

CHEM6129: ADVANCED DIRECTED STUDIES

Effective Term

Semester A 2026/27

Part I Course Overview

Course Title

Advanced Directed Studies

Subject Code

CHEM - Chemistry

Course Number

6129

Academic Unit

Chemistry (CHEM)

College/School

College of Science (SI)

Course Duration

Non-standard Duration

Other Course Duration

Two Semesters (Semesters A and B / Semester B and Summer Term)

One Semester with conditions (Semester B only, with approval and a CGPA of 3.4 or above in Semester A)

Credit Units

0-6

Level

P5, P6 - Postgraduate Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Additional Information

1. Taking CHEM6129 in Semesters A and B
2. Taking CHEM6129 in Semester B Only (with approval and a CGPA of 3.4 or above in Semester A)
3. Taking CHEM6129 in Semester B and Summer Term

Part II Course Details

Abstract

This course aims to allow students to pursue a defined program of study directed by an academic staff member in CHEM. The course encourages students to broaden their vision in scientific research via discovery-based learning and research, to develop their initiative, interests, and individual thinking, and to have a deeper understanding of a specific area in Chemistry/Biology/Environmental/Material Sciences. On completing this course, students will be able to:

- demonstrate their initiative and understanding of the chosen subject area and identify the existing research problems and challenges;
- be familiar with various research methods and be able to identify a promising method for research problems;
- manage and present their report in a precise and coherent manner.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Develop, state, and justify the recent progress of the chosen subject area related to chemical science and technology.		x	x	x
2	Research, assemble, and critically evaluate literature relevant to the problem being analyzed.			x	
3	Identify the challenges and research problems in the chosen subject area and propose the potential solutions.		x	x	
4	Write a report presenting the problem being analysed. The report should be organized in the fashion of a scientific paper, i.e. it should include a research background, methods/results, and conclusions/outlook.			x	x
5	Make a formal oral presentation of the research project, effectively summarising the project's background, discussion/results, and conclusions.			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	Discussions with supervisor	Students will discuss with the supervisor the topic of the project, which will lead to the development, and refinement of a testable chemical problem.	1	
2	Literature search	Students will be engaged in library and web-based searching of the literature, reading, and interpretation of relevant scientific literature, and assembly of a literature review relating to the testable chemical problem.	2, 3	
3	Literature review	Students will accomplish the assembly of a literature review relating to the testable chemical problem.	2, 3	
4	Report writing	Students will write a formal scientific report, under guidance, summarising the current progress, achievements, and outlook related to the subject matter.	3, 4	
5	Oral presentations	Students will give two formal oral presentations, one as the proposal of the project (week 4); and the other one as a summarization at the end of the project. The duration of each presentation is 20 min (5-min question and answer session included).	5	

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Oral presentations	1, 2, 3, 5	30	Total 2 presentations, each of them accounts for 15% of the final marks.	No

2	Reports	1, 2, 3, 4	70	Total 2 reports, a progress report submitted at the end of the first semester and assessed by the supervisor only. A second full report should be submitted by the end of the second semester. The progress report accounts for 20% of the final marks, and the full report for 50%.	No
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Continuous Assessment (%)

100

Minimum Continuous Assessment Passing Requirement (%)

40

Assessment Rubrics (AR)**Assessment Task**

1. Oral presentations (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to demonstrate or explain the principles, methodologies, problems, and limitations of the selected research topic.

Excellent

(A+, A, A-) High

Able to demonstrate a thorough understanding of principles and methodologies, with clear and engaging communication, comprehensive analysis of problems and limitations, strong use of relevant examples, and excellent presentation skills.

Good

(B+, B, B-) Significant

Able to show a good grasp of the material, with mostly clear organization and logical flow, address most problems and limitations, uses relevant examples effectively, and demonstrates strong communication skills with minor delivery issues.

Fair

(C+, C, C-) Moderate

Show a basic understanding of key concepts, and offer limited discussion of problems and limitations, include few relevant examples, and have noticeable issues in verbal communication.

Marginal

(D) Basic

Demonstrate limited understanding of the topic, lacks organization and coherence, provide very little analysis of problems and limitations, use inappropriate or irrelevant examples, and exhibit poor communication skills that hinder understanding.

Failure

(F) Not even reaching marginal levels

Show no understanding of the principles or methodologies, which is incoherent and difficult to follow. Fail to address problems and limitations. Provide no relevant examples, and demonstrate very poor communication skills that completely obstruct comprehension.

Assessment Task

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

Criterion

- Demonstrate critical thinking ability and problem-solving ability in the selected research topic.
- Novelty of the research project.
- Ability to provide detailed, critical analysis of literature results, clear explanations, and fair justifications.
- Demonstrate ability in the integration of various sources of information to explain the impact of the findings via clear written communication.

Excellent

(A+, A, A-) High

The report demonstrates exceptional critical thinking and problem-solving abilities, showcasing a highly innovative research project. It provides a thorough and insightful critical analysis of literature results, with clear, well-supported explanations and justifications. The integration of various sources of information is seamless, effectively illustrating the impact of the findings. Written communication is clear, well-organized, and free of errors, enhancing the overall understanding of the research.

Good

(B+, B, B-) Significant

The report exhibits good critical thinking and problem-solving skills, with a research project that shows some novelty. It includes a solid critical analysis of literature results, mostly clear explanations, and reasonable justifications. The integration of different sources is effective, and the impact of the findings is communicated well, though some sections may lack depth or clarity. Written communication is generally clear and organized, with few minor errors.

Fair

(C+, C, C-) Moderate

The report reflects a basic level of critical thinking and problem-solving ability, with limited novelty in the research project. The analysis of literature results is superficial, with unclear explanations and weak justifications. Integration of sources is present but inconsistent, leading to a vague understanding of the findings' impact. Written communication is adequate but may lack clarity and organization, with several errors that distract from the content.

Marginal

(D) Basic

The report demonstrates minimal critical thinking and problem-solving skills, with little to no novelty in the research project. The critical analysis of literature is inadequate, with unclear explanations and insufficient justification for findings. Integration of sources is poorly executed, resulting in a lack of coherence in explaining the impact of findings. Written communication is unclear, disorganized, and contains numerous errors that hinder comprehension.

Failure

(F) Not even reaching marginal levels

The report shows no evidence of critical thinking or problem-solving abilities and lacks any novelty in the research project. There is no critical analysis of literature results, with unclear or absent explanations and justifications. Integration of information is ineffective or nonexistent, leading to a failure to communicate the impact of findings. Written communication is incoherent, poorly structured, and filled with errors, making it difficult to understand the content.

Part III Other Information

Keyword Syllabus

The course is flexible and has no specific syllabus.

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	Nil