

CHEM8011M: CHEMICAL SAFETY AND ADVANCED INSTRUMENTATION FOR RESEARCH

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Chemical Safety and Advanced Instrumentation for Research

Subject Code

CHEM - Chemistry

Course Number

8011M

Academic Unit

Chemistry (CHEM)

College/School

College of Science (SI)

Course Duration

One Semester

Credit Units

2

Level

R8 - Research Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

BCH8011M Chemical Safety and Advanced Instrumentation for Research

Exclusive Courses

Nil

Part II Course Details

Abstract

The course will enable students to develop their knowledge and capability in conducting risk assessment and dealing with the chemical safety issues in the research laboratory. Students will also be able to discover for themselves how selected advanced and widely used research techniques and instrumental methods in chemistry can be applied to their own research studies.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Identify different types of chemical hazards	21	x		
2	Conduct risk assessment in their research project and laboratory	33	x	x	x
3	Demonstrate an understanding of the basic concepts and working principles of the selected spectroscopic techniques	24	x	x	
4	Apply different spectroscopic techniques in their research project	22	x	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	Students will learn key concepts of the course, such as organic spectroscopy, types of chemical hazards and chemical risk assessment.	1, 2, 3, 4	14
2	Independent Studies	Students will conduct risk assessments on their research projects/experiments.	1, 2, 3	14
3	Assignment	Students will work on an assignment that requires the application of various spectroscopic techniques for chemical identification and characterization.	2, 3, 4	6

4	Group Discussions	Students will be engaged in group discussions to critically assess hazards in the experiments and discuss procedures that minimize the risks.	1, 2, 4	12
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Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Written Assignment	2, 3	40	-	Yes
2	Oral Presentation	1, 2, 4	30	-	No
3	Attendance	1, 2, 4	30	-	No

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

40

Additional Information for ATs

Students are required to submit all assignments and the risk assessments of their research laboratory and experiments to their supervisors and ALERT lab managers. Students are also required to present their major types of experimental procedures related to their research project and the corresponding risk assessment in the group meetings. Students are also required to attend all group meetings.

Assessment Rubrics (AR)**Assessment Task**

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

Criterion

Ability to apply various spectroscopic techniques for chemical identification and characterization.

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

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

Criterion

Ability to conduct risk assessment on their research projects/experiments.

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

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

Criterion

Ability to critically assess hazards in the experiments and discuss procedures that minimize the risks.

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

Written Assignment (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Ability to apply various spectroscopic techniques for chemical identification and characterization.

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

Marginal

(B-, C+, C) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Report / Oral Presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Ability to conduct risk assessment on their research projects/experiments.

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

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(B-, C+, C) Basic

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(F) Not even reaching marginal levels

Assessment Task

Attendance/ Discussion (for students admitted from Semester A 2022/23 to Summer Term 2024)

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Ability to critically assess hazards in the experiments and discuss procedures that minimize the risks.

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(F) Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

- Chemical Safety
- Risk assessment
- Chemical instrumentation

Reading List**Compulsory Readings**

Title	
1	Nil

Additional Readings

Title	
1	Principles of instrumental analysis, 6th ed. (Eds: D. A. Skoog, F. J. Holler, S. R. Crouch), Thomson, 2007
2	Spectrometric Identification of Organic Compounds, 7th ed. (Eds.:R. M. Silverstein, F. X. Webster, D. J. Kiemle), Wiley, Hoboken, 2005
3	Chemical safety in the laboratory (Ed: S. K. Hall) Boca Raton, Lewis, 1994
4	Chemical safety matters, (IUPAC), Cambridge University Press, Cambridge, 1992