Macao Polytechnic Institute

School of Applied Sciences

Bachelor of Science in Computing

Module Outline

Academic Year 2021/2022 Semester 2

Learning Module	Artificial Intelligence		**Class Code**	COMP421-421/422	
Pre-requisite(s)	Nil				
Medium of Instruction	English			**Credit**	3
Lecture Hours	45 hrs	**Lab/Practice Hours**	0 hrs	**Total Hours**	45 hrs
Instructor	Rebecca Choi		**E-mail**	rebeccachoi@ipm.edu.mo	
Office	M509, Meng Tak Building, Main Campus		**Telephone**	8599-3335	

Description

The learning module introduces both the theoretical and the practical aspects of artificial intelligence (AI), including the fundamental mathematical models and the state-of-the-art tools for AI problem solving. The topics include mathematical logic, searching heuristics, Bayesian inference, machine learning and prolog programming language. These topics cover a wide range of key topics in modern AI, from deterministic reasoning to reasoning with uncertainty, from rule-based systems to learning-based systems, etc.

Learning Outcomes

After completing the learning module, students will be able to:

1. Summarize and apply fundamental mathematical models in AI; (SM2p)
2. Convert and solve practical problems by fundamental AI techniques; (SM2p)
3. Illustrate and analyze high level concerns of AI, such as inference and learning; (EA2p)
4. Evaluate and compare different AI models in practical applications; (EA2p, EA3p)
5. Design and implement novel applications based on existing AI models. (EA3p, D4p)

Content

1. Introduction (3 hours)
    1.1 What is computer science
    1.2 What is artificial intelligence

1.3 Relationship between CS and AI

1.4 State-of-the-art in AI

2. Mathematical Logic (9 hours)

2.1 Propositional logic

2.2 First-order logic

3. Search Heuristics (9 hours)

3.1 Graph

3.2 State space search

3.3 DFS and BFS

3.4 A* search

3.5 Examples

4. Bayesian Inference (9 hours)

4.1 Conditional probability and Bayes theorem

4.2 Bayes reasoning

4.3 Bayes networks

4.4 Examples

5. Machine Learning (9 hours)

5.1 From rule-based to learning systems

5.2 Unsupervised learning

5.3 Supervised learning

5.4 Semi-supervised learning

6. Prolog Language (6 hours)

6.1 Prolog fundamental

6.2 Unification

6.3 Lists and recursion

Teaching Method

Lectures and tutorials.

Attendance

Attendance requirements are governed by the “Academic Regulations Governing Bachelor’s Degree Programmes of Macao Polytechnic Institute”. Students who do not meet the attendance requirements for the module will not be permitted to sit the final or re-sit examination and shall be awarded an ‘F’ grade.

Assessment

This learning module is graded on a 100 point scale, with 100 being the highest possible score and 50 being the passing score.

	Item	Description	AHEP3 LO	Percentage
1.	Assignments	Home-based exercises	SM2p, EA3p, D4p	25 %
2.	Test	Knowledge assessment	SM2p, EA2p, EA3p	25 %
3.	Examination	3-hour written examination	SM2p, EA2p, EA3p	50 %
			Total Percentage:	100%

Students with an overall score of less than 35 in the coursework must take the re-sit examination even if the overall score for the module is 50 or above.

Students with a score of less than 35 in the final examination must take the re-sit examination even if the overall score for the module is 50 or above.

Students with an overall final grade of less than 35 are NOT allowed to take the re-sit examination.

Teaching Material

Textbook(s)

1. Stuart Russell (2016). *Artificial Intelligence: A Modern Approach (3rd ed.)* Prentice Hall

Reference

Reference book(s)

1. Judea Pearl (1988). *Probabilistic Reasoning in Intelligent Systems: Networks of Plausible Inference (1st ed.)* Morgan Kaufmann.