THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

85th

FACULTY OF ENGINEERING
工程學院
WHERE CONCEPTS BECOME REALITY

Two days University Experience Programme (TUE2022)

"From Physics and ICT to Engineering"

[Online via Zoom]

16 – 17 August 2022

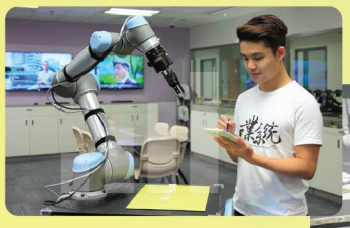
Time: 2:15 p.m. - 5:30 p.m. (Day 1)
2:15 p.m. - 6:00 p.m. (Day 2)

Target Participants: Secondary 5 or 4 students [taking Science, ICT or M1 / M2 subject(s)]

A valuable opportunity to attend University online lectures.

A chance to discuss your study and career aspirations with University academics and student ambassadors.

Participants will get:



A certificate of attendance upon satisfactory completion of 7 online lectures and with passing mark at the online quizzes.

A chance to join a campus and laboratory tour.

Remarks:
The University reserves the right for the final confirmation of the programme.

7 fields of Engineering:

- Aeronautical and Aviation Engineering
- Computing
- Electronic and Information Engineering
- Mechanical Engineering
- Biomedical Engineering
- Electrical Engineering
- Industrial and Systems Engineering

Medium of instruction:
Cantonese
(supplemented with English handouts)

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Website:
www.polyu.edu.hk/feng/tue

We Are PolyU • Together We Excel • 情繫理大 • 共創非凡

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Opening Minds • Shaping the Future • 啟迪思維 • 成就未來

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WHERE CONCEPTS BECOME REALITY

Two days University Experience Programme (TUE 2022) - "From Physics and ICT to Engineering"

Date:	**16th & 17th August 2022 (Tuesday and Wednesday)**
Delivery mode:	Online (via Zoom)
Target:	Secondary 4 or 5 students [taking Science, ICT or M1/M2 subject(s)]
Medium:	Cantonese (supplemented with English handouts)

Rundown

Day 1 *(16 August 2022)*

Time	Programme
2:15 p.m. – 2:45 p.m.	• Opening Ceremony • Interactive Sharing with Engineering Student Ambassador (JUPAS programme choices, career aspiration, student life & experiences)
2:45 p.m. – 2:50 p.m.	Break (5 mins)
2:50 p.m. – 3:30 p.m.	Department of Computing • Thematic lecture: ***Introduction to Computing and Game Technologies*** • Virtual laboratory tour • Project demonstration • Online polling
3:30 p.m. - 3:40 p.m.	• Online quiz (5 mins) • Break (5 mins)
3:40 p.m. – 4:20 p.m.	Department of Electronic and Information Engineering • Thematic lecture: ***Talk on Artificial Intelligence (AI) and Internet of Things (IoT)*** • Department introduction
4:20 p.m. - 4:30 p.m.	• Online quiz (5 mins) • Break (5 mins)
4:30 p.m. – 5:10 p.m.	Department of Electrical Engineering • Thematic lecture: ***How do Electricity and Energy get to us?***
5:10 p.m. – 5:15 p.m.	• Online quiz (5 mins)
5:15 p.m.	End of Day 1

Day 2 *(17 August 2022)*

Time	Programme
2:15 p.m. – 2:55 p.m.	<u>Department of Industrial and Systems Engineering</u> • Thematic lecture: ***Smart Industry and Digital Design*** • Showcase of project in AR (Augmented Reality)
2:55 p.m. - 3:05 p.m.	• Online quiz (5 mins) • Break (5 mins)
3:05 p.m. – 3:45 p.m.	<u>Department of Mechanical Engineering</u> • Thematic lecture: ***Kinematics of Car and PolyU E-Formula Racing Team*** • Virtual PolyU E-Formula Racing Team garage tour • Chats with racing team students
3:45 p.m. - 3:55 p.m.	• Online quiz (5 mins) • Break (5 mins)
3:55 p.m. – 4:35 p.m.	<u>Department of Biomedical Engineering</u> • Thematic lecture: ***Similarities between Ultrasound Imaging and Christmas Cards***
4:35 p.m. - 4:45 p.m.	• Online quiz (5 mins) • Break (5 mins)
4:45 p.m. – 5:25 p.m.	<u>Department of Aeronautical and Aviation Engineering</u> • Thematic lecture: ***Flying with the wright brothers: the first successful mechanical flight and the state-of-the-art*** • Department and programme introduction
5:25 p.m. - 5:35 p.m.	• Online quiz (5 mins) • Break (5 mins)
5:35 p.m. – 6:30 p.m.	• Closing Ceremony • Departmental Sessions (30 minutes) (Breakout room arrangement for participants to meet online with our academic members and student representatives from 7 Engineering Departments)
	End of Two days University Experience Programme

Remarks:

The University reserves the right to make changes to the above programme at any time if the changes are required. All successful registrants of the programme will be notified of the change by email and announcement will be made on the website.

Two days University Experience Programme (TUE) 2022 - "From Physics and ICT to Engineering"

University lectures on engineering applications:

Computing	**Topic:** ***Introduction to Computing and Game Technologies*** **Speaker:** Dr Henry CHAN, Associate Professor and Associate Head, Department of Computing Dr Peter NG, Teaching Fellow, Department of Computing **Related topics in DSE:** **The Compulsory Part:** Information Processing:- (a) Introduction to Information Processing (b) Data Representation (c) Presentation of Information Basic Programming Concepts:- (a) Problem-Solving Procedures (b) Algorithm Design (c) Algorithm Testing **The Elective Part:** Multimedia Production and Web Site Development:- (a) Multimedia Production Software Development:- (a) Programming (b) Programming Languages **Introduction:** Nowadays, computing plays an important role in our daily lives. Interactive computing and computer vision technologies (e.g., augmented reality (AR) technology and machine learning technology) have enabled the development of many innovative and interesting applications. In this lecture, we shall introduce the basics of computer vision technologies, including AR technology. We shall also use interesting examples to demonstrate some basic concepts.

Electronic and Information Engineering	**Topic:** ***Talk on Artificial Intelligence (AI) and IoT (Internet of Things)*** **Speakers:** Dr Ivan HO, Associate Professor, Department of Electronic and Information Engineering Dr Lawrence CHEUNG, Teaching Fellow, Department of Electronic and Information Engineering **Related topics in DSE:** ICT, programming **Introduction:** What is AI and IoT? Why are they important? What is the relationship between them? Machine Learning/Neural Networks/Backpropagation/Deep Learning Applications and Societal Impacts of AI and IoT
Electrical Engineering	**Topic:** ***How do Electricity and Energy get to us?*** **Speaker:** Professor Alan LAU, Professor, Department of Electrical Engineering **Related topics in DSE:** Electricity and Magnetism, Energy and Use of Energy **Introduction:** We cannot imagine our daily life without electricity as it is almost too easy for us to flip a switch or plug a cord to get electricity or energy in general. However, the process of getting electricity is not that straightforward. Also, alternative energy sources and humanity's energy consumption continues to be important issues for the world. This talk explores the ways how the electricity comes from various energy sources to us. The participants will recognize the electricity generation, transmission and distribution from the viewpoints of Electrical Engineering.
Industrial and Systems Engineering	**Topic:** ***Smart Industry and Digital Design*** **Speaker:** Dr YM Tang, Senior Teaching Fellow, Department of Industrial and Systems Engineering **Related topics in DSE:** Physics, Science, Information and Communication Technology **Introduction:** Industry 4.0 is commonly referred to as the fourth industrial revolution and has been called a "smart industry". Within a smart industry, cyber-physical systems monitor physical processes, create a Virtual Reality (VR) of the physical world, utilize big data and Artificial Intelligence (AI) technologies to facilitate future industrial

	revolution. We will also explore how these technologies can be applied in digital design and innovation.
Mechanical Engineering	**Topic:** ***Kinematics of Car and PolyU E-Formula Racing Team*** **Speaker:** Ir Elsa TANG, Senior Instructor, Department of Mechanical Engineering **Related topics in DSE:** Physics Speed, Velocity and Acceleration Renewable energy – Solar Energy **Introduction:** Nowadays, electric cars are commonly used over the world, such as Tesla. In these two years, Formula Electric car (Formula E) is also the big racing event in Hong Kong. When you design electric car, you should have theoretical and practical knowledge about electric motor, batteries, gearbox, power, torque, speed and acceleration. In this lecture, students will learn the basic theory of kinematics of racing car and different applications to car performance. Apart from the introduction of electric car, solar car is also the new trend in the renewable energy and sustainable environment.
Biomedical Engineering	**Topic:** ***Similarities between Ultrasound Imaging and Christmas Cards*** **Speaker:** Dr Hin Chung LAU, Senior Teaching Fellow, Department of Biomedical Engineering **Related topics in DSE:** Medical Physics [Secondary 4-6, Elective part IX] **Introduction:** Medical devices such as ultrasound scanners have enabled radiologists to see through the body without surgery. In this lecture, we will explore the similarities between ultrasound imaging and a typical Christmas card that one could buy from the stationary store. Students will get to know how ultrasound is generated and processed by the computer to generate an image.

Aeronautical and Aviation Engineering	**Topic:** ***Flying with the wright brothers: the first successful mechanical flight and the state-of-the-art*** **Speaker:** Dr Kam K.H. Ng, Assistant Professor Department of Aeronautical and Aviation Engineering **Related topics in DSE:** • Air Transport Regulations • Principles of Flight • Aircraft Performance • Aviation Safety **Introduction:** The first mechanical flight was developed in 1903 by the Wright Brothers. At that time, they made the first sustained, controlled, powered, heavier-than-air manned flight successfully. Their design lays a foundation of mechanical flight and aircraft design, which further impacted the world and the aviation industry. How did Wright Flyer influence the future aircraft design? What are the basic principles of flight? How lessons learnt from the major accidents improve aviation safety and the safety culture? This lecture will guide you through all these topics from principles of flight, aircraft performance, air transport regulations, to aviation safety.

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