

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

Summer Courses 2024
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., telescope and model aeroplanes), and to test their performance. 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（例如望遠鏡和模型飛機），並測試這些玩具的表現。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:



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Course Content:

<p>8 August 2024 (Thursday)</p> <p>10:00 am – 1:00 pm 2:00 pm – 5:00 pm</p>	<p><u>Lecture and demos:</u></p> <p>Motion and the Visible Sound: Introduce the concepts and applications of motion, waves, sound, and resonance using plastic slinky, sound tubes, a signal generator and vibrators, vibrating structures, Chladni plates, and videos of ultra-fast motions.</p> <p>Gone with the Wind: Introduce the concepts and applications of air pressure, Bernoulli’s principle, and the aerodynamics of flying using fluid dynamic toys, demonstrations, and model aeroplanes.</p> <p><u>Hands-on Activity:</u></p> <p>Make a model aeroplane and verify the principles of aerodynamics you have learned</p>
<p>9 August 2024 (Friday)</p> <p>10:00 am – 1:00 pm 2:00 pm – 5:00 pm</p>	<p><u>Lecture and demos:</u></p> <p>The Hammer of Thor: Introduce stunning phenomena of electromagnetism and their applications, such as triboelectricity, Van der Graaf generator, EM induction, discharge tubes, lightning and Tesla coils.</p> <p>Colourful Lights: Introduce the basic properties of light, including colour (frequency and wavelength), reflection, retroreflection, refraction, lenses and simple optical instruments.</p> <p><u>Hands-on Activity:</u></p> <p>Make a model telescope and test it</p> <p><u>Visit:</u></p> <p>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</p>
<p>10 August 2024 (Saturday)</p> <p>10:00 am – 1:00 pm 2:00 pm – 5:00 pm</p>	<p><u>Lecture and demos:</u></p> <p>Beyond the Rainbow: Visualizing the properties and applications of EM waves, visible spectrum, optical phenomena, and the energy of invisible radiations such as infrared and ultraviolet, using colourful LEDs, ultraviolet lamps, diffraction grating, fluorescent materials, and a thermographic camera.</p> <p>Ultracool World: Introduce the properties of gases and materials under cooling, properties of liquid nitrogen, magnetic levitation and their applications.</p> <p><u>Hands-on Activity:</u></p> <p>Observe the spectra of different light sources using a portable spectrometer</p> <p><u>Discussion and Assessment</u></p> <p>Summary of essential ideas and findings, assessment</p>
<p>16* August 2024 (Friday)</p> <p>10:00 am – 1:00 pm 2:00 pm – 5:00 pm</p>	<p>Makeup Class</p>

Date	8, 9, 10, 16* August 2024 (18 hours)			
Time	10:00 am – 1:00 pm & 2:00 pm – 5:00 pm			
Teaching Mode	Face to Face (The Chinese University of Hong Kong)			
Enrollment	20 – 30			
Expected Applicants	Students who are studying S1 – S3			
Tuition Fee	HKD 3,560.00 (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>	>75% 1.25
	Pass	<i>Certificate of Merit</i>	<i>Pass</i>	>75% 1.25
	Attended	<i>Certificate of Attendance</i>	<i>Fail</i>	>75% 0
	Fail	<i>N/A</i>	<i>Fail</i>	<i>N/A</i> 0

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