

BIRKBECK COLLEGE
 University of London

a. Module Specification

Module number	
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(For Registry Use)	

1. Faculty	2. School	3. Degree(s) of which the module forms part
Social Sciences	Computer Science and Information Systems	MSc in Advanced Information Systems Masters by Research in Computer Science

4. Module title
Knowledge Representation and Reasoning

5. Module value	6. Date from which the module will operate	7. Number of students per intake
Half-unit	2002/2003 academic year	About 20 FT and 20 PT

8. Pre-requisites and co-requisites to the module
Prerequisites: Familiarity with the basics of formal reasoning and algorithms (e.g. as taught in a typical U.K. undergraduate degree in computer science, or on a conversion MSc, or equivalent)

9. Does the module supersede an existing module?
No

10. Main aims of the module
To understand how epistemic analysis can contribute to better design of a wide variety of applications including expert, distributed, and multi-agent systems.

11. Learning outcomes

<p>Knowledge and understanding in the context of the subject</p> <p>Understanding how the use of logic can improve the effectiveness of intelligent applications.</p> <p>Cognitive skills</p> <p>Understanding dynamic and reactive behavior by logical modeling and the mechanism of performing reasoning tasks.</p>	<p>Subject-specific practical/professional skills</p> <p>Ability to use logic as a tool for modeling knowledge. Efficient implementation of knowledge representation and processing.</p> <p>General/transferable skills (including key skills)</p> <p>Employing logical analysis for deeper understanding and efficient design of complex applications.</p>
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12. Module structure, syllabus and assessment method

One-term course, 11 weeks 3 hours per week

Assessment: by written examination

Syllabus:

- Reasoning about Knowledge:
 - Basics of modal and temporal logic.
 - Modeling knowledge in multi-agent systems (including common and distributed knowledge, agreement), describing the behavior of a system by using the knowledge of the participating agents, examples of systems.
 - Knowledge-based programming (including protocols and messages).
 - Knowledge and computation – modeling the learning process of agents.
- Knowledge Representation and Processing.
 - Representation and reasoning systems, datalog, examples.
 - Knowledge-based systems, system architecture for expert systems, problem representation, solution-searching algorithms.
 - Incorporating indefinite knowledge, first-order logic and description logic.
 - Considering changes in the world, planning and actions, reactive agents, reasoning about time.
 - Hypothetical reasoning and reasoning under uncertainty.
 - Learning.

Recommended reading:

R. Fagin, J.Y. Halpern, Y. Moses, and M.Y. Vardi,
Reasoning about Knowledge.
The MIT Press, 1995.

D. Poole, A. Mackworth, and R. Goebel,
Computational Intelligence: a Logical Approach.
Oxford University Press, 1998.

13. Workload

Indicate the number of hours the student will spend in:

Lectures 23

Seminars:

Tutorials:10

Field Work:

Project Work:20 hours (2 hours coursework per week)

Laboratories:

b. Resources Specification

1. Teaching staff required

Name	Department	% of total teaching
Szabolcs Mikulas	School of Computer Science and Information Systems	100%

2. Additional resources required

Accommodation

See course proposal forms

Library

Have you discussed library provision for the course with your subject librarian?

Yes

Other Library Resources required e.g. computing, a-v equipment.

None

Computing

Have you discussed any requirements for the use of specific software packages with CCS technical support staff?

No CCS support required.

CCS No implications

Department No outstanding problems

Part-time teaching

Nil

Other

Nil

3. Reading list

a) Books of which students are expected to own copies

None

b) Books for which a high level of duplication within the library will be needed

None

c) Other required reading

Selected research papers available on the internet will be recommended during the course.

4. Recommendations

AGREEMENT

Dean of Faculty _____ **Date** _____

Head of School _____ **Date** _____

Librarian _____ **Date** _____

Comments _____

CCS Manager _____ **Date** _____

Comments _____

CLOSING DATE: 1 FEBRUARY PRECEDING THE SESSION IN WHICH TEACHING WOULD BEGIN. YOU MUST ALSO OBTAIN **ALL** OF THE ABOVE SIGNATURES BEFORE YOU SUBMIT THE FORM.

On completion please return to the Dr Brian Harwood, Registrar.