

# CHEM4041: SELECTED TOPICS IN CHEMISTRY

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## Effective Term

Semester A 2022/23

## 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 DEC-A1 DEC-A2 DEC-A3 app.)		
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
3	Critically evaluate experiments/processes in the selected topics in the Chemical literature and effectively communicate this knowledge within their special study fields.			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	

#### 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.

**Teaching and Learning Activities (TLAs)**

TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures and tutorials	Teaching and learning will be based on a combination of lectures and tutorials to elucidate the approaches of modern chemistry research and its technological impacts.	1
2	Case studies	Teaching and learning will primarily engage the students 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	Teaching and learning will primarily involve large and small group activities examining various molecules/materials/procedures, and the implications in modern technology development. Team work is emphasized in the form of group presentation of selected projects.	3
4	Teacher-student interaction and supervised in-depth discussion	Teaching and learning will entail extensive teacher-student interaction and supervised 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 (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 (%)**

**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**

- Understand the basic concepts in the lectures
- Able to analyse and explain reactions in modern chemistry research and the relevant technological impacts

**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**

Oral Presentations

**Criterion**

- Able to evaluate chemical processes in the literature
- Professionally present key points of learning
- Effectively communicate information orally

**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

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**Assessment Task**

Performance in Teacher-student Interaction

**Criterion**

- Active participation in class discussions
- Active participation in group activities
- Able to raise well-thought questions in class

**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

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**Assessment Task**

Examination

**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

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## 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