CHEM8141: SELECTED TOPICS IN MODERN CHEMISTRY

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Selected Topics in Modern Chemistry

Subject Code
CHEM - Chemistry
Course Number
8141

Academic Unit
Chemistry (CHEM)

College/School
College of Science (SI)

Course Duration
One Semester

Credit Units
3

Level
R8 - Research Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
BCH8141 Selected Topics in Modern Chemistry

Exclusive Courses
Nil

Part II Course Details

Abstract

This is an advanced course on a contemporary topic or group of topics in Pure and/or Applied Chemistry, with examples including catalysis chemistry, materials chemistry, green chemistry and advanced analytical techniques for modern chemistry research. The topic will be announced in advance when this course is offered. It will provide a useful supplement to the advanced courses already specified in the programme.

This course aims to enable the students to achieve the following objects:

- Identify and explain, to an appropriate extent, the real-world and technological importance/relevance of the subject matters covered in a traditional chemistry undergraduate curriculum;
- Describe the selected experimental and theoretical principles of Chemistry and its applied ramifications;
- Apply such principles to structural analysis and property studies of the selected molecules/materials in combination with analytical or environmental procedures in Chemistry;
- Compare and relate the selected topics with the ones in General Chemistry and generate the conceptual links between the two fields, in order to establish a broader perspective on these foundational topics.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Carry out basic analysis of the concepts and reactions/ processes in the selected areas of modern chemistry.			x	
2	Select or design an appropriate instrumental procedure for a structure/property analysis, and reliably implement it with accuracy and precision.			x	x
3	Critically evaluate experiments/processes in the selected topics in the Chemical literature and effectively communicate this knowledge within their special study fields.			x	x
4	Identify and uphold the social responsibilities of chemists, with particular concern for safety and environmental problems in the context of Modern Chemistry.		x		x

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 real-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.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures and tutorials	Students will learn the approaches of modern chemistry research and its technological impacts.	1	

2	Case studies	Students will be engaged in the case studies of the important types of chemical structures/ processes, with visual assistance from computerized programs and real-object models.	2	
3	Group activities	Students will involve in large and small group activities examining various molecules/ materials/procedures, and the implications in modern technology development. Students will participate in team work in the form of group presentation of selected projects.	3	
4	Teacher-student interaction and supervised in-depth discussion	Student will be engaged in extensive teacher-student interaction and be supervised with in-depth discussion among the students, in order to foster independent and critical thinking of the students.	4	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Examination	1, 2, 3, 4	0	-	No

Continuous Assessment (%)

0

Examination (%)

100

Examination Duration (Hours)

3

Minimum Examination Passing Requirement (%)

40

Assessment Rubrics (AR)

Assessment Task

Examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

- Understand the key points in the lectures and tutorials
- Able to apply learning to analyse and solve problems

- Able to expand on learning and formulate new ideas

Excellent
(A+, A, A-) High

Good
(B+, B, B-) Significant

Fair
(C+, C, C-) Moderate

Marginal
(D) Basic

Failure
(F) Not even reaching marginal levels

Assessment Task
Examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
- Understand the key points in the lectures and tutorials
- Able to apply learning to analyse and solve problems
- Able to expand on learning and formulate new ideas

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Basic

Failure
(F) Not even reaching marginal levels

Part III Other Information

Keyword Syllabus
Organic chemistry, inorganic chemistry, chemistry and society, industrial, biological and environmental importance of chemistry, catalysis, luminescent and functional materials, characterization and analytical techniques, physical principles concerning the selected topics.

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Nil