Gifted Education Fund: Off-school Advanced Learning Programmes

Programme No. 2023-12 (For secondary students)

Title of programme	Generative AI and AIoT (GenAIoT) Coding Skills Education for Gifted Students
Programme provider	Department of Electrical Engineering, City University of Hong Kong
Theme(s)	• STEAM-related mentorship programme • Self-initiated research study
Intake	50 students (Secondary 4-5 in the 2023/24 school year)
Prerequisite	• Applicants should demonstrate great interest and outstanding performance in mathematics, and should be experienced in at least one text-based computer programming language such as Python, C/C++, Java and JavaScript. • Applicants should show eagerness to learn about AI-related topics.
Programme delivery period	from May 2024 to Jan 2025 (around 9 months)
Medium of instruction	Course material: English Class teaching/ discussion: English supplemented with Cantonese
Objectives	• to provide gifted students with knowledge of foundation mathematics for use in AI and Python programming for development of relevant AI applications; • to equip students with engineering skills and experiences, through lab sessions, assignments and projects, to develop IoT devices by using advanced hardware and software utilised in the industry; • to develop gifted students' hands on coding abilities and problem solving skills to carry out AI projects, especially developing their own AI model, and have the ability to evaluate its quality; • to enhance gifted students' awareness of the applications and development of generative AI, LLM, GPT, etc, and encourage them to explore further to create their own applications; • to inspire gifted students about the role and computation of System on Chip (SoC) and Integrated Circuit (IC) in AI; • to arouse students' awareness on ethics of using AI in daily life and its security issues, and nurture their ability to distinguish between real and generated fake contents; and • to nurture positive values and attitudes among students and foster their perseverance in overcoming problems
Programme outline	This programme aims to equip gifted students with essential knowledge related to artificial intelligence (AI), generative AI

	(GenAI) and AI internet of things (AIoT) technologies, engineering and mathematics, problem solving abilities, as well as other hands-on skills including software and hardware programming. Positive values and attitudes such as ethics of using AI technology and perseverance to overcome problems which are essential for students' growth and development are also emphasised in this programme. The programme consists of 6 phases. **Phase 1 (1 month)** **Foundational guest lectures on Generative AI and AIoT** • 4 sessions (8 hours in total) • Online/ face-to-face lectures (2 hours each) on the foundational knowledge and understanding in the areas of generative AI and AIoT. Guest lectures provided by CityU-EE faculty members will be arranged to strengthen students' interests and background knowledge. Additionally, experienced industry experts in society and HK Tech 300 companies will be invited to cover related concepts. **Phase 2 (around 1 month)** **Acquisition of Knowledge on Basic Python Programming** • 5 sessions (10 hours in total) • Online/ face-to-face lectures accompanied by in-class and take-home exercises about Python programming skills and code management skills. **Phase 3 (2 months)** **Basic Theory of AI and Machine Learning, Hands-on AI Coding in Python** • 8 sessions (16 hours in total) • Lectures on AI theory, followed by practical coding lab sessions on the history and the theoretical background of AI and machine learning, and popular Python libraries for AI such as Keras, TensorFlow or PyTorch and Scikit-Learn. **Phase 4 (1.5 months)** **AI Internet of Things (AIoT) Design with PYNQ** • 6 sessions (12 hours in total) • Lectures and lab sessions on the overview of FPGA and its applications in AI and programming the FPGA with Python Productivity for Zynq (PYNQ) framework. **Phase 5 (around 1 month)** **Advances and Ethics of AI** • 5 sessions (10 hours in total) • Lectures and lab sessions on AI will be introduced with case studies on secure, reliable and explainable AI, and AI generated content detection. AI research paper study tutorials will also be conducted to prepare students on the continuous

	learning for AI technology. **Phase 6 (2 months)** **Final Project Mentorship, Presentation, Competition and Exhibition** • 3 one-hour mentorship sessions, 40-hour project work and 7-hour exhibition/ competition/ ceremony (50 hours in total) • A one-day competition and exhibition will be held at CityU to showcase the projects completed by students or the models they have built during the programme.
Admission fee	Free of charge
Application method	Application form can be downloaded from the following webpage: https://www.edb.gov.hk/en/curriculum-development/curriculum-area/gifted/ge_fund/gef/osalp.html Please complete the application form and send it by post **on or before 19 April 2024** to the following address: Department of Electrical Engineering City University of Hong Kong Tat Chee Avenue Kowloon Tong (Attn: Professor Ray Cheung Chak-chung)
Document(s) to be submitted	• a completed application form; • evidence of applicant's other learning experience (if any); • a copy of applicant's report cards (the first and second term of the 2022/23 school year); and • a copy of applicant's certificate(s) of award/ participation in courses/ competitions related to STEAM
Enquiry	If you have any questions about this programme, please contact: Professor Ray Cheung Chak-chung Associate Provost (Digital Learning) and Professor, Department of Electrical Engineering, City University of Hong Kong Tel no.: 3442 9849 Email: r.cheung@cityu.edu.hk
Announcement of results	by late May 2024