organic compounds of Phosphorus	13.1, 22.1, 22.4 From Textbook
Weeks 7, 8, 9, 10	Carbonyl Chemistry	Chapter 7 From Ref#2 , Chapter 1 and Chapter 2 From Ref#3
Weeks 11, 12	Aromatic Substitution	Chapter 11 From Ref#3
Weeks 12, 13, 14	Metal-catalyzed Reactions	Chapter 7 and Chapter 8 From Ref#3

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes

**Course Outcome Weight
(Out of 100%)**

**Assessment
method**

Explain the concept of Frontier Orbitals and their relationship with chemical reactivity [1PLO-MP1] [50L9K1, 50L9S1]	15%	
Discuss the properties and reactions of reactive intermediates. [1PLO-MP1] [50L9K1, 50L9S1]	15%	
Explain the principles underlying nucleophilic substitution reactions, polar addition reactions, and elimination reactions and related reaction mechanisms. [1PLO-MP1] [50L9K1, 50L9S1]	20%	
Discuss the properties and reactions of carbonyl compounds. [1PLO-MP1] [50L9K1, 50L9S1]	25%	
Explain the principles underlying aromatic substitution reactions and metal-catalyzed reactions and related reaction mechanisms. [1PLO-MP1] [50L9K1, 50L9S1]	25%	

PLO1.1	PLO2.1	PLO3.2	PLO3.3	PLO2.2	PLO2.3	PLO2.4	PLO3.1	PLO3.4	PLO3.5	PLO3.6	PLO4.1	PLO4.2	PLO4.3	PLO4.4	PLO5.1	PLO-PT1.1	PLO-PT2.1	PLO-PT2.2	PLO-PT3.1

Relationship to NQF Outcomes (Out of 100%)	
L9K1	L9S1
50	50

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