

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

Summer Courses 2024  
Course Outline

*STEM1060 Sustainable Energy Toward Carbon Neutrality*  
*邁向碳中和的可持續能源*

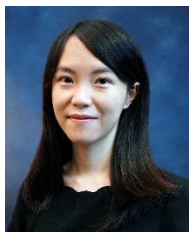
**Introduction:** The global climate change is a major challenge confronting our generation. It is crucial to identify sustainable energy solutions that effectively reduce carbon emissions and pave the way for an affordable, reliable, and low-carbon future. This course is designed to give students an overview of the following topics: carbon capture and utilisation, energy storage, renewable energy, smart power grids, integrated energy systems, carbon accounting and management. This course also consists of laboratory sections for students to acquire hands-on experience. After taking this course, students are expected to gain a comprehensive understanding of these topics, enabling them to better contribute to building a sustainable energy future.

全球氣候變化已成為我們時代所面臨的緊迫挑戰。尋求可持續的能源路徑，以顯著減少溫室氣體排放，對於實現一個經濟高效、穩定可靠且低碳的未來至關重要。本課程的目的是向學生們傳授一系列關鍵知識，包括但不限於：碳捕獲與利用、能源儲存技術、可再生能源、智能電網技術、綜合能源系統和碳排放的核算與管理。本課程亦包括實驗室課節，讓學生獲得相關的實踐經驗。通過本課程，學生們將能夠全面掌握這些關鍵知識，進而更好地為構建一個可持續的能源未來貢獻自己的力量。

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

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

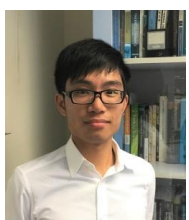
**Teachers:**



**Professor CHEN Yue (陳玥教授)**  
Vice-Chancellor Assistant Professor  
Department of Mechanical and Automation Engineering, CUHK  
Rm. 318, William M.W. Mong Engineering Building  
Tel: 3943 0501, Email: [yuechen@mae.cuhk.edu.hk](mailto:yuechen@mae.cuhk.edu.hk)



**Dr. HAN Dongkun (韓東昆博士)**  
Lecturer  
Department of Mechanical and Automation Engineering, CUHK  
Rm. 101, 1/F, Academic Building No.1  
Tel: 3943 3537, Email: [dkhan@mae.cuhk.edu.hk](mailto:dkhan@mae.cuhk.edu.hk)



**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](mailto:donaldchan@cuhk.edu.hk)

**Course Content:**

5 August 2024 (Monday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<b><u>Chemistry Lecture 1 (Dr. Donald Chan):</u></b> Environmental challenges: energy and pollution 環境挑戰：能源和污染 <b><u>Chemistry Lecture 2 (Dr. Donald Chan):</u></b> Carbon capture and utilisation 碳捕獲與利用
6 August 2024 (Tuesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<b><u>Chemistry Lecture 3 (Dr. Donald Chan):</u></b> Chemical energy storage 化學能的儲存 <b><u>Chemistry Laboratory 1 (Dr. Donald Chan):</u></b> Chemical analysis of battery materials using advanced instruments 電池物料的化學分析
7 August 2024 (Wednesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<b><u>Chemistry Lecture 4 (Dr. Donald Chan):</u></b> Green chemistry and advanced technologies for renewable energy 綠色化學和可再生能源的先進技術 <b><u>Chemistry Laboratory 2 (Dr. Donald Chan):</u></b> Electrochemical synthesis and analysis of fuels 燃料的電化學合成與分析
8 August 2024 (Thursday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<b><u>Engineering Lecture 1 (Prof. Yue Chen):</u></b> Introduction to smart grids 智能電網介紹 <b><u>Engineering Laboratory 1 (Dr. Dongkun Han):</u></b> Solar cell made by blueberry, and wind turbine testing 藍莓製造的太陽能電池和風力渦輪測試
9 August 2024 (Friday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<b><u>Engineering Lecture 2 (Prof. Yue Chen):</u></b> Integrated energy systems 綜合能源系統 <b><u>Engineering Laboratory 2 (Dr. Dongkun Han):</u></b> Making a wind propeller with 3D print and laser cut 使用 3D 列印和鐳射切割製作風力渦輪葉片
12 August 2024 (Monday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<b><u>Engineering Lecture 3 (Prof. Yue Chen):</u></b> Carbon accounting and management 碳排放核算與管理 <b><u>Engineering Laboratory 3 (Dr. Dongkun Han):</u></b> Solar powered car design 太陽能動力汽車設計
13 August 2024 (Tuesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	<b>Assessment 1: Chemistry</b> <b>Assessment 2: Engineering Project Presentation and demonstration (Solar Powered Car Racing)</b> 項目匯報與展示(太陽能車比賽)
14 August 2024* (Wednesday) 9:30 am – 12:30 pm 2:00 pm – 5:00 pm	Make-up Class

<b>Date</b>	5 – 9, 12 – 13, 14* August 2024 (42 hours)				
<b>Time</b>	9:30 am – 12:30 pm and 2:00 pm – 5:00 pm				
<b>Teaching Mode<sup>#</sup></b>	Face-to-Face (The Chinese University of Hong Kong)				
<b>Enrollment</b>	25 – 30				
<b>Expected Applicants</b>	Students studying S4-S6 or equivalents with Chemistry background				
<b>Tuition Fee</b>	HKD 3,500.00				
<b>Credit</b>	2 University Unit(s) <i>Students who complete the course and meet its requirement can opt for credit exemption when studying at CUHK.</i>				
<b>Grading Methods</b>	<b>Certificate</b>	<b>Assessment</b>	<b>Attendance</b>	<b>Credit(s)</b>	
	<b>A to A-</b>	<i>Certificate of Distinction</i>	<i>Excellent</i>	<i>&gt;75%</i>	<i>2</i>
	<b>B+ to D</b>	<i>Certificate of Merit</i>	<i>Pass</i>	<i>&gt;75%</i>	<i>2</i>
	<b>Attended</b>	<i>Certificate of Attendance</i>	<i>Fail</i>	<i>&gt;75%</i>	<i>0</i>
	<b>F</b>	<i>N/A</i>	<i>Fail</i>	<i>N/A</i>	<i>0</i>

\* This date is reserved for make-up classes in case there is any cancellation of classes due to unexpected circumstances.