

CHEM8010M: INTRODUCTION TO SCIENTIFIC RESEARCH

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Introduction to Scientific Research

Subject Code

CHEM - Chemistry

Course Number

8010M

Academic Unit

Chemistry (CHEM)

College/School

College of Science (SI)

Course Duration

Two Semesters

Credit Units

0-2

Level

R8 - Research Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

BCH8010M Introduction to Scientific Research

Exclusive Courses

Nil

Part II Course Details

Abstract

The course is designed for students enrolled in the PhD programmes to train them in acquiring the necessary skills of practicing research scientists via discovery-based study activities.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Identify and define the issues of significance in a given subject area by conducting literature research	20	x	x	
2	Review and critique the body of knowledge from literature of the given subject area	20	x	x	
3	Apply such knowledge to formulate the research methodology for a research project	30		x	x
4	Participate in the regular meetings with supervisors and lab members to report progress and exchange ideas	30	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 explain key concepts in scientific research methodologies.	1, 2, 3	6
2	Independent Studies	Students will carry out critical evaluation of research methodologies in selected literatures.	1, 2, 3	26

3	Group Discussions	In large and small group critical evaluation tasks and debates students will discuss and critically evaluate research strategies and methodologies adopted by other research teams in various disciplines of Biology, Biochemistry, Chemistry, Chemical Biology and Materials Sciences according to their publications.	2, 3, 4	20
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Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Written Assignment	1, 2, 3	50	-	Yes
2	Oral Presentation	2, 3	30	-	No
3	Attendance	4	20	-	No

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

40

Minimum Examination Passing Requirement (%)

0

Assessment Rubrics (AR)**Assessment Task**

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

Criterion

Demonstration of understanding of the scientific literature and the formulation of research proposals.

Excellent

(A+, A, A-) Demonstration of excellent understanding of the scientific literature and the formulation of research proposals. Thorough identification of important issues in the subject areas and design experiments based on reviewing of the current literature. Showing strong evidence of original thinking.

Good

(B+, B, B-) Demonstration of good understanding of the scientific literature and the formulation of research proposals. Ability to identify various issues in the subject areas and design experiments based on reviewing of the current literature.

Fair

(C+, C, C-) Demonstration of adequate understanding of the scientific literature and the formulation of research proposals. Ability to design experiments based on reviewing of the current literature.

Marginal

(D) Only able to briefly describe some scientific principles in the research proposals. Ability to propose appropriate experiments for the research proposals.

Failure

(F) Fail to produce relevant research proposals to demonstrate the understanding of the backgrounds of the selected field of studies. Fail to derive relevant experiments for the research proposals.

Assessment Task

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

Criterion

Communication of research ideas in professional and efficient ways.

Excellent

(A+, A, A-) Ability to communicate ideas professionally, effectively and persuasively via written and oral presentations.

Good

(B+, B, B-) Ability to communicate ideas effectively and persuasively via written and oral presentations.

Fair

(C+, C, C-) Ability to communicate ideas effectively via written and oral presentations.

Marginal

(D) Demonstration of some ability in communicating research ideas with peers.

Failure

(F) Fail to communicate research ideas effectively.

Assessment Task

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

Criterion

Attending lectures and various small/large group discussion activities.

Excellent

(A+, A, A-) 90% attendance or above

Good

(B+, B, B-) 75% < Attendance < 89%

Fair

(C+, C, C-) 60% < Attendance < 74%

Marginal

(D) 50% < Attendance < 59%

Failure

(F) Less than 50% attendance

Assessment Task

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

Criterion

Demonstration of understanding of the scientific literature and the formulation of research proposals.

Excellent

(A+, A, A-) Demonstration of excellent understanding of the scientific literature and the formulation of research proposals. Thorough identification of important issues in the subject areas and design experiments based on reviewing of the current literature. Showing strong evidence of original thinking.

Good

(B+, B) Demonstration of good understanding of the scientific literature and the formulation of research proposals. Ability to identify various issues in the subject areas and design experiments based on reviewing of the current literature.

Marginal

(B-, C+, C) Only able to briefly describe some scientific principles in the research proposals. Ability to propose appropriate experiments for the research proposals.

Failure

(F) Fail to produce relevant research proposals to demonstrate the understanding of the backgrounds of the selected field of studies. Fail to derive relevant experiments for the research proposals.

Assessment Task

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

Criterion

Communication of research ideas in professional and efficient ways.

Excellent

(A+, A, A-) Ability to communicate ideas professionally, effectively and persuasively via written and oral presentations.

Good

(B+, B) Ability to communicate ideas effectively and persuasively via written and oral presentations.

Marginal

(B-, C+, C) Demonstration of some ability in communicating research ideas with peers.

Failure

(F) Fail to communicate research ideas effectively.

Assessment Task

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

Criterion

Attending lectures and various small/large group discussion activities.

Excellent

(A+, A, A-) 95% attendance or above

Good

(B+, B) 72% < Attendance < 94%

Marginal

(B-, C+, C) 50% < Attendance < 71%

Failure

(F) Less than 50% attendance

Part III Other Information**Keyword Syllabus**

- Conducting and presenting literature research
- Writing and presenting a research proposal
- Participating in group meetings

Reading List**Compulsory Readings**

Title	
1	Nil.

Additional Readings

Title	
1	Goodlad, S, 1996: Speaking Technically. Imperial College Press, 112pp.
2	Holtom, D and E Fisher, 1999: Enjoy Writing Your Science Thesis or Dissertation! Imperial College Press, 278pp.
3	Yang, J T, 1995: An Outline of Scientific Writing. World Scientific, 160pp