



## MODULE SPECIFICATION

Part 1: Information			
Module Title	Intelligent Systems		
Module Code	UFCFB4-30-2	Level	Level 5
For implementation from	2018-19		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Environment & Technology	Field	Computer Science and Creative Technologies
Department	FET Dept of Computer Sci & Creative Tech		
Contributes towards			
Module type:	Standard		
Pre-requisites	Introduction to Artificial Intelligence 2018-19		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
<p><b>Educational Aims:</b> In addition to Learning Outcomes, the educational experience may explore, develop, and practise but not formally discretely assess the following:</p> <p>Tutorial problem-solving activity, working as a team member, contributing to group discussion</p> <p><b>Outline Syllabus:</b> Part A: Bivalent to multi-valent logics and probabilistic reasoning</p> <p>Symbolic reasoning – logical reasoning, knowledge representation, and knowledge based systems; cognitive issues; critical AI and philosophical perspectives</p> <p>Probabilistic reasoning and Fuzzy systems - reasoning under conditions of uncertainty, certainty factors and belief measures, Bayesian reasoning and belief networks; fuzzy expert systems, fuzzy sets and rules, membership functions, fuzzy operators, linguistic variables and hedges, fuzzy probability, fuzzy inferencing, fuzzy controllers.</p>

## STUDENT AND ACADEMIC SERVICES

Hybrid Intelligent Systems – notions of hybridity and types; rationale; examples

Part B: Agent-based systems

Agent-based systems - an introduction to agent autonomy, agent architectures (e.g. proactive / reactive / hybrid, subsumption), MEA and planning, deductive and practical reasoning agents and theorem proving, multi-agent communication and cooperation

Part C: Biological models of intelligence.

Artificial neural networks - the neural model, artificial neurons and neuronal learning, the perceptron, multi-layer NNs, Hopfield networks, supervised and unsupervised learning NNs, reinforcement learning.

Evolutionary computing - the evolutionary model, evolutionary strategies, chromosomes, fitness, population selection and selection operators (random, tournament etc); genetic algorithms, crossover, mutation; genetic programming.

Swarm Intelligence - the social model, particle swarm optimization, social networks, PSO algorithms, PSO system parameters, cooperative PSO, ant colony optimization.

Hybrid Intelligent Systems – case studies

**Teaching and Learning Methods:** This module will involve 6 hours contact time per fortnight. The time will be divided between lecture sessions, tutorials, and laboratory sessions. Over the course of the academic year students should expect to spend approximately:

Contact time: 72 hours

Assimilation and development of knowledge: 148 hours

Exam preparation: 40 hours

Coursework preparation: 40 hours

Total study time: 300 hours

Scheduled learning:

The main material in the module will be introduced in lectures and lab sessions. This exposure will be supplemented by tutorials.

Independent learning:

In addition, students will be expected to develop independent learning approaches through directed reading and study.

Group and teamwork learning:

In addition, tutorial sessions will include scheduled student presentations in which the focus of individual, autonomous study will be supplemented by appropriate group work.

By these contrasting and complementary approaches, it is envisaged that a wide array of teaching and learning styles will be represented in the module, with a view to capturing and representing a wide cross section of student learning styles and orientations.

### Part 3: Assessment

The assessment strategy comprises TWO parts:

Written examination comprising material relating directly to all topics covered in lectures.

Themed coursework that elaborates and extends experiences gained in laboratory sessions and exercises, integrating various paradigms.

## STUDENT AND ACADEMIC SERVICES

First Sit Components	Final Assessment	Element weighting	Description
Portfolio - Component B		25 %	Portfolio of online tests and peer assessment
Presentation - Component B		25 %	Assessed student presentation (10 minutes)
Examination - Component A	✓	50 %	Examination (unseen) 3 hours
Resit Components	Final Assessment	Element weighting	Description
Report - Component B		25 %	Written report related to material and topics associated with First Sit Component B (Word length 1000 words)
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Examination - Component A	✓	50 %	Examination (unseen) 3 hours

STUDENT AND ACADEMIC SERVICES

<b>Part 4: Teaching and Learning Methods</b>																			
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Reading List	<p>The reading list for this module can be accessed via the following link:</p> <p><a href="https://uwe.rl.talis.com/modules/ufcfb4-30-2.html">https://uwe.rl.talis.com/modules/ufcfb4-30-2.html</a></p>																		