

Two days University Experience Programme (TUE 2024) - “From Physics and ICT to Engineering”

Date: **17th & 18th July 2024 (Wednesday and Thursday)**
 Venue: V322
 Target: Secondary 4 or 5 students [taking Science, ICT or M1/M2 subject(s)]
 Medium: Cantonese (supplemented with English handouts)

Rundown

Day 1 (17 July 2024)

Time	Programme
10:00 a.m. - 10:10 a.m.	Registration
10:10 a.m. - 10:20 a.m.	Opening Ceremony
10:20 a.m. - 10:50 a.m.	<u>Department of Computing</u> <ul style="list-style-type: none"> • Thematic lecture: <i>Introduction to Computing and Game Technologies</i> • Virtual laboratory tour • Project demonstration • Online polling
10:50 a.m. - 11:10 a.m.	<ul style="list-style-type: none"> • Quiz (5 mins) • Break (15 mins)
11:10 a.m. - 11:40 a.m.	<u>Department of Biomedical Engineering</u> <ul style="list-style-type: none"> • Thematic lecture: <i>Similarities between Ultrasound Imaging and Christmas Cards</i>
11:40 a.m. - 11:45 a.m.	<ul style="list-style-type: none"> • Quiz (5 mins)
11:45 a.m. - 1:00 p.m.	Lunch
1:00 p.m. - 1:30 p.m.	<u>Department of Mechanical Engineering</u> <ul style="list-style-type: none"> • Thematic lecture: <i>Kinematics of Car and PolyU E-Formula Racing Team</i> • Virtual PolyU E-Formula Racing Team garage tour • Chats with racing team students
1:30 p.m. - 1:50 p.m.	<ul style="list-style-type: none"> • Quiz (5 mins) • Break (15 mins)
1:50 p.m. - 2:20 p.m.	<u>Department of Industrial and Systems Engineering</u> <ul style="list-style-type: none"> • Thematic lecture: <i>Smart Industry and Digital Design</i> • Showcase of project in AR (Augmented Reality)
2:20 p.m. - 2:40 p.m.	<ul style="list-style-type: none"> • Quiz (5 mins) • Break (15 mins)
2:40 p.m. - 5:10 p.m.	Campus and Lab Tour 1
5:10 p.m.	End of Day 1

Day 2 (18 July 2024)

Time	Programme
10:00 a.m. - 10:10 a.m.	Registration
10:10 a.m. - 10:20 a.m.	Interactive Sharing with Engineering Student Ambassador (JUPAS programme choices, career aspiration, student life & experiences)
10:20 a.m. - 10:50 a.m.	<u>Department of Electrical and Electronic Engineering</u> <ul style="list-style-type: none">• Thematic lecture: <i>How do Electricity and Energy get to us?</i>
10:50 a.m. - 11:10 a.m.	<ul style="list-style-type: none">• Quiz (5 mins)• Break (15 mins)
11:10 a.m. - 11:40 a.m.	<u>Department of Electrical and Electronic Engineering</u> <ul style="list-style-type: none">• Thematic lecture: <i>Talk on Artificial Intelligence (AI) and Internet of Things (IoT)</i>• Department introduction
11:40 a.m. - 11:45 a.m.	<ul style="list-style-type: none">• Quiz (5 mins)
11:45 a.m. - 1:00 p.m.	Lunch
1:00 p.m. - 1:30 p.m.	<u>Department of Aeronautical and Aviation Engineering</u> <ul style="list-style-type: none">• Thematic lecture: <i>Flying with the wright brothers: the first successful mechanical flight and the state-of-the-art</i>• Department and programme introduction
1:30 p.m. - 1:50 p.m.	<ul style="list-style-type: none">• Quiz (5 mins)• Break (15 mins)
1:50 p.m. - 4:00 p.m.	Campus and Lab Tour 2
4:00 p.m. - 4:10 p.m.	Closing Ceremony
4:10 p.m. - 4:30 p.m.	Certificate Distribution
4:30 p.m.	End of Day 2

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.

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University lectures on engineering applications:

Computing	<p>Topic: <i>Introduction to Computing and Game Technologies</i></p> <p>Speakers: Dr Henry CHAN, Associate Professor and Associate Head Department of Computing</p> <p>Dr Peter NG, Assistant Professor Department of Computing</p> <p>Related topics in DSE: The Compulsory Part: Information Processing:- (a) Introduction to Information Processing (b) Data Representation (c) Presentation of Information</p> <p>Basic Programming Concepts:- (a) Problem-Solving Procedures (b) Algorithm Design (c) Algorithm Testing</p> <p>The Elective Part: Multimedia Production and Web Site Development:- (a) Multimedia Production</p> <p>Software Development:- (a) Programming (b) Programming Languages</p> <p>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.</p>
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Biomedical Engineering	<p>Topic: <i>Similarities between Ultrasound Imaging and Christmas Cards</i></p> <p>Speaker: Dr Hin Chung LAU, Senior Lecturer Department of Biomedical Engineering</p> <p>Related topics in DSE: Medical Physics [Secondary 4-6, Elective part IX]</p> <p>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.</p>
Mechanical Engineering	<p>Topic: <i>Kinematics of Car and PolyU E-Formula Racing Team</i></p> <p>Speaker: Ir Elsa TANG, Senior Instructor Department of Mechanical Engineering</p> <p>Related topics in DSE: Physics Speed, Velocity and Acceleration Renewable energy – Solar Energy</p> <p>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.</p>
Industrial and Systems Engineering	<p>Topic: <i>Smart Industry and Digital Design</i></p> <p>Speaker: Dr YM TANG, Senior Lecturer Department of Industrial and Systems Engineering</p> <p>Related topics in DSE: Physics, Science, Information and Communication Technology</p> <p>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.</p>

**Electrical
and
Electronic
Engineering**

Topic:
How do Electricity and Energy get to us?

Speaker:
Dr Kevin CHAN, Associate Professor and Associate Head
Department of Electrical and Electronic 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.

Topic:
Talk on Artificial Intelligence (AI) and IoT (Internet of Things)

Speaker:
Dr Lawrence CHEUNG, Teaching Fellow
Department of Electrical and Electronic 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

Aeronautical and Aviation Engineering	<p>Topic: <i>Flying with the wright brothers: the first successful mechanical flight and the state-of-the-art</i></p> <p>Speaker: Dr ZHANG Guohao, Research Assistant Professor, Department of Aeronautical and Aviation Engineering</p> <p>Related topics in DSE:</p> <ul style="list-style-type: none"> • Principles of Flight • Aircraft Performance • Aviation Safety <p>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?</p> <p>This lecture will guide you through all these topics from principles of flight, aircraft performance, flight mechanics, to aviation safety.</p>
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