CHEM6133: ADVANCED ENTREPRENEURSHIP PROGRAMME IN CHEMISTRY

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Advanced Entrepreneurship Programme in Chemistry

Subject Code
CHEM - Chemistry
Course Number
6133

Academic Unit
Chemistry (CHEM)

College/School
College of Science (SI)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate 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 serve as a vital catalyst for fostering innovation and driving economic growth. The Advanced Entrepreneurship Programme in Chemistry is designed to cultivate an entrepreneurial mindset among chemistry students, equipping them with both theoretical knowledge and practical skills in scientific and technological entrepreneurship. The course aims to empower students to embrace the mentality of technology entrepreneurship and provides them with an understanding of the fundamental steps involved in establishing technology-based enterprises within the realm of chemistry and related scientific and engineering disciplines. Emphasis is placed on fostering effective communication skills essential in technical entrepreneurship, including patent formatting, language usage, and storytelling abilities for successful business interactions. The course primarily focuses on the development of chemistry-related business ideas and is strategically offered early in the MSc programme, providing students with ample time to gather data and substantiate their entrepreneurial concepts.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Identify and analyze the major technology-related industries in Hong Kong and the rest of the Great Bay Area, and assess their potential for future growth.	10	x	x	
2	Demonstrate an understanding of the different types, purposes, and basic format of Hong Kong, China, US and international patents, and effectively utilize methods for searching patent databases.	30	x	x	
3	Develop effective presentation and storytelling skills for business meetings, employing techniques to engage and captivate the audience.	20	x	x	x
4	Evaluate and critically analyze the key qualities and characteristics of successful entrepreneurs through engaging in site visits and interacting with experienced business mentors.	10	x	x	x
5	Describe the funding potential and pathways available for technical entrepreneurship in Hong Kong and the rest of the Great Bay Area, including identifying sources of funding and understanding the process of securing investment.	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	In-class discussions and presentation	Product Research and Development Exercise: Students will engage in a practical exercise focused on researching and developing a new type of sunscreen (or other chemical product) in the market. They will analyze existing products, identify gaps or areas for improvement, and propose innovative ideas for their hypothetical new product. Overview of Technology-Related Industries: Students will get an overview of the technology-related industries in the Greater Bay Area of China. Students will gain insights into the various industries and their potential for growth, with a specific focus on the chemistry sector. Identification of Key Manufacturers: Students will be tasked with identifying the key manufacturers relevant to their hypothetical new product. They will conduct research and evaluate potential manufacturers based on their capabilities, expertise, and suitability for producing the proposed product. Guest Lectures and Industry Experts: Students will obtain real-world insights and experiences related to entrepreneurship in the chemistry field through guest lectures and interactions with industry experts. These experts will share their knowledge, challenges	1, 2, 3, 4, 5	26 hours in total

2	Small group presentation, Proposal report	Case Studies and Analysis: Students will discuss and analyze case studies of successful and innovative ventures in the chemistry industry. Students will examine the strategies employed, the challenges faced, and the factors that contributed to their success, enabling them to gain practical knowledge and insights applicable to their own entrepreneurial pursuits. Group Projects and Presentations: Students will work in groups to develop comprehensive business plans for their hypothetical new products. They will conduct market research, assess the competitive landscape, formulate marketing strategies, and create financial projections. The groups will present their business plans, allowing for peer feedback and constructive discussions. Reflective Exercises and Discussions: Students will conduct regular reflective exercises and group discussions to reflect on their learning experiences, challenges encountered, and personal growth as aspiring entrepreneurs. These activities will foster critical thinking, self-awareness, and continuous improvement. Workshops and Skill Development: Workshops will be conducted to enhance students' skills in areas such as patent searching, effective communication, presentation techniques, and storytelling skills. These workshops will	2, 3, 4	10 hours in total

3	Field Trips and Industry Visits	Students will have the opportunity to visit relevant industries, research institutions, or start-ups in the Greater Bay Area. These field trips will provide first-hand exposure to the entrepreneurial ecosystem, allowing students to gain practical insights and learn from real-world examples.	3, 4, 5	6 hours in total

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Class discussion/ Quiz	1, 2, 3, 4, 5	15	-	Yes
2	Group presentation	2, 3, 4	25	-	Yes
3	Proposal report	2, 3, 4, 5	20	-	Yes

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2.5

Minimum Continuous Assessment Passing Requirement (%)

40

Minimum Examination Passing Requirement (%)

40

Assessment Rubrics (AR)

Assessment Task

1. Class quiz and discussion (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Assess the students' knowledge and understanding of entrepreneurship in the context of chemistry. This may include written assessments, quizzes, or exams that evaluate their comprehension of key concepts, theories, and principles related to entrepreneurial activities in the chemistry field.

Excellent

(A+, A, A-) Demonstrates exceptional grasp of entrepreneurship in chemistry, seamlessly integrating key concepts, theories, and principles into assessments, showcasing superior understanding and practical application in written and quiz formats.

Good

(B+, B, B-) Shows solid understanding of entrepreneurship within chemistry, effectively applying key concepts and principles in assessments, with competent responses in written tests and quizzes.

Fair

(C+, C, C-) Displays basic knowledge of entrepreneurship in chemistry, with adequate application of fundamental concepts in written assignments and quizzes, but lacks depth in understanding and integration of theories.

Marginal

(D) Shows minimal understanding of entrepreneurship concepts in chemistry. Responses in assessments and quizzes reveal limited grasp of key theories and principles, needing significant improvement.

Failure

(F) Demonstrates insufficient understanding of entrepreneurship in chemistry, failing to comprehend or apply essential concepts, theories, and principles in assessments, quizzes, and exams.

Assessment Task

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

Criterion

Evaluate the students' ability to effectively communicate and present their entrepreneurial ideas and plans in written and oral formats. This may include written reports, business pitches, or presentations where students demonstrate clarity, persuasiveness, and effective communication skills relevant to entrepreneurship in chemistry.

Excellent

(A+, A, A-) Masterfully communicates and presents entrepreneurial ideas in chemistry, excelling in clarity, persuasiveness, and professionalism in all formats.

Good

(B+, B, B-) Effectively communicates and presents entrepreneurial ideas in chemistry, demonstrating good clarity and persuasiveness in written reports and oral presentations.

Fair

(C+, C, C-) Adequately communicates entrepreneurial ideas in chemistry, showing basic clarity and persuasiveness in both written and oral presentations.

Marginal

(D) Barely communicates entrepreneurial ideas in chemistry, with limited clarity and persuasiveness in presentations and written formats.

Failure

(F) Fails to effectively communicate entrepreneurial ideas in chemistry, lacking clarity and persuasiveness in written and oral presentations.

Assessment Task

3. Proposal report (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Evaluate the students' ability to apply entrepreneurial skills and techniques in practical contexts within the chemistry industry. This may involve analyzing case studies, developing business plans, or engaging in simulated entrepreneurial activities to demonstrate their ability to identify opportunities, assess risks, and develop strategies for success.

Excellent

(A+, A, A-) Excellently applies entrepreneurial skills in chemistry, adeptly analyzing case studies and crafting strategic business plans, demonstrating insightful opportunity identification and risk assessment

Good

(B+, B, B-) Applies entrepreneurial skills effectively, showing strong analysis and strategic planning in practical chemistry contexts, with notable risk assessment.

Fair

(C+, C, C-) Demonstrates adequate application of entrepreneurial skills, with reasonable analysis and strategy development in practical tasks, but lacks depth.

Marginal

(D) Displays limited application of entrepreneurial skills; struggles with thorough analysis and effective strategy formulation in practical chemistry settings.

Failure

(F) Fails to apply entrepreneurial skills in practical contexts; lacks understanding in analyzing cases, risk management, and strategic planning.

Assessment Task

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

Criterion

Assess the students' critical thinking skills in evaluating and analyzing entrepreneurial challenges and opportunities specific to the chemistry field. This may include assessing market trends, analyzing competitive landscapes, or identifying opportunities for improvement or innovation.

Excellent

(A+, A, A-) Demonstrates superior critical thinking, expertly analyzing market trends and competitive landscapes, identifying innovative opportunities in chemistry.

Good

(B+, B, B-) Shows strong critical thinking in evaluating chemistry-specific challenges, effectively analyzing market trends and identifying viable opportunities.

Fair

(C+, C, C-) Exhibits basic critical thinking, adequately assessing market trends and competitive scenarios, with some insight into opportunities in chemistry.

Marginal

(D) Displays limited critical thinking; struggles to fully understand or analyze market trends and competitive landscapes in chemistry.

Failure

(F) Lacks critical thinking skills; fails to analyze or evaluate market trends and opportunities effectively in the chemistry field.

Part III Other Information

Keyword Syllabus

1. Introduction and Idea Generation:
- Overview of the course structure and objectives
- Introduction to the three-stage concept of university entrepreneurship education programs
- Case studies of successful business ideas in chemistry-related industries

- Exercise: Research and development of a new product idea in chemistry

2. Technology Industries and Market Opportunities:
- Introduction to technology-related industries, with a focus on chemistry-related industries in the Greater Bay Area of China
- Identifying key manufacturers for hypothetical new product ideas
- Exploration of market opportunities and potential for commercialization

3. Intellectual Assets and Patents:
- Understanding the types and purposes of intellectual assets, with a specific focus on patents
- Overview of the basic structure and format of technology patents
- Introduction to legal terminology commonly used in patents
- Practical exercise: Searching and reading patents related to students' product ideas

4. Learning Agility and Storytelling Skills:
- Definition and importance of learning agility in entrepreneurship
- Developing skills in effectively communicating learning agility and passion
- Techniques for storytelling and engaging presentations in business meetings
- Role-playing exercises and interactive activities to enhance communication skills

5. Path towards Technical Entrepreneurship:
- Examining the intellectual property landscape for inventions and product ideas
- Exploring funding opportunities and resources available for commercialization
- Introduction to CityUHK's funding programs for supporting entrepreneurial ventures
- Developing a roadmap for the commercialization of students' ideas

Integration into the Curriculum:
- Emphasizing the importance of developing original chemistry-related ideas with commercialization potential early in the undergraduate curriculum
- Linking students' ideas to their course selection and study priorities
- Further skill development in drafting patents, business proposals, and collecting experimental data to support patent applications

Reading List

Compulsory Readings

	Title
1	Selected research reviews

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 May.
7	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.