The Hong Kong University of Science and Technology

UG Course Syllabus (Spring 2025-26)

[Course Title] Learning, Reasoning, and Decision Making in AI

[Course Code] COMP 3211

[No. of Credits] 3

[Any pre-/co-requisites] (COMP 2012 OR COMP 2012H) AND COMP 2211

Name: [Instructor(s) Name] XIAO Huiru

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Office Hours: [Specify Office Hours and Location] By email appointment

Course Description

[Briefly describe the course content, key topics or themes, objectives, methods of instruction, e.g., lectures, discussions, projects].

This course provides a comprehensive coverage of the reasoning and decision-making aspects of artificial intelligence (AI). It covers fundamental concepts and techniques of AI, such as search, constraint satisfaction, game theory, game tree search, Markov decision processes, reinforcement learning, multi-agent systems, logic reasoning, and probabilistic reasoning.

List of Topics

- Simple intelligent agents
- Search (Uniformed, Heuristic, Adversarial)
- Learning
- Knowledge Representation, Reasoning, and Planning
- Multiagent systems, game theory and auction
- Uncertainty
- Others

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Identify the fundamental concepts and techniques of AI: autonomous agents, search, knowledge representation, and machine learning.
2. Understand and apply techniques for searching state spaces, including breadth-first, depth-first, best-first, A* search, minmax game tree search, minmax with alpha-beta pruning, and hill-climbing search.
3. Appreciate some cutting edge research in AI such as multiagent systems, game theory, ontology, semantic web, big data, deep learning, and others.

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessment Task	Contribution to Overall Course grade (%)
Assignments (including programming assignments)	15%
Midterm	35%
Final exam	50%

Assessments:

[List specific assessed tasks, exams, quizzes, their weightage, and due dates; perhaps, add a summary table as below, to precede the details for each assessment.]

Assessment Task	Contribution to Overall Course grade (%)	Due date
Assignments	15%	Assignment 1: Around end-February * Assignment 2: Around end-March * Assignment 3: Around early-May *
Midterm exam	35%	Around end-March *
Final exam	50%	

* Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Mapping of Course ILOs to Assessment Tasks

[add to/delete table as appropriate]

Assessed Task	Mapped ILOs	Explanation
Assignments	ILO1, ILO2, ILO3	The three assignments evaluate students' knowledge on fundamental concepts and techniques of AI (ILO1), techniques for search state spaces (ILO2), cutting edge research in AI (ILO3).
Midterm exam	ILO1, ILO2	The midterm exam evaluates students' knowledge on fundamental concepts and techniques of AI (ILO1), techniques for search state spaces (ILO2).
Final exam	ILO1, ILO2, ILO3	The final exam evaluates students' knowledge on fundamental concepts and techniques of AI (ILO1), techniques for search state spaces (ILO2), cutting edge research in AI (ILO3).

Grading Rubrics

[Detailed rubrics for each assignment will be provided. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.]

Each assignment and exam have different detailed rubrics, depending on specific problems and the score distribution among the problems.

Final Grade Descriptors:

[As appropriate to the course and aligned with university standards]

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals.
B	Good Performance	Shows good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Course AI Policy

[State the course policy on the use of generative artificial intelligence tools to complete assessment tasks.]

The students can use generative AI tools to complete assignments, but they must acknowledge in assignments if they do so.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include scores and detailed comments. Students who have further questions about the feedback including marks should consult the instructor within seven days after the feedback is received.

Resubmission Policy

[If applicable, explain the policy for resubmitting work or reassessment opportunities, including conditions and deadlines.]

No late submission or resubmission will be accepted.

Required Texts and Materials

[List required textbooks, readings, and any other materials]

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

[Optional] Additional Resources

[List any additional resources, such as online platforms, library resources, etc.]

N/A