



Jerash University
Faculty of pharmacy
Department of pharmaceutical science
First semester, 2016/2017

Course Syllabus

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| 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 |
| <u>Lecture Time</u> : Su + Tu 09:00-11:00 | Credit hours: 3 hours |

Academic Staff Specifics

| Name | Rank | Office Number | Office Hours | E-mail Address |
|----------------------------------|------------------|--------------------------------------|-------------------------|-----------------------------|
| Dr. Muwaffag Badawneh | Professor | 406 Pharmacy building | 12:00 – 13:00 | badawneh@hotmail.com |

Course module description:

This course will subject the student to the molecular orbital theory of organic compounds, saturated aliphatic cyclic and acyclic hydrocarbon. Principles of the IUPAC nomenclature of organic compounds, unsaturated hydrocarbons, halogen compounds. Isomerism and stereoisomerism of organic compounds, alcohol and ethers aldehydes and ketones.

Course module objectives:

For student to have a solid understanding of structure of hybridization, steric hindrance, polarity and the structure theory of organic chemistry .
Substitution and elimination reaction provide a good chance for the student to understand the importance of organic chemistry bringing the student to the point that they can propose a reasonable synthesis using substitution and give a careful selection of materials.

Course/ module components

- **Books (title , author (s), publisher, year of publication)**

Text book 1- Organic Chemistry, J.. Mc-Murry, 2008, 7th edition.

- References:** 1- Organic Chemistry, SOLOMN and FRYHLE, Wily international brooks/cale, thomson learning, 2007, ninth edition.
2- Organic Chemistry, H. Hart; Leslie E. Grain et al 1999, tenth edition

The above textbooks cover the course material in detail. However, additional practical tips, examples and conclusions are discussed in details by the lecturer and the student will be responsible for the additional material.

Students will be expected to give the same attention to these references as given to the Module textbook(s)

Teaching methods:

Lectures, discussion group, tutorials and problem solving

Learning outcome

By the end of this course, students will be able to:

- know the basic principle of organic chemistry.
- Have a good knowledge of electronic structure of the atom and molecules, resonance theory, inductive effect and electro negativity of an element.
- Have an good idea of organic chemistry regarding stereochemistry, reaction and synthesis according to their knowledge in functional group and reaction mechanism.
- Cognitive skills (thinking and analysis).

Interactive learning by participating the student into the lectures content.

• Communication skills (personal and academic):

- Organic chemistry allows the student to use what they learned from the course to explain, communicate and predict what follows. Each student will be able to use this skill and communicate in a way to apply what he have learned, reasoning this way to a solution rather than memorizing

Review concept at office hours

- Practical and subject specific skills (Transferable Skills).

Student has the ability to transfer what he learned to deign, formulate and synthesize medicinal agent of pharmaceutical interest.

Assessment instruments

| <u>Allocation of Marks</u> | |
|---|-------------|
| Assessment Instruments | Mark |
| First examination | 20 |
| Second examination | 20 |
| Final examination: 50 marks | 40 |
| Reports, research projects, Quizzes, Home works, Projects | 20 |
| Total | 100 |

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

Documentation and academic honesty

- Documentation style (with illustrative examples)

Taking headlines/notes from the text book with further elaborated/detailed discussion during the lecture.

- Avoiding plagiarism.

Course/module academic calendar

| week | Basic and support material to be covered | Homework/reports and their due dates |
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| (1) | -Introduction. -bonding in organic molecules. -covalent bondings and formal charges. -polar covalent bond. -structure of molecules. -polar and non polar molecules. - resonance structures | |

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|----------------------------------|---|-----------------|
| | -atomic and molecular orbital. -valence bond theory and resonance. -hybridization. | |
| (2) | -Alkanes their structure, properties, and their nomenclature, synthesis and chemical reactions. -conformational analysis and structural isomerism's | |
| (3) | -alkenes and alkynes, their structures and nomenclature , synthesis and reactions. Acidity of alkynes | |
| (4) | Cyclo aliphatic hydrocarbons , structure and the strain theory. Stability and their reactions. Conformational analysis | |
| (5) | Dienes : conjugation and resonance Stability and reactivity, Electrophilic addition reactions (1,2- vs 1,4- addition) Isoprene reactions | |
| (6) First Exam | Organic reactions: -substitution (free radical, nucleophilic, substitution reactions) -elimination reactions -addition reactions. -rearrangement reactions | |
| (7) + (8) | - Alkyl halides: classification and their physical properties. Preparation of aliphatic halides. Nucleophilic aliphatic substitution Mechanism and kinetics of both(SN1 and SN2) Carbocations structure and stability organometallic compounds. Dehydrohalogenation of alkyl halides Elimination reactions(E1 and E2) mechanisms Elimination E1 vs E2 | |
| (9) | Functional groups and the systematic nomenclature of organic compounds (IUPAC nomenclature) | |
| (10) and (11) | Stereochemistry and stereoisomerism, Optical activity, the chiral center and enantiomers, diastereomers , Meso structures and the reactions of chiral molecules. Racemic reactions | |
| (12) +(13) | Alcohols and ethers, thioethers. Classification and properties of alcohol -structure and nomenclature -preparation of alcohols. -Reactions of alcohols (alcohols as acids and bases , oxidation and anylisis of diols)-ethers, thioethers and thiols | |
| (14) | -aldehydes and ketones. -nomenclature. -preparation. -general consideration of the reactions -unsaturated aldehydes and ketones | |
| (15) Final Examination | Final Exam Week | Final Exam Week |

Attendance policy: Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.