

MODULE / COURSE-UNIT PROPOSAL FORM (revised Sept05)

Registry use only:

Module/course-unit code	Received	DC approval
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N.B: In developing the module/course-unit, account should be taken of the Framework for Higher Education Qualifications, which can be found at: <http://www.qaa.ac.uk/academicinfrastructure/FHEQ/EWNI/default.asp>, relevant QAA Benchmarking Statements (<http://www.qaa.ac.uk/academicinfrastructure/benchmark/default.asp>) and, where appropriate, the requirements of Professional and Statutory Bodies.

1. Title (see footnote ¹)		2. Value	3. Level	4. Duration
Semantic Web		0.5	Please see footnote ² M	Number of terms 1
5. Programme(s) of which the module/course-unit forms part (insert * by the title for a new programme). Please indicate the total number of modules/ course-units for each programme and specify to which programmes it is a core and to which programmes it is an option and in which year(s) of the programme it is offered.				
Programme(s)		Total no. of modules/ course units in programme	Core/Option	Year(s) in which offered
MSc in Advanced Information Systems		8	Option	Both
MSc in Web Information Systems		8	Option	Both
MSc in Computational Intelligence*		8	Option	Both
MSc in E-Business Technology		8	Option	Both
Masters in Research in Computer Science		4	Option	Both
6. School (or Department) responsible for this module/course-unit*	7. Date module/course-unit will commence	8. Maximum/minimum number of students per intake		
* For FCE include Subject Desk School of Computer Science and Information Systems	October 2006	30/10		
9. Pre-requisites and/or Restrictions				
<i>Restrictions may include modules/course-units only being available to students studying a particular programme or modules/course-units which cannot be taken in conjunction with this one.</i>				
None				
10. Teaching and Learning Methods				
Indicate the total contact hours the student will spend in:				
Lectures:	27 hours	Field Work: (Please also state here: number of trips; group or independent; location and duration of; resources/equipment required)		
Seminars:				
Tutorials:		Practical Classes: 7 hours (labs, computers, languages)		

¹ Where a module/course-unit is being developed as part of a new programme, this form should be submitted with the Programme Proposal/Programme Specification Form.

² This section should detail the level of the module/course-unit in accordance with the qualification levels which are described in the Framework for Higher Education Qualifications (see: <http://www.qaa.ac.uk/academicinfrastructure/FHEQ/EWNI/default.asp>, an extract of which can be found in the appendix to this form).

Modules/course-units on Masters degrees, Postgraduate Certificates and Postgraduate Diplomas should be designated as level M (Masters). Modules/course-units on Foundation degrees should be identified as either level C (Certificate) or level I (Intermediate) and those on Bachelors degrees with Honours should normally be designated as level C (Certificate) for modules/course-units usually taken in year 1, level I (Intermediate) for modules/course-units usually taken in years 1 and 2 and level H (Honours) for work in the final two years of the programme.

Project Work:	Other (please specify):
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11. Main aims, special features and rationale

Main Aims

The course intends to introduce the theoretical foundations of the Semantic Web, which brings semantics to the (syntactic) Internet. The aim is to provide students both with theoretical and practical skills of building ontologies and representing them in description logics. More specifically, the main aims are:

1. To explain the goals of the Semantic Web:
 - What is it for?
 - What is there now?
 - Where is it going?
2. To explain the foundations for the Semantic Web:
 - 2.1. Languages and logic
 - RDF and its relatives
 - Description logics
 - OWL and the Protege/OWL tools
 - 2.2. Ontology problems
 - Language and concepts
 - Common idioms and common pitfalls
3. To give examples of practical ontology building.

Special Features

The Semantic Web is an exciting new direction in the development of the Internet. It provides a common framework that allows **data** to be shared and reused across application, enterprise, and community boundaries.

Rationale for introducing the module/course-unit in the context of existing provision including statement of how this proposal meets student needs.

[a. If the proposal supersedes an existing module/course-unit please give the title and code of the superseded module(s)/course unit(s) and the reason for replacement.]

[b. If the proposal relates to an existing module/course-unit please give the title and code of the related module(s)/course unit(s) together with an explanation of how this relationship will work.]

The Semantic Web is an example of advanced information processing strongly relevant to a number of advanced information systems in present day use, for example building and maintaining ontologies in bioinformatics. Semantic Web is also a very active research area.

12. Learning Outcomes

Please note: The learning outcomes should relate to the overall aims of the programme(s) to which the module/course-unit forms part.

Students who have taken the module/course-unit should be able to demonstrate the following knowledge, skills and understanding:

<p>Subject Specific</p> <p>Having completed the course, the students will be familiar with the concept of Semantic Web, ontology languages for the Semantic Web (RDF and OWL) as well as the logical foundations of OWL. They will learn how to construct ontologies using OWL and various description logics. They will also understand the mechanism of performing reasoning tasks.</p> <p>Intellectual</p> <p>Understand the aims, achievements and limitations of the Semantic Web. Understand the scientific background and rationale for the methods.</p>	<p>Practical</p> <p>The students will be able to build and maintain ontologies, and use Protege/OWL tools</p> <p>Personal and Social</p> <p>Be aware of the impact of the Semantic Web on our everyday life.</p>
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13. Syllabus

Please itemise the main topics of study.

1. The history of the Semantic Web. Syntactic vs semantic web. Ontologies in (Computer) Science.
2. The layered approach to the Semantic Web. XML, the tree model of XML documents, XML Schema. Querying XML documents, XPath.
3. RDF (Resource Description Framework). RDF Schema. RDF/S semantics.
4. Requirements for ontology languages. From RDFS to OWL. Three species of OWL. OWL ontologies.
5. Ontology engineering.
6. Reasoning with OWL. Open vs closed worlds. Constructors.
7. Description logics.
8. Reasoning with description logics. Tableau algorithms.
9. OWL as a description logic.
- 10-11. Lab sessions: OWL and the Protege/OWL tools.

References:

Grigoris Antoniou and Frank van Harmelen. *A Semantic Web Primer*. MIT Press, 2004. ISBN 0-262-01210-3

Franz Baader, Diego Calvanese, Deborah McGuinness, Daniele Nardi and Peter Patel-Schneider. *The Description Logic Handbook: Theory, Implementation and Applications*. Cambridge University Press, 2003. ISBN 0521781760

14. Scheme of Assessment

Assessment methods which enable the student to demonstrate the learning outcomes for the module.

Elements of assessment include: Coursework (essay, report, classroom exercises), Dissertation, Project, Written Paper (seen, unseen, take away, multiple choice, other), Presentation, Practical, Orals, Fieldwork.

Element of assessment	Weighting	Characteristics (eg, word count, duration, date)
Coursework	20%	This will include building a small ontology in the lab and using an automatic classifier to check its consistency.
Written examination	80%	
Total:	100%	

Rationale:

The practical work will broaden and deepen the students' understanding of what can be achieved using the Semantic Web.

Pass requirements (i.e. all elements have to be passed, some elements must be passed as well as a pass overall, or just a pass overall must be obtained?)

Pass overall.

Will there be any special arrangements for re-assessment?

No.

15. Teaching Staff

	Name	FT or PT	School
Module/Course-Unit Coordinator	Professor Michael Zakharyashev	FT	CS&IS
Birkbeck teaching staff	Professor Michael Zakharyashev Dr Roman Kontchakov	FT PT	CS&IS CS&IS
Sessional teaching staff	None		

(Please supply an up to date c.v.
of all sessional teaching staff)

Include details of any technical staff required None

16. Additional Resources Required*

Please identify any additional resources required. Please note that the teaching and learning must be sufficiently flexible to enable all reasonable adjustments to be made in accordance with the Disability Discrimination Act (DDA).

* If new module/course-unit can be managed with existing resources, write 'NIL' against the appropriate headings.

Accommodation NIL

Library (Please attach a list of the core texts and a short indicative reading list as a guide (max. half a page))

Grigoris Antoniou and Frank van Harmelen. *A Semantic Web Primer*. MIT Press, 2004. ISBN 0-262-01210-3

Franz Baader, Diego Calvanese, Deborah McGuinness, Daniele Nardi and Peter Patel-Schneider. *The Description Logic Handbook: Theory, Implementation and Applications*. Cambridge University Press, 2003. ISBN 0521781760

Have you discussed library provision for the module/course-unit with your subject librarian? **Yes / No**

Computing

Have you discussed any requirements for the use of specific software packages with CCS technical support staff?
Yes / No

CCS

School

Please state requirements for any other resources. None

17. Agreement

	Name	Signature	Date
Author of this proposal	Professor Michael Zakharyashev		
Module/Course-Unit Coordinator	Professor Michael Zakharyashev		
Head of School	Prof A Poulouvassilis		
Dean of Faculty	Dr RG Johnson		
Librarian			
Comments			
CCS Manager			

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

Please return the form to the Assistant Registrar (Registration and Regulations).

Extracts from the QAA Framework for Higher Education Qualifications (FHEQ)

For further details of the FHEQ see:

<http://www.qaa.ac.uk/academicinfrastructure/FHEQ/EWNI/default.asp>

A brief guide to academic qualifications

The higher education qualifications awarded by universities and colleges in England, Wales and Northern Ireland are at five levels. In ascending order, these are the Certificate, Intermediate, Honours, Masters and Doctoral levels.

Certificate level

The holder of a Certificate of Higher Education will have a sound knowledge of the basic concepts of a subject, and will have learned how to take different approaches to solving problems. He or she will be able to communicate accurately, and will have the qualities needed for employment requiring the exercise of some personal responsibility.

The Certificate may be a first step towards obtaining higher level qualifications.

Intermediate level

Holders of qualifications at this level will have developed a sound understanding of the principles in their field of study, and will have learned to apply those principles more widely. Through this, they will have learned to evaluate the appropriateness of different approaches to solving problems. Their studies may well have had a vocational orientation, enabling them to perform effectively in their chosen field.

They will have the qualities necessary for employment in situations requiring the exercise of personal responsibility and decision-making.

The intermediate level includes ordinary (non-Honours) degrees, the Foundation degree, Diplomas of Higher Education, and other higher diplomas.

Honours level

An Honours graduate will have developed an understanding of a complex body of knowledge, some of it at the current boundaries of an academic discipline. Through this, the graduate will have developed analytical techniques and problem-solving skills that can be applied in many types of employment. The graduate will be able to evaluate evidence, arguments and assumptions, to reach sound judgements, and to communicate effectively.

An Honours graduate should have the qualities needed for employment in situations requiring the exercise of personal responsibility, and decision-making in complex and unpredictable circumstances.

Honours degrees form the largest group of higher education qualifications. Typical courses last for three years (if taken full-time) and lead to a Bachelors degree with Honours, having a title such as Bachelor of Arts (BA(Hons)) or Bachelor of Science (BSc(Hons)). Also at this level are short courses and professional 'conversion' courses, based largely on undergraduate material, and taken usually by those who are already graduates in another discipline, leading to Graduate Certificates or Graduate Diplomas.

Masters Level

Much of the study undertaken at Masters level will have been at, or informed by, the forefront of an academic or professional discipline. Students will have shown originality in the application of knowledge, and they will understand how the boundaries of knowledge are advanced through research. They will be able to deal with complex issues both systematically and creatively, and they will show originality in tackling and solving problems.

They will have the qualities needed for employment in circumstances requiring sound judgement, personal responsibility and initiative, in complex and unpredictable professional environments.

Masters degrees are awarded after completion of taught courses, programmes of research, or a mixture of both. Longer, research-based programmes often lead to the degree of MPhil. Most Masters courses last at least one year (if taken full-time), and are taken by persons with Honours degrees (or equivalent

achievement). Some Masters degrees in science and engineering are awarded after extended undergraduate programmes that last, typically, a year longer than Honours degree programmes. Also at this level are advanced short courses, often forming parts of Continuing Professional Development programmes, leading to Postgraduate Certificates and Postgraduate Diplomas.

(Note: the MAs granted by the Universities of Oxford and Cambridge are not academic qualifications.)

Qualifications, volumes of learning, and credit

The framework is a **qualifications** framework, based upon the outcomes represented by the main qualification titles. It is not a credit framework, nor is it dependent on the use of credit.

Providers of higher education programmes need to be able to demonstrate how the design of curricula secures academic and intellectual progression. However, it is for providers to decide how this is best demonstrated, whether by a credit structure or otherwise.

Qualification descriptors

Descriptor for a qualification at Certificate (C) level: Certificate of Higher Education

Certificates of Higher Education are awarded to students who have demonstrated:

- i knowledge of the underlying concepts and principles associated with their area(s) of study, and an ability to evaluate and interpret these within the context of that area of study;
- ii an ability to present, evaluate, and interpret qualitative and quantitative data, to develop lines of argument and make sound judgements in accordance with basic theories and concepts of their subject(s) of study.

Typically, holders of the qualification will be able to:

- a evaluate the appropriateness of different approaches to solving problems related to their area(s) of study and/or work;
- b communicate the results of their study/work accurately and reliably, and with structured and coherent arguments;
- c undertake further training and develop new skills within a structured and managed environment;

and will have:

- d qualities and transferable skills necessary for employment requiring the exercise of some personal responsibility.

Descriptor for a qualification at Intermediate (I) level: Degree (non-Honours)

Non-Honours degrees are awarded to students who have demonstrated:

- i knowledge and critical understanding of the well-established principles of their area(s) of study, and of the way in which those principles have developed;
- ii ability to apply underlying concepts and principles outside the context in which they were first studied, including, where appropriate, the application of those principles in an employment context;
- iii knowledge of the main methods of enquiry in their subject(s), and ability to evaluate critically the appropriateness of different approaches to solving problems in the field of study;
- iv an understanding of the limits of their knowledge, and how this influences analyses and interpretations based on that knowledge.

Typically, holders of the qualification will be able to:

- a use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis;
- b effectively communicate information, arguments, and analysis, in a variety of forms, to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively;

c undertake further training, develop existing skills, and acquire new competences that will enable them to assume significant responsibility within organisations;

and will have:

d qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision-making.

Descriptor for a qualification at Honours (H) level: Bachelors degree with Honours

Honours degrees are awarded to students who have demonstrated:

i a systematic understanding of key aspects of their field of study, including acquisition of coherent and detailed knowledge, at least some of which is at or informed by, the forefront of defined aspects of a discipline;

ii an ability to deploy accurately established techniques of analysis and enquiry within a discipline;

iii conceptual understanding that enables the student:

- to devise and sustain arguments, and/or to solve problems, using ideas and techniques, some of which are at the forefront of a discipline; and
- to describe and comment upon particular aspects of current research, or equivalent advanced scholarship, in the discipline;

iv an appreciation of the uncertainty, ambiguity and limits of knowledge;

v the ability to manage their own learning, and to make use of scholarly reviews and primary sources (eg refereed research articles and/or original materials appropriate to the discipline).

Typically, holders of the qualification will be able to:

a apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding, and to initiate and carry out projects;

b critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), to make judgements, and to frame appropriate questions to achieve a solution - or identify a range of solutions - to a problem;

c communicate information, ideas, problems, and solutions to both specialist and non-specialist audiences;

and will have:

d qualities and transferable skills necessary for employment requiring:

- the exercise of initiative and personal responsibility;
- decision-making in complex and unpredictable contexts; and
- the learning ability needed to undertake appropriate further training of a professional or equivalent nature.

Descriptor for a qualification at Masters (M) level: Masters degree

Masters degrees are awarded to students who have demonstrated:

i a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of their academic discipline, field of study, or area of professional practice;

ii a comprehensive understanding of techniques applicable to their own research or advanced scholarship;

iii originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline;

iv conceptual understanding that enables the student:

- to evaluate critically current research and advanced scholarship in the discipline; and
- to evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses.

Typically, holders of the qualification will be able to:

a deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences;

b demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level;

c continue to advance their knowledge and understanding, and to develop new skills to a high level;

and will have:

d the qualities and transferable skills necessary for employment requiring:

- the exercise of initiative and personal responsibility;
- decision-making in complex and unpredictable situations; and
- the independent learning ability required for continuing professional development.