

Bright Future Engineering Talent Hub

STEM Carnival Workshop 2023

Department	Code	Workshop	Description
Systems Engineering 系統工程學系	ADSE-W1A ADSE-W1B	Industry 4.0 工業 4.0	Half-day event with a focus on 'Industry 4.0', includes visits to labs and demonstrations of the Department of Systems Engineering. Emphasis will be on the use of sensors, internet of things (IoT), data analytics, and intelligent manufacturing. Students will have an opportunity to work and develop their own smart city and smart manufacturing prototypes  以“工業 4.0”為重點的半天活動包括參觀系統工程學系的實驗室和演示重點將放在傳感器、物聯網 (IoT)、數據分析和智能製造的使用上。學生將有機會製作自己的智慧城市和智能製造模型。
	ADSE-W2	3D Computer Simulation 三維電腦模擬	The world trend is to let professional companies develop time-consuming 3D simulation components. The users can create their innovative ideas and improve their designs based on the simulation results.  This workshop demonstrates how to apply professional 3D simulation software to do meaningful jobs, such as designing a robotic production line and an automatic warehouse.  世界趨勢讓專業公司開發耗時的 3D 仿真組件。用戶可以根據仿真結果，創造創新想法並改進設計。  本工作坊將演示如何應用專業的三維仿真軟件，完成有意義的工作，例如設計機械人生產線和自動化倉庫。
Architecture and Civil Engineering 建築學及土木工程學系	ACE-W1	Robotics Workshop 機械人工作坊	Build a simple robot to climb various objects under the student's control through his/her smart phone.  學生將建造可讓起重機在不同的地形條件下移動的機械人的工作坊。
	ACE-W2A ACE-W2B	Implementing Virtual Design and Construction by Using Building Information Modelling Technology 虛擬建築的創新科技	Building Information Modelling (BIM) is an emerging technology in construction and engineering. This technology can be applied to improve design efficiency, promote coordination and collaboration among project participants, and enhance buildability in construction.  In this workshop, BIM adoption in virtual design and construction will be demonstrated by using Virtual Reality (VR) and the mobile app.  建築信息模擬 (BIM) 是建築和工程領域的新興技術。該技術可用於提高設計效率，促進項目參與者之間的協調與協作，以及增強可建造性。  本工作坊將通過使用虛擬實境 (VR) 和流動應用程式來示範 BIM 技術如何實施虛擬建築設計和建造。
Biomedical Engineering 生物醫學工程學系	BME-W1	Biomedical Properties of Human Hair and Bone 從生物醫學角度看人體頭髮及骨頭的機械特性	Learning the basic mechanical properties of biomaterials (like hair and bones) and their importance.  學習生物材料（如頭髮和骨骼）的基本機械特性及其重要性。
	BME-W2	Know the Basics of Micro-Fabrication 認識微製造的基礎方法及在生物醫學上的重要性	Appreciation of simple micro-fabrication processes through the learning of basic etching, bonding and UV curing processes commonly applied in biomedical applications.  通過學習生物醫學應用中常用的基本蝕刻、粘合和紫外線固化工藝，了解簡單的微製造工藝。
	BME-W3	Differentiate and Sorting Biomedical Particles Using AC Current 學習控制電流從而分辨不同的生物醫學粒子及細胞	Appreciate and learn how to manipulate Micro particles using some dielectrophoresis (DEP) methods, which in effect can help to detect and differentiate good /bad human cells.  通過介電泳(dielectrophoresis)方法控制微粒子去檢測和分辨人體正常細胞與腫瘤細胞。

	BME-W4	<p>A DIY Hand-Powered Centrifuge Using Paper</p> <p>手動紙製離心機</p>	<p>The high-speed centrifuge is one of the most commonly used laboratory equipment in many biomedical applications including disease diagnosis.</p> <p>The centrifuge spins biological samples at a very high speed to separate blood components and makes pathogens easier to detect.</p> <p>This workshop demonstrates how to make a DIY hand-powered centrifuge, called Paperfuge, using simple materials such as paper, string and plastic. It can achieve a spinning speed up to 125,000 rpm. The Paperfuge is a useful tool for disease detection, such as Malaria and HIV, in rural areas where the power supply is limited.</p> <p>高速離心機是生物醫學應用中其中一種最常用的實驗室設備，例如用於疾病診斷。</p> <p>離心機利用非常高速度的旋轉生物樣品，分離血液成分，使病原體更易於檢測。</p> <p>在本工作坊，我們會示範如何利用簡單材料，DIY 一個手動離心機，稱為 Paperfuge。Paperfuge 可以靠一雙手實現高達 125,000 rpm 的旋轉速度。在電力供應有限的落後地區，對於檢測瘧疾、HIV 等疾病，是一件非常有用的工具。</p>
<p>Computer Science</p> <p>電腦科學系</p>	CS-W1A CS-W1B	<p>DIVE into Deep Learning</p> <p>趣味探索深度學習</p>	<p>In this workshop, registered participants will learn to train a deep learning model in a virtual environment that is Diversified, Interactive, Versatile, and Engaging.</p> <p>在本工作坊，參加者將在多元、互動、多功能及有趣的虛擬環境中，學習建構深度學習模型。</p>
<p>Electrical Engineering</p> <p>電機工程學系</p>	EE-W1	<p>Harness the Wind (Simple Wind Power Generator)</p> <p>簡單的風力發電機</p>	<p>With interest in renewable energies, a simple wind electricity generator project would be ideal, and the end product is useful. This is especially so, if it can be used to charge a battery or has a USB output. Wind energy is not without its own problems such as unsightly towers, costs and maintenance as well as dependency on the availability of wind and its direction. In this workshop, students will learn how to build a simple wind power generator. High school students will join this workshop together with University students to perform the tasks assigned in the workshop.</p> <p>由於對可再生能源的興趣，一個簡單的風力發電機項目將是理想的，並且最終產品很有用。如果它可用於為電池充電或具有 USB 輸出。風能並非沒有其自身的問題，例如笨重的塔、成本和維護以及對風的可用性及其方向的依賴。在這個工作坊中，學生將學習如何搭建一個簡單的風力發電機。在這個工作坊中，高中生將與大學生一起參加這個工作坊，完成工作坊分配的任務。</p>
<p>Mechanical Engineering</p> <p>機械工程學系</p>	MNE-W1	<p>3D Printing Workshop (Low Carbon Energy Lifestyle)</p> <p>3D 打印工作坊 (低碳能源生活)</p>	<p>Among the innovative technologies being developed, 3D-aided design (CAD) has become more widely used. This technology has been applied in the low-carbon energy industry.</p> <p>Students will learn about knowledge on 3D printing in this workshop. We hope to enhance students' interest in advanced technology and inspire them to contribute to building a more sustainable society.</p> <p>在眾多創新科技中，3D 電腦輔助設計 (CAD) 是科技產業中逐漸普及的技術，從概念設計、模擬實物至實體化都被廣泛應用。能源行業亦有應用此技術，研發更具效能的低碳發電方法。</p> <p>透過工作坊，我們希望為學生開啟探索科技的眼界，讓他們了解低碳能源及 3D 打印的新知識，長遠而言，啟發他們對不同專業領域的興趣，並為可持續未來作出貢獻。</p>
	MNE-W2	<p>Visit to CLP Power Low Carbon Energy Education Centre</p> <p>中華電力低碳能源教育中心參觀</p>	<p>Countries worldwide are facing challenges posed by climate change. Although the perfect fuel is yet to be found, we are constantly exploring better options. Low carbon energy sources are being developed, and each has its own advantages and limitations.</p> <p>We offer visitors an inspiring and enlightening experience as they learn about the importance of low carbon energy to address the environmental challenges we face.</p> <p>全球各地正面對氣候變化帶來的挑戰，儘管完美的燃料尚未出現，但我們一直在尋找更好的燃料。不同種類的低碳能源也應運而生，但各有其優點和限制。</p> <p>我們為參觀人士提供具啟發性及教育意義的學習體驗，讓參觀人士深入了解如何運用低碳能源來應對氣候變化所帶來的挑戰。</p>
	MNE-W3	<p>LEGO Programming Workshop</p>	<p>Wind and solar energy are two of the widely-used renewable power sources in Hong Kong.</p>

		LEGO 機械人編程工作坊	<p>We organize STEM LEGO building and programming activities to introduce low carbon energy sources and let participants understand the relationship between energy and climate change, and enhance their interest in science.</p> <p>風能和太陽能是香港最常用的兩種可再生能源。</p> <p>我們透過含有 STEM 元素的 LEGO 組裝及編程活動，讓參加者認識各種低碳能源，了解能源與氣候變化的關係，並培養他們對科學的興趣。</p>
	MNE-W4	Sumo Robot 相撲機械人	<p>In this workshop, the students will build and program a Sumo robot to push another Sumo robot which decorated as fossil fuels out of the activity zone. They can learn the importance of replacing high carbon-emission fossil fuels by low carbon energy sources. They can also enhance their interests in science, creativity and ability in programming.</p> <p>在本工作坊，學生可以參與組裝及編程相撲機械人，指示機械人將設計成化石燃料的相撲機械人推離活動範圍。過程中，他們可以學習以低碳能源取代化石燃料的重要性。同時，培養他們對科學的興趣，發展創意和增強編程的能力。</p>
Materials Science and Engineering 材料科學及工程學系	MSE-W1A MSE-W1B	3D Printing Workshop (3D Polymeric Models)  3D 打印工作坊 (聚合物模型)	<p>Students will be guided to print simple 3D polymeric models using different essential parameters.</p> <p>講師將指導學生使用計算機程序使用不同的基本參數打印簡單的 3D 聚合物模型。</p>
	MSE-W2	Rechargeable Battery DIY Workshop  充電電池 DIY 工作坊	<p>Instructors will guide students to make simple Zn-MnO<sub>2</sub> rechargeable batteries.</p> <p>導師將指導學生製作簡單的 Zn-MnO<sub>2</sub> 充電電池。</p>