SISP 1001
Innovation in STEM projects

Course Description

The course aims to introduce STEM projects and state-of-the-art technologies in science and engineering to solve environmental problems in daily life. This experiential course will provide an overview to potential students who wish to engage in STEM education. Students will design and develop a prototype through various innovative learning activities under the guidance of instructors, explain the underlying scientific principles, integrate the multidisciplinary knowledge with innovation and creativity to critically evaluate complex, real-world problems. The course also serves to strengthen students' concepts in science and engineering, and improves their organization and presentation skills, which are important in their future study.

Topics

- Introduction
- Projects for Conceptual Design of Smart fish for Microplastics Detection
- Water Pollutants & Wastewater Treatment
- **Experiment 1**- Microplastics Sampling and Characterization
- **Experiment 2**- Water Pollutant Treatment Process
- **Experiment 3**- 3D-printing Technology
- **Experiment 4**- Photocatalytic Oxidation Process

Grading Scheme

- Project report (60%)
- Project presentation (20%)
- Course participation (10%)
- Peer evaluation (10%)

[Topics and grading schemes are subject to change as deemed appropriate. Students will receive information and guidelines in class on how they will be assessed for the course.]

Teaching Mode

The course will be delivered face-to-face.

Attendance Requirement

Attendance is expected and required. The minimum attendance required is 70%. Attendance for the assessment activities [e.g. group presentation and final exam] is mandatory.

Instructor(s) Profile

Prof. Cindy LAM	**Prof. Frank LAM**
Prof. Cindy Lam obtained her Ph.D. in Marine Environmental Science at the University of Oldenburg, Germany in 2007. She has joined the Department of Ocean Science at HKUST as a Lecturer since 2012 with extensive experience in organizing experiential learning and ocean science-related education projects for secondary and university students. She has extended her interests in incorporating innovative tools (e.g. AR, VR, gamification) to enhance students' motivation and active engagement in lectures and lab courses. With her research interests in investigating the potential impacts of microplastics on marine ecosystems, she has the enthusiasm to develop autonomous devices and speed up the monitoring and detection of microplastics in the ocean.	Prof. Frank Lam is currently the Associate Dean of Students and Assistant Professor of Engineering Education at the Department of Chemical and Biological Engineering at HKUST. He received his Ph.D. at HKUST in 2005 and has been a Visiting Assistant Professor in the Department of Chemical Engineering at the Technion Israel Institute of Technology (TIIT) in Israel and the Department of Chemistry at The University of Hong Kong, conducting research on functional materials for environment and teaching on the environmental engineering. His research focuses on separation, air pollution control, and wastewater treatment through adsorption and heterogeneous catalysis. He also concentrates on the Experiential Learning approach and Visual Reality for knowledge delivery.