ISDN 4000R

Introduction to Soft Robotics (Fall 23-24)

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Hong Kong University of Science and Technology

Division of Integrative Systems and Design

ISDN 4000R – Introduction to Soft Robotics

Course Vector: 3

Course Description:

Soft Robotics is an emerging field of research that focuses on the use of soft materials to realize adaptive behavior in robots. This course will provide an overview of the soft robotics field covering both technology and applications. Through a series of lectures and hands-on practice during labs, students will be brought up to speed with the latest technological developments in soft actuators, soft sensors, soft robot manufacturing, soft robot modelling, and soft robot control. For the final project, each student group will deepen their knowledge on a selected technology from a recent research paper. Taking inspiration from nature, the chosen technology will be deployed to realize a robotic manipulation or locomotion system with an application in medical care, health care, aerospace, agriculture, or search and rescue.

Course Learning Outcomes:

CILO-1:   Develop a broad understanding of soft robotics as an emerging field of research
CILO-2:   Develop the capability to integrate knowledge from different disciplines to enable a robot to deliver a desired behavior
CILO-3:   Acquire practical skills to design, manufacture, and control soft robotic systems

Grading:
        20% Project report
        50% Presentations
                25% for research paper presentation
                25% for final project presentation
        15% Course participation
        15% Quiz

Late Policy: All assignment are due @ 11:59pm, They may be submitted late by no more than 48 hours (weekend and holiday included). The penalty for late submission is 50% of the score. No score will be given for submissions after 48 hours.

Course Outline:

Week	Date	Description
1	Sep 1	Introduction to Soft Robotics (course introduction)
1	Sep 3	Soft Actuators
2	Sep 10	Soft Sensors
3	Sep 17	Design, Modeling, and Simulation
4	Sep 24	Manufacturing & Materials
5	Oct 1	Soft Robot Control
6	Oct 8	**Research Paper Presentation (25%)**
7	Oct 15	Biomimetic and Biohybrid Systems
8	Oct 22	Soft Robot Locomotion
9	Oct 29	Soft Robot Manipulation
10	Nov 5	Applications of Soft Robots
11	Nov 12	**Project Presentation (25%)**
12	Nov 19	**Report Deadline (20%), Quiz (15%)**
13	Nov 26	Project Feedback