

## COURSE SPECIFICATIONS

### Form

Course Title: **Photochemistry**

Course Code: **4026834-3**



Date: 31-10-2018

Institution: Umm Al-Qura University.

College: Faculty of Applied Science

Department: Department of Chemistry

### A. Course Identification and General Information

1. Course title and code: **Photochemistry / 4026834-3**

2. Credit hours: **3 hrs. (theoretical)**

3. Program(s) in which the course is offered. **M. Sc. in 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. Saleh A. Ahmed**

5. Level/year at which this course is offered: **3<sup>rd</sup>/ 2<sup>nd</sup>**

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 type="text"/>	percentage?	<input type="text"/>
b. Blended (traditional and online)	<input checked="" type="checkbox"/>	percentage?	<input type="text" value="80%"/>
c. E-learning	<input checked="" type="checkbox"/>	percentage?	<input type="text" value="20%"/>
d. Correspondence	<input type="text"/>	percentage?	<input type="text"/>
f. Other	<input type="text"/>	percentage?	<input type="text"/>

Comments:

## B Objectives

### 1. The main objective of this course

By the end of this course student will be familiar with the basics of photochemistry and mechanisms of photochemical reactions as well as the applications of photochemistry in industry.

### 2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

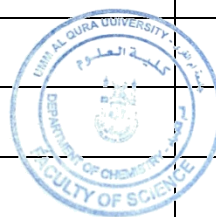
- The use of smart teaching halls for lectures.
- Increased use of IT or web based reference material.
- Encourage students to carry out research reports in the field of photochemistry using the library, data base services, and/or websites.
- Changes in content as a result of new research in the field.

## C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

### Course Description:

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to the basic principle photochemistry.	1	3
Different light sources and their uses, filters and the ranges of light. Fluorescence and phosphorescence.	2	3
The fate of excited states: physical processes (Jablonski diagram), chemical processes. General types of photochemical reactions.	2	3
Photo-reduction reactions, photochemical reactions of ethenes, polyethenes and ethynes, photodimerization of benzenoid compounds.	2	6
Photooxidation, photochemical aromatic substitution, photochemical fragmentation.	2	3
Common photochemical reactions and their kinetics.	2	6
Storage of solar energy and its conversions.	1	3
Photochemistry of vision.	1	3



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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	39	--	--	--	--	39
	Actual	39	--	--	--	--	39
Credit	Planned	3	--	--	--	--	3
	Actual	3	--	--	--	--	3

## 3. Individual study/learning hours expected for students per week.

2

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

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 targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

### Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Know the basic principles of photochemical reactions	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Scientific discussion</li> <li>• Web-based study</li> <li>• Library visits</li> </ul>	<ul style="list-style-type: none"> <li>• Exams</li> <li>• web-based student performance systems</li> <li>• portfolios</li> <li>• long and short essays</li> <li>• posters</li> </ul>
1.2	Determine the type of mechanism and intermediates in different photochemical reactions		
1.3	Write a mechanism for a photochemical transformation		
1.4	Write the products of photochemical reaction correctly		
1.5	Recognize the application of photochemistry		
1.6	Outline the general types of photochemical reactions		
1.7	Define the different electronical excitation states		

1.8	Recognize the application of photochemistry		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Compare between different types of photochemical reactions	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Scientific discussion</li> <li>• Web-based study</li> <li>• Library visits</li> </ul>	<ul style="list-style-type: none"> <li>• Exams</li> <li>• web-based student performance systems</li> <li>• portfolios</li> <li>• long and short essays</li> <li>• posters</li> <li>• demonstrations</li> </ul>
2.2	Compare between different sources of light		
2.3	Apply the basic principles of photochemistry		
2.4	Predict the products of different photochemical reactions		
2.5	Formulate the outputs of different photochemical reactions		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Use the photochemical reactions to prepare different classes of organic molecules	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Scientific discussion</li> <li>• Web-based study</li> </ul>	<ul style="list-style-type: none"> <li>• Exams</li> <li>• web-based student performance systems</li> </ul>
3.2	Choose the suitable mechanism for a given photochemical reaction		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Evaluate the importance of photochemistry	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Scientific discussion</li> <li>• Library visits</li> <li>• Web-based study</li> </ul>	<ul style="list-style-type: none"> <li>• Web-based student performance systems</li> <li>• Individual and group presentations</li> </ul>
4.2	Evaluate the different photochemical reactions to synthesis of various organic compounds		
4.3	Demonstrate the mechanism of different photochemical reactions		
<b>5.0</b>	<b>Psychomotor(if any)</b>		
5.1	Not applicable		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Mid-term exam	9	30%
2	Assignments and activities		10%
3	Final Exam	15-16	60%

## D. Student Academic Counseling and Support

### 1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per 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

- **Persico, Maurizio, Granucci, Giovanni "Photochemistry; A Modern Theoretical Perspective", 1<sup>st</sup> ed., Springer International Publishing, 2018.**
- Photochemistry: Volume 38 by Angelo Albini, 2010.
- Modern Molecular Photochemistry of Organic Molecules by Nicholas J. Turro (2009).

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

- Lecture handouts available on the coordinator website.
- Photochemistry of Organic Compounds: From Concepts to Practice (Postgraduate Chemistry Series) by Petr Klán (2009).
- CRC Handbook of Organic Photochemistry and Photobiology, W. M. Horspool and F. Lenci., CRC Press, London, NY, 2003.

### 3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

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

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

- **ChemDraw Ultra 11.0**

## 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.)

- Classrooms capacity (10) students.
- Providing hall of teaching aids including computers and projector.

### 2. Technology resources (AV, data show, Smart Board, software, etc.)

- Room equipped with computer, projector 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 Procedures

### 1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

- Questionnaires can be used to collect student feedback.
- Student representation on staff-student committees and institutional bodies.
- Structured group discussions and/or focus groups.

### 2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

- Observations and the assistance of colleagues.
- Independent evaluation for extent to achieve students the standards.
- Independent advice of the duties and tasks.

### 3. Procedures for Teaching Development

- 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. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members 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 developing it.

- 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.

Name of Course Instructor: Prof. Dr. Saleh A. Ahmed

Signature: 

Date Completed: 31 - 10 - 2018

Program Coordinator: Dr. Ismail Ibrahim Althagafi

Signature: 

Date Received: 31/10/2018

