JERASH UNIVERSITY
FACULTY OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL SCIENCE

Course Syllabus

Course Title: Pharmaceutical Organic Chemistry (I)	**Course code:** 1101111
Course Level: 1st year	**Course prerequisite (s) and/or co requisite (s):** Prerequisite: General Chemistry; 0301101 Co requisite: Pharmaceutical Organic Chemistry Lab
Lecture Time :1:30 hr	**Credit hours:** 3 hours

Academic Staff Specifics

Name	Rank	Office Number and Location	Office Hours				E-mail Address& Website
Dr. Suhaib Ibrahim Alkhamaiseh	Assistant Prof.	510 Pharmacy Building	Sun	Mon	Tues	Wed	s.alkhamaiseh@gmail.com
			8-11	8-10 12-2	8-11	8-10 12-2	

1 Course module description:

Pharmaceutical Organic Chemistry (I) is a three credit hours course; it was designed to be suitable for pharmacy students. This course covers the traditional principles of organic chemistry which are essential for building further understanding and to cover the common organic reactions. Also, to show a biological example to make the material more interesting and meaningful to students. In this course will introduce students to structure and Bonding; polar covalent Bonds; acids and Bases; organic compounds: hydrocarbons, their stereochemistry and IUPAC nomenclature; organic compounds: cycloalkanes and their stereochemistry; stereochemistry at tetrahedral centers; an overview of organic Reactions; alkenes and alkynes; Reactions of alkenes and alkynes; aromatic compounds; and organohalides: nucleophilic substitutions and Eliminations.

2 Course objectives

This course intended for students to have a solid background in pharmaceutical organic chemistry; to distinguish between different functional groups; to understand the pharmaceutical organic compounds structures, hybridizations, and stereochemistry; to give a correct IUPAC nomenclature; to differentiate between organic chemistry reactions types.

3 Course/ module components

The reference textbooks are arranged by relevance

- McMurry, John E. Organic Chemistry with Biological Applications. Cengage Learning, 2015. 3rd edition.
- Hart, Harold, et al. Organic chemistry: a short course. Cengage Learning, 2012. 13th edition.
- T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder . Organic chemistry. John Wiley & Sons, Jan 17, 2013. 11th edition.

4 Teaching methods:

Lectures, on-board sketches, tutorials and problem solving.

5 Learning outcome

By the end of this course, students will acquire:

5.1 Knowledge

- To know the basic principle of organic chemistry.
- To understand an electronic structure of the atom and molecules.
- To realize a stereochemistry of organic compounds.
- To outline a functional group in organic chemistry.
- To clarify the organic reaction mechanism.

5.2 Cognitive skills (Thinking and analysis).

To solve problems.
To nomenclature compounds.
To draw structures.
To recognize reactions mechanism.

5.3 Communication skills (personal and academic):

Discuss problems in groups.
Demonstrate work individual or in a team.

5.4 Practical and subject specific skills (Transferable Skills).

Students will be able to examine organic compounds in term of physical properties; distinguished between different functional groups in term of chemical properties. In addition, the course helps the students to comprehend organic chemistry-II, biochemistry, medicinal chemistry and pharmacology properly.

6 Assessment instruments

Assessment method	Mark
First exam	**20%**
Second exam	**20%**
Final exam	**40%**
Quizzes, reports, classroom questions	**20**
Total	**100**

Make up exam well be afford for valid reasons only with consent of dean. Make-up exam may be different from regular exam in content and format.

7 Attendance policy:

Absence from lectures and/or tutorials shall not be exceeded 15%. Students who exceeded the 15% limit without a medical or emergency excuse acceptable and approved by the Dean of the relevant college/faculty shall not be allowed to take the final exam and shall receive a mark of zero for the course. If the excuses were approved by the Dean, the number of absence should not be exceeded 20% limit otherwise the student shall be considered to have withdrawn from the course.

8 Documentation and academic honesty

Taking headlines/notes from the text book with further elaborated/detailed discussion during the lecture with avoidance of plagiarism. The citation is provided wherever it is required.

9 Course/module academic calendar

Week	**Basic and support material to be covered**	**Homework/reports and their due dates**
(1)	• Introduction. • Structure and Bonding Atomic Structure: Bonding Theory Hybridization Drawing Chemical Structures	
(2)	• Polar Covalent Bonds Electronegativity Formal Charges Resonance Acids and Bases Organic Acids and Organic Bases	
(3-4)	• Organic Compounds Functional Groups Nomenclature Cis–Trans Isomerism Conformations Axial and Equatorial Bonds	
(5-6) 1st Exam	• Stereochemistry Enantiomers Optical Activity Diastereomers Meso Compounds Racemic Mixtures	1st Exam As per time table
(7-8)	• Organic Reactions Kinds of Organic Reactions ReactionsMechanisms Radical Reactions Polar Reactions Using Curved Arrows Describing a Reaction:	

	Equilibria Rates Energy Changes Bond Dissociation Energies Energy Diagrams and Transition States Intermediates Comparison between Biological Reactions and Laboratory Reactions	
(9-10) 2nd exam	• Alkenes and Alkynes Calculating the Degree of Unsaturation Naming Alkenes and Alkynes Cis–Trans Isomerism in Alkenes Alkene Stereochemistry and the E,Z Designation Stability of Alkenes Electrophilic Addition Reactions of Alkenes Orientation of Electrophilic Addition: Markovnikov's Rule Carbocation Structure and Stability Preparing Alkenes: A Preview of Elimination Reactions Halogenation of Alkenes Halohydrins from Alkenes Hydration of Alkenes Reduction of Alkenes: Hydrogenation Oxidation of Alkenes Conjugated Dienes Reactions of Conjugated Dienes The Diels–Alder Cycloaddition Reaction Reactions of Alkynes	2nd exam **As per time table**
(11-12)	• Aromatic Compounds Naming Aromatic Compounds Structure and Stability of Benzene Aromaticity and the Hückel (4n + 2) Rule Aromatic Ions and Aromatic Heterocycles Polycyclic Aromatic Compounds Reactions of Aromatic Compounds: Electrophilic Substitution Alkylation and Acylation of Aromatic Rings: The Friedel–Crafts Reaction Substituent Effects in Electrophilic Substitutions Nucleophilic Aromatic Substitution Oxidation and Reduction of Aromatic Compounds	
(13-15)	• Organohalides: Nucleophilic Substitutions and Elimination Names and Structures of Alkyl Halides Preparing Alkyl Halides Reactions of Alkyl Halides: Grignard Reagents Organometallic Coupling Reactions The SN2 Reaction The SN1 Reaction Elimination Reactions: Zaitsev's Rule The E2 Reaction The E1 and E1cB Reactions A Summary of Reactivity: SN1, SN2, E1, E1cB, and E2	
(15)	Presentation presented by students	**Last lecture**
(16) Final Exam	Final Exam Week	Final Exam Week