UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title:	Artificial Intelligence
Module Code:	COS5028-B
Academic Year:	2019-20
Credit Rating:	20
School:	Department of Computer Science
Subject Area:	Computer Science
FHEQ Level:	FHEQ Level 5
Pre-requisites:	
Co-requisites:	

Contact Hours	
Type	**Hours**
Lectures	24
Laboratory	24
Directed Study	152

Availability	
Occurrence	**Location / Period**
BDA	University of Bradford / Semester 1 (Sep - Jan)

Module Aims

To provide an introduction to the foundations of Artificial Intelligence (AI).

To introduce important AI concepts and some application areas of AI, and thereby to equip students with the basic methods and techniques of AI.

To provide some practical hand-on experience by implementing basic AI concepts using some programming languages, e.g. Java (an object oriented programming language) and Prolog (a logic programming language).

Outline Syllabus

1. Intelligent Agents: Different types of agents will be considered: simple reflex agents, model-based reflex agents, goal-based agents and utility-based agents. The practical implementations will be done using Java programming language.

2. Learning from Examples. Different approaches to learning will be discussed: supervised and unsupervised learning. Some learning algorithms, including decision trees, regression models and artificial neural networks, will be introduced.

3. Quantifying Uncertainty. Concepts related to quantifying uncertainty in artificial intelligence, e.g. probability, joint distributions and the Bayes rule, will be discussed with examples from real world scenarios.

4. Solving Problems by Searching. Different search techniques, e.g. breadth-first search, depth-first search, uniform-cost search, depth-limit search and iterative deepening search, will be introduced with examples and algorithms.

5. Planning. Methods for planning and agent architectures in planning will be introduced. Also, some scheduling concepts, e.g. linking classical human planning to artificial intelligence, will be discussed.

6. Inference in First-order Logic: First order logic and the concept of inference will be introduced with programming examples in Prolog programming language

Learning Outcomes

1	demonstrate how intelligent agents work and how agents learn by examples by training;
2	identify and describe basic principles and concepts underpinning uncertainty, probability and errors in learning;
3	understand fundamental searching and planning algorithms in AI and develop technical skills to implement the relevant algorithms using Java programming language;
4	understand basic concepts in first-order logic and inference, and apply them to derive logical conclusions using the Prolog programming language.

Learning, Teaching and Assessment Strategy

The course will consist of lectures, computer lab sessions, independent study, and directed reading to provide the opportunity to gain theoretical knowledge and practical knowledge of Artificial Intelligence. Students will be assessed through 2 courseworks and end of semester exam.

Mode of Assessment				
Type	**Method**	**Description**	**Length**	**Weighting**
Summative	Examination - closed book	Examination	1.5 hours	50%
Summative	Coursework	Case study analysis using computer programming	-2000 words	50%

Reading List
To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html.

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.