



Course Specifications

Course Title:	Special topics in Organic chemistry
Course Code:	4024583-2
Program:	Chemistry program
Department:	Chemistry
College:	Faculty of Applied Science
Institution:	Umm Al-Qura University




Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective.....	4
3. Course Learning Outcomes	4
C. Course Content	4
D. Teaching and Assessment	5
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods	5
2. Assessment Tasks for Students	7
E. Student Academic Counseling and Support	7
F. Learning Resources and Facilities	7
1. Learning Resources	7
2. Facilities Required.....	8
G. Course Quality Evaluation	8
H. Specification Approval Data	8

A. Course Identification

1. Credit hours:
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 8 th level/ 4 th year
4. Pre-requisites for this course (if any): Chemistry of Natural Products
5. Co-requisites for this course (if any): Not applicable

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	30
2	Laboratory/Studio	0
3	Tutorial	0
4	Exams & Quizzes	6
	Total	36
Other Learning Hours*		
1	Study	30
2	Assignments	10
3	Library	3
4	Projects/Research Essays/Theses	4
5	Exams & Quizzes	13
	Total	60

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

The course include some selected topics of organic chemistry which available for the student to learn and does not studied in the other pervious courses as the chemistry of biomolecules. Also, provide basic understanding of the basic principles of photochemistry and related applications.

2. Course Main Objective

By the end of this course student will be familiar with the chemistry of important biomolecules such as carbohydrates, nucleic acids, amino acid, fats and oils. Also, provide basic understanding of the basic principles of photochemical reactions and their applications

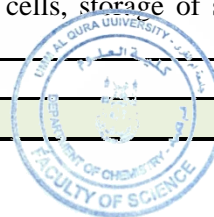
3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Name different organic classes and bioactive molecules such as carbohydrate, nucleic acid, lipids and proteins	K1
1.2	Recognize the different methods of preparations of organic bioactive molecules such as carbohydrate, lipids and proteins.	K3
1.3	Familiar with the physical and chemical properties of different organic bioactive molecules such as carbohydrate, lipids and proteins	K3
1.4	Determine the type of mechanism and intermediates in different organic reactions such as carbens and nitrens	K1
1.5	Define the different electronical excitation states	K1
1.6	Know the basic principles of photochemical reactions	K1
1.7	Outline the general types of photochemical reactions	K3
1.8	Write a mechanism for a photochemical transformation	K3, K5
1.9	Recognize the application of photochemistry	K2
2	Skills :	
2.1	Explain the different strategies for preparation of bioactive organic compounds	S2
2.2	Analyze the reasons for the unique physical properties in some bioactive organic compounds	S2
2.3.	Summarize the different reactions of reactive intermediates such as carbenes and nitrenes	S1
2.4	Evaluate the different methods of preparation of organic compounds	S1
2.5	Demonstrate a synthetic pathways for synthesis of organic molecules	S3, S1
2.6	Apply the basic principles of photochemistry	S2
2.7	Compare between the different types of photochemical and pericyclic reactions	S1
2.8	Ability to communicate results of work to classmates.	S8
2.9	Ability to work in a team to perform a specific task.	S8
3	Competence:	
3.1	Use the internet as a means of communication and a source of information to know the different types of carbohydrates and lipids.	C1, C3
3.2	Encourage students to use internet for searching certain electronic journals regarding applications of photochemistry in different fields.	C1, C3
3.3	Scientific writing of long essays on implementations of reactive intermediates in synthesis of bioactive molecules.	C1, C2
3.4	Scientific writing of long essays on implementations of photochemistry in synthesis of bioactive molecules.	C1, C2

C. Course Content

No	List of Topics	Contact Hours
1	Classification and nomenclature of Carbohydrates	2
2	Chemical reactions and synthesis of carbohydrates and related compounds,	4

3	Nucleosides – Nucleotides –Nucleic Acids	2
4	Amino acids: classification, nomenclature, chemical reactions and synthesis	2
5	Proteins and peptides: physical and chemical properties, and applications	2
6	Chemistry of Lipids	2
7	Chemistry and reaction of carbenes and nitrene	2
8	Introduction to the basic principle photochemistry-Introductory concepts, The quantization of light and matter and the three principles of light matter interaction	2
9	Light nature and light sources	2
10	Light absorption and electronically excited states: Ground state (S_0), Excited states (S_1 , T_1 , T_2), and energy transfer- fluorescence - phosphorescence	2
11	Theory and the excited states	2
12	General types of photochemical reactions: The photochemistry of alkenes and carbonyl compounds. Photochemical cross-linking and degradation of polymers.	2
13	Applications of photochemistry in semiconductors (solar cells, storage of solar energy and its conversions).	2
14	Selected photochemical reactions.	2
Total		30



D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge		
1.1	Name different organic classes and bioactive molecules such as carbohydrate, nucleic acid, lipids and proteins	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • Oral exam • Short essay
1.2	Describe the different methods of preparations of organic bioactive molecules such as carbohydrate, lipids and proteins.	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Web-based study 	<ul style="list-style-type: none"> • Exams • web-based student performance systems • portfolios
1.3	Familiar with the physical and chemical properties of different organic bioactive molecules such as carbohydrate, lipids and proteins	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • Exams • long and short essays • posters lab manuals
1.4	Determine the type of mechanism and intermediates in different organic reactions such as carbens and nitrens	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Web-based study 	<ul style="list-style-type: none"> • Exams • HW
1.5	Define the different electronical excitation states	<ul style="list-style-type: none"> • Lectures 	<ul style="list-style-type: none"> • Exams
1.6	Know the basic principles of photochemical reactions	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • Exams • web-based student performance systems • portfolios
1.7	Outline the general types of photochemical reactions	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Web-based study 	<ul style="list-style-type: none"> • Exams • web-based student performance systems • portfolios • long and short essays • posters lab manuals

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.8	Write a mechanism for a photochemical transformation	<ul style="list-style-type: none"> Lectures Scientific discussion 	<ul style="list-style-type: none"> Exams web-based student performance systems portfolios long and short essays posters lab manuals
1.9	Recognize the application of photochemistry	<ul style="list-style-type: none"> Lectures Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> Exams web-based student performance systems portfolios
2.0	Skills		
2.1	Explain the different strategies for preparation of bioactive organic compounds	<ul style="list-style-type: none"> Lectures Scientific discussion 	<ul style="list-style-type: none"> Exams web-based student performance systems
2.2	Analyze the reasons for the unique physical properties in some bioactive organic compounds	<ul style="list-style-type: none"> Lectures Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> Exams web-based student performance systems portfolios posters demonstrations
2.3	Summarize the different reactions of reactive intermediates such as carbenes and nitrenes	<ul style="list-style-type: none"> Lectures Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> Exams web-based student performance systems portfolios HW
2.4	Compare between the different types of photochemical and pericyclic reactions	<ul style="list-style-type: none"> Lectures Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> Exams web-based student performance systems portfolios posters demonstrations
2.5	Apply the basic principles of photochemistry	<ul style="list-style-type: none"> Lectures Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> Exams HW Portfolios Oral exams
2.6	Ability to communicate results of work to classmates.	<ul style="list-style-type: none"> Scientific discussion Web-based study 	<ul style="list-style-type: none"> Oral exam presentation
2.7	Ability to work in a team to perform a specific task.	<ul style="list-style-type: none"> Scientific discussion Web-based study 	<ul style="list-style-type: none"> Exams web-based student performance systems portfolios posters demonstrations
3.0	Competence		
3.1	Evaluate the different methods of preparation of organic compounds	<ul style="list-style-type: none"> Lectures Scientific discussion 	<ul style="list-style-type: none"> web-based student performance systems individual and group presentations
3.2	Demonstrate a synthetic pathways for synthesis of organic molecules	<ul style="list-style-type: none"> Lectures Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> web-based student performance systems individual and group presentations

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.3	Use the internet as a means of communication and a source of information.	<ul style="list-style-type: none"> • Online - Library visits • Web-based study 	<ul style="list-style-type: none"> • web-based student performance systems • individual and group presentations
3.4	Encourage students to use internet for searching certain electronic journals regarding topics of the course.	<ul style="list-style-type: none"> • Library visits • Web-based study 	<ul style="list-style-type: none"> • web-based student performance systems • individual and group presentations
3.5	Scientific writing.	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Writing essay 	<ul style="list-style-type: none"> • web-based student performance systems • long and short essays

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework or activities.	--	10 %
2	First Periodic Exam.	6	20 %
3	Second Periodic Exam.	12	20 %
4	Final Exam.(2 hours exam)	16	50 %

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- We have faculty members to provide counseling and advice.
- Office hours: During the working hours weekly.
- Academic Advising for students.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> • T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "Organic Chemistry, 11th Edition, International Student Version" 2013, John Wiley & Sons. • P. Finch, <i>Carbohydrates: Structures, Syntheses and Dynamics</i>, Springer Science & Business Media, 2013. • Ian Fleming, <i>Pericyclic Reactions</i> (Oxford Chemistry Primers) 1st Edition, 1999. • Axel Griesbeck, Michael Oelgemöller, Francesco Ghetti, <i>CRC Handbook of Organic Photochemistry and Photobiology</i>, Third Edition, 2012.
Essential References Materials	<ul style="list-style-type: none"> • Lecture Handouts available on the coordinator website • P. M. Collins, P. J. Ferrier, <i>Monosaccharides: Their Chemistry and Their Role in Natural Products</i>, 1995, John Wiley & Sons

	<ul style="list-style-type: none"> Nicholas J. Turro, <i>Modern Molecular Photochemistry</i>, University Science Books, 1991.
Electronic Materials	<ul style="list-style-type: none"> http://www.chemweb.com http://www.sciencedirect.com http://www.rsc.org
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> Classrooms capacity (30) students. Providing hall of teaching aids including computers and projector.
Technology Resources (AV, data show, Smart Board, software, etc.)	<ul style="list-style-type: none"> Room equipped with computer and projector and TV.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	<ul style="list-style-type: none"> No other requirements.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Quality of learning resources	Students Peer Reviewer	Direct
Effectiveness of teaching and assessment	Program leader	Direct
Extent of achievement of CLO's	Peer Reviewer	Direct

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Received by: Dr. Ismail Althagafi

Department Head

Signature:



Date: 20/12/2019

