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

Summer Courses 2023
Course Outline

CUSA2023 Introduction to Bionics
仿生學淺談

Introduction:

Bionics is the branch of science dedicated to the studying of the characteristics, structure or functions of bio-systems for innovations in developing new technology, it is also known as "Biomimicry" or "Biomimetics". Since 1960s, bionics has developed quickly and applied widely in various fields of science and technology. With an emphasis on the scientific basis of various processes or phenomena in nature, this course aims to introduce to the students the various inspirations which human beings acquired from nature, the methodology, the major applications, and the advancements of bionics. Students will learn in form of lectures, videos, demonstrations, quizzes, discussions, and also gain hands-on experience through participating in worksheets and self-exploratory activities.

仿生學又稱為「模擬生物學」或「生物模仿學」，是一門研究生物系統的特質、結構及功能原理的科學，主要用以研發各種創新科技。自六十年代開始，仿生學的迅速發展使其在各個科學及技術範疇中漸漸普及。本課程旨在以各種科學現象或過程的原理為基礎，通過講解、視頻、示範、測驗、及討論等內容介紹仿生學的原理及仿生學在各方面的應用。學生亦可通過工作紙及在家實驗等活動，親身了解仿生學的基本原理。

Medium of Instruction:

Cantonese supplemented with English
粵語輔以英語

Organising Unit:

Centre for Promoting Science Education, Faculty of Science, CUHK

Teachers:

Dr. CHUNG, Kwok Cheong (鍾國昌博士)
School of Life Sciences, CUHK
Email: kcchung@cuhk.edu.hk

Course content:

8 August 2023 (Tuesday) 2:00 pm – 5:00 pm	**Lecture:** • Introduction: history, methodology and scope of Bionics **Demonstration:** • Relationship between the number of setae in Gecko foot & its holding force
10 August 2023 (Thursday) 2:00 pm – 5:00 pm	**Lecture:** • Application of Bionics: structures / materials / architecture **Demonstration:** • Superhydrophobicity, the lotus effect and water striders **Homework:** • How to build stronger bones?
15 August 2023 (Tuesday) 2:00 pm – 5:00 pm	**Lecture:** • The secrets of flying: Principle of animal flight & aerodynamics **Homework:** • Practice flying with a Glider/Pterosaur model
17 August 2023 (Thursday) 2:00 pm – 5:00 pm	**Lecture:** • Use of sound by animals • Application of Bionics: art / energy / management **Homework:** • The folding leaves exercise
22 August 2023 (Tuesday) 2:00 pm – 5:00 pm	**Lecture:** • Application of Bionics: health / medicine
24 August 2023 (Thursday) 2:00 pm – 5:00 pm	**Lecture:** • Application of Bionics: environmental and sustainability **Homework:** • Find out the golden ratio: Constructing the “Golden Section Gauge”
25 August 2023* (Friday) 2:00 pm – 5:00 pm	Make-up Class

Duration	6 half day sessions (total 18 contact hours)
Date	8, 10, 15, 17, 22, 24 August 2023 25 August 2023* (make-up class)
Time	2:00 pm – 5:00 pm
Teaching Mode	Face to Face (The Chinese University of Hong Kong)
Enrollment	20 – 40
Expected applicants	Students who are promoting to or studying S2 – S3
Tuition Fee	HKD 3,180.00
Credit	1.25 Academy Unit Certificates or letters of completion will be awarded to students who attain at least 75% Attendance, pass the assessment (if applicable) and awarded B grade or above in the course.
Grading Methods	Letter grades range from A to F.

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