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

Second Term, 2024-2025

MAEG5735: Applied Computational Intelligence

Course Coordinator:	Prof. LAM Hiu Fung Alan (alam@mae.cuhk.edu.hk)
Mentor:	TBC
Class Day:	Tuesday
Class Period:	6:30 p.m. – 9:15 p.m. (A 3-unit course load is given 3-session per week. Each session is 45 mins.) (Each hour is inclusive of a 15-min break).
Classroom:	Room 103, Y.C. Liang Hall, CUHK (LHC 103)
Teaching Mode:	On-site face-to-face
Course Website:	https://blackboard.cuhk.edu.hk/ultra/courses/_190372_1/cl/outline

Course Outline

This course applies artificial intelligent algorithms to solve mechanical and automation problems. It consists of the following topics: various areas of emerging technologies of artificial intelligent systems; introduction and review of neural networks; support vector machines; fuzzy systems; simulated annealing, and genetic algorithms; the applications of intelligent systems to control, robotics, automation, manufacturing, and transportation systems

Learning Outcomes

Upon completion of the course, students should have achieved the following outcomes:
1. Understand the emerging technologies of various artificial intelligent systems;
2. Understand the functions and characteristics of specific artificial intelligent systems; and
3. Understand the design principles and application potentials of artificial intelligent systems.

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)

Course Schedule

Class	Date	Course Content
1	Jan 7, 2025 (Tue)	LN01 Introduction to Applied Computational Intelligence
2	Jan 14, 2025 (Tue)	LN02 Basics of Neural Networks
3	Jan 21, 2025 (Tue)	LN03 Advanced Neural Networks
Jan 28, 2025 (Tue) – Lunar New Year Vacation		
4	Feb 4, 2025 (Tue)	LN04 Basic Fuzzy Logic
5	Feb 11, 2025 (Tue)	LN05 Applications of Fuzzy Logic
6	Feb 18, 2025 (Tue)	LN06 Basic Simulated Annealing
7	Feb 25, 2025 (Tue)	LN07 Applications of Simulated Annealing
8	Mar 4, 2025 (Tue)	**Midterm Exam**

9	Mar 11, 2025 (Tue)	LN08 Basic Genetic Algorithm
10	Mar 18, 2025 (Tue)	LN09 Applications of Genetic Algorithm
11	Mar 25, 2025 (Tue)	LN10 Basic Swarm Intelligence
12	Apr 1, 2025 (Tue)	LN11 Applications of Swarm Intelligence
13	Apr 8, 2025 (Tue)	LN12 Future Development of Computational Intelligence
14	Apr 15, 2025 (Tue)	**Final Exam**

Assessment Scheme

Assignments	20%
Midterm Exam	30%
Final Examinations	50%

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

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.