

## MODULE DESCRIPTOR

### Module Title

Artificial Intelligence for Problem Solving

Reference	CM3152	Version	1
Created	November 2023	SCQF Level	SCQF 9
Approved	September 2012	SCQF Points	15
Amended	July 2022	ECTS Points	7.5

### Aims of Module

To provide the student with the ability to demonstrate the practical skills required for the development of intelligent problem-solving systems.

### Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Explain the main problem solving methods within Artificial Intelligence.
- 2 Differentiate the various search methods which can be used for problem solving.
- 3 Demonstrate the use of a suitable search strategy in an intelligent problem-solving system.
- 4 Assess the use of heuristics in a problem solving task.

### Indicative Module Content

Artificial Intelligence definition, concepts, problems and examples, paradigms. Uninformed searches: breadth-first, depth-first, depth-limited, iterative deepening, bidirectional search. Informed searches: Best-first, A\*, heuristics. Adversarial searches: Minimax, Alpha-beta pruning. Local searches: Hill-climbing and variants, Genetic Algorithms (GA).

### Module Delivery

Lectures are used to deliver the main principles underlying problem solving methods. Computing laboratories are used to examine case studies which reinforce the material covered in lectures and to design and implement prototype problem-solving systems. The understanding of the student is further enhanced through directed reading.

**Indicative Student Workload**

	Full Time	Part Time
Contact Hours	30	N/A
Non-Contact Hours	120	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	N/A
Actual Placement hours for professional, statutory or regulatory body		

**ASSESSMENT PLAN**

If a major/minor model is used and box is ticked, % weightings below are indicative only.

**Component 1**

Type:	Examination	Weighting:	50%	Outcomes Assessed:	1, 2
Description:	A closed book exam that contributes 50% to total module assessment.				

**Component 2**

Type:	Coursework	Weighting:	50%	Outcomes Assessed:	3, 4
Description:	A programming coursework that contributes 50% to total module assessment.				

**MODULE PERFORMANCE DESCRIPTOR****Explanatory Text**

The calculation of the overall grade for this module is based on 50% weighting of the exam and 50% weighting of the coursework. An overall minimum grade D is required to pass the module.

		Coursework:						NS
		A	B	C	D	E	F	
Examination:	A	A	A	B	B	C	E	
	B	A	B	B	C	C	E	
	C	B	B	C	C	D	E	
	D	B	C	C	D	D	E	
	E	C	C	D	D	E	E	
	F	E	E	E	E	E	F	
NS		Non-submission of work by published deadline or non-attendance for examination						

**Module Requirements**

Prerequisites for Module	Object oriented software development or equivalent.
Corequisites for module	None.
Precluded Modules	None.

**INDICATIVE BIBLIOGRAPHY**

- 1 Russell, S., Norvig, P. 2020. Artificial Intelligence: A Modern Approach (4th edition). Pearson.
- 2 Millington, I. 2019. Artificial Intelligence for Games. CRC Press.
- 3 Flasinski, Maiusz. 2016. Introduction to Artificial Intelligence. Springer.
- 4 E. Wolfgang. 2017. Introduction to Artificial Intelligence. Springer.
- 5 Yannakakis, G. N., Togelius, J. 2018. Artificial Intelligence and Games. Springer.