



MODULE SPECIFICATION

Part 1: Information			
Module Title	Intelligent and Adaptive Systems		
Module Code	UFME7K-15-M	Level	Level 7
For implementation from	2018-19		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Contributes towards	Mechanical Engineering [Sep][FT][Frenchay][1yr] MSc 2018-19 Mechanical Engineering [Sep][PT][Frenchay][2yrs] MSc 2018-19 Robotics and Autonomous Systems [Sep][FT][Frenchay][1yr] PhD 2018-19		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
<p>Educational Aims: See Learning Outcomes.</p> <p>Outline Syllabus: The syllabus includes:</p> <p>Introduction: Review of the links with other disciplines, e.g. classical AI, psychology, robotics, ethology, neuroscience and classical control. Scope and limitations of this module, especially with respect to classical control and AI.</p>

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Learning and adaptive systems: Working definitions of intelligence, adaptive systems and learning. Adaptation through learning versus design.

Basic Architectures: Neural networks. Fuzzy systems. Evolutionary computation. Supervised, unsupervised and reinforcement learning.

Compound Architectures: Neuro-fuzzy Systems. Behaviour-based systems. Agentbased systems. Multi-agent and swarm systems.

Example applications: Review of work carried out in this Faculty, and at other establishments, in order to demonstrate the major strengths and weaknesses of the techniques.

Teaching and Learning Methods: Lectures will introduce the fundamental concepts. Tutorial sessions will be used for two purposes: they will be used to expose students to demonstrations of the basic architectures in action as well as to discuss real implementations of these new techniques. Tutorials are designed to illustrate the essential details of a particular concept or technique, and especially its strengths and weaknesses in both technical and business contexts. At all times specific examples will be used to "ground" the theory.

Contact hours will include lectures (1 hour per week) and practical tutorial sessions (2 hours per week).

Contact hours: 36

Self-study hours: 54

Coursework Preparation hours: 36

Examination Preparation hours: 24

Total hours: 150

Part 3: Assessment

The module is concerned with the study of innovative technological approaches to intelligent control and adaptive systems in robotics. The assessment strategy reflects this, encouraging independent learning and research in component B where the assignment is designed to elaborate and extend experiences gained in laboratory sessions and exercises.

The controlled conditions Component A is a written exam, , designed to assess understanding of important features in the architecture of intelligent and adaptive systems and for students to critically compare the performance characteristics of the advanced new techniques covered in this module with traditional approaches.

First Sit Components	Final Assessment	Element weighting	Description
Written Assignment - Component B		50 %	Written assignment (4000 words)
Examination - Component A	✓	50 %	Examination
Resit Components	Final Assessment	Element weighting	Description
Written Assignment - Component B		50 %	Written assignment (4000 words)
Examination - Component A	✓	50 %	Examination

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Part 4: Teaching and Learning Methods		
Learning Outcomes	On successful completion of this module students will be able to:	
	Module Learning Outcomes	
	MO1	Demonstrate a thorough understanding of the important features of intelligent and adaptive systems using both basic and compound architectures
	MO2	Critically compare the performance characteristics of the advanced new techniques covered in this module with traditional approaches to selected problems in signal processing, classification and control
	MO3	Apply the principles covered in this module in a practical robotics application
	MO4	Study independently where necessary for the understanding of new advancements in the field
	MO5	Transfer these advanced new techniques from the research sector to industrially-relevant applications
Contact Hours	Contact Hours	
	Independent Study Hours:	
	Independent study/self-guided study	114
	Total Independent Study Hours:	114
	Scheduled Learning and Teaching Hours:	
	Face-to-face learning	36
	Total Scheduled Learning and Teaching Hours:	36
	Hours to be allocated	150
	Allocated Hours	150
Reading List	<p>The reading list for this module can be accessed via the following link:</p> <p>https://uwe.rl.talis.com/modules/ufme7k-15-m.html</p>	