CHEM2073: ENTREPRENEURSHIP PROGRAMME IN CHEMISTRY 1

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Entrepreneurship Programme In Chemistry 1

Subject Code
CHEM - Chemistry
Course Number
2073

Academic Unit
Chemistry (CHEM)

College/School
College of Science (SI)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

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.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-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		x	
2	Describe the types, purposes and the basic format of a Hong Kong patent, and identify methods for searching patent databases.	30		x	
3	Identify skills required for presentation and storytelling in business meetings.	20		x	
4	Critically evaluate the qualities of entrepreneurs through site visits and interactions with business mentors.	30	x		x
5	Describe funding potential and path of technical entrepreneurship in Hong Kong (and the rest of the Great Bay Asia).	10		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	In-class discussion/ presentation	As an exercise of product research and chemical development, students will pick a product or chemical that is currently available in the market and discuss the chemistry and story behind with new idea.	1	
2	Lectures	In lectures, students will learn the types, purposes and the basic structure of technology patents. They will also learn the legal meanings of the vocabulary commonly used in patents. They will also 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.	2	
3	Lectures	In lectures, students will learn the funding opportunities, if they wish to commercialise their ideas.	5	
4	Lectures	In lectures, students will learn recent research data on learning agility. They will also learn the experience from CHEM faculty members with successful knowledge transfer cases. Through group discussion, students will learn how to apply learning agility in the entrepreneurial world.	3	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	In-class discussion / assignment	1, 3, 4	30	-	Yes
2	Written assignment	1, 4	30	-	Yes

3	Oral Presentation	4	30	-	Yes
4	Quizzes	1, 2, 5	10	-	Yes

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

40

Assessment Rubrics (AR)

Pass (P)

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 in-class discussion/assignment, written assignment, oral presentation and quizzes.

Failure (F)

If the student fails to achieve the above criteria.

Part III Other Information

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.

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 products or chemicals available in the market. This arrangement of providing background information and related chemistry knowledge on current available products offers several key advantages for students. It gives them a comprehensive understanding of real-world applications, connecting theoretical concepts to practical realities. Students can develop critical thinking skills by analyzing product development, industry trends, and the relationships between chemical properties and product performance.

Learning from the Chem faculties with successful knowledge transfer experiences.

By observing chemistry faculties' successful knowledge transfer, students will gain invaluable lessons - practical skills, industry awareness, strategies for bridging academia-industry divides, effective communication, entrepreneurial mindset, adaptability, and interdisciplinary approaches. These lessons will equip students with a well-rounded skill set to navigate the transition from academic training to industry challenges.

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.

Learning agility and storytelling skills in business meetings

“Learning agility” is defined 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 appeal to 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 put our graduates at disadvantage in the job market.

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 CityUHK 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.

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	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.
2	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.
3	van Rooij, E. (2019). Turning basic science discoveries into successful commercial opportunities. Cardiovascular research, 115(12), e127-e129.
4	Andrews, J., & Higson, H. (2008). Graduate employability, ‘soft skills’ versus ‘hard’ business knowledge: A European study. Higher education in Europe, 33(4), 411-422.
5	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.
6	Gangemi, J. (2007), “A Weeklong Festival for Entrepreneurship”, BusinessWeek, February 22, 2007.http:// www.businessweek.com/smallbiz/content/feb2007/sb20070222_645291.h tm?chan=smallbiz_smallbiz+index +page_today's+top+stories
7	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.
8	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