

## MODULE DESCRIPTOR

<b>MODULE TITLE</b>	ARTIFICIAL INTELLIGENCE		
<b>MODULE CODE</b>	CO3519 (L6)	<b>CREDIT VALUE</b>	20 UK CREDITS / 10 ECTS
<b>SCHOOL</b>	SCHOOL OF SCIENCES		

### MODULE AIMS

1. Introduce students to the approach and techniques of Artificial Intelligence.
2. Familiarise students with the techniques and algorithms that are employed in Artificial Intelligence.
3. Help students understand some of theoretical underpinnings of computing.

### MODULE CONTENT

#### Indicative syllabus content:

Artificial Intelligence (AI) is an important topic within Computer Science. The techniques and algorithms of AI can be applied in a variety of important ways.

This module will introduce AI in the context of computer games. Games are an ideal "toy" environment in which to explore AI techniques. The module will then move onto exploring some of theoretical underpinnings of AI and Computing.

#### Introduction to Artificial Intelligence

- Intelligent Agents
- Finite State Machines
- Search algorithms. This will be done in the context of pathfinding: Breadth-First, Depth-First, Hill-Climbing, Dijkstra's algorithm, Best-First, A\*
- Decision Making, Conceptual Search

#### Advanced Artificial Intelligence

- Influence Maps
- Cellular Automata
- Blackboard model
- Planning
- Production systems
- Turing Machines and computability
- Machine learning
- Behaviour trees
- Decision trees

### INTENDED LEARNING OUTCOMES

#### On successful completion of this module a student will be able to:

1. Explain the theoretical underpinnings of algorithms and techniques specific to artificial intelligence.
2. Critically evaluate the principles and algorithms of artificial intelligence.
3. Analyse and evaluate the theoretical foundations of artificial intelligence and computing.
4. Implement artificial intelligence algorithms.

### TEACHING METHODS

All the AI development techniques covered will be introduced from a programming viewpoint and illustrated practically.

Lectures will present concepts illustrated with examples and will be used to direct student reading and research into relevant topics. Tutorial and practical sessions will allow students to investigate and apply the material illustrated in the lectures.

As well as reinforcing the topics covered in the lecture, tutorials will also allow the student to examine and evaluate other possible approaches to these topics. Tutorials will also include the presentation and discussion of student investigation.

In practical sessions, students will apply their general programming skills to implement, modify and explore AI algorithms.

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The summative assessment uses a written examination to test the students' comprehension and application of the concepts taught to or discovered by the students and their practical skills in the application of AI algorithms and concepts through a coursework assignment that will involve implementation. The examination will allow the students to demonstrate their knowledge and their understanding of the concepts. For example, a question might require the student to interpret part of a formal specification, or to identify errors in a faulty specification.

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## **ASSESSMENT METHODS**

This module is assessed through coursework and an examination.