The Hong Kong University of Science and Technology

UG Course Syllabus

Community Services Project: STEAM Project for the Community

ENGG2900H

2 Credits (graded Pass or Fail)

Pre-requisites: Nil

Name: Professor Tim WOO

Email: eetim@ust.hk

Office Hours: By email appointments

Course Description

This Project Course (ENGG2900H) provides HKUST undergraduate students with ample opportunities for personal growth, not only in essential 21st-century competencies - such as Creativity, Critical Thinking, Collaboration, and Communication - but also in acquiring a diverse array of practical skills pertinent to project management through the execution of their STEAM projects. Throughout the course, students will assume the role of Workshop Developers, where they will craft their teaching materials and construct prototypes for instruction. Ultimately, they will serve as Tutors or Assistants, imparting their acquired engineering knowledge and technological expertise to primary and secondary school students. This experience will serve as excellent preparation for aspiring engineers, equipping them to mentor the next generation of professionals in the field. The course will commence in the Summer Semester and extend into the Fall Semester; during the Summer Term, many theoretical concepts will be taught, while community service initiatives will be implemented in the Fall semester.

Topics

- Project Management Basics
- STEAM (Science, Technology, Engineering, Art, and Mathematics) Education
- Relationship between the 21st-century skills and STEM education
- The Basics of STEAM elements – hardware and software
- Design of the workshop and the serious and fun games for education
- Outreach services for servicing the community

Benefits from the Community Service Project

From the perspective of university students, the project offers an opportunity to impart their knowledge of STEAM technology to the target audience. Furthermore, it benefits HKUST undergraduates by fostering their intellectual development beyond the confines of their respective academic disciplines.

Target Served Group (i.e., Primary and Secondary School Students)

The serviced group consists of primary and secondary school students, who will benefit from teaching materials designed by course participants. Through the project, these students will engage with knowledge in Science, Technology, Engineering, Arts, and Mathematics (STEAM).

Role and Responsibilities of HKUST Students

Participants are expected to complete the deliverables outlined in the syllabus, which include preparing proposals and conducting presentations. They should maintain regular communication with the Project Supervisor and/or the School's Project Coordinator, track project progress to ensure timely completion of deliverables, and keep all data and analyses confidential if requested by HKUST. Additionally, they must represent themselves and the university professionally, ensure equal contribution from all students, and prepare a creative self-reflective journal or project detailing their learning experience. Lastly, adherence to university regulations on academic integrity and proper citation practices is essential to avoid plagiarism.

Course Requirements

Each student/group is required to submit the following to the Project Supervisors.

- Deliverables as stated on the Course syllabus:
  - Group Proposal for workshop development
  - Preparations for Service Day
  - Teaching materials and worksheets designed for the workshop
  - Self-reflective Paper
  - Program and Peer Evaluation Forms
- Before the actual service takes place, each group will need to have a presentation for workshop development and receive pre-event recommendations.
- All students must attend all sessions on the listed working schedule in the working schedule below.
- All team members should commit to the agreed due dates and respect the time devotion of the business partner for all interaction – punctuality and good preparation are expected

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:
ILO1. Elucidate the foundational concepts of STEM Education, and comprehend the teaching skills being an educator.
ILO2. Understand the basics of project management.
ILO3. Effectively transfer the technological knowledge to the target served group.
ILO4. Effectively writing any proposal/ presentation.
ILO5. Develop and practice the 21st-century skills through the project-based learning of community service.
ILO6. Improve their hands-on experience from idea to deliverables.
ILO7. Have a self-reflection through the project and review their limitation for further self-improvement on his/her 21-st century skills.

Statement on adopting Criterion-referenced Assessment (CRA)

Students are graded with reference to their peers) to ***criterion-referencing****,* where student **performance is evaluated against achievement of course intended learning outcomes (ILOs)**

Assessment and Grading

This course will be assessed using criterion-referencing, and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments and weighting:

Assessment Task	Contribution to Overall Course grade (%)	Due date
Idea Presentation	10%	Week 5 in Summer Semester
Project Proposal	10%	Week 7 in Summer Semester
Project Deliverables	20%	Week 8 in Summer Semester
Community Service	20%	Weekend of Week 10 in Fall Semester
Closing Project Presentation	20%	Week 11 in Fall Semester
Reflective Report	20%	Week 12 in Fall Semester

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Idea Presentation	ILO1, ILO2	This task evaluates students' understanding of STEAM concepts (ILO1) and their application within the project (ILO2), culminating in an assessment of their presentation skills.
Project Proposal	ILO3, ILO4	This task evaluates students' proficiency in concepts and skills transfer (ILO3) through the composition of an effective proposal (ILO4).
Project Deliverables	ILO5, ILO6	This task offers students an opportunity to hone their practical skills (ILO6) through the engaging method of project-based learning (ILO5).
Community Service	ILO5, ILO6	This task aims to let students learning through hands-on experience (ILO5, ILO6)
Closing Project Presentation	ILO3, ILO4, ILO5	This task enables students to reinforce their learning (ILO3, ILO4) from the project while further refining their pitching skills (ILO5).
Reflective Report	ILO7	This task provides students with a chance to enrich what they have learnt and review for their self-improvement. (ILO7)

Grading Rubrics

Assessment Task	Criteria	Exemplary (4)	Proficient (3)	Satisfactory (2)	Needs Improvement (1)
Idea Presentation (10%)	Clarity of "idea"	"Idea" is exceptionally clear and engaging, with strong connections to STEAM.	"Idea" is clear and relevant, with some connections to STEAM.	"Idea" is somewhat clear, but lacks depth or relevance.	"Idea" is unclear or poorly presented.
	Creativity	Highly creative and original; demonstrates innovative thinking	Some creative elements demonstrate some originality	Limited creativity; relies heavily on existing ideas.	Lacks creativity and originality.
Project Proposal (10%)	Structure and Organization	"Proposal" is exceptionally well-structured; all required components are present.	"Proposal" is well-structured; most components are present.	"Proposal" is somewhat organized; missing some components.	"Proposal" is poorly structured or incomplete.
	Feasibility of Project	"Project" is highly feasible with clear, realistic goals and timeline.	"Project" is feasible with mostly clear goals and timeline.	"Project" has some feasibility issues; goals or timeline are unclear.	"Project" is not feasible; lacks clear goals or timeline.
Project Deliverables (20%)	Quality of work	Deliverables exceed expectations; high quality, thorough, and well-executed.	Deliverables meet expectations; quality is good and mostly thorough.	Deliverables are adequate; quality is fair but lacks depth.	Deliverables are of poor quality or incomplete.
	Application of Theory	Excellent application of theoretical concepts to practical work.	Good application of theory; some connections made to practice	Limited application of theory; unclear connections to practice.	No application of theory to practice.
Community Service (20%)	Engagement and Impact	Highly engaged with the community significant positive impact was observed.	Engaged with the community; positive impact noted	Some engagement with the community; limited impact.	Minimal or no engagement with the community.
	Reflection on Experience	Deep reflection, insightful understanding of community needs, and personal growth.	Good reflection, some understanding of community needs, and personal growth.	Limited reflection; minimal insight into community needs or personal growth.	No reflection or understanding demonstrated.

Closing Project Presentation (20%)	Presentation Skills	Presentation is engaging, clear, and well-rehearsed; excellent use of visual aids.	Presentation is clear and organized; good use of visual aids.	Presentation is somewhat clear; limited use of visual aids.	Presentation is unclear, poorly organized, or lacks visual aids.
	Ability to Answer Questions	Answers questions thoroughly and confidently; demonstrates deep understanding.	Answers questions adequately; shows good understanding.	Answers questions but lacks depth or clarity.	Unable to answer questions or demonstrates poor understanding.
Reflective Report (20%)	Depth of Reflection	Exceptionally deep reflection on learning experiences and project outcomes.	Good reflection on learning experiences and project outcomes.	Some reflection lacks depth or insight into experiences.	Minimal reflection; lacks understanding of experiences.
	Connection to ILOs	Strong connections were made between experiences and intended learning outcomes.	Some connections were made between experiences and intended learning outcomes.	Limited connections made; unclear link to ILOs.	No connections made to ILOs.

Scoring
Exemplary (4): 90-100%
Proficient (3): 75-89%
Satisfactory (2): 60-74%
Needs Improvement (1): 0-59%

Final Grade Descriptors:

This is a two-credit course that will span across summer and fall semesters (and is graded Pass (≥ 60%) or Fail (< 60%). The 2 credits will be granted after the whole course has been completed.

Course AI Policy

Students are encouraged to utilize AI for idea generation; however, they must acknowledge its use at any stage of project development or in any submitted documents.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.