UNIVERSITY of BRADFORD

Module Descriptor

Computational Modelling and Artificial Intelligence

Module Code:	COS5022-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Computer Science
Subject Area:	Computer Science
FHEQ Level:	FHEQ Level 5
Module Leader:	Dr Attila Csenki

Additional Tutors:

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	42
Tutorials	12
Laboratory	12
Directed Study	132
Examinations DO NOT USE	2

Availability Periods

Occurrence	Location/Period
NLA	Namal College / Semester 2 (Feb - May)
BDA	University of Bradford / Semester 2 (Feb - May)

Module Aims

To provide an introduction to the foundation of Symbolic and Declarative Computing. There are two main aims:

(a) To convey the basics of two programming paradigms, represented respectively by Haskell (a functional programming language) and Prolog (a logic programming language).

(b) To introduce the AI philosophy to computer science students and thereby to equip students with the basic techniques of AI. To discuss some of the application areas of AI.

Outline Syllabus

Functional Programming. A basic course in Functional Programming in Haskell using the Hugs system. Reasoning about programs - Structural Induction.

Neural Networks. Classifiers, perception training algorithm, the delta rule, network of perceptions, the generalised delta rule (back propagation algorithm). Application: a rudimentary character recognition system.

Prolog. An introduction to Logic Programming through Prolog.

Propositional Calculus. Truth Tables. Reasoning & Resolution Proofs. Predicate Calculus.

AI Techniques. Search algorithms: Blind Search and Informed Search algorithms; Bayesian Networks - a method for inference under uncertainty; basic probability theory, the Bayesian network, Bayesian network adapting, handling evidence, inexact inferencing.

Module Learning Outcomes

On successful completion of this module, students will be able to...

1	1. Understand the basics of logical and functional programming techniques, and how AI techniques apply to practical problems 2. furnish in the said programming languages solutions to certain AI problems, 3. pursue further studies independently in AI and allied fields.
2	1. Develop formal proof techniques in program construction, and understand and apply basic symbolic AI techniques. 2. Solve certain problems in AI using a dedicated program library (such as MATLAB's Neural Network Toolbox)
3	Pursue a systematic approach to the construction of programs analyse and disassemble problems into their building blocks and build solutions based on this analysis. (Stepwise refinement, modularization and, more generally, creative thinking are all characteristics of the activities pursued here.)

Learning, Teaching and Assessment Strategy

Consists of lectures, laboratory study, tutorials and directed reading provide the opportunity to gain theoretical knowledge, which is assessed by examination, and practical skills which are assessed by coursework assignments. Teaching will involve lab sessions using Prolog implementations of pertinent algorithms.

Students required to undertake supplementary assessment will be asked to repair deficiencies.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Examination - closed book	EXamination	2 hours	50%	Yes
Summative	Coursework	3 coursework assignments		50%	Yes

Legacy Code (if applicable)

CM-0318L and CM-0239D (latter wef 2017/8)

Reading List

To view Reading List, please go to **rebus:list**.