

## Liverpool John Moores University

Title: KNOWLEDGE ENGINEERING  
Status: Definitive  
Code: **3004BELCM** (101120)  
Version Start Date: 01-08-2011

Owning School/Faculty: Arts, Professional and Social Studies  
Teaching School/Faculty: Bellerby's College - Brighton

Team	Leader
Jarmila Hickman	Y

**Academic Level:** FHEQ3      **Credit Value:** 12.00      **Total Delivered Hours:** 68.00  
**Total Learning Hours:** 120      **Private Study:** 52

### Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	66.000

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Technology	AS1	Assessed practical projects	50.0	
Exam	AS2	Closed book examinations	50.0	2.00

### Aims

*This module introduces the concept of dealing with knowledge as opposed to purely data and information.*

*Students learn the difference between knowledge, data and information and from this, what a knowledge based system consists of, how humans and computers process information differently and how and where knowledge based systems are used in practice.*

*Students learn how knowledge suitable for a knowledge based system is acquired and what the limitations of this may be prior to learning the different types of knowledge based systems.*

*The lifecycle of knowledge based systems will be learnt in addition to how uncertainty can be dealt with.*

*Students also will gain exposure to current research in this field such as that in fuzzy logic and in other intelligent systems.*

## **Learning Outcomes**

After completing the module the student should be able to:

- 1 Understand the need for knowledge based systems.
- 2 Understand the different types of knowledge based systems.
- 3 Set up and use at least one type of Expert System (such as ExSys or Prolog) and thereby understand the concept of declarative programming.
- 4 Understand how forwards and backwards chaining are used.
- 5 Describe at least one lifecycle system / methodology (such as Common KADS).
- 6 Understand how knowledge based systems are currently being used and developed.

## **Learning Outcomes of Assessments**

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

technology	1	3	4	6	
EXAM	1	2	4	5	6

## **Outline Syllabus**

- 1. Explain the reasoning for knowledge based systems including what knowledge is, the difference between deep and shallow knowledge, how we can use knowledge and how computer systems can utilise knowledge.*
- 2. Exposure to different types of knowledge based systems and methodologies – including expert systems, case based reasoning and neural networks.*
- 3. Look at the way in which human experts can be used to effectively feed into a knowledge based system.*
- 4. Inferencing techniques. Also learning the difference between forwards and backwards chaining.*
- 5. The difference between procedural and declarative programming. Development of knowledge based systems using programs such as ExSys and Prolog.*
- 6. Introduce the different lifecycles and methodologies often used in knowledge based systems such as blackboard architecture, KADS, CommonKADS and Hybrid Methods.*
- 7. Explore the ways in which uncertainty in knowledge based systems can be dealt with.*
- 8. Look into the use of fuzzy logic and other developmental methods and systems.*

## **Learning Activities**

1. Research the history of knowledge based systems.
2. Produce a report on current applications of knowledge based systems.
3. Perform a practical exercise of knowledge acquisition from a mock human expert and represent collected data using blackboarding techniques, frames and other methods.
4. Perform non computer based practical activities on the use of inferencing, forwards and backwards chaining.
5. Develop small scale knowledge based systems using Exsys, Prolog or similar packages.
6. Produce a report on one aspect or one application currently under development.

## References

<b>Course Material</b>	Book
<b>Author</b>	Schreiber, G
<b>Publishing Year</b>	2000
<b>Title</b>	Knowledge Engineering and Management
<b>Subtitle</b>	The Common KADS Methodology
<b>Edition</b>	
<b>Publisher</b>	MIT Press
<b>ISBN</b>	9780262193009

## Notes

Students are introduced to the differences between knowledge, data and information and, from that, to knowledge-based systems. There will be an opportunity to be exposed to current research in this field such as that in fuzzy logic and in other intelligent systems.