Liverpool John Moores University

Title:	ARTIFICIAL INTELLIGENCE SYSTEMS
Status:	Definitive
Code:	**6008ENG** (106213)
Version Start Date:	01-08-2016
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Electronics and Electrical Engineering

Team	Leader
Karl Jones	Y

Academic Level:	FHEQ6	**Credit Value:**	12	**Total Delivered Hours:**	48
Total Learning Hours:	120	**Private Study:**	72		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Practical	24

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	AS1	Coursework on Expert Systems	30	
Essay	AS2	Coursework on Fuzzy Logic	20	
Essay	AS3	Coursework on Neural Networks	30	
Essay	AS4	Coursework on Evolutionaly Systems	20	

Aims

Following this module, students will gain an appreciation of several artificial intelligence techniques and their application.

Learning Outcomes

After completing the module the student should be able to:

1	Undertake knowledge acquisition and knowledge representation
2	Use a Windows based KBS shell to develop a small rule-based intelligent system
3	Use fuzzy mathematics and apply fuzzy logic
4	Develop a realistic small fuzzy logic system in a simulation environment
5	Apply neural network techniques
6	Apply the fundamental prinicples of genetic algorithms

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

CW	1	2
CW	3	4
CW	5	
CW	6	

Outline Syllabus

Intelligent knowledge based systems:
introduction to Knowledge Based Systems,
methods of knowledge representation,
production rules, frames, logic, sematic networks, predicate logic,
methods of knowledge acquisition, knowledge elicitation,
KBS functions: rule based systems, inference engines, chaining
probability, bayesian and predicate logic.

Fuzzy logic:
fuzzy fundamentals, fuzzy calculus, fuzzy mathematics,
fuzzification and defuzzification, inference methods, membership functions.

Neural nets:
concepts, biological and artifical neurons, learning schemes,
multi-layer perceptron, backpropagation, training algorithms,
implementation for pattern recognition, design issues.

Evolutionary Computing (introduction)
Genetic Algorithms, principles, data coding, fundamental operations,
Basic GA
Genetic programming.

Learning Activities

Lectures supported by handouts and tutorials where appropriate.
Practical sessions will use software packages for implementing AI methods.
An individual student report is required for all courseworks.

Notes

To develop an appreciation of Intelligent Knowledge Based Systems (KBS) and experience of building a small rule-based model.
To highlight the concepts of fuzzy logic and fuzzy mathematics, and create a fuzzy logic system.
To introduce the concepts of neural networks and evolutionary systems and gain experience in their application.