هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	***PHOTOCHEMISTRY***
Course Code:	***CHEM 448***
Program:	***Bachelor in Chemistry***
Department:	***Chemistry***
College:	***College of Science***
Institution:	***Jazan University (JU)***

Table of Contents

A. Course Identification

1. Credit hours: **2h**
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: **Level 8 / Year 4**
4. Pre-requisites for this course (if any)**:** **none**
5. Co-requisites for this course (if any)**:** **none**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	***27***	***90%***
2	**Blended**		
3	**E-learning**	***3***	***10%***
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	***30***
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	*30*

B. Course Objectives and Learning Outcomes

1. Course Description

Course Title	Course Number	Contact Hours (CH)		Credit unit (CU)	Year	Level	Pre-requisite
		Lec.	Prac.				
Photochemistry	*CHEM 448*	*2*	*0*	*2*	*4*	*8*	*none*

This course aims to give students the basic principles of photochemistry and its chemical and biological applications

Course objectives: They are to identify the following.

- ***Laws of photochemistry***
- ***Experimental methods in photochemistry***
- ***Mechanisms of photochemical reactions***
- ***The applications of photochemistry***

Syllabus: A-Theoretical contents

Basic principles of photochemistry: Laws of photochemistry- Beer-lambert law - Fluorescence and phosphorescence- Photochemical reactions and quantum yield- Mechanisms of photochemical reactions- Experimental methods in photochemistry- The applications of photochemistry.

Syllabus: A-Practical contents

none

2. Course Main Objective

This course aims to give students the basic principles of photochemistry and its chemical and biological applications.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding** ***Up on completing this course, student will be able to***	
1.1	***Demonstrate a broad knowledge in photochemistry topics as, electromagnetic radiation, photochemistry, absorption of light, photochemistry laws and application, quantum yield, electronic and molecular translons, …. etc (M)***	K1
1.2	***Describe correctly photochemistry phenomena, essential facts, principles and theories across the nature of light and the photon, Jablonski diagram of energy. Frank-Condon principle, the degeneration of the excited states of the quantum yields….etc (M)***	K2
2	**Skills :** ***Up on completing this course, student will be able to***	
2.1	***Demonstrate the knowledge and skills required to use charts and solve problems in the relations of light and electromagnetic radiation. ,i.e, Beer-lambert law, quantum yield, stern -volmer equation…….. etc*** (M)	S1

CLOs		Aligned PLOs
2.2	*Use communication and on line technology to prepare a report/poster on selected photochemistry topic* (M)	S4

C. Course Content

No	List of Topics	Contact Hours
1	*Meaning of photochemistry / photochemical Reactions*	*4*
2	*Laws of photochemistry (Grotthurs-Draper law and Stark- Einstein law)*	*4*
3	*Criteria for photochemical reactions and Frank-Condon principle*	*4*
4	*Jablonski Diagram*	*3 + 1 Exam*
5	*Importance of photochemical reactions*	*2*
6	*Examples of photochemical reactions (Photo addition - Photosynthesis - Photocleavage - photoreduction)*	*6*
7	*Techniques and applications of photochemistry*	*3+1 Exam*
8	*Presentation Session*	*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 and Understanding** **Upon completion of the course, student will be able to:**		
1.1	*Demonstrate a broad knowledge in photochemistry topics as, electromagnetic radiation, photochemistry, absorption of light, photochemistry laws and application, quantum yield, electronic and molecular translons, …. etc (M)*	• *lecture* • *group work discussion*	*oral* *written examinations* *Quizzes* *HW*
1.2	*Describe correctly photochemistry phenomena, essential facts, principles and theories across the nature of light and the photon, Jablonski diagram of energy. Frank-Condon principle, the degeneration of the excited states of the quantum yields….etc. (M)*	• *lecture* *group work discussion*	*oral* *written examinations* *Quizzes* *HW*
2.0	***Skills*** **Upon completion of the course, student will be able to:**		
2.1	*Demonstrate the knowledge and skills required to use charts and solve problems in the relations of light and electromagnetic radiation. ,i.e, Beer-lambert law, quantum yield, stern - volmer equation…….. etc (M)*	• *lecture* *group work discussion*	*oral* *written examinations* *Quizzes* *HW*
2.2	*Use communication and on line technology to prepare a report/poster on selected photochemistry topic. (M)*	*research activities* *project-based learning* *Technology-enabled learning*	*assignments* *reports / project* *rubric*

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	*Homework assignment (H.W. 1)*	*2*	*1*
2	*Lecture Quizzes (Q1)*	*5*	*5*
3	*Mid-term Exam (MID. 1)*	*8*	*15*
6	*Mid-term exam (MID. 2)*	*14*	*15*
7	*Presentation Session*	*14*	*4*
8	*Final EXAM*	*17*	*60*
	Total Exam		100

***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:

- *Instructor will be available for academic counseling on daily basis for at 4h/day during office hours.*
- *The office hours are listed in the instructor time table and delivered to students in the first lecturer in each semester.*
- *Instructor is available in a WhatsApp group with student.*
- *E-mail and Telephone number are delivered to student for any help during semesters.*

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	*Principles and Applications of Photochemistry, R. P. Wayne, 2009, John Wiley & Sons, Ltd, ISBN 978-0-470-01493-6.*
Essential References Materials	• *Photochemistry; C. E. Wayne & R. P. Wayne, 1996, OUP primer* • *Photochemistry, Past, Present and Future; Angelo Albini, Springer-Verlag Berlin Heidelberg 2016, ISBN 978-3-662-47976-6*
Electronic Materials	*Some course contents and materials are posted on Black board sites*
Other Learning Materials	• *https://en.wikipedia.org/wiki/Photochemistry* • *https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/photchem.htm* • *http://photobiology.info/Photochem.html* • *https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Book%3A_Basic_Principles_of_Organic_Chemistry_(Roberts_and_Caserio)/28%3A_Photochemistry* • *https://pages.uoregon.edu/tgreenbo/voltaicCellEMF.html* • •

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	***1 Lecture room(s) for groups of 50 students***
Technology Resources (AV, data show, Smart Board, software, etc.)	***Smart board, Data show, Black board, internet***
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	***none***

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and Assessment	***Student***	***Likert-type Survey CES) Indirect***
Extent of achievement of course learning outcomes	***Instructor & Course coordinator***	***Class room evaluation (direct & indirect***
Quality of learning resources	***Program coordinator***	***Indirect***
Exam Quality assessment	***Assessment committee***	***Indirect***

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	**Chemistry Department Council**
Reference No.	42 / 35 /102 112
Date	17 /09 /1442 Corresponding to 28 / 04 /2021