City University of Hong Kong Course Syllabus

offered by Department of Chemistry with effect from Semester A 2024/25

Part I Course Overv	view
Course Title:	Advanced Directed Studies
Course Code:	CHEM6129
Course Duration:	2 semesters
Credit Units:	6 credits
Level:	_P6
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: (Course Code and Title)	Nil
Precursors: (Course Code and Title)	Nil
Equivalent Courses: (Course Code and Title)	Nil
Exclusive Courses: (Course Code and Title)	Nil

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Part II Course Details

1. 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.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (If applicable)	curricu learnin (Please approp		ated omes where
			AI	A2	<i>A3</i>
1.	Develop, state, and justify the recent progress of the chosen subject area related to chemical science and technology.		V	V	V
2.	Research, assemble, and critically evaluate literature relevant to the problem being analyzed.			1	
3.	Identify the challenges and research problems in the chosen subject area and propose the potential solutions.		√	1	
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.			V	V
5.	Make a formal oral presentation of the research project, effectively summarising the project's background, discussion/results, and conclusions.			V	V
		100%			

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.

3.

Learning and Teaching Activities (LTAs)
(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CII	CILO No.			Hours/week (if applicable)	
		1	2	3	4	5	
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.	V					
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.		√	V			
Literature review	Students will accomplish the assembly of a literature review relating to the testable chemical problem.		1	1			
Report writing	Students will write a formal scientific report, under guidance, summarising the current progress, achievements, and outlook related to the subject matter.			V	V		
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).					V	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities		LO N	o.			Weighting	Remarks	
		1 2 3 4 5]				
Continuous Assessment: 100%								
Oral presentations	√ 	V	√ 		√ 	30%	Total 2 presentations, each of them accounts for 15% of the final marks.	
Reports	√ 	√	√ 	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		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%.	
Examination: <u>0</u> %								
						100%		

Starting from Semester A, 2015-16, students must satisfy the following minimum passing requirement for CHEM courses:

"A minimum of 40% in both coursework and examination components."

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Applicable to students admitted in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent	Good	Fair	Marginal	Failure
		(A+, A, A-)	(B+, B, B-)	(C+, C, C-)	(D)	(F)
1. Oral	Ability to	<mark>High</mark>	<mark>Significant</mark>	Moderate	Basic	Not even reaching
presentations	demonstrate or	Able to demonstrate a	Able to show a good grasp	Show a basic	Demonstrate	marginal levels
	explain the	thorough understanding	of the material, with	understanding of	limited	Show no
	principles,	of principles and	mostly clear organization	key concepts, and	understanding of	understanding of
	methodologies,	methodologies, with	and logical flow, address	offer limited	the topic, lacks	the principles or
	problems, and	clear and engaging	most problems and	discussion of	organization and	methodologies,
	limitations of the	communication,	limitations, uses relevant	problems and	coherence,	which is incoherent
	selected research	comprehensive analysis	examples effectively, and	limitations, include	provide very	and difficult to
	topic.	of problems and	demonstrates strong	few relevant	little analysis of	follow. Fail to
		limitations, strong use of	communication skills with	examples, and have	problems and	address problems
		relevant examples, and	minor delivery issues.	noticeable issues in	limitations, use	and limitations.
		excellent presentation		verbal	inappropriate or	Provide no relevant
		skills.		communication.	irrelevant	examples, and
					examples, and	demonstrate very
					exhibit poor	poor
					communication	communication
					skills that hinder	skills that
					understanding.	completely obstruct
						comprehension.
2. Report	-Demonstrate	High	Significant	Moderate	Basic	Not even reaching
	critical thinking	The report demonstrates	The report exhibits good	The report reflects a	The report	marginal levels
	ability and	exceptional critical	critical thinking and	basic level of	demonstrates	The report shows no
	problem-solving	thinking and problem-	problem-solving skills,	critical thinking and	minimal critical	evidence of critical
	ability in the	solving abilities,	with a research project that	problem-solving	thinking and	thinking or
	selected research	showcasing a highly	shows some novelty. It	ability, with limited	problem-solving	problem-solving
	topic.	innovative research	includes a solid critical	novelty in the	skills, with little	abilities and lacks
	-Novelty of the	project. It provides a	analysis of literature	research project.	to no novelty in	any novelty in the
	research project.	thorough and insightful	results, mostly clear	The analysis of	the research	research project.
	-Ability to	critical analysis of	explanations, and	literature results is	project. The	There is no critical
	provide detailed,	literature results, with	reasonable justifications.	superficial, with	critical analysis	analysis of
	critical analysis of	clear, well-supported	The integration of	unclear	of literature is	literature results,
	literature results,	explanations and	different sources is	explanations and	inadequate, with	with unclear or

-Demonstrate ability in the integration of various sources of information to explain the impact of the findings via	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.	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.	Integration of sources is present but inconsistent, leading to a vague understanding of	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	to a failure to communicate the impact of findings. Written communication is incoherent, poorly structured, and filled with errors, making it difficult
1	,	errors.		_	
of the findings via	overall understanding of		adequate but may	lack of	Written
clear written	the research.		lack clarity and	coherence in	communication is
communication.			organization, with	explaining the	incoherent, poorly
			several errors that	impact of	-
			distract from the	findings.	filled with errors,
			content.		
				communication	to understand the
				is unclear,	content.
				disorganized,	
				and contains	
				numerous errors	
				that hinder	
				comprehension.	

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Criterion Excellent		Marginal	Failure
		(A+, A, A-)	(B+, B)	(B-, C+, C)	(F)
1. Oral	Ability to demonstrate or	<mark>High</mark>	Significant	Moderate	Not even reaching
presentations	explain the principles,	Able to demonstrate a	Able to show a good	Show a basic	marginal levels
	methodologies, problems, and	thorough understanding	grasp of the material,	understanding of key	Show no understanding
	limitations of the selected	of principles and	with mostly clear	concepts, and offer	of the principles or
	research topic.	methodologies, with	organization and logical	limited discussion of	methodologies, which is
		clear and engaging	flow, address most	problems and	incoherent and difficult
		communication,	problems and	limitations, include few	to follow. Fail to address
		comprehensive analysis	limitations, uses	relevant examples, and	problems and
		of problems and	relevant examples	have noticeable issues in	limitations. Provide no
		limitations, strong use of	effectively, and	verbal communication.	relevant examples, and

		relevant examples, and	demonstrates strong		demonstrate very poor
		excellent presentation	communication skills		communication skills
		skills.	with minor delivery		that completely obstruct
			issues.		comprehension.
2. Report	-Demonstrate critical thinking	High	Significant	Moderate	Not even reaching
•	ability and problem-solving	The report demonstrates	The report exhibits good	The report reflects a	marginal levels
	ability in the selected research	exceptional critical	critical thinking and	basic level of critical	The report shows no
	topic.	thinking and problem-	problem-solving skills,	thinking and problem-	evidence of critical
	-Novelty of the research	solving abilities,	with a research project	solving ability, with	thinking or problem-
	project.	showcasing a highly	that shows some	limited novelty in the	solving abilities and
	-Ability to provide detailed,	innovative research	novelty. It includes a	research project. The	lacks any novelty in the
	critical analysis of literature	project. It provides a	solid critical analysis of	analysis of literature	research project. There
	results, clear explanations, and	thorough and insightful	literature results, mostly	results is superficial,	is no critical analysis of
	fair justifications.	critical analysis of	clear explanations, and	with unclear	literature results, with
	-Demonstrate ability in the	literature results, with	reasonable	explanations and weak	unclear or absent
	integration of various sources	clear, well-supported	justifications. The	justifications.	explanations and
	of information to explain the	explanations and	integration of different	Integration of sources is	justifications.
	impact of the findings via clear	justifications. The	sources is effective, and	present but inconsistent,	Integration of
	written communication.	integration of various	the impact of the	leading to a vague	information is
		sources of information is	findings is	understanding of the	ineffective or
		seamless, effectively	communicated well,	findings' impact.	nonexistent, leading to a
		illustrating the impact of	though some sections	Written communication	failure to communicate
		the findings. Written	may lack depth or	is adequate but may lack	the impact of findings.
		communication is clear,	clarity. Written	clarity and organization,	Written communication
		well-organized, and free	communication is	with several errors that	is incoherent, poorly
		of errors, enhancing the	generally clear and	distract from the	structured, and filled
		overall understanding of	organized, with few	content.	with errors, making it
		the research.	minor errors.		difficult to understand
					the content.

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

The course is flexible and has no specific syllabus.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

Nil

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

Nil