



# Course Specification

## (Bachelor)

Course Title: : **PHOTOCHEMISTRY**

Course Code: **448CHEM2**

Program: **Bachelor of Science in Chemistry**

Department: **Physical Sciences**

College: **College of Science**

Institution: **Jazan University (JU)**

Version: **TP-153 2024**

Last Revision Date: **5/5/2024**

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## A. General information about the course:

### 1. Course Identification

1. Credit hours: ( 2H )

### 2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others  
B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: ( Level8/Year 4)

### 4. Course general Description:

#### Course general Description

Course Title	Course Number	Contact Hours (CU)		Credit unit (CU)	Year	Level	Pre-requisite
		Lec.	Prac.				
Photochemistry	448CHEM2	2	0	2	4	8	447CHEM3

*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*

### 5. Pre-requirements for this course (if any):

447CHEM3

### 6. Co-requisites for this course (if any):

*none*

### 7. Course Main Objective(s):

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

### 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%



No	Mode of Instruction	Contact Hours	Percentage
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> <li>Traditional classroom</li> <li>E-learning</li> </ul>		
4	Distance learning		

### 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		30

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	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 transitions, .... etc (M)	K (1.1)	Lecture group work discussion	Objective Q
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)	K(1.2)	Lecture group work discussion	Short answer Questions
2.0	Skills; (Upon completion of the course, student will be able to)			



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
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)	S(2.1)	lecture group work discussion	Solving Problems & chart analysis
2.2	Use communication and on line technology to prepare a report/poster on selected photochemistry topic. (M)	S((2.4)	project-based learning Technology-enabled learning	Research presentation rubric
3.0	Values, autonomy, and responsibility; (Upon completion of the course, student will be able to)			
3.1	Act with integrity and good ethics in chemistry profession and their obligation to society (M)	V(3.2)	Research activities	Ethic check rubric

### 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	5
5.	Importance of photochemical reactions	4
6.	Examples of photochemical reactions (Photo addition - Photosynthesis - Photocleavage - photoreduction)	4
7.	Techniques and applications of photochemistry	4
8.	Presentation Session	1
Total		30

### D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	HW	7-8	5
2.	Mid-term Exam1	6-8	15
3.	Mid-term Exam1	12-14	15





No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
4.	Presentation Session	15	3
5.	Ethic check	15	2
6.	Final EXAM	16-17	60
<b>Total</b>			<b>100</b>

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

Essential References	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
Supportive References	Principles and Applications of Photochemistry, R. P. Wayne, 2009, John Wiley & Sons, Ltd, ISBN 978-0-470-01493-6.
Electronic Materials	Some course contents and materials are posted on Black board sites
Other Learning Materials	<ul style="list-style-type: none"> <li>• <a href="https://en.wikipedia.org/wiki/Photochemistry">https://en.wikipedia.org/wiki/Photochemistry</a></li> <li>• <a href="https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/photchem.htm">https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/photchem.htm</a></li> <li>• <a href="http://photobiology.info/Photochem.html">http://photobiology.info/Photochem.html</a></li> <li>• <a href="https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Book%3A_A_Basic_Principles_of_Organic_Chemistry_(Roberts_and_Caserio)/28%3A_Photochemistry">https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Book%3A_A_Basic_Principles_of_Organic_Chemistry_(Roberts_and_Caserio)/28%3A_Photochemistry</a></li> <li>• <a href="https://pages.uoregon.edu/tgreenbo/voltaicCellEMF.html">https://pages.uoregon.edu/tgreenbo/voltaicCellEMF.html</a></li> </ul>

### 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	1 Lecture room(s) for groups of 50 students
<b>Technology equipment</b> (projector, smart board, software)	Smart board, Data show, Black board, internet
<b>Other equipment</b> (depending on the nature of the specialty)	none

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Likert-type Survey CES) Indirect



Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Students assessment	Instructor & Course coordinator	Class room evaluation (direct & indirect)
Quality of learning resources	Program coordinator	Indirect
The extent to which CLOs have been achieved	Assessment committee	Indirect
Other		

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

### G. Specification Approval

COUNCIL /COMMITTEE	Physical Sciences Department Council
REFERENCE NO.	Psci2415
DATE	28/03/1446 Corresponding to 1 / 10 /2024



## H. Attachments

### 1- Practical Work

None

### 2- Blue Print

Course Name	PHOTOCHEMISTRY
Course Code	448 CHEM

PLOs	K1	K2	S1	S2	S3	S4	V1	V2
CLOs	1.1	1.2	2.1			2.2		3.1
Marks	12	20	63	---	---	3	---	2

Learning Domain	PLOs	CLOs	Assessment Type	Assessment Tool	No of Questions	Marks of the Assessment	Weight of the Assessment
Knowledge & understanding	K1	1.1 (12M)	HW	Objective Q	2	1	1
			Mid-term	Objective Q	4	4	4
			Final Exam	Objective Q	14	7	7
	K2	1.2 (20M)	HW	Short answer Questions	2	2	2
			Mid-term	Short answer Questions	5	5	5
			Final Exam	Short answer Questions	7	13	13
Skills	S1	2.1 (63M)	HW	Solving Problems & chart analysis	2	2	2
			Mid-term	Solving Problems & chart analysis	7	21	21
			Final Exam	Solving Problems & chart analysis	8	40	40
	S4	2.2 (3M)	Research presentation	Research rubric	-	-	1
				PPT design	-	-	1
				Oral discussion	-	-	1
Value	V2	3.1 (2)	Research ethic check	ethic check rubric	-	2	2
TOTAL		100					100

