

# Republic of Yemen

Ministry of Higher Education & Information Technology

Emirates International University



Faculty of Dentistry

Department of Basic science

Doctor of Dental Surgery

Course Specification of Organic Chemistry

Course No.(-----)



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Review committee:



Head of the Department



Quality Assurance head



Dean of Faculty



I. Course Identification and General Information:			
1	Course Title:	Organic Chemistry	
2	Course Code & Number:	----	
3	Credit Hours:	Credit Hours	Lab. Hours
		Theory Hours	
		Lecture	Exercise
		3	2
		--	2
4	Study Level/ Semester at which this Course is offered:	1st Level / 2nd Semester	
5	Pre –Requisite (if any):	General chemistry	
6	Co –Requisite (if any):	None	
7	Program (s) in which the Course is Offered:	Doctor of Dental Surgery	
8	Language of Teaching the Course:	English	
9	Study System:	Semester based System	
10	Mode of Delivery:	Full Time	
11	Location of Teaching the Course:	Faculty of Dentistry	
12	Prepared by:	Dr. Mokhtar Al-Ghorafi	

II. Course Description:
<p>This course will subject the students to the basic knowledge of aliphatic compounds, include the physical and chemical properties, chemical reactions, methods of preparation and mechanisms of hydrocarbon ,alkyl halide , alcohol , ethers ,aldehydes , ketones ,carboxylic acid and amine including stereoisomerism of organic compounds, the structural formula and functional groups of compounds to understand other courses such as biochemistry.</p>

III. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:		Referenced PILOs Learning out of program		
<b>A. Knowledge and Understanding:</b>		I, A or E		
a1	Identify the basic principle of functional group in aliphatic organic compounds and synthesis.	I	A1	A1. Describe the scientific basis of dentistry and the relevant biomedical and behavioral sciences which form the basis for understanding human growth, development and health.
a2	Describe the systematic methods of identification, synthesis of various classes of organic compounds.	I	A1	A1. Describe the scientific basis of dentistry and the relevant biomedical and behavioral sciences which form the basis for understanding human growth, development and health.
<b>B. Intellectual Skills:</b>				
b1	Interpret the methods of synthesis and physical chemical properties of medicinal agents.	I	B1	B1. Incorporate theoretical basic biomedical, behavioral and dental sciences with the clinical signs and symptoms for appropriate understanding of disease and its management.
b2	Explain the reaction mechanisms and effect of condition on the type of organic chemical reactions	I	B1	B1. Incorporate theoretical basic biomedical, behavioral and dental sciences with the clinical signs and symptoms for appropriate understanding of disease and its management.
<b>C. Professional and Practical Skills:</b>				
c1	Handle basic laboratory equipments and chemicals effectively and safely.		C1	C1. Obtain and record a comprehensive history, perform an appropriate physical examination, interpret the findings and organise appropriate further investigations to reach a correct diagnosis and treatment.
c2	Identify organic compounds from their physical and chemical properties by analysis of functional groups of compounds		C1	C1. Obtain and record a comprehensive history, perform an appropriate physical examination, interpret the findings and organise appropriate further investigations to reach a correct diagnosis and treatment.



D. Transferable Skills:				
d1	Work effectively with their colleagues	I	D3	D3. Demonstrate leadership and teamwork skills with colleagues and other oral health team for effective delivery of oral health care.
d2	Adopt the principles of lifelong learning needed for continuous professional development.	I	D1	D1. Commit to continuous education, self-development and lifelong learning to remain updated with advances in dental practice.

**(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1 Identify the basic principle of functional group in aliphatic organic compounds and synthesis.	Lectures Presentation	-Quizzes -Midterm Exam -Final Exam
a2 Describe the systematic methods of identification, synthesis of various classes of organic compounds.	Lectures Presentation	-Quizzes -Midterm Exam -Final Exam

**(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
b1 Interpret the methods of synthesis and physical chemical properties of medicinal agents.	-Lectures - Discussion	-Quizzes and Home work -Midterm Exam -Final Exam
b2 Explain the reaction mechanisms and effect of condition on the type of organic chemical reactions	-Lectures - Discussion	-Quizzes and Home work -Midterm Exam -Final Exam

**(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
c1 Handle basic laboratory	-Lectures	- Direct observation

	equipment's and chemicals effectively and safely.	-Lab Experiments	- Practical Exam
c 2	Identify organic compounds from their physical and chemical properties by analysis of functional groups of compounds	-Lectures -Lab Experiments	- Direct observation - Practical Exam
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
	<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1	Work effectively with their colleagues	- Discussion - Self Learning - Presentation	Research Homework Group work Direct observation
d2	Adopt the principles of lifelong learning needed for continuous professional development.	- Discussion - Self Learning - Presentation	Research Homework Group work Direct observation

#### IV. Course Contents:

##### A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	<b>Introduction to Pharmaceutical Organic Compounds:</b>	Introduction, solubility , type of chemical bonds, -hybridization and their types chemical bonding in drug–receptor interactions -Representation of organic - Types chemical bond cleavage	1	2	a1,a2,b1, b2
2	<b>Organic reaction</b>	-Type of organic reactions, and type of their mechanisms Substitution -Addition -Elimination -Types of reagents	1	2	a1,a2,b1, b2
3	<b>Alkanes</b>	--nomenclature, preparations, and reaction properties), and free radical substitution reaction mechanism.)	1	2	a1,a2,b1, b2



No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
4	<b>Aromatic compounds</b>	Name Physical and chemical properties Aromaticity	1	2	a1,a2,b1, b2
5	<b>Alkenes</b>	Alkenes and cycloalkenes (nomenclature, preparations, and reaction properties), and elimination & addition reaction mechanism Pharmaceutical importance of alken(Isomer , activity ,stability and metabolism)	2	4	a1,a2,b1, b2
6	<b>Alkynes</b>	Alkynes (nomenclature, preparations, and properties), acidity of acetylene physical and chemical properties of alkyne group	1	2	a1,a2,b1, b2
7	<b>Organic halides</b>	Alkyl halides (nomenclature, preparations, and properties), Nucleophilic substitution reactions mechanism, and reactions of organometallic compounds. Pharmaceutical importance of alkyl halide	1	2	a1,a2,b1, b2
8	<b>Midterm Exam</b>		1	2	a1,a2,b1, b2
9	<b>Alcohols ,ether and phenol</b>	-Alcohols (nomenclature, preparations, and properties), esterification reaction mechanisms – Ethers (nomenclature, preparations, and properties) physical and chemical properties of drugs contain alcohol functional group(prodrug and metabolism)	2	4	a1,a2,b1, b2
10	<b>Aldehydes and ketones</b>	Aliphatic and aromatic aldehydes &Ketones (nomenclature, preparations, and properties), Addition, condensation (Aldol) reaction mechanism, and cannizaro reaction	1	2	a1,a2,b1, b2
11	<b>Carboxylic acid</b>	Aliphatic and aromatic carboxylic acids (nomenclature, preparations, and properties), factors affecting on the acidity of drugs	1	2	a1,a2,b1, b2
12	<b>Derivatives of carboxylic acid</b>	-Acyl halides -Anhydride -Esters	1	2	a1,a2,b1, b2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
		-Amides Stability of drugs containing one or more of that compounds			
13	Aliphatic and aromatic amines	Aliphatic amines (nomenclature, preparations, and properties), factors affecting on the basicity of drugs	1	2	a1,a2,b1, b2
14	Final Exam	-MCQs and essay questions	1	2	a1,a2,b1, b2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

**B. Case Studies and Practical Aspect:**

No.	Tasks/ Experiments	Week Due	Contact Hours	Learning Outcomes (CILOs)
1	Laboratory safety	1 <sup>st</sup>	2	c1,c2, d1,d2
2	Test of alkene	2 <sup>nd</sup>	2	c1,c2, d1,d2
3	Test of alcohols	3 <sup>rd</sup>	2	c1,c2, d1,d2
4	Test of aldehydes	4 <sup>th</sup>	2	c1,c2, d1,d2
5	Test of ketones	5 <sup>th</sup>	2	c1,c2, d1,d2
6	Test of acids	6 <sup>th</sup>	2	c1,c2, d1,d2
7	Test of acid derivatives	7 <sup>th</sup>	2	c1,c2, d1,d2
8	Test of amines	8 <sup>th</sup>	2	c1,c2, d1,d2
9	Test of ammonium salt	9 <sup>th</sup> -10 <sup>th</sup>		c1,c2, d1,d2



No.	Tasks/ Experiments	Week Due	Contact Hours	Learning Outcomes (CILOs)
10	Lassaigne's test, test for nitrogen	11 <sup>th</sup>	2	c1,c2, d1,d2
11	Test for sulfur	12 <sup>th</sup>	2	c1,c2, d1,d2
12	Test for halogen in absence of nitrogen and sulfur	13 <sup>th</sup>	2	c1,c2, d1,d2
13	Revision	14 <sup>th</sup>	2	c1,c2, d1,d2
14	Final exam	15 <sup>th</sup>	2	c1,c2, d1,d2
<b>Number of Weeks /and Units Per Semester</b>		<b>15</b>	<b>30</b>	

#### V. Teaching Strategies of the Course:

Lectures  
Discussion  
Self-Learning  
Presentation  
Seminars  
Lab Experiments

#### VI. Assessment Methods of the Course:

Quizzes  
Midterm Exam  
Final Exam  
Practical Exam  
Research  
Homework  
Group work  
Direct observation

#### VII. Assignments:



No.	Assignments	Week Due	Mark	Aligned CILOs(symbols)
1	Assignments : Searching about related subjects of functional groups in organic chemistry	10 <sup>th</sup>	5	a1, a2, b1, b2, d1, d2
<b>Total</b>			<b>5</b>	

### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	10 <sup>th</sup>	5	5 %	a1, a2, b1, b2, d1, d2
2	Quizzes	6 <sup>th</sup>	5	5 %	a1,a2,b1,b2
3	Midterm Exam	8 <sup>th</sup>	20	20 %	a1,a2,b1,b2
4	Practical Exam	15 <sup>th</sup>	20	20 %	c1,c2, d1,d2
5	Final Exam	16 <sup>th</sup>	50	50 %	a1,a2,b1,b2
<b>Total</b>			<b>100</b>	<b>100%</b>	

### IX. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ):

- 1- Satyajit D. Sarker, 2007 Chemistry for Pharmacy Students General, Organic and Natural Product Chemistry,
- 2- Paula yurkanisbruice organic chemistry 4th edition

#### 2- Essential References:

- 1- SOLOMN and FRYHLE 2003 Organic Chemistry, eighth edition. Wily international brooks/cale, thombsnlearning,
- 2- J.. Mc-Murry 2014, Organic Chemistry, 8th edition.

#### 3- Electronic Materials and Web Sites etc.:

##### Websites:

- 1- <https://www.khanacademy.org/science/organic-chemistry>

### X. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

## Faculty of Dentistry

### Department of Basic Science

### Doctor of Dental Surgery





## Course Plan (Syllabus) of Organic Chemistry

Course No.( -----)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Mokhtar Al-Ghorafi	Office Hours					
Location & Telephone No.:							
E-mail:	Alghorafi2030@yahoo.com	SAT	SUN	MON	TUE	WED	THU

II. Course Identification and General Information:					
1	Course Title:	Organic Chemistry			
2	Course Code & Number:	----			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	2
4	Study Level/ Semester at which this Course is offered:	1st Level / 2nd Semester			
5	Pre –Requisite (if any):	General chemistry			
6	Co –Requisite (if any):	None			

7	<b>Program (s) in which the Course is Offered:</b>	Doctor of Dental Surgery
8	<b>Language of Teaching the Course:</b>	English
9	<b>Study System:</b>	Semester based System
10	<b>Mode of Delivery:</b>	Full Time
11	<b>Location of Teaching the Course:</b>	Faculty of Dentistry
12	<b>Prepared by:</b>	Dr. Mokhtar Al-Ghorafi

### III. Course Description:

This course will subject the students to the basic knowledge of aliphatic compounds, include the physical and chemical properties, chemical reactions, methods of preparation and mechanisms of hydrocarbon, alkyl halide, alcohol, ethers, aldehydes, ketones, carboxylic acid and amine including stereoisomerism of organic compounds, the structural formula and functional groups of compounds to understand other courses such as biochemistry.

### IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

	<b>A. Knowledge and Understanding:</b>
a1	Identify the basic principle of functional group in aliphatic organic compounds and synthesis.
a2	Describe the systematic methods of identification, synthesis of various classes of organic compounds.
	<b>B. Intellectual Skills:</b>
b1	Interpret the methods of synthesis and physical chemical properties of medicinal agents.
b2	Explain the reaction mechanisms and effect of condition on the type of organic chemical reactions
	<b>C. Professional and Practical Skills:</b>
c1	Handle basic laboratory equipments and chemicals effectively and safely.
c2	Identify organic compounds from their physical and chemical properties by analysis of



	functional groups of compounds
<b>D. Transferable Skills:</b>	
d1	Work effectively with their colleagues
d 2	Adopt the principles of lifelong learning needed for continuous professional development.

<b>V. Course Contents:</b>				
<b>A. Theoretical Aspect:</b>				
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	<b>Introduction to Pharmaceutical Organic Compounds:</b>	Introduction, solubility , type of chemical bonds, -hybridization and their types chemical bonding in drug–receptor interactions -Representation of organic - Types chemical bond cleavage	1	2
2	<b>Organic reaction</b>	-Type of organic reactions, and type of their mechanisms Substitution -Addition -Elimination -Types of reagents	1	2
3	<b>Alkanes</b>	--nomenclature, preparations, and reaction properties), and free radical substitution reaction mechanism.)	1	2
4	<b>Aromatic compounds</b>	Name Physical and chemical properties Aromaticity	1	2
5	<b>Alkenes</b>	Alkenes and cycloalkenes (nomenclature, preparations, and reaction properties), and elimination & addition reaction mechanism Pharmaceutical importance of alken(Isomer , activity ,stability and metabolism)	2	4
6	<b>Alkynes</b>	Alkynes (nomenclature, preparations, and properties), acidity of acetylene physical and chemical properties of alkyne group	1	2
7	<b>Midterm Exam</b>		1	2
8	<b>Organic halides</b>	Alkyl halides (nomenclature, preparations, and		

## V. Course Contents:

### A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		properties), Nucleophilic substitution reactions mechanism, and reactions of organometallic compounds. Pharmaceutical importance of alkyl halide	1	2
9	Alcohols ,ether and phenol	-Alcohols (nomenclature, preparations, and properties), esterification reaction mechanisms – Ethers (nomenclature, preparations, and properties) physical and chemical properties of drugs contain alcohol functional group (prodrug and metabolism)	2	4
10	Aldehydes and ketones	Aliphatic and aromatic aldehydes & Ketones (nomenclature, preparations, and properties), Addition, condensation (Aldol) reaction mechanism, and Cannizzaro reaction	1	2
11	Carboxylic acid	Aliphatic and aromatic carboxylic acids (nomenclature, preparations, and properties), factors affecting on the acidity of drugs	1	2
12	Derivatives of carboxylic acid	-Acyl halides -Anhydride -Esters -Amides Stability of drugs containing one or more of that compounds	1	2
13	Aliphatic and aromatic amines	Aliphatic amines (nomenclature, preparations, and properties), factors affecting on the basicity of drugs	1	2
14	Final Exam	-MCQs and essay questions	1	2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>

### B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Week Due	Contact Hours
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<b>B. Case Studies and Practical Aspect:</b>			
No.	Tasks/ Experiments	Week Due	Contact Hours
1	Laboratory safety	1 <sup>st</sup>	2
2	Test of alkene	2 <sup>nd</sup>	2
3	Test of alcohols	3 <sup>rd</sup>	2
4	Test of aldehydes	4 <sup>th</sup>	2
5	Test of ketones	5 <sup>th</sup>	2
6	Test of acids	6 <sup>th</sup>	2
7	Test of acid derivatives	7 <sup>th</sup>	2
8	Test of amines	8 <sup>th</sup>	2
9	Test of ammonium salt	9 <sup>th</sup> -10 <sup>th</sup>	4
10	Lassaigne's test, test for nitrogen	11 <sup>th</sup>	2
11	Test for sulfur	12 <sup>th</sup>	2
12	Test for halogen in absence of nitrogen and sulfur	13 <sup>th</sup>	2
13	Revision	14 <sup>th</sup>	2
14	Final exam	15 <sup>th</sup>	2
<b>Number of Weeks /and Units Per Semester</b>		<b>15</b>	<b>30</b>

### VI. Teaching Strategies of the Course:

Lectures

- Discussion
- Self-Learning
- Presentation
- Seminars
- Lab Experiments

### VII. Assessment Methods of the Course:

Quizzes

Midterm Exam  
Final Exam  
Practical Exam  
Research  
Homework  
Group work  
Direct observation

**VIII. Assignments:**

No.	Assignments	Week Due	Mark
1	Assignments : Searching about related subjects of functional groups in organic chemistry	10th	5
<b>Total</b>			<b>5</b>

**IX. Schedule of Assessment Tasks for Students During the Semester:**

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	Assignments	10 <sup>th</sup>	5	5 %
2	Quizzes	6 <sup>th</sup>	5	5 %
3	Midterm Exam	8 <sup>th</sup>	20	20 %
4	Practical Exam	15 <sup>th</sup>	20	20 %
5	Final Exam	16 <sup>th</sup>	50	50 %
<b>Total</b>			<b>100</b>	<b>100%</b>

**X. Learning Resources:**

**1- Required Textbook(s) ( maximum two ):**

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**2- Essential References:**



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**3- Electronic Materials and Web Sites etc.:**

**Websites:**

<https://www.khanacademy.org/science/organic-chemistry>

**XI. Course Policies: (Based on the Uniform Students' Bylaw (2007))**

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4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
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