



**Jordan University of Science and Technology**  
**Department of Chemistry**  
**Course Syllabus: Chem 217**

<b>Course Information</b>	
<b>Course Number:</b> Chem 217 (912170)	<b>Course Name:</b> Organic Chemistry for Non-chemist students
<b>Credit Hours:</b> 3	<b>Contact Hours:</b> 3
<b>E-learning web address:</b> www.Just.edu.jo/e-learning	
<b>Prerequisites:</b> Chem103	
<b>Required or Elective or Selected Elective:</b> Required	

<b>Instructor Information</b>	
<b>Coordinator:</b>	<b>Instructor:</b>
<b>Office Hours:</b>	<b>Office Location:</b>
<b>Instructors E-mail:</b>	

<b>Course Catalog</b>
<p><b>Course Description:</b> (Give a brief description of the course as it appears in the study plan ) This course aims to teach students the basic principles of organic chemistry. The first part of the course will cover the fundamental aspects of structural organic chemistry to familiarize the students the main families of organic chemistry functions as well as the 3D structure of organic molecules. The basics of reactivity will also covered using the mechanisms. The course will be frequently illustrated will examples linked to other scientific disciplines, in particular to the field of life sciences.</p>
<p><b>Textbook: Textbook:</b> ( title, author, and year)</p> <p><b>Textbook:</b> <i>Organic Chemistry</i> (12th Edition), Authors: Harold Hart, Leslie Craine, David Hart and C. Hadad. Houghton Mifflin Company, Boston U.S.A. <b>2007</b>.</p>
<p><b>References and Supplement Materials:</b></p> <ol style="list-style-type: none"><li>1. Organic Chemistry, 8<sup>th</sup> ed., By Solomons.(<b>2004</b>)</li><li>2. Organic Chemistry, J. McMurry (<b>2004</b>)</li></ol>

Evaluation		
First Exam	30	%
Second Exam	30	%
Final Exam	40	%

Outcomes of instruction: By the end of the course, students should be able to
1- Understand the structural organic chemistry for main families of organic chemistry. 2- Understand the 3D structure of organic molecules. 3- Manipulate the basic of reactivity and the mechanisms 4- Manipulate the functional groups transformations

Topics to be Covered		
Week	Chapter	Topics
1	1	<b>Bonding and Isomerism</b> a) How electrons are arranged in atoms b) Ionic and covalent bonds c) Valence and hybridization d) Isomerism e) Writing structural formula f) Resonance
2	2	<b>Alkanes and Cycloalkanes and Geometric isomerism</b> a) The structure of Alkanes b) IUPAC Rules for naming Alkanes c) Alkyl and Halogen substituents d) Conformation and geometric isomerism e) Cycloalkanes and Isomerism f) Reactions of Alkanes.
3	3	<b>Alkenes and Alkynes</b> a) Definition and classification b) Nomenclature c) Geometric Isomerism in Alkenes d) Addition and substitution reactions e) Polar addition reactions (addition of Halogens and water) f) Addition of unsymmetric reagents to unsymm. Alkenes (Markonikovs' Rule and Hydroboration reaction)
4	3	<b>Alkenes and Alkynes.....continued</b> g) Reaction equilibrium and reaction rates h) Addition of hydrogen i) Addition to conjugated system

		<ul style="list-style-type: none"> <li>j) Oxidation of Alkenes</li> <li>k) Addition reactions to alkynes</li> <li>l) Acidity of alkynes</li> </ul>
5	4	<p><b>Aromatic compounds : ( omit 4.13)</b></p> <ul style="list-style-type: none"> <li>a) Some Facts About Benzene.</li> <li>b) Structure of Benzene. Orbital Model for Benzene &amp; Resonance.</li> <li>c) Nomenclature of Aromatic compounds</li> <li>d) Electrophilic Aromatic substitution reactions</li> <li>e) Ring activating and deactivating substituents</li> </ul>
<b>First Exam ( 30%)</b>		
6	5	<p><b>Stereoisomerism: (omit 5.12)</b></p> <ul style="list-style-type: none"> <li>a) Chirality and Enantiomers.</li> <li>b) Stereogenic Centers; the Stereogenic Carbon Atom.</li> <li>c) Configuration and the R-S Convention.</li> <li>d) The E-Z Convention for cis-trans Isomers.</li> <li>e) Polarized Light and Optical Activity.</li> <li>f) Properties of Enantiomers</li> <li>g) Diastereomers and Meso compounds</li> <li>h) Stereochemistry and chemical reactions</li> </ul>
7	6	<p><b>Organic Halogen Compounds :</b></p> <ul style="list-style-type: none"> <li>a) Nucleophilic Substitution</li> <li>b) S<sub>N</sub>2 Mechanism</li> <li>c) S<sub>N</sub>1 Mechanism</li> <li>d) Dehydrohalogenation: E1 and E2</li> <li>e) Substitution and Elimination in competition</li> </ul>
8	7	<p><b>Alcohols, Phenols, and Thiols : (omit 7.15-7.16)</b></p> <ul style="list-style-type: none"> <li>a) Nomenclature of Alcohols &amp; its Classification.</li> <li>b) Nomenclature of Phenols.</li> <li>c) Hydrogen Bonding in Alcohols and Phenols.</li> <li>d) Acidity and Basicity Reviewed. The Acidity &amp; Basicity of Alcohols and Phenols.</li> <li>e) Dehydration of Alcohols to Alkenes.</li> </ul>
9	7	<p><b>Alcohols, Phenols, and Thiols : (omit 7.15 - 7.16)</b></p> <ul style="list-style-type: none"> <li>f) The Reaction of Alcohols with Hydrogen Halides.</li> <li>g) Oxidation of Alcohols to Aldehydes, Ketones, and Carboxylic Acids.</li> <li>h) Aromatic Substitution in Phenols.</li> <li>i) Thiols, the Sulfur Analogs of Alcohols and Phenols</li> </ul>
10	8	<p><b>Ethers and Epoxides: (omit 8.9)</b></p> <ul style="list-style-type: none"> <li>a) Nomenclature of ethers and properties</li> <li>b) The Grignard Reagent</li> <li>c) Preparation and cleavage of ethers</li> <li>d) Epoxides</li> </ul>

Second Exam		Date and Room will be assigned later
11	9	<b>Aldehydes and Ketones : (Omit 9.14 - 9.19)</b> a) Nomenclature of Aldehydes and Ketones b) Synthesis of Aldehydes and Ketones c) Addition of Alcohol d) Addition of water e) Addition of Grignard Reagent f) Addition of hydrogen cyanide g) Addition of Nitrogen nucleophile h) Reduction of carbonyl compounds i) Oxidation of carbonyl compounds
12	10	<b>Carboxylic Acids and their Derivatives : (Omit 10.22)</b> a) Nomenclature and Physical Properties b) Acidity and acidity constant c) Effect of structure on Acidity d) Preparation of Acids e) Carboxylic acid derivatives
13	10	<b>Carboxylic Acids and their Derivatives : (Omit 10.22)</b> f) Preparation and Reactions of Esters g) Preparation and Reactions of Acyl Halides h) Preparation and Reactions of Acid Anhydrides i) Urea and Amides
14	11	<b>Amines and Related Nitrogen compounds : (Omit 11.9-11.10)</b> a) Classification and structure of Amines b) Nomenclature and preparation of Amines c) Preparation of Amines d) The basicity of Amines e) Reaction of Amines with strong acids f) Aromatic diazonium compounds g) Diazo coupling
<b>Final Exam (40%)</b>		

**Relationship of the Course to the Chemistry Program Outcomes:**

<b>Program outcomes (a - k)</b>	<b>√</b>	<b>Level (L, M, H)</b>
(a) an ability to apply knowledge of mathematics, science, and applied sciences	√	<b>H</b>
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	√	<b>M</b>
(c) an ability to formulate or design a system, process, or program to meet desired needs	√	<b>M</b>
(d) an ability to function on multidisciplinary teams	√	<b>L</b>
(e) an ability to identify and solve applied science problems	√	<b>L</b>
(f) an understanding of professional and ethical responsibility	√	<b>M</b>
(g) an ability to communicate effectively	√	<b>L</b>
(h) the broad education necessary to understand the impact of solutions in a global and societal context	√	<b>M</b>
(i) a recognition of the need for and an ability to engage in life-long learning	√	<b>H</b>
(j) a knowledge of contemporary issues	√	<b>L</b>
(k) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.	√	<b>M</b>