



Course Specifications

Physical Organic Chemistry

4023551-3





Course Specifications

Institution Umm Al-Qura University.	Date of Report: 2017
College/Department: Faculty of Applied Science - Department of Chemistry.	

A. Course Identification and General Information

1. Course title and code: Physical organic chemistry/ 4023551-3	
2. Credit hours: 3 hrs (theoretical).	
3. Program(s) in which the course is offered: Chemistry and Industrial Chemistry (If general elective available in many programs indicate this rather than list programs)	
4. Name of faculty member responsible for the course: Prof. Dr. Thoraya A. Farghaly	
5. Level/year at which this course is offered: 4/2.	
6. Pre-requisites for this course (if any): Aromatic Chemistry	
7. Co-requisites for this course (if any)	
8. Location if not on main campus: both on El-Abdyah and El-Zaher	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom	<input checked="" type="checkbox"/> What percentage? <input type="text" value="%100"/>
b. Blended (traditional and online)	<input type="checkbox"/> What percentage? <input type="text"/>
c. e-learning	<input type="checkbox"/> What percentage? <input type="text"/>
d. Correspondence	<input type="checkbox"/> What percentage? <input type="text"/>
f. Other	<input type="checkbox"/> What percentage? <input type="text"/>
Comments:	

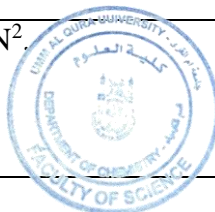


B Objectives

<p>1. What is the main purpose for this course?</p> <p>A full knowledge of the basic concepts of physical organic chemistry including the mechanism of chemical reactions. Study the stereochemistry in different reaction types is also involved and chirality.</p>
<p>2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> • Using smart classes for teaching in lectures. • The students will be encouraged to prepare an essay or a report from literature by using the library, data base services, and/or internet to follow up and update the new topics of the physical organic chemistry and stereochemistry course.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
<ul style="list-style-type: none"> ▪ Thermodynamic parameters affected the reactions. ▪ Reaction kinetic and determination of the reaction orders. ▪ Determination of reaction mechanism by physical and chemical properties. 	2	6
<ul style="list-style-type: none"> ▪ Factors affecting the distribution of electrons in molecules: (Inductive effect- Mesomeric effect- Steric effect). 	1	3
<ul style="list-style-type: none"> ▪ Nucleophilic substitution reaction SN¹ and SN². 	2	6





<ul style="list-style-type: none"> ▪ Elimination reactions E1 and E2. 		3
<ul style="list-style-type: none"> ▪ Exam 1 		
<ul style="list-style-type: none"> ▪ Electrophilic addition to carbon-carbon double bond. ▪ Nucleophilic addition to carbonyl group. 	1	3
<ul style="list-style-type: none"> ▪ Free radicals reactions. 	1	3
<ul style="list-style-type: none"> ▪ Solvent effect on chemical reactions. ▪ The chemistry of the reactive intermediate such as carboanion, carbocation, carbens and free radicals. 	1	3
<ul style="list-style-type: none"> ▪ Introduction to stereochemistry: Isomerism - Configuration - shape and types of isomerism: structural and conformational. 	1	3
<ul style="list-style-type: none"> ▪ conformational isomerism, Geometrical isomerism, Optical isomerism 	2	6
<ul style="list-style-type: none"> ▪ Chiral study and their properties. 	1	3
<ul style="list-style-type: none"> • Compounds that contain more than one chiral carbon atom - Diastereomers and their properties. 	1	3
<ul style="list-style-type: none"> • Revision 	1	3
<ul style="list-style-type: none"> • Exam 2 		





2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	42	-	-	-	-	42
Credit	3					3

3. Additional private study/learning hours expected for students per week. - <input type="text"/>

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy
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	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
	1- Memorize of the basic rules in organic chemistry. 2- Understand of the division of types of electronic effects of groups in molecules. 3- Knowledge and understanding of the mechanism of different types of organic reactions. 4- Understand SN1 and SN2 Mechanisms. 5- Knowledge of types of isomerism. 6- Draw a shape of open and cyclic compounds. 7- Understand of the absolute configuration. 8- Knowledge of Diastercomers and their properties and Molecular Chirality.	1-Using open discussion to link the previous knowledge to the current and future topics. 2-The students use the internet to prepare an essay about a recent advances related to the course of physical organic chemistry and stereochemistry.	<ul style="list-style-type: none"> • Homework . • Oral discussion. • Assignments.



2.0	Cognitive Skills		
	<ul style="list-style-type: none"> ○ To acquire skills to different types of electronic effects in molecules. ○ To acquire skills to know the path of interaction and then find out mechanism. ○ Developing skills of drawing shape of the stereochemistry of organic compounds. ○ Understanding of the different types of isomerism. 	<ul style="list-style-type: none"> ● Using brain storming at the beginning of each lecture in order to stimulate the students towards the new topic of the course. ● Enhancing open discussion during the lecture 	<ul style="list-style-type: none"> ● Assignments ● Homework
3.0	Interpersonal Skills & Responsibility		
	<ul style="list-style-type: none"> ➤ Divide the student in to teams to perform some joint reports. ➤ The development of the student to accepts the opinion of his colleague in his participation to perform an active presentation for the topic related to the course, and evaluate the results to find out the response of students for the collective cooperation. 	<ul style="list-style-type: none"> ● Encourage the solving problems in groups during lecture. ● Making open discussion about certain recent topic of the course. 	Homework and group reports.



4.0	Communication, Information Technology, Numerical		
	<ul style="list-style-type: none"> Communicate effectively in oral and written forms. Using information and communication technologies. Using basic mathematical and statistical techniques. 	<ul style="list-style-type: none"> Using computer lab. Visiting the Central Library. Using international information network. 	<ul style="list-style-type: none"> Ask questions in the tests to explanation for simple statistical information. Assessing the duties associated with suitable use of communication skills and numerical.
5.0	Psychomotor		
	Non-requirement in the curriculum.	Non-requirement in the curriculum.	Non-requirement in the curriculum.

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
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 %
5	Total		100 %

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

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



E. Learning Resources

1. List Required Textbooks

- 1- "Modern Physical Organic Chemistry" Eric V. Anslyn, Texas, Austin Dennis A. Dougherty, University Science Books Sausalito, California, 2005.
- 2-Howard Maskill "*Structure and Reactivity in Organic Chemistry, Volume 81 of Oxford Chemistry Primers*" 1999, OUP Oxford.

2. List Essential References Materials (Journals, Reports, etc.)

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

1. John McMurry's "*Organic Chemistry, 8th edition, International Edition*" 2011, Brooks/Cole.
2. T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "*Organic Chemistry, 11th Edition, International Student Version*" 2013, John Wiley & Sons.
3. R. K. Sharma "*Stereochemistry, Volume 4*" **2008**, Discovery Publishing House.
4. Michael J. T. Robinson "*Organic Stereochemistry*" **2000**, OUP Oxford.

4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

- <http://www.chemweb.com>
- <http://www.sciencedirect.com>
- <http://www.rsc.org>

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

- Microsoft PowerPoint, Microsoft Word, Microsoft Excel.
- Videos on physical organic chemistry.
- CD for learning physical organic chemistry.



F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. 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.
2. Computing resources (AV, data show, Smart Board, software, etc.) <ul style="list-style-type: none">○ Room equipped with computer and projector and TV.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) <p>No other requirements.</p>

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none">➤ Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor <ul style="list-style-type: none">✓ Observations and the assistance of colleagues.✓ Independent evaluation for extent to achieve students the standards.✓ Independent advice of the duties and tasks.
3 Processes for Improvement of Teaching <ul style="list-style-type: none">• Workshops for teaching methods.• Continuous training of member staff.• Review of strategies proposed.• Providing new tools for learning.• The application of e-learning.• Exchange of experiences internal and external.



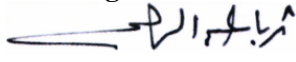
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

- Check marking of a sample of exam papers, or student work.
- Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- ❖ Periodic Review of the contents of the syllabus and modify the negatives.
- ❖ Consult other staff of the course.
- ❖ Hosting a visiting staff to evaluate of the course.
- ❖ Workshops for teachers of the course.

Faculty or Teaching Staff: Prof. Thoraya A. Farghaly

Signature:  Date Report Completed: 12/1/2019

Received by: Dr. Ismail Althagafi Department Head

Signature:  Date: 20/1/2019

