

ATTACHMENT 5.

Kingdom of Saudi Arabia

**The National Commission for Academic Accreditation &
Assessment**

T6. Course Specifications

(CS)

Advanced Physical Organic Chemistry

(402733-2)



Course Specifications

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

A. Course Identification and General Information

1. Course title and code: Advanced Physical Organic Chemistry / 402733-2			
2. Credit hours: 2 hrs. (Theoretical)			
3. Program(s) in which the course is offered. Ph. D. in Chemistry			
4. Name of faculty member responsible for the course: Prof. Basim H. Asghar			
5. Level/year at which this course is offered: 2nd / 1st			
6. Pre-requisites for this course (if any): not applicable			
7. Co-requisites for this course (if any): not applicable			
8. Location if not on main campus: El-Abedyah, El-Azizya, and El-Zaher			
9. Mode of Instruction (mark all that apply)			
a. traditional classroom	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="80%"/>
b. blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="text"/>
c. e-learning	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="20%"/>
d. correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. other	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments:			

B Objectives

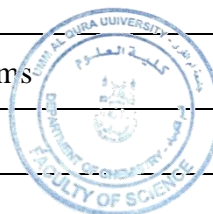
1. What is the main purpose for this course?
 - a- The student can formulate and explain the basic rules connecting the structure of organic molecules and their reactivity
 - b- The student has the basic ability to predict and to present in written form the mechanism, regio-, and stereoselectivity of the selected organic reactions.
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):
 - The use of smart teaching halls for lectures.
 - Encourage students to carry out research reports in the course field using the library, data base services, and/or websites.
 - Increased use of IT or web based reference material.
 - Changes in content as a result of new research in the field.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
a- Molecular structure and reactivity	1	2
b- Linear free energy relationships	3	6
c- Transition state theory and related topics	1	2
d- General principles for writing reaction mechanisms	2	4
e- Interpretation of isotope effects	1	2



f- Nucleophilicity, electrophilicity, acidity, basicity	2	4
g- Reactions of acids and bases	1	2
h- Solvent and salt effects and its role in defining the mechanism of reactions	1	2
i- Study of details and advanced concepts of the mechanism of organic reactions.	1	2

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	26	---	---	---	---	26
Credit	2	---	---	---	---	2

3. Additional private study/learning hours expected for students per week.

2 hrs.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge At the end of this course you will be able to:		

1.1	Write reaction mechanisms in organic chemistry	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Use the library to work duties and a small research on Advanced Physical Organic Chemistry. • Use of the internet to carry out some reports on course subjects. 	<ul style="list-style-type: none"> • Written mid-term and final exams. • Long and short essays.
1.2	Identify theoretical aspects of Transition state and related topics		
1.3	Describe the applications of linear free energy relationships and their relation with writing reaction mechanisms		
1.4	Explain scientific basis of isotope effects		
1.5	Understand the fundamental principles of solvent and salt effects and its role in defining the mechanism of reactions		
1.6	Recording the relation between structure, intermediate and mechanism		
2.0	<p>Cognitive Skills At the end of this course you will be able to:</p>		
2.1	Suggest alternative reagents and reactions for performing desired organic transformations	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • Periodic tests and assignments. • Measuring the response to the assignments. • Through assignments and homework
2.2	Interpret reaction mechanism by physical and chemical properties		
2.3	Discuss orally and in writing organic reactions with regard to mechanisms and stereoselectivity		
2.4	Plan and evaluate multi-step organic reaction sequences using basic retrosynthetic analysis		
3.0	<p>Interpersonal Skills & Responsibility</p>		
3.1	Operate in team work and accept his college's opinions.	<ul style="list-style-type: none"> • Dividing students into 	<ul style="list-style-type: none"> • Evaluate the

3.2	Choose the suitable method to solve problems.	groups to carry out collective scientific reports.	results of collective works and duties as well as knowing the contribution of each individual through dialogue and discussion.
3.3	Develop the student's ability in self-reliance and responsibility.	<ul style="list-style-type: none"> • Periodic individual duties to develop the skill of taking responsibility and self-reliance. 	<ul style="list-style-type: none"> • Assessment of individual tasks and duties to determine the student's ability to self-reliance.
4.0	Communication, Information Technology, Numerical		
4.1	Use computers and the international information network (the Internet) to identify recent research relevant to decision sources.	<ul style="list-style-type: none"> • Visiting research centers. • The use of computers in the training room of the department. 	<ul style="list-style-type: none"> • Evaluation of the duties associated with the proper use of numerical and communication skills.
4.2	Communicate effectively in oral and written forms.	<ul style="list-style-type: none"> • Using the internet for collecting data. 	<ul style="list-style-type: none"> • Web-based student performance

			systems. • Individual and group presentations.
5.0	Psychomotor		
5.1	Not applicable.		

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	Assignments and activities.	--	10 %
2	Midterm Exam.	8	30 %
3	Final Exam.	15-16	60 %
4	Total	100 %	

D. Student Academic Counseling and Support

<p>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)</p> <ul style="list-style-type: none"> • Office hours: During the working hours weekly. • Academic advising for students. • Availability of Staff members to provide counseling and advice.

E Learning Resources

1. List Required Textbooks

<ul style="list-style-type: none">➤ Eric V. Anslyn, Dennis A. Dougherty, <i>Modern Physical Organic Chemistry</i>, University Science; illustrated edition edition, 2005.➤ R. B. Grossman, <i>The Art of Writing Reasonable Organic Reaction Mechanisms</i>, Springer., 2003.➤ Robert W. Taft, <i>Progress in Physical Organic Chemistry</i>, John Wiley & Sons, 1993.
2. List Essential References Materials (Journals, Reports, etc.) <ul style="list-style-type: none">➤ Marjorie C. Caserio, Reaction mechanisms in organic chemistry. I. The experimental approach, journal of chemical Education (ACS).
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc.) <ul style="list-style-type: none">➤ Hon Man Yau and Anna K. Croft, <i>Reaction mechanisms: polar reactions</i>, <i>Annu. Rep. Prog. Chem., Sect. B: Org. Chem.</i>, 2013.➤ Edyta M. Greer and Christopher V. Cosgriff, <i>Reaction mechanisms: pericyclic reactions</i>, <i>Annu. Rep. Prog. Chem., Sect. B: Org. Chem.</i>, 2012.
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. <ul style="list-style-type: none">➤ http://www.chemguide.co.uk/mechmenu.html➤ http://www.chemhelper.com/mechanisms.html➤ http://www.chem.ox.ac.uk/vrchemistry/iom/➤ http://www.askthenerd.com/ocol/OCOL.HTM➤ https://www.organic-reaction.com/organic-and-medicinal-chemistry-news/the-journal-of-organic-chemistry/
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. None.

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.) ➤ Equipped lecture hall specializing in Organic chemistry.
2. Computing resources (AV, data show, Smart Board, software, etc.) ➤ Room equipped with computers, data show and TV.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list): No other requirements.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching ➤ Structured group discussions and/or focus groups. ➤ Questionnaires can be used to collect student feedback. ➤ Student representation on staff-student committees and institutional bodies.
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department ➤ The instructor's statement of his/her goals for the course, teaching methods and philosophy, student outcomes, and plans for improvement are a critical source of information. ➤ A systematic self-review has the potential for contributing significantly to the instructor's teaching improvement by focusing on the strengths and weaknesses of the course in light of his/her original course objectives. ➤ Visits by other faculty can provide information about the process of teaching. ➤ Colleagues have the expertise to evaluate the quality of a course as evidenced by its content and format (peer reviewers).
3 Processes for Improvement of Teaching ➤ Providing new tools for learning. ➤ The application of e-learning. ➤ Exchange of experiences internal and external. ➤ Training programs and workshops for Staff member. ➤ Review of strategies proposed.

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 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.

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

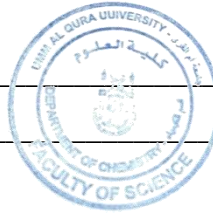
- Workshops for teachers of the course.
- Periodic review of the contents of the syllabus and modify the negatives.
- Consult other staff of the course.
- Hosting a visiting staff to evaluate of the course.

Name of Instructor: **Prof. Basim H. Asghar**

Signature: _____ Date Report Completed: **2017**

Name of Field Experience Teaching Staff _____

Program Coordinator: _____



Signature: _____ Date Received: _____