

School of Engineering	ENGG 2900D
School of Science	SCIE 1090D
School of Business and Management	SBMT 2100H

Course Title: Community Services Project: Underwater Robot Community Engagement Project**Duration: Spring Semester, 2024****Project Introduction and Guideline**

This Project course (ENGG2900D/SCIE1090D/SBMT2100H) gives HKUST undergraduate students the opportunity to work in teams from different schools (i.e. SENG/SSCI/SBM), to serve identified community group (i.e. primary and secondary school students/South Asian youths etc.), to understand limitations on the served groups and to learn how to apply theoretical knowledge on the building of underwater robots. Throughout the project, HKUST undergraduate students will act as Workshop Tutors/Assistants transferring their skills of underwater robot, assisting primary and secondary school students and/or South Asian youths to build their own prototype. HKUST undergraduate students will also learn the skills of event management throughout the project.

i) Topics

- Inclusive education and STEM (Science, Technology, Engineering and Mathematics)
- 21st century skill and STEM education
- The Basics of the underwater robotics (UWR)
- Design of the serious and fun games in education
- Workshop design
- Outreach of the underwater robotic competition

ii) Grading Scheme

This is a two-credit course, graded Pass or Fail. To achieve the Pass grade, each student must complete all (including the service for the schools (30%), the presentation (30%) and the self-reflective report (40%)) on time and meet the course requirements. Also, the required tasks must be satisfied by both the HKUST Project Supervisor(s) and School's Project Coordinator for students from respective Schools.

iii) Textbooks and paper references**Book**

- i) Underwater Robotics: Science, Design and Fabrication (by Marine Advanced Technology Education, 1st Edition, 2010)

Papers

- i) D. Catlin and M. Blamires, "Designing Robots for Special Needs Education," Technology, knowledge and learning, vol. 24, no. 2, pp. 291–313, 2019, doi: 10.1007/s10758-018-9378-8
- ii) J. Yuh and M. West, "Underwater robotics," Advanced robotics, vol. 15, no. 5, pp. 609–639, 2001, doi: 10.1163/156855301317033595.
- iii) A. Gomez Chavez, A. Ranieri, D. Chiarella, and A. Birk, "Underwater Vision-Based Gesture Recognition: A Robustness Validation for Safe Human-Robot Interaction," IEEE robotics & automation magazine, vol. 28, no. 3, pp. 67–78, 2021, doi: 10.1109/MRA.2021.3075560.
- iv) C. Sik-Lanyi and J. Ara, "Serious and Fun Games: Introduction to the Special Thematic Session," in Computers Helping People with Special Needs, Cham: Springer International Publishing, 2022, pp. 67–72.

- v) Widya, R. Rifandi, and Y. Laila Rahmi, "STEM education to fulfil the 21st century demand: a literature review," Journal of physics. Conference series, vol. 1317, no. 1, pp. 012208-, 2019, doi: 10.1088/1742-6596/1317/1/012208.

Updated on Jan 23, 2024