THE CHINESE UNIVERSITY OF HONG KONG
M.Sc. Programme in Mechanical and Automation Engineering

Second Term, 2023-2024

MAEG5725: Control and Industrial Automation

Course Coordinator: Professor YUAN Haidong (hdyuan@mae.cuhk.edu.hk)
Mentor: Mr. GAO Songqun (1155155504@link.cuhk.edu.hk)
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 Class Day: Wednesday
Class Period: 6:30 p.m. – 9:30 p.m.
Classroom: Room 505, Yasumoto International Academic Park, CUHK (YIA 505)
Teaching Mode: On-site face-to-face
Course Website: https://blackboard.cuhk.edu.hk/ultra/courses/_190370_1/cl/outline

Course Outline
This course is designed to equip students with the knowledge of modern control systems analysis and design, and skills of control theory for practical applications of industrial automation systems. It will cover the following topics: state space representation, realizability, stability, controllability, observability; linear control design methods including pole placement, observer, asymptotic tracking and disturbance rejection, internal model design, and feedforward design; introduction to nonlinear systems. Various examples, e.g., robot control, satellite's attitude control and servomechanism are included.

Learning Outcomes
Upon completion of the course, students should have achieved the following outcomes:
1. Able to derive a state-space model for a given physical system;
2. Able to perform stability analysis and computer simulation of time responses of the model; and
3. Able to perform feedback controller design for fulfilling a given specification.

Academic Honesty and Plagiarism
Students are expected to conform to the highest standards of honesty and integrity. Students are encouraged to discuss course material to foster the motivations of ideas and produce high quality works. They may work together in the preliminary stages of individual homework assignments but the final work must reflect their originality and individual efforts. Plagiarism is considered a disciplinary offence which can result in reduced grades, failed subjects and suspension from the university. (http://www.cuhk.edu.hk/policy/academichonesty)

All text-based assignments should be submitted to the University's plagiarism detection engine VeriGuide (https://academic.veriguide.org/academic/login_CUHK.jspx).

With each assignment, students will be required to submit a signed declaration that you are aware of these policies, regulations, guidelines and procedures. Students may refer to the Information on Academic Honesty and Plagiarism and Honesty in Academic Work: A Guide for Students and Teachers (cuhk.edu.hk).

Course Schedule

Class	Date
1	Jan 10, 2024 (Wed)
2	Jan 17, 2024 (Wed)
3	Jan 24, 2024 (Wed)
4	Jan 31, 2024 (Wed)
5	Feb 7, 2024 (Wed)
6	Feb 14, 2024 (Wed)
7	Feb 21, 2024 (Wed)
8	Feb 28, 2024 (Wed)
9	Mar 6, 2024 (Wed)
10	Mar 13, 2024 (Wed)
11	Mar 20, 2024 (Wed)
12	Mar 27, 2024 (Wed)
13	Apr 3, 2024 (Wed)
14	Apr 10, 2024 (Wed)

Assessment Scheme (to be confirmed)

Feedback from Students
The course will be evaluated by course evaluation done by students.

Required/Recommended Readings
The details will be provided by the course instructor.

Use of Generative Artificial Intelligence (AI) Tools in Teaching, Learning and Assessment
In this course, the approach of "**Use only with explicit acknowledgement**" is adopted. Students may use some AI tools in some class activities and assignments on the condition that they make explicit acknowledgement and proper citations of the input from AI tools. Students are reminded to clarify with the course teacher and obtain permission if necessary when in doubt. Students may refer to the Use of Generative Artificial Intelligence.

Grade Descriptor
'A': EXCELLENT - exceptionally good performance and far exceeding expectation in all or most of the course learning outcomes; demonstration of superior understanding of the subject matter, the ability to analyze problems and apply extensive knowledge, and skillful use of concepts and materials to derive proper solutions.

'B': GOOD - good performance in all course learning outcomes and exceeding expectation in some of them; demonstration of good understanding of the subject matter and the ability to use proper concepts and materials to solve most of the problems encountered.

'C': FAIR - adequate performance and meeting expectation in all course learning outcomes; demonstration of adequate understanding of the subject matter and the ability to solve simple problems.

'D': MARGINAL - performance barely meets the expectation in the essential course learning outcomes; demonstration of partial understanding of the subject matter and the ability to solve simple problems.

'F': FAILURE - performance does not meet the expectation in the essential course learning outcomes; demonstration of serious deficiencies and the need to retake the course.

Enrollment Requirement
For students in MSc Mechanical and Automation Engineering; Not for students who have taken ENGG5403