

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

*SAYT1001 Bonding in Organic Compounds, and
Reactivity and Selectivity of Organic Reactions*
有機化合物的鍵合，與有機反應的活性及選擇性

Introduction: This course is designed to allow students to have a basic understanding of the bonding and structures of organic molecules and ions, their influences on the molecular properties of organic compounds, and the reactivity and selectivity of some organic reactions. This course will focus on the stability of reaction intermediates, and the reactivity and selectivity of addition reactions, nucleophilic substitutions, and eliminations.

本課程設計旨在讓同學對有機分子及離子的鍵合及結構，及它們在有機分子的特性和有機反應的活性及選擇性的影響上有基礎的理解。本課程將會集中討論各類反應中間體的穩定性，及加成反應、親核取代反應和消除反應的活性及選擇性。

Medium of Instruction: Cantonese supplemented with English
粵語主講及輔以英語

Organising Unit: Department of Chemistry, Faculty of Science, CUHK

Teachers:



Dr. MAK Kin Wah Kendrew (麥建華博士)

Principal Lecturer

Department of Chemistry, CUHK

Rm. 355, Science Centre South, CUHK

Tel: 3943 8136, Email: kendrewmak@cuhk.edu.hk

Course Content:

27 July 2026 (Monday) 9:30 am – 12:30 pm	<u>Lecture (1): Electronic Structure of Atoms</u> - The atomic line spectrum of hydrogen - The energy states of the hydrogen atom and the Bohr's atomic model - Wave behaviour of electrons - Atomic orbitals (<i>s</i>, <i>p</i>, and <i>d</i>-orbitals) - Energies of orbitals in multi-electron atoms - Electron configurations of atoms and ions <u>Assessment:</u> Multiple-choice and short-answer questions assignment
29 July 2026 (Wednesday) 9:30 am – 12:30 pm	<u>Lecture (2): Shapes of Molecules, Orbital Hybridization, and Chemical Bonding</u> - Shapes of molecules (the Valence Shell Electron Pair Repulsion Theory) - Sigma (σ) and pi (π) bonds - Hybridization of atomic orbitals - Orbital hybridization and bonding - Orbital hybridization and shapes of molecules <u>Assessment:</u> Multiple-choice and short-answer questions assignment
31 July 2026 (Friday) 9:30 am – 12:30 pm	<u>Lecture (3): Properties of Organic Acids and Bases, Electron Delocalization, and Resonance Stabilization</u> - Basic concepts about acids and bases - Definitions of the acid dissociation constant (K_a) and pK_a - How the structure of an acid affects its pK_a value - Electron flow in a reaction (reaction mechanism) - Electron delocalization and resonance structures - Resonance stabilization <u>Assessment:</u> Multiple-choice and short-answer questions assignment
3 August 2026 (Monday) 9:30 am – 12:30 pm	<u>Lecture (4): Reactions of Alkanes and Alkenes: Addition and Substitution Reactions</u> - Radical substitution of alkanes - Reaction mechanism of radical substitution reactions - Stability of radicals and reaction selectivity - Nucleophiles and Electrophiles - Addition reactions of alkenes – Markovnikov's rule - Reaction mechanism of addition reactions - Reaction selectivity, carbocation stability, and carbocation rearrangement - Nucleophilic substitutions: S_N1 and S_N2 mechanisms <u>Assessment:</u> Multiple-choice and short-answer questions assignment
5 August 2026 (Wednesday) 9:30 am – 12:30 pm	<u>Lecture (5): Nucleophilic Substitution and Elimination Reactions: Reactivity and Selectivity</u> - Reactivity and selectivity of S_N1 and S_N2 reactions - Elimination reactions: E1 and E2 mechanisms - Reactivity and selectivity of E1 and E2 reactions - Competitions between S_N1, S_N2, E1, and E2 <u>Assessment:</u> Short-answer test

Date	27, 29, 31 July, 3, 5 August 2026 (15 hours) <i>(7 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 12:30 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	30 – 60				
Expected Applicants	Students who are promoting to or studying S4 – S6				
Tuition Fee	HKD 3,200.00				
Credit	1 University Unit(s) <i>Students who complete the course and meet its requirement can opt for credit exemption when studying at CUHK.</i>				
Grading Methods	Certificate	Assessment	Attendance	Credit(s)	
	A to A-	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1</i>
	B+ to D	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	F	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

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Summer Courses 2026
Course Outline

CUSA1021 Analysis in Modern Chemistry
現代化學分析

Introduction: This course aims at introducing the basic concepts and techniques in carrying out chemical analysis by using various modern spectroscopic and chromatographic instruments. Students will learn how to use modern instruments to determine the amounts of substances present in a mixture down to part per million levels (ppm), and identify the structure of a compound. Techniques such as UV-visible spectroscopy, infrared spectroscopy, mass spectrometry, nuclear magnetic resonance spectroscopy, gas chromatography and high performance liquid chromatography will be covered. This course will also discuss some common standard practices of collecting and preparing samples for laboratory testing, the accreditation system in testing laboratories. This course is conducted in the format of lecture.

本課程旨在介紹化學分析中所用到的現代光譜和色譜儀器的基本概念和技術。學生將學習使用該等儀器來分析濃度水平低至百萬分之一的物質，並確定化合物的結構。課程內容包括紫外-可見光譜法、紅外線光譜法、質譜分析法、核磁共振、氣相色譜法及高效能液相色譜法的操作技巧，以及化驗工作中的收集及製備樣本的常用標準技巧和香港化驗室所實行的認可系統。課程以講課形式進行。

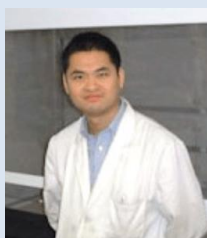
Medium of Instruction: Lecture presented in Cantonese, supplemented with English terminologies. Written materials in English.
粵語主講，輔以英語術語。英文講義。

Organising Unit: Department of Chemistry, Faculty of Science, CUHK

Teachers:



Dr. CHAN Wing Fat (陳永發博士)
Part Time Lecturer
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Dr. CHEUNG Yu San (張羽伸博士)
Senior Lecturer
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Dr. MAK Kin Wah Kendrew (麥建華博士)
Principal Lecturer
Department of Chemistry, CUHK
Rm. 355, Science Centre South, CUHK
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Course Content:

20 July 2026 (Monday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm (Dr. YS Cheung)	<u>Lecture:</u> • UV-visible Spectroscopy • Infrared Spectroscopy • Mass Spectrometry <u>Assessment:</u> • Short-answer exercise
22 July 2026 (Wednesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm (Dr. Kendrew Mak)	<u>Lecture:</u> • Nuclear Magnetic Resonance Spectroscopy <u>Assessment:</u> • Short-answer exercise
24 July 2026 (Friday) 9:30 am – 12:30 pm (Dr. WF Chan)	<u>Lecture:</u> • GC and HPLC (Analysing the chemical composition of a sample using advanced chromatographic techniques) • Chemical Testing (Sampling techniques and the accreditation system) <u>Assessment:</u> • Essay

Date	20, 22, 24 July 2026 (15 hours) <i>(28 July 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 12:30 pm &/or 2:00 pm – 5:00 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	30				
Expected Applicants	Students who are studying in S5-S6 (in the academic year 2025-2026)				
Tuition Fee	HKD 3,200.00				
Credit	1 Academy Unit(s) <i>Students can accumulate credits which will be regarded as "Other Learning Experience" when applying University.</i>				
Grading Methods		<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

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Summer Courses 2026
Course Outline

CUSA1041 Essentials of Organic Chemistry
有機化學精華

Introduction: This course aims at introducing the essential concepts of organic chemistry and how it is closely related to our daily life. Students will learn the fundamental knowledge of organic chemistry with a particular emphasis on stereochemistry. Through laboratory demonstration and participation, students will be introduced to basic experimental techniques and scientific methods in organic chemistry. Students can therefore gain appreciation of the daily practice of a synthetic organic chemist in a university research environment.

本課程旨在介紹有機化學的精華和這一學科與我們日常生活的緊密聯繫。學生將學習有機化學的基本知識及立體化學的專題討論。通過參加實驗，學生將學到有機實驗的基本技術和科學方法，從而接觸到有機合成化學家在大學研究環境裏的日常工作及操作。

Medium of Instruction: English and Cantonese
英語，粵語

Organising Unit: Department of Chemistry, Faculty of Science, CUHK

Teachers:



Prof. Gavin Chit TSUI (徐哲教授)

Associate Professor

Department of Chemistry, CUHK

Office: Room 162, Science Centre South, CUHK

Telephone: 3943 6293 E-Mail: gctsui@cuhk.edu.hk

Course Content:**CUSA1041A (Group A students)**

24 August 2026 (Monday)	9:30 am – 12:30 pm	Lecture I: Introduction to Organic Chemistry (<i>All students</i>)
	2:00 pm – 5:00 pm	Lab 1: Separation of Mixtures by Column Chromatography (<i>Group A</i>)
25 August 2026 (Tuesday)	9:30 am – 12:30 pm	Lecture II: Alkanes and Stereochemistry (<i>All students</i>)
26 August 2026 (Wednesday)	9:30 am – 12:30 pm	Lecture III: Chemistry of Life and Basic Organic Reactions (<i>All students</i>)
	2:00 pm – 5:00 pm	Lab 2: Resolution of <i>trans</i> -1,2-diaminocyclohexane (<i>Group A</i>)
27 August 2026 (Thursday)	9:30 am – 12:30 pm	Lecture IV: Natural Products and Molecules that Changed the World (<i>All students</i>)

CUSA1041B (Group B students)

24 August 2026 (Monday)	9:30 am – 12:30 pm	Lecture I: Introduction to Organic Chemistry (<i>All students</i>)
25 August 2026 (Tuesday)	9:30 am – 12:30 pm	Lecture II: Alkanes and Stereochemistry (<i>All students</i>)
	2:00 pm – 5:00 pm	Lab 1: Separation of Mixtures by Column Chromatography (<i>Group B</i>)
26 August 2026 (Wednesday)	9:30 am – 12:30 pm	Lecture III: Chemistry of Life and Basic Organic Reactions (<i>All students</i>)
27 August 2026 (Thursday)	9:30 am – 12:30 pm	Lecture IV: Natural Products and Molecules that Changed the World (<i>All students</i>)
	2:00 pm – 5:00 pm	Lab 2: Resolution of <i>trans</i> -1,2-diaminocyclohexane (<i>Group B</i>)

- For the lecture sessions in the morning, all students will attend the same class.
- For the lab sessions in the afternoon, students will be divided into two groups (A or B) by the instructor. Students will join the lab sessions in **EITHER Group A or Group B** according to the schedule.

Date	24, 25, 26, 27 August 2026 (18 hours) (28 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)				
Time	9:30 am – 12:30 pm and/or 2:00 pm – 5:00 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	CUSA1041A (Group A): 15 – 20 CUSA1041B (Group B): 15 – 20 <i>Please indicate your preference (A or B) in your online application form for the instructor's consideration. If any ONE group is full, we will try to assign you to the other group.</i>				
Expected Applicants	Students who are promoting to or studying S4 – S6				
Tuition Fee	HKD 3,600.00				
Credit	1.25 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods		<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.25</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.25</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

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***CUSA1081 Some Amazing Discoveries in Science:
Principles behind, their Importance, and their Applications***
科學中的一些精彩發現：其背後的原理、重要性及應用

Introduction:

This course covers the stories of some discoveries in science. Students will learn the principle behind, the importance of the discoveries, their applications and the science of a lot of related topics. Topics included: atomic and molecular structure, chemical bonding, fake gold, X-ray, radioactive decay, fluorescence and phosphorescence, noble gases, the father of organic chemistry, polymers, chemical analysis (physical methods, elemental analysis, and chromatography), etc. This course is conducted in the format of lecture, supplemented with demonstrations as well as in-class and at-home activities. Snapshots and PowerPoint sample can be downloaded from:

CUHK CUSA1081 YSCheung Snapshots and PowerPoint sample

https://gocuhk-my.sharepoint.com/:f/g/personal/yscheung_cuhk_edu_hk/EmVcKWj0hk9Hsfat5sbegvMBpehkuxFD6VhORyFEc4YYKA?e=sJtiMu
or <https://bit.ly/419QkGX> or QR-code below



本課程涵蓋了一些科學發現的故事。學生將學習其背後的原理、重要性、應用及許多相關主題的科學。主題包括：原子和分子結構、化學鍵、假金、X 射線、放射性衰變、熒光和磷光、貴族氣體、有機化學之父、聚合物、化學分析（物理方法、元素分析及色譜）等。本課程以講課形式進行，輔以示範以及課堂和居家活動。相片和 PowerPoint 樣本可從以下網址下載：

CUHK CUSA1081 YSCheung Snapshots and PowerPoint sample

https://gocuhk-my.sharepoint.com/:f/g/personal/yscheung_cuhk_edu_hk/EmVcKWj0hk9Hsfat5sbegvMBpehkuxFD6VhORyFEc4YYKA?e=sJtiMu
或 <https://bit.ly/419QkGX> 或以上二維碼

**Medium of
Instruction:**

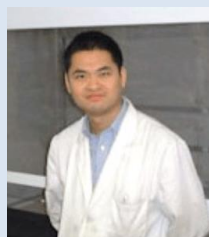
Lecture presented in Cantonese, supplemented with English terminologies. Written materials in English.

粵語主講，輔以英語術語。英文講義。

Organising Unit:

Department of Chemistry, Faculty of Science, CUHK

Teachers:



Dr. CHEUNG Yu San (張羽伸博士)

Senior Lecturer

Department of Chemistry, CUHK

Rm. 234, Science Centre North, CUHK

Tel: 3943 6265, Email: yscheung@cuhk.edu.hk

Course Content:

27 July 2026 (Monday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Basic concepts in chemistry • King's crown: Archimedes vs Goldsmith • The discovery of X-ray • The discovery of radioactivity <u>Assessment:</u> • Short-answer exercise
29 July 2026 (Wednesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Noble gases • The father of organic chemistry <u>Assessment:</u> • Short-answer exercise
31 July 2026 (Friday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Polymers <u>Assessment:</u> • Short-answer exercise

Date	27, 29, 31 July, 2026 (18 hours) (4 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)				
Time	9:30 am – 12:30 pm & 2:00 pm – 5:00 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	30				
Expected Applicants	Students who are studying in S2 or S3 (in the academic year 2025-26)				
Tuition Fee	HKD 3,400.00				
Credit	1.25 Academy Unit(s) <i>Students can accumulate credits which will be regarded as "Other Learning Experience" when applying University.</i>				
Grading Methods		<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.25</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.25</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

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Summer Courses 2026
Course Outline

CUSA1091 Artistic and Colourful Chemistry
色彩斑斕的化學世界

Introduction: This course combines the disciplines of science and culture and aims to provide students with fundamental understanding on the nature of science and their influences on our culture and daily life.

This course aims to provide students, who have a knowledge of the principles of chemistry, an overview on the mechanism of perceiving colors, the production of various classes of dyes and pigments, including their corresponding applications. Graphics, demonstrations, and project presentations are the major elements of interactive learning environment in this course.

本課程將結合科學與文化的內容，目的讓學生對基礎自然科學有更深入認識和了解，以至科學對日常生活和文化的影響。

本課程冀讓對化學有基拙理解的學生們明白顏色接收的基理，不同類型染料和顏料的製作以及其相應的應用。本課程會以不同的圖片，示範，小組專題研習及報告的形式以達至互動的學習環境和氣氛。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Department of Chemistry, Faculty of Science, CUHK

Teachers:



Dr. HAU, Chun Kit Sam (侯俊傑博士)
Lecturer
Department of Chemistry, CUHK
Rm. G1564, Science Centre South, CUHK,
Tel: 3943 8135, Email: sckhau@cuhk.edu.hk

Course Content:

12 August 2026 (Wednesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • A Brief Historical Introduction on Color • The Physical and Chemical Basis of Color <u>Lab:</u> • <i>Colour Composition in dyes and ink; 'Magic' Writing</i> <u>Assessment:</u> • In Class Worksheet or Online Google Form
13 August 2026 (Thursday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Azo Dyes and Pigments • Carbonyl Dyes and Pigments <u>Lab:</u> • <i>Synthesis of Azo Dyes</i> <u>Assessment:</u> • In Class Worksheet or Online Google Form
14 August 2026 (Friday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Textile Dyes • Inorganic Pigments • Applications of Dyes and Pigments <u>Lab:</u> • <i>Dyeing Method with DIY Dyes</i> <u>Assessment:</u> • In Class Worksheet or Online Google Form

Date	12, 13, 14 August 2026 (18 hours) (17 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)				
Time	9:30 am – 12:30 pm & 2:00 pm – 5:00 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	30 – 40				
Expected Applicants	Students who are promoting or studying S3 – S6				
Tuition Fee	HKD 3,600.00				
Credit	1.25 Academy Unit(s) <i>Students can accumulate credits which will be regarded as "Other Learning Experience" when applying University.</i>				
Grading Methods	<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.25</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.25</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

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CUSA1111 Chemistry in Food and Health
食物與健康的化學

Introduction: Nowadays, people have increasing awareness of healthy lifestyle. They care about what they eat and whether it is good for health. They would like to develop a balanced diet to enhance health and beauty. This course aims to introduce students to basic concepts with the relationship of nutrition and food to chemistry, as well as to develop students' abilities in presentation skills through group project of case study.

This course emphasises on the scientific principles in chemistry related to food, diet and health. It provides the introduction of the chemical substances that can be found in food systems (including nutrients), such as protein, lipid, carbohydrate and phytochemicals. Moreover, working principles in food additives that related to chemistry will be further illustrated. In addition, different cooking methods will be introduced. Further applications with selected food in experiments will be performed in laboratory.

Face-to-face teaching in lectures with the aid of interactive discussions in class will be adopted. Experimental sessions in laboratory will also be included. A group presentation of case study will be applied for final assessment in this course.

今時今日，人們對健康生活方式的意識日益增強。他們關心自己吃什麼以及是否對健康有益。他們希望制定均衡飲食以增強健康和保持美麗。本課程旨在向學生介紹營養、食品與化學關係的基本概念，並透過案例研究小組計畫培養學生的表達能力。

本課程強調與食物、飲食和健康相關的化學科學原理。它介紹了食品系統中存在的化學物質（包括營養素），例如蛋白質、脂質、碳水化合物和植物化學物質。此外，本課程也進一步闡述與化學相關的食品添加劑的工作原理，並且會介紹不同的烹調方法。另外將會在實驗室對選定食品進行實驗，作為進一步應用。

本課程採取面對面授課及課堂互動討論的方式進行教學，也包括實驗課。本課程的最終評估將採用案例研究的小組展示。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Department of Chemistry, Faculty of Science, CUHK

Teachers:



Dr. LO Chui Man Cat (盧翠雯博士)
Lecturer
Department of Chemistry, CUHK
Rm. 333C, Science Centre South, CUHK
Tel: 3943 0623, Email: cmlo@cuhk.edu.hk

Course Content:

4 August 2026 (Tuesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Nutrition for human health • Major nutrients and their chemical properties in food <u>Case Study:</u> • Discussion of the major nutrients and their functions in a selected food
5 August 2026 (Wednesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Phytochemicals in food <u>Case Study:</u> • Discussion of the major nutrients and their functions in a selected food <u>Experiment:</u> • Anthocyanin in red cabbage – Application in pH indicator
10 August 2025 (Monday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Food for health and beauty • Food safety and food additives <u>Case Study:</u> • Discussion of the major nutrients and their functions in a selected food
12 August 2025 (Wednesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Healthy diet and cooking methods <u>Assessment:</u> • Group presentation of case study <u>Experiment:</u> • Preparation of sunscreen lotion and test for its effectiveness with UV-test card

Date	4, 5, 10, 12 August 2026 (24 hours) <i>(13 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 12:30 pm & 2:00 pm – 5:00 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	30 – 40				
Expected Applicants	Students who are studying S1– S3				
Tuition Fee	HKD 4,000.00				
Credit	1.75 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.75</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.75</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1121 Chemistry Basis in Cooking Process
烹飪過程的化學基礎

Introduction: Many people perform cooking at home and try to explore new cooking methods. Some people may be curious about what happened to cooking and the chemical reactions that involved in cooking process. For examples, change in texture of cooking eggs, colour changes in cooking beef, shrimp and crab, color change of vegetables in acidic and alkaline medium, browning of apples in prolong storage in air, etc. Actually, they are all related to chemical reactions.

This course is designed to illustrate the chemistry basis related to cooking process. Emphasis is given to the observable changes in color and texture of the food. Selected techniques in various cooking methods will be discussed in lectures. Due to safety reasons, cooking will not be performed in the laboratory, and some related experiments were chosen instead. For examples, we need to wash the cooking utensils and dishes after cooking. One experiment is the application of recycled cooking oil to make soap that can be used for washing. Another experiment is the study of color changes of phytochemicals in vegetables in acidic and alkaline medium with their possible application as a pH indicator.

Face-to-face teaching in lectures with the aid of interactive discussions in class will be adopted. Video demonstration for selected cooking methods will also be provided. Experimental sessions in laboratory will also be included. A group presentation of case study will be applied for final assessment in this course.

許多人都會在家做飯，並嘗試探索新的烹飪方法，有些人可能會好奇在烹飪過程中發生了什麼事，以及在烹飪過程中涉及的化學反應。例如，煮蛋時質地的變化，烹調牛肉、蝦、蟹時顏色的變化，蔬菜在酸性和鹼性介質中的顏色變化，以及蘋果在空氣中長期存放的褐變等。事實上，它們都與化學反應有關。

本課程旨在闡釋與烹飪過程相關的化學基礎原理，強調在於食物顏色和質地的可觀察變化，以及在上課時討論一些不同的烹飪方法和技術。基於安全考慮，我們不會在實驗室進行煮食，取而代之，我們選取了一些相關的實驗。例如，我們煮食後需要清洗廚具和碗碟，其中一項實驗是利用回收的食用油來製造可用於洗滌的肥皂，另一項實驗是研究蔬菜中植化素在酸性和鹼性介質中的顏色變化及其作為 pH 指示劑的應用。

本課程採取面對面授課及課堂互動討論的方式進行教學，並將提供所選烹飪方法的影片示範，也包括相關的實驗課。本課程的最終評估將採用案例研究的小組展示。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Department of Chemistry, Faculty of Science, CUHK

Teachers:



Dr. LO Chui Man Cat (盧翠雯博士)
Lecturer
Department of Chemistry, CUHK
Rm. 333C, Science Centre South, CUHK
Tel: 3943 0623, Email: cmlo@cuhk.edu.hk

Course Content:

17 August 2026 (Monday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Colour change of vegetables in acidic and alkaline medium • Chemical reactions of apples browning <u>Case Study:</u> • Sharing of a recipe and discussion on the chemistry basis involved in the cooking method <u>Experiment:</u> • Extraction and practical use of phytochemicals in vegetables
19 August 2026 (Wednesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Introduction of cooking oil and the chemical reactions during frying <u>Case Study:</u> • Sharing of a recipe and discussion on the chemistry basis involved in the cooking method <u>Experiment:</u> • Possible recycling of cooking oil: Making cold process handmade soap for washing dishes
24 August 2026 (Monday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Structure of an egg and its various cooking methods • Tricks in cooking meat and the reasons of color changes in beef, shrimp and crab <u>Case Study:</u> • Sharing of a recipe and discussion on the chemistry basis involved in the cooking method
26 August 2026 (Wednesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Biological and chemical leavening in baking bread and tarts <u>Case Study and Group Presentation:</u> • Sharing of a recipe and discussion on the chemistry basis involved in the cooking method <u>Assessment:</u> • Group presentation of case study

Date	17, 19, 24, 26 August 2026 (24 hours) <i>(27 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 12:30 pm & 2:00 pm – 5:00 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	30 – 40				
Expected Applicants	Students who are studying S3– S5 (in the academic year 2024-2025)				
Tuition Fee	HKD 4,000.00				
Credit	1.75 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods		<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.75</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.75</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1141 Exploring Chemistry in Anime, Comics and Games
在二次元世界中探索化學

Introduction:

Anime, comics and games (ACG) describe a global subculture covering a wide range of animations, comic books and video games. ACG often reflects social values and provides imaginative spaces where diverse communities can connect and express themselves. Beyond cultural influence, ACG often incorporates chemistry concepts into stories and gameplay, blending science with entertainment. For example, anime series illustrate alchemy-inspired reactions and futuristic materials. Comics highlight chemical transformations and the conservation of mass. Games can simulate processes such as synthesis, catalysis, or energy conversion. These creative works not only spark curiosity but also make abstract chemical principles such as bonding, reactions, and thermodynamics accessible, inspiring younger generations to explore chemistry, materials science, and related fields.

This course is designed for students to explore chemistry through popular ACG creations that adopt scientific principles in their narratives or gameplay mechanics. Through lectures, students will discover fundamental chemistry concepts hidden in popular plots and settings. Students will also carry out a guided case study on selected topics and present their interesting findings to the class.

ACG (anime, comics and games) 描述了一種涵蓋各類動畫、漫畫與電子遊戲的全球次文化。ACG 常常反映社會價值，並提供充滿想像力的空間，讓多元社群能夠交流與表達自我。除了文化影響之外，ACG 也常將化學概念融入故事與遊戲玩法之中，將科學與娛樂結合。例如，動畫作品展現受煉金術啟發的反應與未來材料；漫畫強調化學轉化與質量守恒；遊戲則能模擬合成、催化或能量轉換等過程。這些創作不僅激發好奇心，還使得鍵結、反應與熱力學等抽象的化學原理更易理解，並啟發年輕世代探索化學、材料科學及相關領域。

本課程旨在引導學生透過受科學原理啟發的熱門 ACG 作品探索化學。學生將透過課堂發現隱藏在熟悉情節與設定中的基礎化學概念。學生亦會在指導下進行專題研究，並就所選主題進行匯報。

**Medium of
Instruction:**

Cantonese
粵語

Organising Unit:

Department of Chemistry, Faculty of Science, CUHK

Teachers:



Dr. Chan Ka Long Donald (陳家朗博士)

Lecturer

Department of Chemistry, CUHK

Rm. G54, Science Centre South, CUHK

Tel: 3943 0567, Email: donaldchan@cuhk.edu.hk

Course Content:

17 August 2026 (Monday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Equivalent exchange – Classification and properties of matter • Energy conversion – Thermochemistry and laws of thermodynamics <u>Assessment:</u> • Short-answer questions assignment
18 August 2026 (Tuesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • To create or destroy – Some important reactions and impossible reactions <u>Assessment:</u> • Short-answer questions assignment
20 August 2026 (Thursday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture:</u> • Solids and futuristic materials – Smart polymers and nanomaterials <u>Guided Case Study:</u> • Discussion of the scientific concepts in selected ACG topics <u>Assessment:</u> • Presentation of case study

Date	17, 18, 20 August 2026 (18 hours) (21 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)				
Time	9:30 am – 12:30 pm & 2:00 pm – 5:00 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	30 – 40				
Expected Applicants	Students who are studying S5– S6				
Tuition Fee	HKD 3,600.00				
Credit	1.25 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods		<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.25</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.25</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1023 Great Discoveries in Biomedical Sciences Practical One
生物醫學大發現 實習一

Introduction: This practical course aims at supplementing the lecture courses **CUSA2013 Great Discovery in Biomedical Sciences (Senior Class)** or **CUSA3003 Biological Science Student Knowledge Enhancement Course** with some practical skills of literature research and scientific presentation.

本實習科旨在為修讀 **CUSA2013 生物醫學大發現(高級班)** 或 **CUSA3003 生命科學學生知識增進課程** 之同學提供有關文獻研究和科學報告的實習。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Biochemistry Programme, School of Life Sciences, Faculty of Science, CUHK

Teachers:



Dr. LO Fai Hang (羅輝恒博士)
Lecturer
School of Life Sciences, CUHK
Rm. G83, Science Centre, CUHK
Tel: 3943 5019, E-mail: lofaihang@cuhk.edu.hk

Demonstrators: Students from Programme of Biochemistry, School of Life Sciences, CUHK

Course Content:

5 September 2026 (Saturday) 10:00 am – 1:00 pm 2:30 pm – 4:30 pm	<u>In-class activities & Assessment:</u> • Introduction to literature research 文獻研究基本技巧簡介 • Introduction to scientific presentation 科學報告基本技巧簡介 • Group work and case study 小組練習及個案討論
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Date	5 September 2026 (5 hours) <i>(19 September 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	10:00 am – 1:00 pm & 2:30 pm – 4:30 pm				
Venue	The Chinese University of Hong Kong				
Expected Applicants	Students who are promoting or studying S5 – S6 who are interested in biomedical sciences				
Tuition Fee	HKD 1,400.00				
Credit	0.25 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>0.25</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>0.25</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>
Remarks:	Students need to bring along a laptop or tablet for the course				

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1033 Great Discoveries in Biomedical Sciences Practical Two
生物醫學大發現 實習二

Introduction: This practical course aims at supplementing the lecture courses **CUSA2013 Great Discovery in Biomedical Sciences (Senior Class)** or **CUSA3003 Biological Science Student Knowledge Enhancement Course** with some practical skills of scientific method and data presentation.

本實習科旨在為修讀 **CUSA2013 生物醫學大發現(高級班)** 或 **CUSA3003 生命科學學生知識增進課程** 之同學提供有關科學方法和數據表達的實習。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Biochemistry Programme, School of Life Sciences, Faculty of Science, CUHK

Teachers:



Dr. LO Fai Hang (羅輝恒博士)
Lecturer
School of Life Sciences, CUHK
Rm. G83, Science Centre, CUHK
Tel: 3943 5019, E-mail: lofaihang@cuhk.edu.hk

Demonstrators: Students from Programme of Biochemistry, School of Life Sciences, CUHK

Course Content:

12 September 2026 (Saturday) 10:00 am – 2:00 pm	<u>In-class activities & Assessment:</u> • Introduction to laboratory safety and bioethics 實驗室安全簡介及生物倫理 • Discussion of scientific method 科學方法討論 • Data analysis and presentation 數據分析及表達 • Discussion and exercise 小組討論 / 習作
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Date	12 September 2026 (4 hours) <i>(19 September 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	10:00 am – 2:00 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	25 – 40				
Expected Applicants	Students who are promoting or studying S5 – S6 who are interested in biomedical sciences				
Tuition Fee	HKD 1,300.00				
Credit	0.25 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods		<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>0.25</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>0.25</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>
Remarks:	Students need to bring along a laptop or tablet for the course				

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1043 Life Science in Daily Life
日常生活中的生命科學

Introduction: Life science is the study of all living organisms and life processes at all levels from ecological to molecular. While many people refer life science as biology, it is an enormous field of study that also covers genetics, molecular biology, cell biology, biochemistry, food science, biotechnology, ecology, and more. The knowledge of life science teaches us to respect and love the nature and all life forms. It also plays a substantial role in human welfare and helps to create many of our daily needs ranging from food to medicine.

生命科學以科學方式對所有生物體和生命過程由生態到分子各個層面進行研究。雖然許多人將生命科學稱為生物學，但其實它是一個巨大的研究領域，其中還包括遺傳學、分子生物學、細胞生物學、生物化學、食品科學、生物技術、生態學等。生命科學的知識教會我們尊重和熱愛自然和所有生命體。它還在人類福利方面發揮著重要作用，並有助於創造我們從食物到藥品的許多日常需求。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: School of Life Sciences, Faculty of Science, CUHK

Teachers:



Professor NGO Chi Ki Jacky (敖志祺教授)

Associate Professor

School of Life Sciences, Faculty of Science, CUHK

Rm E403, Science Centre East Block, CUHK

E-mail: jackyngo@cuhk.edu.hk

Course Content:

21 July 2026 (Tuesday) 9:30 am – 1:00 pm 2:15 pm – 5:45 pm	<u>Lecture 1</u> - What are Life Sciences? - Importance of Life Sciences in Our Daily Lives. - Thinking and Acting like a Life Scientist. <u>Laboratory 1</u> # - Effectiveness of antiseptics and disinfectants on bacteria around us
23 July 2026 (Thursday) 9:30 am – 1:00 pm 2:15 pm – 5:45 pm	<u>Lecture 2</u> - The Building Blocks of Our Bodies. - DNA – the Blueprint of Life. <u>Laboratory 2</u> # - Extraction of DNA from fruits - Making plastic from milk and analysis of milk proteins
28 July 2026 (Tuesday) 9:30 am – 1:00 pm 2:15 pm – 5:45 pm	<u>Lecture 3</u> - The Central Dogma: From DNA to Proteins. - The 20 Letters of Protein that Make Life Possible. <u>Laboratory 3</u> # - Micropipetting and Gel Electrophoresis for DNA Analysis
30 July 2026 (Thursday) 9:30 am – 1:00 pm 2:15 pm – 5:45 pm	<u>Lecture 4</u> - Unleashing the Potentials of Life Sciences. <u>Laboratory 4</u> # - Expression of Green Fluorescent Protein (GFP) in Bacteria

Students are required to wear lab coats when attending the laboratory sessions.

Date	21, 23, 28, 30 July 2026 (28 hours) (31 July 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)				
Time	9:30 am – 1:00 pm & 2:15 pm – 5:45 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	20 – 36				
Expected Applicants	Students who are promoting to or studying S2 – S5				
Tuition Fee	HKD 4,200.00				
Credit	2 Academy Unit(s) Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.				
Grading Methods	Certificate	Assessment	Attendance	Credit(s)	
	Distinction	Certificate of Distinction	Excellent	>75%	2
	Pass	Certificate of Merit	Pass	>75%	2
	Attended	Certificate of Attendance	Fail	>75%	0
	Fail	N/A	Fail	N/A	0

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1053 Nutrition Across the Lifespan
生命各階段的營養需求

Introduction: This course aims to explore the fundamental nutritional needs at various stages of life, including adolescence and adulthood. At the same time, students will learn how to apply nutritional knowledge in real life. The course includes lectures and workshops, where students will design nutritious recipes and evaluate the nutritional values of common packaged foods. This course aims to guide students to make informed dietary choices and understand the vital role of nutrition in a healthy life.

本課程旨在探討人體各階段，包括青少年與成年時期的基本營養需求。同時，學生將學習如何把營養知識應用於現實生活中。本課程包括講課與工作坊，學生需設計營養食譜，以及評估常見包裝食品的營養價值。本課程旨在啟發學生作出有根據的飲食選擇，並理解營養在健康生活中的關鍵角色。

Medium of Instruction: English supplemented by Cantonese
英語輔以粵語

Organising Unit: School of Life Sciences, Faculty of Science, CUHK

Teachers:



Miss SIN Man Ching Daisy
Assistant Lecturer
School of Life Sciences, Faculty of Science, CUHK
Rm 525, Mong Man Wai Building, CUHK
E-mail: daisymcsin@cuhk.edu.hk

Course Content:

11 August 2026 (Tuesday) 9:30 am – 12:00 noon 2:00 pm – 4:30 pm	<u>Lecture 1</u> - Explore the nutritional needs of pregnant women and children <u>Group Discussion Workshops 1</u> - Learn about how to analyse food labels on packaged foods - Plan and discuss about how to design a healthy recipe
18 August 2026 (Tuesday) 9:30 am – 12:00 noon 2:00 pm – 4:30 pm	<u>Lecture 2</u> - Explore the nutritional needs of adolescents and adults <u>Group Discussion Workshops 2</u> - Discuss the healthy packaged foods available in the market - Finalise the healthy recipe design
25 August 2026 (Tuesday) 9:30 am – 12:00 noon 2:00 pm – 4:30 pm	<u>Lecture 3</u> - Explore the nutritional needs of older adults <u>Workshop 3 - Projects/Assignment</u> - Short quiz (open book) - Presentation of healthy recipes and healthy packaged food choices - Short essay - reflective journal

Date	11, 18, 25 August 2026 (15 hours) (27 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)				
Time	9:30 am – 12:00 noon & 2:00 pm – 4:30 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	25 – 30				
Expected Applicants	Students who are promoting to or studying S5 – S6				
Tuition Fee	HKD 3,200.00				
Credit	1 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1073 Increasing Environmental Chemicals in Natural Ecosystems
自然生態系中環境化學品的增加

Introduction: This course aims to give students a scientific overview of different environmental chemical issues in the planet Earth, and will look into the scientific basis and find out potential solution to different environmental chemical pollution problems. The class will cover topics related to different ecosystem types and the environmental chemicals on the planet, which are related to their presented problems such as global climate change, nutrient enrichment, wildlife population declines, and other environmental health concerns including human health. The course will cover the basic concepts of ecology, environmental sciences, microbiology, plant and animal sciences, ecotoxicology, and environmental sustainability. Case studies will be provided to help the students better grasp the underlying principles.

本課程旨在讓學生對地球上各種環境化學問題有一個科學的概述，並探討其科學基礎，並找到解決各種環境化學污染問題的潛在解決方案。課程將涵蓋不同生態系統類型及其地球上的環境化學物質，這些化學物質與它們所面臨的問題息息相關，例如全球氣候變遷、營養富集、野生動物種群下降以及其他環境健康問題，包括人類健康。課程將涵蓋生態學、環境科學、微生物學、植物與動物科學、生態毒理學和環境永續性的基本概念。課程將提供案例研究，幫助學生更好地理解相關原則。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: School of Life Sciences, Faculty of Science, CUHK

Teachers:



Professor TSUI Tsz Ki Martin

Associate Professor

School of Life Sciences, Department of Earth and Environmental Sciences
Faculty of Science, CUHK

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Course Content:

17 August 2026 (Monday) 9:30 am – 12:30 pm	<u>Lecture 1</u> • Course Introduction and Major Global Environmental Chemical Issues • Four spheres and their interactions • Water, global warming, land use changes, nutrients and toxic chemicals • Ecosystem Types on the Earth, and their Stressors • Ecosystem services • Stressors in different ecosystem types <u>Case Discussion 1:</u> Emerging environmental chemicals
18 August 2026 (Tuesday) 9:30 am – 12:30 pm	<u>Lecture 2</u> • Global Climate Change • Greenhouse gases and consequences of climate change • Experiments and modelling in climate change • Wetland, Functions, and Stressors • Wetland types • Unique characteristics of wetlands on environmental chemicals <u>Assessment 1:</u> End-of lecture quiz
19 August 2026 (Wednesday) 9:30 am – 12:30 pm	<u>Lecture 3</u> • Urbanization and Environmental Pollution • Pollution problems in cities • Urban elemental cycles • Global Carbon Cycle • Forest ecosystems • Aquatic ecosystems <u>Case Discussion 2:</u> Common environmental problems in Asian big cities
20 August 2026 (Thursday) 9:30 am – 12:30 pm	<u>Lecture 4</u> • Nutrient Cycle and Eutrophication • Essential nature of nutrients • Consequences of excessive nutrients • Anions and Heavy Metals in the Environment • Chloride, perchlorate, and sulphate • Metals, metalloids, and mercury <u>Assessment 2:</u> End-of lecture quiz
21 August 2026 (Friday) 9:30 am – 12:30 pm	<u>Lecture 5</u> • Organic Pollutants and Emerging Micropollutants • Key persistent environmental organic compounds • Microplastics, antibiotics, nanoparticles • Environmental Monitoring • Abiotic monitoring • Biotic monitoring <u>Case Discussion 3:</u> How can we know the environmental quality changes in Hong Kong?
24 August 2026 (Monday) 9:30 am – 12:30 pm	<u>Lecture 6</u> • Future Perspectives of Environmental Chemicals • Regulations and policies • Responsibility of designing synthetic chemicals • Environmental Toxicity and Health Concerns • Natural ecosystem health • Human health <u>Assessment 3:</u> End-of lecture quiz
25 August 2026 (Tuesday) 9:30 am – 12:30 pm	<u>Group Project and Presentation:</u> Each team (3-4 students) work together to propose a topic of their interests about an environmental chemical, their problems, and the potential solution. The team will present to the class and all students will have a chance to interact with the presenting team. <u>Final Assessment:</u> A test will be conducted to test the overall understanding of the students on the class materials.

Date	17, 18, 19, 20, 21, 24, 25 August 2026 (21 hours) (26 or 27 August 2026 is reserved for class make-up in case there is any cancellation of classes due to adverse weather or other unexpected factors.)				
Time	9:30 am to 12:30 pm				
Venue	The Chinese University of Hong Kong				
Enrolment	20				
Expected Applicants	Students who are advancing to S3 – S6				
Tuition Fee	HKD 3,600.00				
Credit	1.5 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods		<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>
	Distinction	<i>Certificate of Distinction</i>	<i>Pass</i>	<i>>75%</i>	<i>1.5</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.5</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>
Remarks:	Students are requested to bring laptops/notebooks or tablets with them for this course.				

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1083 Life on Land: From Underground to Canopy
陸地生命：從地下到樹冠

Introduction: This course offers an in-depth exploration of terrestrial ecosystems, examining the intricate connections between life below the soil and above the ground. Students will investigate how physical, chemical, and biological processes shape habitats and sustain biodiversity. Topics include soil ecology, forest ecology, freshwater ecology, as well as plants and animals' interaction and human impacts on terrestrial systems. Through lectures, field trips and class activities, students will gain a holistic understanding of how terrestrial life systems function and how they can be conserved in the face of global environmental change.

本課程深入探索陸地生態系統，研究土壤下方與地面上生命之間的複雜連結。學生將探討物理、化學及生物過程如何塑造生境並維持生物多樣性。課程內容涵蓋土壤生態學、森林生態學、淡水生態學，以及動植物互動與人類對陸地系統的影響。透過講課、實地考察及課堂活動，學生將全面理解陸地生命系統的運作方式，並掌握在全球環境變遷下如何保育這些系統。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: School of Life Sciences, Faculty of Science, CUHK

Teachers:



Dr. LAW Man Suet Michelle (羅文雪博士)

Lecturer

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Demonstrators: Students from School of Life Sciences, CUHK

Course Content:

27 July 2026 (Monday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Module 1: Introduction to Terrestrial Ecosystems:</u> • Overview of terrestrial biomes • Key concepts: ecosystem structure and function • Vertical dimension of terrestrial life (soil to canopy) <u>Module 2: Life Below Ground:</u> • Soil formation and composition • Soil ecology: microorganisms, fungi, and nutrient cycling • Plant-soil interactions • Activity: Soilblitz
28 July 2026 (Tuesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Module 3: Life Above Ground:</u> • Forest structure and adaptations • Forest canopy dynamics and plant succession • Outdoor excursion around CUHK campus (such as Lake Ad Excellentiam)
29 July 2026 (Wednesday) 2:00 pm – 5:00 pm 6:00 pm – 9:00 pm	<u>Module 4: Freshwater and Terrestrial Linkages:</u> • Streams, rivers, and wetlands within terrestrial landscapes • Role of freshwater systems in biodiversity and nutrient flow • Night safari at Tai Po Kau Nature Reserve
31 July 2026 (Friday) 9:30 am – 12:30 pm	<u>Final Assessment</u>

Date	27 July 2026 – 30 July 2026 (21 hours) <i>(3 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 12:30 pm & 2:00 pm – 5:00 pm (27-28 July 2026) 2:00 pm – 5:00 pm & 6:00 pm – 9:00 pm (29 July 2026) 9:30 am – 12:30 pm (31 July 2026)				
Venue	The Chinese University of Hong Kong				
Expected Applicants	Students who are promoting or studying S4 – S6				
Tuition Fee	HKD 3,800.00				
Credit	1.5 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>0.25</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>0.25</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>
Remarks:	Students need to bring along a laptop or tablet for the course				

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1093 Amazing Mushrooms: Exploring the Applications in Sustainability Practices
神奇的菇菌：探索在可持續發展中的應用

Introduction: This course takes you on a fascinating journey into the hidden world of fungi — exploring how these remarkable organisms shaped life on land, sustain ecosystems, and inspire next-generation sustainability solutions. You will discover how fungi connect plants through underground networks, clean up pollution, and transform food waste into valuable products. Through interactive lectures and hands-on workshops, you will learn how fungi are driving innovations in food production, biofuels, and sustainable materials. Students will even cultivate mushrooms using local wood and food waste, and design eco-friendly, waterproof cushioning materials made from fungal mycelium — showing how science and creativity can work together for a greener future.

本課程將帶領學生走進真菌的奇妙世界，探索這些神秘生物如何塑造陸地生命、維繫生態系統，並啟發新一代的永續創新方案。學生將了解真菌如何透過地下網絡連結植物、淨化污染，甚至把食物廢料轉化為有價值的資源。課程結合互動講座與實作體驗，內容涵蓋真菌生物學、演化生態學、食品生物技術、生物修復與環境永續等主題。學生更有機會利用本地木材與食物廢料培植菇菌，及設計以真菌菌絲體製成的環保防水緩衝材料，親身體驗科學與創意如何攜手打造更綠色的未來。

Medium of Instruction: Cantonese
粵語

Organising Unit: School of Life Sciences, Faculty of Science, CUHK

Teachers:



Dr. TANG Ming Chak (鄧銘澤博士)

Lecturer

School of Life Sciences, CUHK

G01B, Science Centre East Block, CUHK

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Demonstrators: Students from Programme of Biology, School of Life Sciences, CUHK

Course Content:

21 July 2026 (Tuesday) 9:30 am – 1:00 pm 2:30 pm – 6:00 pm	Lecture: Fungi Under the Spotlight: Four Big Questions - Where did fungi come from, and how did they first evolve? - How did fungi make life on land possible? - Did fungi secretly shape the rise of mammals? - Why are fungi vital for keeping Earth's cycles in balance? Fungi Connections: Unraveling Evolution's Hidden Teamwork - Discovering fungi's core concept: symbiosis - Revisiting Darwin's puzzle — why do organisms cooperate? - Cooperation or competition? Finding nature's hidden balance - Eye-opening insights from mycorrhizal networks — nature's underground internet Class Activities: - Exploring evolution through game theory - Visualizing the “Wood-Wide Web”: drawing the hidden fungal network beneath our feet
23 July 2026 (Thursday) 9:30 am – 1:00 pm 2:30 pm – 6:00 pm	Lecture: Mushrooms on the Menu: Culinary Secrets Revealed - Discover the irresistible umami flavor unlocked by fungi - From forests to feasts: wild mushrooms going gourmet - Ancient kitchens and the forgotten roots of biotechnology - Mushroom farming — the green revolution of modern agriculture Fungi and the Future of Food: A Perfect Match - Global food challenges, sustainability movements, and new market trends - The four key ways fungi are transforming food innovation - A myco-powered diet: reimagining how we eat for a sustainable future Laboratory Activities: - Hands-on cultivation: growing mushrooms using Hong Kong's local wood and food waste
25 July 2026 (Saturday) 9:30 am – 1:00 pm 2:30 pm – 6:00 pm	Lecture: Ancient Degraders of Toxic Waste - Nature's fastest learners in breaking down plastics and medical waste - The true “hazard specialists”: from nuclear radiation and crude oil to heavy metals and dye-contaminated water - Smart recyclers consuming food-industry byproducts - Beyond biotechnology — fungi as powerful partners for environmental restoration Long-Term Partners for a Sustainable Future - The fungal revolution in eco-friendly materials - Harnessing fungi for renewable biofuels - Achieving perfect synergy between fungi innovation and carbon neutrality Laboratory Activities: - Creating mushroom-based waterproof cushioning materials

Date	21, 23, 25 July 2026 (21 hours) (28, 30 July 2026 are reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)				
Time	9:30 am – 1:00 pm & 2:30 pm – 6:00 pm				
Venue	The Chinese University of Hong Kong				
Expected Applicants	Students who are promoting or studying S4 – S6				
Tuition Fee	HKD 3,800.00				
Credit	1.5 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods		<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>0.25</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>0.25</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
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Summer Courses 2026
Course Outline

CUSA2043 An Ocean of Inspiration and Beauty
海洋啟示錄

Introduction: The oceans cover 70% of the Earth's surface and is the biggest biome on Earth as well as the most important component of the biosphere. In addition to the cradle of life on Earth, the ocean is also one of the crucial factors for maintaining life on Earth. In the history of mankind, the oceans have been admired and greatly respected for its significance in the human exploration of nature, as well as in the development of human civilization. This course intends to offer an overview of the oceans from perspectives such as culture, history, science, philosophy and arts; as well as to acknowledge the importance of the oceans to mankind and other life forms on Earth. The core concepts include the roles played by the oceans in the development of human civilization, the impact and reliance of human beings on the oceans, ocean processes and the physical, chemical and biological properties of the oceans, diversity of marine ecosystems and marine organisms, how marine organisms solve their specific problems and provide inspirations for solving human problems, the importance of the oceans in maintaining global climatic and ecological balances, as well as how we should protect, conserve and sustainably exploit the oceans for our future generations and all life forms on Earth.

海洋覆蓋了地球七成的表面，是地球最大的生物群系和生物圈最重要的部份。海洋既是地球上生命產生的搖籃，又是維持生命的必要關鍵因素之一。自古以來人類對神祕莫測的海洋既敬畏又嚮往；海洋是人類對自然的探索，以至文明的產生和發展過程中極重要部份。本課程旨在讓學員從文化、歷史、科學、哲學、及藝術等角度去認識海洋；及了解海洋對人類以至其他生物的重要性。主要課程內容包括海洋在人類文明發展的角色、人類對海洋的影響和依賴、各種海洋過程及海洋的物理，化學，生物等方面的特性、海洋生態系和海洋生物的多樣性、海洋生物如何適應獨海洋環境並為人類提供解決問題的靈感、海洋在調節全球氣候和生態平衡的功能、及我們應如何維護、保育及永續地開發海洋等。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Centre for Promoting Science Education, Faculty of Science, CUHK

Teachers:



Dr. CHUNG, Kwok Cheong (鍾國昌博士)

School of Life Sciences, CUHK

Email: kcchung@cuhk.edu.hk

Course Content:

13 July 2026 (Monday) 2:00 pm – 5:30 pm	<u>Theme 1. Ocean and Man:</u> 1. The oceans and the marine environment; 2. Importance of the oceans; 3. A history of maritime development; 4. The rise and fall of maritime power.
15 July 2026 (Wednesday) 2:00 pm – 5:30 pm	<u>Theme 1. Ocean and Man:</u> 1. Marine resources and their exploitation; 2. Deterioration & conservation of the marine environment.
17 July 2026 (Friday) 2:00 pm – 5:30 pm	<u>Theme 2. Marine Ecosystems:</u> 1. The marine environment, zonation of the oceans, physical and chemical properties; 2. Plate tectonics & associated phenomena; 3. Ocean processes.
20 July 2026 (Monday) 2:00 pm – 5:30 pm	<u>Theme 2. Marine Ecosystems:</u> 1. Coastal marine ecosystems: rocky shores, mangrove forests, estuary / soft-bottom intertidal ecosystems, coral reefs, kelp forests etc. 2. Oceanic marine ecosystems: open oceans and deep oceans, hydrothermal vents and cold seeps etc.
22 July 2026 (Wednesday) 2:00 pm – 5:30 pm	<u>Theme 3. Marine Organisms:</u> 1. Classification of living organisms; 2. Major types of marine organisms.
24 July 2026 (Friday) 2:00 pm – 5:30 pm	<u>Theme 3. Marine Organisms:</u> 1. Survival, adaptation & evolution of marine organisms; 2. Inspirations from marine organisms.

Date	13, 15, 17, 20, 22, 24 July 2026 (21 hours) <i>(1 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	2:00 pm – 5:30 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	20 – 40				
Expected applicants	Students who are promoting to or studying S4 – S6				
Tuition Fee	HKD 3,600.00				
Credit	1.5 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	Certificate	Assessment	Attendance	Credit(s)	
	Distinction	<i>Certificate of Distinction</i>	<i>Pass</i>	<i>>75%</i>	<i>1.5</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.5</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA3003 Biological Science Student Knowledge Enhancement Course
生命科學學生知識增進課程

Introduction: The 'Biological Science Knowledge Enhancement Course' is designed specifically for Form 4 to Form 6 students, who are interested in Biological Science. The course is composed of two modules. In Module I of this course, the objectives are to provide the students with basic principles and concepts related to biological science. In Module II, the objectives are to provide the students with more specific knowledge related to the applications of biological science.

「生命科學學生知識增進課程」是專為中四至中六對生命科學感興趣的學生而設的知識增潤課程。此課程分為兩個單元。課程第一單元的目標為介紹生命科學中的基本理論和概念。在第二單元，本課程將進一步向學生介紹一些生命科學中較為深入的知識及應用。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Biochemistry Programme, School of Life Sciences, Faculty of Science, CUHK

Teachers:



Dr. LO Fai Hang (羅輝恒博士)

Lecturer

School of Life Sciences, CUHK

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Demonstrators: Students from Programme of Biochemistry, School of Life Sciences, CUHK

Course Content:

1 August 2026 (Saturday) 10:00 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture:</u> • Introduction to biomolecules • Understanding metabolism • Introduction to cells
8 August 2026 (Saturday) 10:00 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture:</u> • Understanding physiology • Basic molecular biology and molecular genetics • Introduction to immunology and haematology • Understanding microbiology and infectious diseases • Basic neurobiology • Basic endocrinology
15 August 2026 (Saturday) 10:00 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture:</u> • Understanding physiology • Basic molecular biology and molecular genetics • Introduction to immunology and haematology • Understanding microbiology and infectious diseases • Basic neurobiology • Basic endocrinology
22 August 2026 (Saturday) 10:00 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture:</u> • Understanding physiology • Basic molecular biology and molecular genetics • Introduction to immunology and haematology • Understanding microbiology and infectious diseases • Basic neurobiology • Basic endocrinology

Date	1, 8, 15, 22 August 2026 (26 hours) <i>(31 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	10:00 am – 1:00 pm; 2:00 pm – 5:30 pm				
Teaching Mode	Face to Face (The Chinese University of Hong Kong)				
Enrollment	30 – 50				
Expected Applicants	Students who are promoting or studying S4 – S6 who are interested in biomedical sciences				
Tuition Fee	HKD 4,000.00				
Credit	1.75 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	Certificate	Assessment	Attendance	Credit(s)	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>0.25</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>0.25</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1035 Mysteries in the Atomic World
原子世界的奧秘

Introduction: This course will bring students to retrace the thinking paths of physicists in the early 20th century to unravel the mysteries of atoms. The course includes lectures, experiments, and a visit. Students will glimpse through the basic concepts of quantum physics, such as wave-particle duality, quantization, wave function and its probabilistic interpretation, spin, and their applications to understand some atomic and nuclear phenomena, including energy levels in atoms, atomic spectra, formation of molecules, as well as a more advanced topic on magnetic resonance imaging (MRI), which is now widely applied to medical imaging.

Students will gain hands-on experience in using modern laboratory equipment to measure atomic spectra, and determine the charge mass ratio of electrons. **A visit to a company in Hong Kong Science and Technology Park will also be included to let students gain hands-on experience in the operation of a medical MRI machine.**

本課程帶領學生重溫二十世紀初物理學家探索原子奧秘的過程。課程包括講座、實驗，和參觀三部分。學生將瞥見量子物理的基本概念，包括波粒二象性、量子化、波函數及其或然率詮釋，自旋；這些概念如何應用於了解原子和核子的現象，包括原子的能階、光譜、分子的形成，以及一個較深入、目前廣泛應用於醫療造影的現象：磁力共振。

學生也會學習如何利用現代科學儀器測量原子的光譜，以及電子的電荷質量比。課程也包括到香港科學技術園參觀一間儀器公司，實際操作醫學磁力共振儀器。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Department of Physics, Faculty of Science, CUHK

Teachers:



Dr. TONG Shiu Sing (湯兆昇博士)

Senior Lecturer

Department of Physics, Faculty of Science, CUHK

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Tel: 3943 6400, E-mail: sstong@phy.cuhk.edu.hk

Course Content:

20 August 2026 (Thursday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture and demos:</u> Discovery of subatomic particles, atomic spectra, wave particle duality, quantum double-slit interference experiment, relationship between classical wave phenomena and quantization, atomic models and quantization of atomic energy, the concept of wave function, probabilistic interpretation, and the emergence of quantum physics <u>Laboratory Activities:</u> Study of atomic spectra, and charge to mass ratio of electron
21 August 2026 (Friday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture and demos:</u> Basic concepts of quantum physics, Schrödinger equation, particle in a box and hydrogen atom, and Uncertainty Principle. Electron microscopes, quantum phenomena such as quantum tunnelling and our existence. The concept of spin, Pauli Exclusion Principle and atomic orbitals, and their applications to atomic and nuclear phenomena, basic principles of Magnetic Resonance Imaging (MRI). <u>Laboratory Activities:</u> Visiting the modern physics laboratory at the Department of Physics, CUHK. Experiments with a scanning electron microscope and a transmission electron microscope, seeing microscopic objects, atoms, and electron diffraction patterns
22 August 2026 (Saturday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Visit:</u> Visiting a Magnetic Resonance Imaging (MRI) company at Hong Kong Science Park. Experience the operation of an MRI machine and acquisition of MRI images. <u>Lecture and demos:</u> Understanding atoms and molecules, chemical reactions, and other quantum phenomena <u>Discussion:</u> Summary of essential ideas and findings, assessment

Date	20, 21, 22 August 2026 (21 hours) <i>(29 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 1:00 pm & 2:00 pm – 5:30 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	20 – 30				
Expected Applicants	Students who are promoting to or studying S4 – S6				
Tuition Fee	HKD 3,800.00 (including materials for experiments)				
Credit	1.5 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.5</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.5</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1045 Discovering the Universe
探索宇宙

Introduction: Humans want to explore the universe by looking up into the sky since ancient times. This course offers the outline about the selected phenomena which were observable with the naked eye. Upon finishing the course, students will acquire the development of modern astronomy, knowledge of the basic observational features of the sky, and the application of physical principles to astronomy.

The course includes lectures, experiments, and observation sessions. The experiments session is aimed to provide students with hand-on experience in basic physical principles and ideas in Astronomy. Student will have indoor observation of simulated night in class. Outdoor solar observation will be held if weather permits.

人類自古以來已希望通過觀察天文現象來探索身處的宇宙。本課程的設計正旨在概述這些肉眼能見的天象。完成課程的學生會了解當代天文的發展、有關天象的基本知識，以及物理定律在天文學上的應用。

本課程分為講座、實驗，和天文觀察三部份。實驗部份的目的是讓學生有機會親身驗證認識基本科學原理和天文概念。學生在天文觀察部份，可以參與模擬星空觀察。若天氣許可，學生會於室外作太陽的觀察。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Department of Physics, Faculty of Science, CUHK

Teachers:



Dr. LEUNG Po Kin (梁寶建博士)
Senior Lecturer
Department of Physics, CUHK
Rm. 220, Science Centre North Block, CUHK
Tel: 3943 4078, E-mail: pkleung@cuhk.edu.hk

Demonstrators: Students from Department of Physics, CUHK

Course Content:

27 July 2026 (Monday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture 講課:</u> (3.5 hrs) • Introduction to Astronomy 天文學簡介 • Ancient Greek Astronomy (Plato, Aristotle) 古希臘天文 (柏拉圖、阿里士多德) • Modern Astronomy (Copernicus, Kepler, Galileo, Newton) 現代天文(哥白尼、開普勒、伽利略、牛頓) • Newton's laws of motion and law of gravitation 牛頓運動定律和重力定律 • Basics concepts of celestial sphere 天球介紹 <u>Assessment 評核:</u> MC, short questions, etc 選擇題、短題目..... <u>Lab 實驗:</u> (3.5 hrs) • Newtonian mechanics (Measuring gravitational acceleration; If time permits, also verifying Newton's second law.) 牛頓力學 (例如：量度地心引力加速、確認牛頓運動定律)
28 July 2026 (Tuesday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture 講課:</u> (3.5 hrs) • Constellations 星座、Seasons 季節、The Moon (phase, tides, eclipses) 月球 (月相、潮汐、掩蝕) <u>Lecture 講課:</u> (1.5 hrs) • Overview of the Solar System 太陽系概覽 • Planets 行星、Dwarf planets and asteroids 矮行星和小行星、Comets 彗星、Meteors 流星 <u>Assessment 評核:</u> MC, short questions, etc 選擇題、短題目..... <u>Observation 天文觀察:</u> (2 hrs) (note: this session would be moved to the 1st or 3rd day in case of bad weather 若天氣欠佳，此部份將改到第一天或第三天) • Basics related to observation 有關天文觀察的基本知識 • Physical principles behind telescope 望遠鏡的原理 • Outdoor solar observation (if weather permits) (如天氣許可) 室外太陽觀察 • Indoor simulated night sky observation 室內模擬星空觀察
30 July 2026 (Thursday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture 講課:</u> (3.5 hrs) • The Sun – the nearest star 太陽 – 最接近的恆星、Stars 恆星、Star light 星光 • Conclusion 總結、Brief introduction to other fields in Astronomy 其他天文學範疇概覽 <u>Assessment 評核:</u> MC, short questions, etc 選擇題、短題目..... <u>Lab 實驗:</u> (3.5 hrs) • Light (e.g. information in starlight, observing the spectra of elements.) 光 (例如：星光裏的訊息、觀察原素光譜) <u>Assessment 評核:</u> Lab report 實驗報告

Date	27, 28, 30 July 2026 (21 hours) (31 July 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)				
Time	9:30 am – 1:00 pm & 2:00 pm – 5:30 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	20 – 30				
Expected Applicants	Students who are promoting to or studying S4 – S6				
Tuition Fee	HKD 3,800.00				
Credit	1.5 Academy Unit(s) <i>Students can accumulate credits which will be regarded as "Other Learning Experience" when applying University.</i>				
Grading Methods	<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.5</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.5</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1095 Relativity and Particle Physics
相對論與粒子物理學

Introduction: This course is tailored for students who are curious about the fundamental workings of the universe. Embarking on a captivating exploration of special relativity, we will uncover the mind-bending concepts of time dilation and length contraction. We will then dive into the realm of particle physics, unravelling the mysteries of elementary particles and fundamental interactions. Students will be able to learn about the cutting-edge technologies used in particle accelerators and detectors in frontier scientific research, and gain some hands-on experience with apparatus. Come join us on this exhilarating journey as we unlock the secrets of the cosmos and inspire a lifelong passion for scientific discovery!

本課程特別為對宇宙基本運作感到好奇的學生度身打造。我們將踏上一段引人入勝的探索之旅，揭示狹義相對論中如時間膨脹和長度收縮等概念。我們更會深入粒子物理學的領域，解開基本粒子、基本相互作用的神秘面紗。此外，同學們將會學習到粒子加速器和探測器等用於前沿研究的尖端技術，並有機會親自動手操作儀器。讓我們一同展開這趟令人振奮的科學探索之旅程，解開宇宙的奧秘！

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Department of Physics, Faculty of Science, CUHK

Teachers:



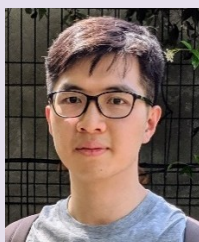
Dr. CHENG Hok Chuen Tom (鄭學全博士)

Lecturer

Department of Physics, CUHK

Room 217, 2/F, Science Centre North Block

Tel: 3943 3397, E-mail: hccheng@phy.cuhk.edu.hk



Dr. YIP Long Sang Kenny (葉朗生博士)

Lecturer

Department of Physics, CUHK

Room 222, 2/F, Science Centre North Block

Tel: 3 943 6278, E-mail: lskyip@phy.cuhk.edu.hk

Course Content:

20 July 2026 (Monday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Special Relativity (Dr. YIP Long Sang Kenny):</u> <u>Lecture:</u> Michelson-Morley experiment, postulates of special relativity and constancy of the speed of light in vacuum, time dilation, and length contraction.
22 July 2026 (Wednesday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Special Relativity (Dr. YIP Long Sang Kenny):</u> <u>Lecture:</u> - Lorentz transformation, twin paradox, cosmic muon lifetime, and assessment. <u>Laboratory Activities:</u> - Measurement of muon lifetime at the Department of Physics, CUHK. <u>Particle Physics (Dr. CHENG Hok Chuen Tom):</u> <u>Lecture:</u> - Historical overview and discoveries, and elementary particle dynamics.
24 July 2026 (Friday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Particle Physics (Dr. CHENG Hok Chuen Tom):</u> <u>Lecture:</u> - Particle decays and conservation laws, relativistic kinematics, selected contemporary topics, particle detectors (at lab visit), and assessment. <u>Laboratory Activities:</u> - Experiments with particle detection devices such as cloud chambers and modern particle detectors at the Department of Physics, CUHK.

Date	20, 22, 24 July 2026 (21 hours) (25 July 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)				
Time	9:30 am – 1:00 pm and 2:00 pm – 5:30 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	20 – 30				
Expected Applicants	Students who are promoting to or studying S4-S6 with good knowledge in mathematics and physics				
Tuition Fee	HKD 3,800.00				
Credit	1.5 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.5</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.5</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1105 Sidewalk Physicists' Lab
「明辨是非」物理實驗室

Introduction: The course aims to introduce essential concepts in physics through vivid demonstrations and hands-on STEM activities. Using the style of a famous popular science TV programme, the instructor will present students with stunning science magic and tricks, leading them to enjoy an exciting journey of discovering the principles of physics in mechanics, waves, sound, optics, radiations, solar energy, electromagnetism, gases, aerodynamics, and low-temperature material properties. Hands-on activities will be arranged for students to construct their own STEM toys (e.g., electromagnetic guns), and conduct experiments. The course is suitable for students enthusiastic about learning science, technology and natural phenomena through STEM but without a physics background.

本課程旨在透過生動的演示和實踐 STEM 活動來介紹物理學的基本概念。導師以著名科普電視節目的風格，為學生呈現令人驚嘆的科學魔術和技巧，帶領學生享受一段激動人心的旅程，以探索力學、波動、聲音、光學、輻射、電磁學、氣體、空氣動力學和低溫物料等物理原理。我們將安排學生動手製作自己的 STEM 玩具（例如電磁炮），並進行物理實驗。本課程適合熱衷於透過 STEM 學習科學、技術和自然現象、但沒有物理背景的學生。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Department of Physics, Faculty of Science, CUHK

Teachers:



Dr. TONG Shiu Sing (湯兆昇博士)

Senior Lecturer

Department of Physics, Faculty of Science, CUHK

Rm. 223, 2/F, Science Centre North Block, CUHK

Tel: 3943 6400, E-mail: sstong@phy.cuhk.edu.hk

Course Content:

6 August 2026 (Thursday) 9:30 am – 12:30 pm 2:00 pm – 5:30 pm	<u>Lecture and demos:</u> Colourful Lights: Introduce the basic properties of light, including colour (frequency and wavelength), reflection, retroreflection, refraction, lenses, optical illusions, mirages, visible spectrum, and other optical phenomena. Beyond the Rainbow: Visualizing the properties and applications of EM waves, and the energy of invisible radiations such as infrared and ultraviolet, colourful LEDs, ultraviolet lamps, diffraction grating, fluorescent materials, and thermographic camera. <u>Hands-on Activity:</u> 1. Making a paper microscope, observing microscopic objects like plant cells and LCD monitor, and measure the size of some small features by taking photos and using a software 2. Observe the spectra of different light sources using a portable spectrometer
7 August 2026 (Friday) 9:30 am – 12:30 pm 2:00 pm – 5:30 pm	<u>Lecture and demos:</u> Motion and the Visible Sound: Introduce the concepts and applications of motion, waves, sound, and resonance using plastic slinky, sound tubes, signal generators and vibrators, vibrating structures, Chladni plates, and videos of ultra-fast motions. The Hammer of Thor: Introduce stunning phenomena of electromagnetism and their applications, such as triboelectricity, testing conductivity, Van der Graaf generator, discharge tubes, lightning, Tesla coils, magnetic field visualizations, electromagnets, and EM induction. <u>Hands-on Activity:</u> Experiments on electromagnetism, including (1) Implosion of aluminium cans with EM force (2) Shooting a target with EM cannon, and (3) Scrolling "dumbbell" on double metal tracks <u>Visit:</u> Electron microscopes: Visit the central laboratory of the Physics Department and learn how electron microscopes enable us to see very small objects and explore the microscopic world
8 August 2026 (Saturday) 9:30 am – 12:30 pm 2:00 pm – 4:00 pm	<u>Lecture and demos:</u> Gone with the Wind: Introduce the concepts and applications of air pressure, experiments with the vacuum, Bernoulli's principle, the aerodynamics of flying machines and model aeroplanes, fluid pressure, buoyant force, and surface tension. Ultracool World: Introduce the properties of gases and materials under cooling, properties of liquid nitrogen, superconductor levitation and their applications. <u>Discussion and Assessment</u> Summary of essential ideas and findings, assessment

Date	6, 7, 8 August 2026 (18 hours) <i>(15 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 12:30 pm & 2:00 pm – 5:30 pm (6, 7 August 2026) 9:30 am – 12:30 pm & 2:00 pm – 4:00 pm (8 August 2026)				
Venue	The Chinese University of Hong Kong				
Enrollment	20 – 30				
Expected Applicants	Students who are studying S1 – S3				
Tuition Fee	HKD 3,600.00 (including materials for experiments)				
Credit	1.25 Academy Unit(s) <i>Students can accumulate credits which will be regarded as "Other Learning Experience" when applying University.</i>				
Grading Methods	Certificate	Assessment	Attendance	Credit(s)	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.25</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.25</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1145 Astronomical Observation
天文觀測

Introduction: Astronomy is a unique scientific discipline, as it cannot rely on traditional laboratory experiments. Instead, it advances through sophisticated observational methods—employing instrumentation like telescopes, meticulous observation strategies, and rigorous data analysis. Crucially, unlike laboratory work which can produce three-dimensional data, all astronomical measurements—such as density, velocity, and temperature—are projected onto a two-dimensional plane of sky. This fundamental limitation makes data interpretation exceptionally complex, necessitating a heavy reliance on numerical modeling.

Since 2021, The Chinese University of Hong Kong (CUHK) has been developing Hong Kong's first professional astronomical camera, named *Roger*. Upon completion, *Roger* will be deployed on telescopes at premier global sites, such as those in Hawaii or Greenland. This course offers a rare opportunity to visit the CUHK laboratory where *Roger* is being assembled—a first-of-its-kind experience in Hong Kong. Additionally, the course will survey essential observation strategies and introduce the principles of numerical modeling critical to modern astronomy.

天文學是一門獨特的科學領域，其研究無法在傳統的實驗室中進行。取而代之的是，它依賴於精密的觀測方法——運用如望遠鏡等先進儀器、精心設計的觀測策略，以及嚴謹的數據分析。至關重要的是，有別於能產生三維數據的實驗室研究，所有天文測量數據——例如密度、速度與溫度——都是沿著視線方向投影在二維平面上的。這項根本限制使得數據解讀變得異常複雜，必須高度依賴數值模擬技術。

自 2021 年起，香港中文大學一直致力於研發香港首台專業級天文相機，命名為「*Roger*」。完成後，*Roger* 將被部署於全球頂級的觀測站，例如夏威夷或格陵蘭的望遠鏡上。本課程提供了一個難得的機會，參觀正在組裝 *Roger* 的中大實驗室——這在香港是前所未有的體驗。此外，課程也將概述重要的天文觀測策略，並介紹對現代天文學至關重要的數值模擬原理。

Medium of Instruction: Mandarin supplemented with English
普通話輔以英語

Organising Unit: Department of Physics, Faculty of Science, CUHK

Teachers:



Professor LI Hua Bai (李華白教授)

Professor

Department of Physics, CUHK

Rm. 305, Science Centre North Block, CUHK

Tel: 3943 1118, E-mail: hbli@cuhk.edu.hk

Demonstrators: Students from Department of Physics, CUHK

Course Content:

3 August 2026 (Monday) 9:30 am – 12:30 pm	<u>Lecture:</u> (3 hrs): The Cosmic Landscape – An Introduction to Astronomy. • Solar System • Milky Way • Laniakea Supercluster • Cosmic Web • Cosmic Microwave Background Radiation (CMBR) <u>Assessment:</u> MC
4 August 2026 (Tuesday) 9:30 am – 12:30 pm	<u>Lecture:</u> (3 hrs): Decoding Light – The Cosmic Messenger • What is Light -- Electromagnetic waves • Blackbody Radiation -- Why is the Sun white? • Line Emission -- Why is the neon light red? • Doppler Effect -- Mercury's speed gun. • Distance Ladder -- Cosmic ruler <u>Assessment:</u> MC
5 August 2026 (Wednesday) 9:30 am – 12:30 pm	<u>Lecture:</u> (3 hrs): Windows to the Universe – Telescopes and Observational Techniques. • Types of Telescopes -- the final station of cosmic messengers • Types of Detectors -- thermometer-type and antenna-type • The Effects of the Atmosphere -- the ultimate foreground noise • Observation Strategies <u>Assessment:</u> MC
6 August 2026 (Thursday) 9:30 am – 12:30 pm	<u>Lecture:</u> (1.5 hrs): A Glimpse into the Backstage – CUHK Lab Tour • The Birth of Star -- a mystery CUHK Star-Formation group trying to solve • Tool 1 -- submillimeter camera, Roger — <i>Roger</i> • Tool 2 -- magnetohydrodynamic simulation code, Scorpio — <i>Scorpio</i> • Tool 3 -- gas dynamic experiment <u>Lab Visit:</u> (1.5 hrs): the lab of CUHK Star Formation Group (SFG)
7 August 2026 (Friday) 9:30 am – 12:30 pm	<u>Lecture:</u> (3 hrs): Bridging Observation and Theory – Data Interpretation and Modeling • Triumph of Physics -- interpretation of Hertzsprung-Russell (H-R) diagram • Dark Matter -- how to make cosmic web from CMBR • Hypothesize Leading Measurements -- how Juno peeks the interior of Jupiter • Numerical Simulations -- the ultimate probe of complex phenomena <u>Assessment:</u> MC
8 August 2026 (Saturday) 9:30 am – 12:30 pm	<u>Lecture:</u> (3 hrs): Capstone Workshop – Analysing Real Observational Data • Practice with the data of the gas dynamic experiment from the SFG lab. • Analyzing the gas dynamic data from giant molecular clouds.

Date	3-8 August 2026 (18 hours) <i>(10 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 12:30 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	20				
Expected Applicants	Students who are promoting to or studying S4 – S6				
Tuition Fee	HKD 3,600.00				
Credit	1.25 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1.5</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1.5</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

SAYT1006 Risk Management and Actuarial Science
風險管理與精算學

Introduction: The uncertainty in an event or an activity is known as risk. Risks are encountered in trivial events such as travelling and in professional activities such as business partnership. We take risk every day. This course provides a broad perspective on both current practices and mathematical theories of risk management. Topics include qualitative and quantitative classifications of risks, mathematical modelling of financial markets and derivatives, current financial issues and crises, and statistical analysis of financial data, mathematics of insurance and Actuarial Science. This course is designed for the students who are interested in the scientific and mathematical aspects of risk management, financial market and actuarial science.

任何事件或活動的不確定性皆可視為風險。我們於日常中會遭遇到各項大大小小的風險。小如平日生活之衣食住行、大如商業之投機活動，風險總是伴隨左右。本課程為風險管理的實際應用和數學理論提供廣泛概要。本課程涵蓋範圍包括：風險的質化與量化分類，金融市場與衍生產品的數學建模，現今金融的課題與危機，金融數據的統計分析，保險數學與精算。本課程為有興趣於風險管理，金融市場或精算學之數理概念的同學而設。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Department of Statistics and Data Science, Faculty of Science, CUHK

Teachers:



Dr. LEUNG Sze Him, Isaac (梁思謙博士)

Lecturer

Department of Statistics and Data Science, CUHK

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E-mail: shleung@cuhk.edu.hk

Course Content:

16 July 2026 (Thursday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture 1: Overview of Risk Management</u> • Risk and management • Qualitative and quantitative aspects of risks • Random variables • Probability distributions <u>Computer-lab Session 1: Introduction to R language and data acquisition</u>
21 July 2026 (Tuesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture 2: Measures of risk</u> • Distribution function and quantile • Value at risk (VaR) • Conditional value at risk (cVaR) <u>Computer-lab Session 2: Computing various risk measures</u>
23 July 2026 (Thursday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture 3: Modelling of Market and Financial Products – Part I</u> • Stock prices and limit order market • Futures and options as financial derivatives for hedging and leverage • One-step binomial tree • No-arbitrage principle and risk-neutral probability <u>Computer-lab Session 3: Simulation techniques for pricing derivatives</u>
28 July 2026 (Tuesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture 4: Modelling of Market and Financial Products – Part II</u> • Vector and matrix operations • Portfolio allocation • Markowitz portfolio theory <u>Computer-lab Session 4: Hedge fund manager case Study</u>
30 July 2026 (Thursday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<u>Lecture 5: Actuarial Science</u> • Life contingency table • Survival modelling and actuarial theories • Pricing insurance products <u>Computer-lab Session 5: Evaluation of insurance contracts</u>

Date	16, 21, 23, 28, 30 July 2026 (30 hours) <i>(4 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 12:30 pm & 2:00 pm – 5:00 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	30 – 40				
Expected Applicants	Students who are promoting to or studying S4 – S6 with good knowledge in mathematics, knowledge in economic is preferable but not necessarily				
Tuition Fee	HKD 4,200.00 (Students who have attended all sessions will be granted a HKD 500 scholarship)				
Credit	1 University Unit(s) <i>Students who complete the course and meet its requirement can opt for credit exemption when studying at CUHK. This credit can only be used to apply exemption from the 1 credit course RMSC1101 Elementary Concepts in Risk Management</i>				
Grading Methods		<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>
	A to A-	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1</i>
	B+ to D	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	F	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1026 Statistical Modeling and Big Data Analytics
統計模型及大數據分析

Introduction: Data from various fields, such as climatology, finance and sports, exhibit different properties. This course aims to use the R-package (a statistical software) to visualize the properties of the data, fit the data into various statistical models, evaluate model performance and perform model predictions. Topics include exploratory data analysis, time series models, hidden Markov models, Poisson process and analysis of big data problems. Students will gain hands-on experience in statistical programming at the computer lab.

各種領域的數據（如氣候學，金融及運動）會展示不同的特質。本課程目標是透過統計軟件 R 去透視數據多方面的特性，從而用適當的統計模型去解釋，評估模型的表現及作出數據預測。本課程涵蓋範圍包括：探索性數據分析，時間序列模型，隱馬爾可夫模型，泊松過程和大數據問題的分析。學生將親身體驗統計程式的編寫。

Medium of Instruction: Cantonese supplemented with English
粵語輔以英語

Organising Unit: Department of Statistics and Data Science, Faculty of Science, CUHK

Teachers:



Dr. LIU, Kin Yat (廖健壹博士)

Lecturer

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Room 116, Lady Shaw Building, CUHK

E-mail: kinyatliu@cuhk.edu.hk

Course Content:

24 August 2026 (Monday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture 1:</u> - Basics in Statistical Modeling: Random Variables, Probability Distributions - Sports Data: Properties, Poisson Process, Implied Probability and Odds - Exploratory Data Analysis (EDA): Scatter plot, Box plot, Histogram, Quartile-quartile Plot, Correlation and Autocorrelation <u>Computer Lab Activities 1:</u> - R/Python programming: The Basics, Sports Data Modeling, EDA <u>Assessment:</u> - Data Modeling in R/Python
25 August 2026 (Tuesday) 9:30 am – 1:00 pm 2:00 pm – 5:30 pm	<u>Lecture 2:</u> - Climate Data: Properties, Seasonal ARIMA Model, Model Prediction - Financial Data: Properties, Hidden Markov Model, GARCH Model - Monte Carlo Simulation - Big Data Problems and Analysis <u>Computer Lab Activities 2:</u> - R/Python programming: Estimation of Time Series Models <u>Case Discussion and Assessment:</u> - Data Modeling in R/Python

Date	24, 25 August 2026 (14 hours) <i>(26 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 1:00 pm & 2:00 pm – 5:30 pm				
Venue	The Chinese University of Hong Kong				
Enrollment	20 – 30				
Expected Applicants	Students who are promoting to or studying S4 – S6				
Tuition Fee	HKD 3,200.00				
Credit	1 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

CUSA1056 Space-Time Data Science
時空數據科學

Introduction: Space-time data science addresses some of the biggest challenges facing our communities, from tracking air quality to predicting disease outbreaks and optimizing traffic flow in city planning. This course opens the door to exciting possibilities by teaching students how to understand the intricate relationships for data in spatial and temporal dimensions.

By studying the dynamics of space-time data, students will explore real-world applications that directly impact their lives and the environment around them. This hands-on course provides a unique opportunity to develop critical thinking and analytical skills while engaging with relevant, practical problems in fields like public health, urban planning, and even sports analytics.

The course incorporates hands-on projects and practical exercises. Students will have the opportunity to apply their knowledge to real-world problems, working with data science libraries and tools. By engaging in these practical activities, students will develop valuable skills in data analysis, model development, and evaluation

時空數據科學致力於解決我們社會所面臨的重大挑戰，從追蹤空氣品質、預測疾病爆發，到優化城市規劃中的交通流量。本課程將引導學生深入理解數據在空間與時間維度上的複雜關聯，為解決現實難題開啟全新視角。

通過學習時空數據的動態特性，學生將有機會探索與自身生活和周遭環境息息相關的實際應用。這門實用課程提供了一個獨特的契機，讓學生在參與公共衛生、城市規劃甚至體育分析等領域的問題時，培養批判性思維與分析能力。

課程內容將涵蓋實作專題與練習，學生將有機會運用所學知識解決實際問題，並熟悉常用的數據科學工具。透過這些實踐活動，學生將能掌握數據分析、模型開發與評估等方面的實用技能。

Medium of Instruction: English
英語

Organising Unit: Department of Statistics and Data Science, Faculty of Science, CUHK

Teachers:



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Course Content:

17 August 2026 (Monday) 9:30 am – 1:00 pm	<u>Module 1:</u> • Characteristics of Spatial and Temporal Data • Data Cleaning and Preparation: Preprocessing Essentials • Basic Visualization of Space-Time Datasets
18 August 2026 (Tuesday) 9:30 am – 1:00 pm	<u>Module 2:</u> • The Art of Exploratory Data Analysis (EDA) for Spatiotemporal Data • Visualizing Multidimensional Data: Beyond Basic Maps • Discovering Patterns: Clusters, Trends and Outliers
19 August 2026 (Wednesday) 9:30 am – 1:00 pm 2:00 pm – 4:00 pm	<u>Module 3:</u> • Modelling Relationships: Introduction to Spatial Regression • Analysing Event Locations: Point Pattern Analysis • Kriging: Predicting Values Across Space • Working with data science libraries • Hands-on Projects: Implementing data science algorithms for real-world spatial data (e.g. sports analytics problems, crime hot spot analysis)
20 August 2026 (Thursday) 9:30 am – 1:00 pm 2:00 pm – 4:00 pm	<u>Module 4:</u> • Introduction to Time Series: Autoregressive models and others • Extension to spatiotemporal models • Forecasting: Prediction in Space-time dimension • Working with data science libraires • Hands-on Projects: Implementing data science algorithms for real-world spatial-temporal data (e.g. disease mapping, daily precipitation forecasting)

Date	17-20 August 2026 (18 hours) <i>(21 August 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 1:00 pm (17 & 18 August 2026) 9:30 am – 1:00 pm & 2:00 pm – 4:00 pm (19-20 August 2026)				
Venue	The Chinese University of Hong Kong				
Enrollment	20 – 30				
Expected Applicants	Students studying S4-S5 with good knowledge in mathematics				
Tuition Fee	HKD 3,600.00				
Credit	1.25 Academy Unit(s) <i>Students can accumulate credits which will be regarded as “Other Learning Experience” when applying University.</i>				
Grading Methods	Certificate	Assessment	Attendance	Credit(s)	
	Distinction	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>1</i>
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>1</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

The Chinese University of Hong Kong
Faculty of Engineering and Faculty of Science
Science Academy for Young Talent

Summer Courses 2026
Course Outline

STEM1070 Introduction to Artificial Intelligence
人工智能導論

Introduction: Artificial Intelligence is revolutionizing various industries, from healthcare and finance to transportation and entertainment. This course aims to provide you with a solid foundation in both the mathematical concepts necessary for AI and the practical skills required for machine learning.

We will cover essential mathematical topics such as linear algebra, calculus, and probability theory, exploring how they relate to AI and its algorithms. Once we have established a mathematical and statistical foundations, we will delve into the exciting world of machine learning. You will learn about different types of machine learning algorithms, including supervised and unsupervised learning, and understand how these algorithms can be used to make predictions, recognize patterns, and make intelligent decisions. This course will incorporate hands-on projects and practical exercises. You will have the opportunity to apply your knowledge to real-world problems, working with popular machine learning libraries and tools. By engaging in these practical activities, you will develop valuable skills in data analysis, model development, and evaluation.

人工智能正在革新各個行業，從醫療保健和金融到交通運輸和娛樂。本課程旨在提供人工智能所需的數學概念和機器學習所需的實踐技能的基礎。

本課程涵蓋線性代數、微積分和概率論等基本數學主題，探索它們與人工智能及其算法的關係。在建立了數學和統計基礎之後，我們將深入探索人工智能世界。學習不同類型的機器學習算法，包括監督學習和無監督學習，並了解這些算法如何用於預測、識別模式和做出智能決策。本課程將結合實踐項目和實際練習。應用所學知識於現實世界的問題，並使用流行的機器學習庫和工具進行工作。通過參與這些實踐活動，發展出有價值的數據分析、模型開發和評估技能。

Medium of Instruction: English supplemented with Cantonese
英語輔以粵語

Organising Unit: Department of Statistics, Faculty of Science, CUHK
Department of Mechanical and Automation Engineering, Faculty of Engineering, CUHK

Teachers:



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Course Content:

	AM session 9:30 am – 12:30 pm	PM session 1:30 pm – 4:30 pm
22 July 2026 (Wednesday)	<u>Fundamentals of AI (Dr. Han)</u> 1. What is AI 2. Basic principles of AI 3. Modern AI technologies 4. Data in AI 5. Basics of machine learning	<u>Fundamentals of linear algebra for AI: (Dr. Liu)</u> 1. Scalars, vectors, and matrices 2. Vector operations (addition, subtraction, scalar multiplication) 3. Matrix operations (addition, subtraction, multiplication) 4. Matrix transformations 5. Solving systems of linear equations
23 July 2026 (Thursday)	<u>Lab E1: Face recognition (Dr. Han)</u> 1. Familiarize the procedures of face recognition with Machine Learning 2. Investigate a demo code of Face recognition Complete hands-on tasks by studying an open-source project of face recognition	<u>Lab S1: Linear algebra (Dr. Liu)</u> 1. Basic data types and operations 2. Variables, loops, and conditionals 3. Input/output and basic functions 4. Introduction to software libraries for linear algebra
24 July 2026 (Friday)	<u>Lab E2: Neural Machine Translation (NMT) (Dr. Han)</u> 1. Study the procedures to build a NMT model in a toy example 2. Introduce a pre-trained model and learn the procedure of fine-tuning with custom datasets Understand the factors affecting the model performance	<u>Calculus and Probability in AI: (Dr. Liu)</u> 1. Differentiation and its role in optimization 2. Partial derivatives and gradients 3. Chain rule 4. Common discrete and continuous random variables 5. Probability mass function (PMF) and probability density function (PDF) 6. Expected value and variance
27 July 2026 (Monday)	<u>Lab E3: Movie review classification (Dr. Han)</u> 1. Familiarize the pre-process of the IMDb dataset 2. Test a long short-term memory (LSTM) model, which is a typical artificial recurrent neural network (RNN) architecture, to categorize the IMDb dataset 3. Test a mixed model [convolutional neural network (CNN) + LSTM] of this task Compare the output of these two models and tune for a better performance	<u>Lab S2: Calculus, Probability and Visualization (Dr. Liu)</u> 1. Implementing differentiation in Python 2. Solving basic optimization problems using calculus 3. Visualizing functions 4. Generating random samples from distributions 5. Visualizing and analyzing data using probability distributions
28 July 2026 (Tuesday)	<u>Lab E4: Voice cloning (Dr. Han)</u> 1. Understand the background and motivation of Text-to-Speech 2. Understand the basic procedure of Text-to-Speech 3. Be aware of different models for Text-to-Speech Try to clone your own voice by using given open-source voice cloning interface	<u>Linear regression: (Dr. Liu)</u> 1. Simple linear regression 2. Multiple linear regression 3. Model evaluation (R-squared, adjusted R-squared) 4. Assumptions and diagnostics
29 July 2026 (Wednesday)	<u>Lab E5: Students' learning level prediction (Dr. Han)</u> 1. Four learner level prediction methods will be explained (K-nearest neighbor, Support vector machine, Naïve Bayes and Back propagation neural network). 2. Implement the above machine learning methods in a real case study 3. Gain hands-on experience in tuning the parameters and training the AI models. Select the best method by searching for the optimal parameters	<u>Lab S3: Linear Regression (Dr. Liu)</u> 1. Implementing linear regression 2. Model evaluation using different metrics 3. Visualization techniques for regression
30 July 2026 (Thursday)	Evaluation through project presentation and project report (Dr. Han)	Evaluation through project presentation and project report (Dr. Liu)

Date	22 – 24, 27 – 30 July, 2026 (42 hours) <i>(31 July 2026 is reserved for class make-up in case there is any cancellation of classes due to bad weather or other unexpected factors.)</i>				
Time	9:30 am – 12:30 pm & 1:30 pm – 4:30 pm				
Teaching Mode	Face to Face (The Chinese University of Hong Kong)				
Enrolment	25 – 30				
Expected Applicants	Students studying S4-S6 or equivalents				
Tuition Fee	HKD 3,500.00 (Students who attend all sessions will be granted a HKD 500 scholarship)				
Credit	2 University Unit(s) <i>Students who complete the course and meet its requirement can opt for credit exemption when studying at CUHK.</i>				
Grading Methods		<i>Certificate</i>	<i>Assessment</i>	<i>Attendance</i>	<i>Credit(s)</i>
	A to A-	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>>75%</i>	<i>2</i>
	B+ to D	<i>Certificate of Merit</i>	<i>Pass</i>	<i>>75%</i>	<i>2</i>
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>>75%</i>	<i>0</i>
	F	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>