City University of Hong Kong
Course Syllabus

offered by Department of Chemistry
with effect from Semester A 2022/23

Part I Course Overview

Course Title:	Photochemistry
Course Code:	CHEM8142
Course Duration:	1 semester
Credit Units:	3 credits
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	BCH8142 Photochemistry
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

This course is a postgraduate taught course tailored for postgraduate research students only.

In this course students will:

- explore and apply the basic principles of photochemistry;
- analyze and interpret photoeffects of coordination chemistry;
- identify and apply the photochemical reactions of certain classes of organic compounds;
- explain examples of the effects of photochemistry in nature and in various applications.

2. Course Intended Learning Outcomes (CILOs)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Demonstrate an understanding of excited states and apply group theory to photochemical problems	20%	✓		
2.	Explain natural and anthropogenically derived photochemical phenomena	20%	✓	✓	
3.	Describe and apply photochemical reactions of certain homologous series of organic compounds	20%	✓	✓	
4.	Analyze, discuss, conduct and defend their own investigation into a photochemical phenomenom	20%		✓	✓
5.	Critically evaluate photochemical theories and literature	20%		✓	✓
		100%			

A1: *Attitude*
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: *Ability*
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

TLA	Brief Description	CILO No.					Hours/week (if applicable)
		1	2	3	4	5	
Group activities	Students will learn through large group activities exploring problems and calculations in photochemistry	✓					
Lectures, videos and web-based teaching methods	Lectures, videos and web-based teaching methods will enable students to develop experience in recognizing and explaining natural and anthropogenically derived photochemical phenomena		✓				
Group activities and tutorials	Large and small group interactive questioning and tutorials will provide opportunities for students to select and apply photochemical reactions of certain homologous series			✓			
Oral presentations	Student-centred learning and student oral presentations will form the basis for this activity where a specific aspect of photochemistry is explored in detail				✓		
Literature review	Students will independently review current theories and experiments in photochemistry critically and both give and receive feedback based these insights from the current literature					✓	

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.					Weighting*	Remarks
	1	2	3	4	5		
Continuous Assessment: 30%							
Assignment				✓		5%	
Short Tests	✓	✓	✓			10%	
Presentation				✓		15%	
Examination: 70% (duration: 3 hours)							
						100%	

Starting from Semester A, 2015-16, students must satisfy the following minimum passing requirement for courses offered by CHEM:
"A minimum of 40% in both coursework and examination components."

5. Assessment Rubrics

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Assignment	Ability to analyse and solve problems relevant to photochemistry	High	Significant	Basic	Not even reaching marginal levels
2. Short Tests	Ability to analyse and solve problems relevant to photochemistry	High	Significant	Basic	Not even reaching marginal levels
3. Presentation	Ability to analyze, discuss, conduct and defend their own investigation into a photochemical phenomenom	High	Significant	Basic	Not even reaching marginal levels
4. Examination	Ability to demonstrate an understanding of excited states and apply group theory to photochemical problems, to explain natural and anthropogenically derived photochemical phenomena, and to describe and apply photochemical reactions of certain homologous series of organic compounds	High	Significant	Basic	Not even reaching marginal levels

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignment	Ability to analyse and solve problems relevant to photochemistry	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Short Tests	Ability to analyse and solve problems relevant to photochemistry	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Presentation	Ability to analyze, discuss, conduct and defend their own investigation into a photochemical phenomenom	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Examination	Ability to demonstrate an understanding of excited states and apply group theory to photochemical problems, to explain natural and anthropogenically derived photochemical phenomena, and to describe and apply photochemical reactions of certain homologous series of organic compounds	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information

1. Keyword Syllabus

Basic principles of photochemistry: photophysical processes and photodissociation. Absorption and emission of radiation. Nature of color.

Photochemical reactions of organic compounds.

Photochemistry and spectroscopy of transition metals and rare earths. Charge transfer photochemistry. Molecular emission. Energy transfer processes.

Kinetics of photophysical processes. Reactions of excited species: photochemical reactions. Techniques in photochemistry.

Lasers. Optical materials.

Atmospheric photochemistry. Photosynthesis.

Vision. Photoimaging. Photochromism and chemiluminescence. Solar energy storage. Photopolymerisation. Supramolecular photochemistry: photomolecular devices. Photomedicine.

2. Reading List

2.1 Compulsory Readings

1.	
2.	
3.	
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2.2 Additional Readings

1.	Photochemistry, C.E. Wayne and R.P. Wayne. Oxford University Press. New York,1996.
2.	Principles and Applications of Photochemistry, R.P. Wayne. Oxford University Press. New York, 1988.
3.	Supramolecular Photochemistry, Ed. Vincenzo Balzani, NATO ASI Series. Reidel, Dordrecht, 1987.
4.	Elements of Inorganic Photochemistry, G.J. Ferraudi. Wiley. Canada,1988.
5.	Principles of Photochemistry. J.A. Barltrop and J.D. Coyle. Wiley. New York, 1978.
6.	Surface Photochemistry. ed. M. Anpo. Wiley, 1996.
7.	Introduction to Organic Photochemistry. J.D. Coyle. Wiley, 1998.
8.	Photochemistry and Photophysics of metal complexes. D.M. Roundhill. Plenum, New York, 1994.
9.	The Physics and Chemistry of Colour, K. Nassau. Wiley, 2001.
10.	Lasers in Chemistry, D.L. Andrews. Springer-Verlag, 1986.
11.	Modern Molecular Photochemistry, N.J. Turro. University Science Books, Mill Valley, California, USA, 1991.