

## Gifted Education Fund: Off-school Advanced Learning Programmes

Title of Programme	<b>Developing Students' Innovation Competency through Advanced STEM Learning Experience</b>
Programme Provider	Academy for Bright Future Young Engineers, The Hong Kong University of Science and Technology
Theme	STEM-related Mentorship Programme
Maximum No. of Participants and Class Level in the 2021/22 School Year	40 students (Secondary 1-4)
Pre-requisite	No special background knowledge or skills are required.
Programme Delivery Period	From July 2022 to February 2023 (8 months) (tentative)
Medium of Instruction	Course Material: English supplemented with Chinese for important technical terms Class teaching/ Discussion: English supplemented with Cantonese where necessary
Objectives	<ul style="list-style-type: none"> <li>• To broaden and enhance gifted students' knowledge and skills required in studies of STEM-related disciplines;</li> <li>• To develop the STEM and innovation competency of students;</li> <li>• To promote students' awareness and understanding of the development of cutting-edge research in STEM-related disciplines;</li> <li>• To inspire students to pursue further studies of STEM-related disciplines and seek for STEM-related careers in future; and</li> <li>• To nurture positive values and attitudes among students such as responsibility, perseverance, resilience, empathy, respect and willingness to collaborate with people, etc.</li> </ul>
Programme Outline*	<p>This programme aims to broaden and enhance the knowledge and skills of gifted students in STEM-related disciplines, develop their ability in innovation and creation, promote their awareness of the latest development in STEM-related research and inspire students to further pursue their studies or careers in STEM-related fields. Besides, due attention is made on nurturing positive values and attitudes such as responsibility, perseverance, respect for others, etc. essential for personal growth and development. The programme consists of three phases.</p> <p>Phase I: STEM-related Training Courses (39 hours in total)</p> <ul style="list-style-type: none"> <li>• This phase will first introduce, through a number of compulsory courses, various soft skills such as thinking skills, proposal writing skills and foundation knowledge necessary for learning the subsequent parts of the programme.</li> <li>• Hands-on design and thinking workshops are then provided to</li> </ul>

broaden and enhance students' knowledge in selected themes of physics, chemistry and biology, or programming, robots, food science and technology subject to the choice of students. The workshops are interdisciplinary in nature and students will need to apply their STEM knowledge and thinking skills to complete the learning tasks.

- Before proceeding to the next phase, students will submit a research proposal as an interim assessment.

Phase II: Research Mentorship Programme (20 hours in total)

- Students will conduct research under mentorship and support of academics and helpers in this phase of the programme. Being divided into the science stream and the engineering stream, students will have meetings and practical sessions with their mentors according to the agreed arrangements.
- Research topics for students of the science stream are classified as chemical sciences, life sciences or physical sciences whereas students of the engineering stream will study and develop robotics and AI, smart devices or food technology.
- Students will produce deliverables such as a physical/ virtual prototype, a project report, a research paper, etc. by the end of this phase.

Phase III: Student Academic Conference (1 day)

- A distinguished guest speaker will be invited to deliver a keynote speech in a student academic conference organised by the programme provider.
- Students will participate in the conference and showcase their learning outcomes and talents. They will present their designs or research results with the aids of presentation files, posters, video clips, etc. to participants which may include parents, teachers and other guests.

\* In view of the latest development of the COVID-19 pandemic, the programme provider may need to modify the learning and teaching activities as a contingency.