

Course Syllabus

**offered by Department of Chemistry
with effect from Semester A 2021/22**

This form is for the completion by the *Course Leader*. The information provided on this form is the official record of the course. It will be used for the City University's database, various City University publications (including websites) and documentation for students and others as required.

Please refer to the Explanatory Notes on the various items of information required.

Prepared / Last Updated by:

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**City University of Hong Kong
Course Syllabus**

**offered by Department of Chemistry
with effect from Semester A 2021/22**

Part I Course Overview

Course Title:	Entrepreneurship Programme In Chemistry 1
Course Code:	CHEM2073
Course Duration:	1 semester
Credit Units:	3
Level:	B2
Proposed Area: <i>(for GE courses only)</i>	<input type="checkbox"/> Arts and Humanities <input type="checkbox"/> Study of Societies, Social and Business Organisations <input type="checkbox"/> Science and Technology
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: <i>(Course Code and Title)</i>	Nil
Precursors: <i>(Course Code and Title)</i>	Nil
Equivalent Courses: <i>(Course Code and Title)</i>	Nil
Exclusive Courses: <i>(Course Code and Title)</i>	Nil

Part II Course Details

1. Abstract

(A 150-word description about the course)

Entrepreneurial activities are a crucial engine that drives innovation and economic growth. This course intends to develop innovation mindsets and attitudes in chemistry students, and teach them the theoretical and practical knowledge in scientific and/or technological entrepreneurship. We aim to empower students to develop the mentality of technology entrepreneurship, as well as to introduce the key steps for founding new technology-based firms in the field of chemistry and related scientific and engineering disciplines. Knowledge in communication necessary in technical entrepreneurship, ranging from the format and language used in patents to storytelling skills in business meetings, will be introduced. This course focuses on the development of chemistry-related business ideas, and is taught at a relative early stage in the BSc programme, in order to introduce the entrepreneurial motivation to chemistry students when there is still time for them to collect data to substantiate their business ideas.

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)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	List the major technology-related industries in Hong Kong and the rest of the Great Bay Area and evaluate the areas with potentials in future growth.	10%		✓	
2.	Describe the types, purposes and the basic format of a Hong Kong patent, and identify methods for searching patent databases.	30%		✓	
3.	Identify skills required for presentation and storytelling in business meetings.	20%		✓	
4.	Critically evaluate the qualities of entrepreneurs through site visits and interactions with business mentors.	30%	✓		✓
5.	Describe funding potential and path of technical entrepreneurship in Hong Kong and the rest of the Great Bay Area.	10%		✓	
*If weighting is assigned to CILOs, they should add up to 100%.		100%			

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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 self-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. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.					Hours/week (if applicable)
		1	2	3	4	5	
In-class discussions	As an exercise of product research and development, the students will be asked to research into the current sunscreen (or other chemical products) available in the market and come up with an (hypothetical) idea of a new type of sunscreen. An overview of technology-related industries in the Greater Bay Area of China will be introduced, and the students will identify the key manufacturer for their hypothetical new product.	✓					
Lectures	Lectures will be given on the types, purposes and the basic structure of technology patents. Legal meanings of the vocabulary commonly used in patents will be introduced. The students will learn to search the United States Patent and Trademark Office or the Google patent-search Web sites and read patents related to the ideas they initiated. As an exercise, the students will prepare a summary of patents related to their product ideas.		✓				
	Lectures will be given on the funding opportunities the students can obtain if they wish to commercialise their ideas.					✓	
	A short lecture on recent research data on learning agility. Group discussion on how to apply learning agility in the entrepreneurial world.			✓			
Site visit	A site visit to a technology-related company will be arranged and the students will be asked to give an oral presentation on the visit.				✓		

4. Assessment Tasks/Activities (ATs)

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

Assessment Tasks/Activities	CILO No.					Weighting*	Remarks
	1	2	3	4	5		
Continuous assessment: <u>100%</u>							
In-class discussion	✓		✓	✓		70%	
Written assignment on technology-related industries in the Greater Bay Area of China	✓			✓		10%	
Oral Presentation on the site visit				✓		10%	
Quizzes	✓	✓			✓	10%	
Examination: <u>0%</u> (Duration: -)							
* The weightings should add up to 100%.						100%	

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.”

5. Assessment Rubrics

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

In this course the students will only obtain a PASS or FAIL grade:

Grade	Criteria
PASS	Students will pass if they have: 1. Participated in class activities of over 70% of lectures and tutorials. 2. Achieved a minimum of 40% in the written assignment, oral presentation and quizzes.
FAIL	If the student fails to achieve the above criteria.

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

1. Keyword syllabus:

This course adopts the three-stage concept of university entrepreneurship education programmes (Crispeels et al, 2009). Comprising seven milestones, this course will help students to learn how to effectively generate chemistry-related ideas, identify market opportunities. These ideas will be “channelled” into entrepreneurial processes and actions, leading to the development of business plans that will be judged by a panel made of a combination of academic scientists, knowledge transfer specialists and real-life entrepreneurs. The students will also be introduced to various funding streams in Hong Kong that could be applied for to introduce a new idea to the market. In addition, this course will teach important “soft skills” for entrepreneurs, such as learning agility, presentation and negotiation skills.

Weeks 1-3: Case studies of good business ideas in chemistry-related industries.

As an exercise of product research and development, the students will research into the current sunscreen (or other chemical products) available in the market and come up with an (hypothetical) idea of a new type of the product. An overview of technology (especially chemistry-related) industries in the Greater Bay Area of China will be introduced, and the students will identify the key manufacturer for their hypothetical new product.

Weeks 4-7: Types of intellectual assets and the basic format of patents.

Lectures will be given on the types, purposes and the basic structure of technology patents. Legal meanings of the vocabulary commonly used in patents will be introduced. The students will learn to search the United States Patent and Trademark Office or the Google patent-search Web sites and read patents related to the ideas they initiated in Milestone 1. As an exercise, the students will prepare a summary of patents related to their product ideas.

Weeks 8-9: Learning agility and storytelling skills in business meetings

“Learning agility” is defined as an individual’s ability and passion to quickly study a new problem and use their own learning process to gain deep understanding before making a decision (May and Wong, 2017). It is one of the most distinguishing qualities highly valued by employers. Learning agility, sometimes described as “knowing what to do when you don’t know what to do”, requires an “open and receptive mindset.” While our students are well-equipped with technical knowledge, they lack training in communicating their learning agility and passion, especially during the limited time of job interviews. This often puts our graduates at a disadvantage in the job market.

Weeks 10-13: Path towards technical entrepreneurship

The students will consider how an invention would fit into the intellectual property landscape and the available funding opportunities provided by CityU if they wish to commercialise their ideas.

Integration into the curriculum

This course aims to stimulate the students to develop original, chemistry-related ideas with commercialisation potentials at a relatively early stage of the undergraduate curriculum, so that the students can use their ideas as a roadmap for their subsequent selection of courses and study priorities. Highly motivated students can take the follow-up course, “Entrepreneurship Programme In Chemistry 2” (EPIC2), where they will learn how to draft patents and business proposals based on their ideas, and to collect experimental data to support patent application.

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.)

1.	
2.	
3.	
...	

2.2 Additional Readings

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

References:

Reis, S. R. N., & Reis, A. I. (2013, March). How to write your first patent. In *2013 3rd Interdisciplinary Engineering Design Education Conference* (pp. 187-193). IEEE.

Voss, T., Paranjpe, A. S., Cook, T. G., & Garrison, N. D. (2017). A short introduction to intellectual property rights. *Techniques in vascular and interventional radiology*, 20(2), 116-120.

van Rooij, E. (2019). Turning basic science discoveries into successful commercial opportunities. *Cardiovascular research*, 115(12), e127-e129.

Andrews, J., & Higson, H. (2008). Graduate employability, ‘soft skills’ versus ‘hard’ business knowledge: A European study. *Higher education in Europe*, 33(4), 411-422.

Crispeels, T., Uecke, O., Goldchstein, M., & Schefczyk, M. (2009). Best practices for developing university bioentrepreneurship education programmes. *Journal of Commercial Biotechnology*, 15(2), 136-150.

Gangemi, J. (2007), “A Weeklong Festival for Entrepreneurship”, *BusinessWeek*, February 22, 2007. http://www.businessweek.com/smallbiz/content/feb2007/sb20070222_645291.htm?chan=smallbiz_smallbiz+index+page_today's+top+stories

May Knight & Natalie Wong, “The Organizational X-Factor: Learning Agility”, Korn Ferry Insights article, <https://focus.kornferry.com/leadership-and-talent/the-organisational-x-factor-learning-agility/>. Published on November 22, 2017, retrieved on May 3, 2019.

Rae, D (2010), Universities and enterprise education: Responding to the challenges of the new era, *Journal of Small Business and Enterprise Development*, Vol.17, No.4, pp.591-606

A. Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

GE PILO	Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)
PILO 1: Demonstrate the capacity for self-directed learning	
PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology	
PILO 3: Demonstrate critical thinking skills	
PILO 4: Interpret information and numerical data	
PILO 5: Produce structured, well-organised and fluent text	
PILO 6: Demonstrate effective oral communication skills	
PILO 7: Demonstrate an ability to work effectively in a team	
PILO 8: Recognise important characteristics of their own culture(s) and at least one other culture, and their impact on global issues	
PILO 9: Value ethical and socially responsible actions	
PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation	

GE course leaders should cover the mandatory PILOs for the GE area (Area 1: Arts and Humanities; Area 2: Study of Societies, Social and Business Organisations; Area 3: Science and Technology) for which they have classified their course; for quality assurance purposes, they are advised to carefully consider if it is beneficial to claim any coverage of additional PILOs. General advice would be to restrict PILOs to only the essential ones. (Please refer to the curricular mapping of GE programme: http://www.cityu.edu.hk/edge/ge/faculty/curricular_mapping.htm.)

B. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

Selected Assessment Task