

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, 2025

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 groups (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 the underwater robot, helping primary and secondary school students and/or South Asian youths to build their prototypes. 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)
- The 21st century skill and STEM education
- The Basics of the underwater robotics (UWR)
- The design of the serious and fun games in education
- The workshop design
- The 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) Yim, T. S., Woo, K. T., & Chin, L. T. (2024, May). Promoting Inclusive Education through Virtual Underwater Robotics Experience: Enhancing STEM Learning and Collaboration with Real-World Applications. In *2024 IEEE Global Engineering Education Conference (EDUCON)* (pp. 1-5). IEEE.
- ii) Yim, T. S., Woo, K. T., & Chin, L. T. (2024, May). Promoting Inclusive Education through Virtual Underwater Robotics Experience: Enhancing STEM Learning and Collaboration with Real-World Applications. In *2024 IEEE Global Engineering Education Conference (EDUCON)* (pp. 1-5). IEEE.
- iii) Catlin, D., & Blamires, M. (2019). Designing robots for special needs education. *Technology, knowledge and learning*, 24(2), 291-313.

- iv) Chavez, A. G., Ranieri, A., Chiarella, D., & Birk, A. (2021). Underwater vision-based gesture recognition: A robustness validation for safe human–robot interaction. *IEEE Robotics & Automation Magazine*, 28(3), 67-78.
- v) Sik-Lanyi, C., & Ara, J. (2022, July). Serious and Fun Games: Introduction to the Special Thematic Session. In *International Conference on Computers Helping People with Special Needs* (pp. 67-72). Cham: Springer International Publishing.
- vi) Rifandi, R., & Rahmi, Y. L. (2019, October). STEM education to fulfil the 21st century demand: a literature review. In *Journal of Physics: Conference Series* (Vol. 1317, No. 1, p. 012208). IOP Publishing.

Updated on Jan 21, 2025