CHEM4041: SELECTED TOPICS IN CHEMISTRY

Effective Term
Semester A 2024/25

Part I Course Overview

Course Title
Selected Topics in Chemistry

Subject Code
CHEM - Chemistry
Course Number
4041

Academic Unit
Chemistry (CHEM)

College/School
College of Science (SI)

Course Duration
One Semester

Credit Units
4

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
BCH4041 Selected Topics in 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 through a combination of lectures and tutorials that elucidate the approaches of modern chemistry research and its technological impacts.	1	
2	Case studies	Students will primarily engage 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 be primarily involved in large and small group activities examining various molecules/materials/ procedures, and their implications in modern technology development. Teamwork is emphasized and students will participate in group presentations of selected projects.	3	
4	Teacher-student interaction and supervised in-depth discussion	Students will benefit from extensive teacher-student interaction and supervised in-depth discussion with the peers, in order to foster independent and critical thinking of the students.	4	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Tutorial Assignments	1, 2	15	
2	Oral Presentations	3	10	
3	Performance in Teacher-student Interaction	4	5	

Continuous Assessment (%)

30

Examination (%)

70

Examination Duration (Hours)

3

Additional Information for ATs

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."

Assessment Rubrics (AR)

Assessment Task

Tutorial Assignments

Criterion

Demonstration of understanding the principles and practice of the selected topics in chemistry

Excellent (A+, A, A-)

Able to demonstrate excellent understanding of the principles and practice of the selected topics in chemistry.

Good (B+, B, B-)

Able to describe and explain the principles of the selected topics in chemistry.

Fair (C+, C, C-)

Able to describe and explain some key principles of the selected topics in chemistry.

Marginal (D)

Able to briefly describe isolated principles of the selected topics in chemistry.

Failure (F)

Fail to accurately describe and explain relevant principles of any topics in chemistry.

Assessment Task

Oral Presentations

Criterion

Demonstration of understanding the principles and practice of the selected topics in chemistry, and the ability to present those principles and practice in concise, orderly and professional manners.

Excellent (A+, A, A-)

Able to deliver fluent, well organized and well prepared presentations to demonstrate excellent understanding of the principles and practice of the selected topics in chemistry.

Good (B+, B, B-)

Able to deliver fluent presentations, with evidence of proper preparation, to describe and explain the principles of the selected topics in chemistry.

Fair (C+, C, C-)

Able to deliver presentations, with evidence of proper preparation, to describe and explain some key principles of the selected topics in chemistry.

Marginal (D)

Able to deliver comprehensible presentations to briefly describe isolated principles of the selected topics in chemistry.

Failure (F)

Fail to present relevant principles of any topics in chemistry in coherent and comprehensible manners.

Assessment Task

Performance in Teacher-student Interaction

Criterion

Demonstration of active participation in class discussions and group activities.

Excellent (A+, A, A-)

Able to actively participate in class discussions and group activities to demonstrate excellent understanding of the principles and practice of the selected topics in chemistry.

Good (B+, B, B-)

Able to regularly participate in class discussions and group activities to demonstrate good understanding of the principles and practice of the selected topics in chemistry.

Fair (C+, C, C-)

Able to regularly participate in class discussions and group activities to demonstrate understanding of the key principles and practice of the selected topics in chemistry.

Marginal (D)

Able to occasionally participate in class discussions and group activities to demonstrate understanding of isolated principles and practice of the selected topics in chemistry.

Failure (F)

Fail to participate in class discussions and group activities.

Assessment Task

Examination

Criterion

Demonstration of understanding the principles and practice of various topics in the field of chemistry.

Excellent (A+, A, A-)

Able to demonstrate excellent understanding of the principles and practice of various topics in the field of chemistry.

Good (B+, B, B-)

Able to describe and explain the principles of various topics in the field of chemistry.

Fair (C+, C, C-)

Able to describe and explain some key principles of selected topics in the field of chemistry.

Marginal (D)

Able to briefly describe isolated principles of selected topics in the field of chemistry.

Failure (F)

Fail to accurately describe and explain relevant principles of any topics in the field of chemistry.

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