Programme Specification and Curriculum Map for MSc Data and Knowledge Engineering

1. Programme title	Data and Knowledge Engineering
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University
4. Programme accredited by	
5. Final qualification	MSc
6. Academic year	2009/2010
7. Language of study	English
8. Mode of study	Full time, Part time

9. Criteria for admission to the programme

The principal criteria for admission are that entrants are capable of working at postgraduate level and are able to succeed at, and benefit from, the programme. The following would normally be considered appropriate entry qualifications:

- An Honours Degree in a discipline related to the programme, such as relevant numerate subjects or those providing a significant exposure to Information Technology, or
- An Honours Degree together with employment or professional experience in a field relevant to the programme and at an appropriate level in the field.

International students whose first language is not English or who have not been taught in the English medium throughout must achieve an IELTS score of 6.5 or TOEFL 575 (paper based) 231 (computer based).

University policies supporting students with disabilities apply, as described in the Guide and Regulations, 'Information for Students with Disabilities'.

10. Aims of the programme

- The programme aims to enable students to improve an organisation's ability to manage and exploit its knowledge assets. This includes the specification, design, construction and maintenance of computerised systems and analysis and discovery of new knowledge to help improve the performance of the organisation. To this end, the student will learn state of the art techniques to maintain, analyse, and discover new information.

- The programme develops the ability of graduates to conduct their own research independently and to integrate technologies, concepts, theories, and models from a wide range of modules including AI and Machine Learning. The programme provides a learning framework in which the student may reflect and develop with a high level of independence. One of the key points of the programme is that Data and Knowledge Engineering is an ongoing activity. It is crucial that graduates are able to research on their own, and keep abreast of the ever changing literature in this field.

- Each module is designed to investigate Knowledge Management and Engineering methods, tools and techniques and evaluate their applicability within specific commercial domains. The course will be independent of specific software systems, languages or technology paradigms; instead the student will be prepared to assess the suitability of these in context.

- In addition to acquiring an immediate set of practitioner skills, students will be given the opportunity to apply the theory to practical problems on a project under supervision. During the project the student will be expected to explore the potential of existing and emerging data and knowledge management technologies for solving problems in organisations. This programme enhances graduates' ability to respond to rapidly changing technological and commercial environments by providing the opportunity for study of new approaches. The advanced study skills of the graduate student enable this approach and reduce dependence on specific technologies within the programme

11. Programme outcomes	
A. Computing-related cognitive abilities On completion of this programme the successful student will be able to : 1. Reflect on the relationships among knowledge, information and data, appropriately integrating these into activities and decisions. 2. Analyse the suitability of software tools for particular Knowledge Engineering and Management tasks, taking into consideration past successes of tools and likely future changes. 3. Formalise people's knowledge and analyse their use of it in specific cases. 4. Analyse the role of various stakeholders in Knowledge Engineering and data analysis activities. 5. Evaluate the use of knowledge by organisations and propose improvements at strategic and operational levels.	**Teaching/learning methods** Students gain computing-related cognitive abilities through a combination of formal lectures and resource based learning, small group discussions, small group and individual exercises, lab sessions, demonstration software, on-line examples and the research project. Throughout their studies students are encouraged to undertake independent study both to supplement and consolidate what is being learned, and to broaden their individual knowledge and understanding of the subject. Critical evaluation and selection of methods, tools and solutions engage the students in relating theory to practice. **Assessment Method** Students' computing-related cognitive abilities are assessed by group and individual coursework, presentations, unseen examination and the research project.
B. Computing-related practical abilities On completion of this programme the successful student will be able to: 1. Specify, design and construct data mining, Knowledge Engineering and other intelligent systems. 2. Specify, design, construct, integrate, maintain and evaluate knowledge systems. 3. Develop useful interfaces that highlight different knowledge for different users. 4. Use a wide range of knowledge representation and visualisation techniques in applications. 5. Work as a member of a knowledge engineering team. 6. Analyse cases and suggest ways of improving the creation, communication and utilisation of knowledge.	**Teaching/learning methods** Students learn computing-related practical skills through a blended learning approach which involves face-to-face sessions (lectures and/or seminars), self directed, resource-based learning, small group discussions, small group and individual exercises, laboratory sessions, demonstration software, on-line examples and the research project. Weekly seminar sessions provide the opportunity to address questions, queries and problems. Analysis, modelling and problem solving skills are further developed through example case studies, computer laboratory sessions and through supervised small group teaching. Feedback is given to students on all assessed coursework.

	Assessment Students' practical skills are assessed by group and individual coursework, presentations, unseen examinations and the project dissertation.
C. Additional transferable skills On completion of this programme the successful student will be able to: 1. Understand and master skills for working in teams both face to face and through a range of distance mechanisms. 2. Critique existing research. 3. Critique a range of research methods and reflect on when they are appropriate. 4. Learn independently and critically in familiar and unfamiliar environments. 5. Pursue independent knowledge management activities. 6. Cultivate knowledge networks and communities of practice.	**Teaching/learning methods** Students acquire transferable skills through the teaching and learning programme outlined above. Although not all the skills are explicitly taught, they are nurtured and developed throughout the programme, which is structured and delivered in such a way as to promote this. **Assessment method** Students' transferable skills are assessed by coursework, examinations and the project.

12. Programme structure (levels, modules, credits and progression requirements)

12. 1 Overall structure of the programme

The programme is available in full and part-time mode in the UK and overseas. Students study the following four, level 4, 30-credit taught modules:

- BIS4435 Industrial Data Management for Decision Support
- BIS4700 Multi-channel e-Commerce (100% CW)
- BIS4407 Research Methods in Knowledge Management (100% CW)
- BIS4405 Knowledge Discovery

  Once all modules have been passed (i.e. the student has obtained 120 credits) they progress onto the 60 credit
- BIS4992 Postgraduate Computing Project.

All modules on the programme are compulsory. The University academic year is split into three 12-week blocks. Full-time students study two 30-credit modules per 12-week block and undertake the project module (60 credits) normally over a period of 16 weeks. Part-time students would typically study one 30-credit module per 12-week block and would complete the project over two 12-week blocks. Details of each module can be found in the Computing Subject and Programme Handbook.

12.2 Levels and modules		
Level 4		
COMPULSORY[1]	CREDIT POINTS	PROGRESSION REQUIREMENTS
BIS4405 Knowledge Discovery	30	
BIS4407 Research Methods in Knowledge Management	30	
BIS4435 Industrial Data Management for Decision Support	30	
BIS4700 Multi-channel e-Commerce	30	
BIS4992 Postgraduate Computing Project	60	Students may not commence BIS4992 until they have obtained 120 credits.

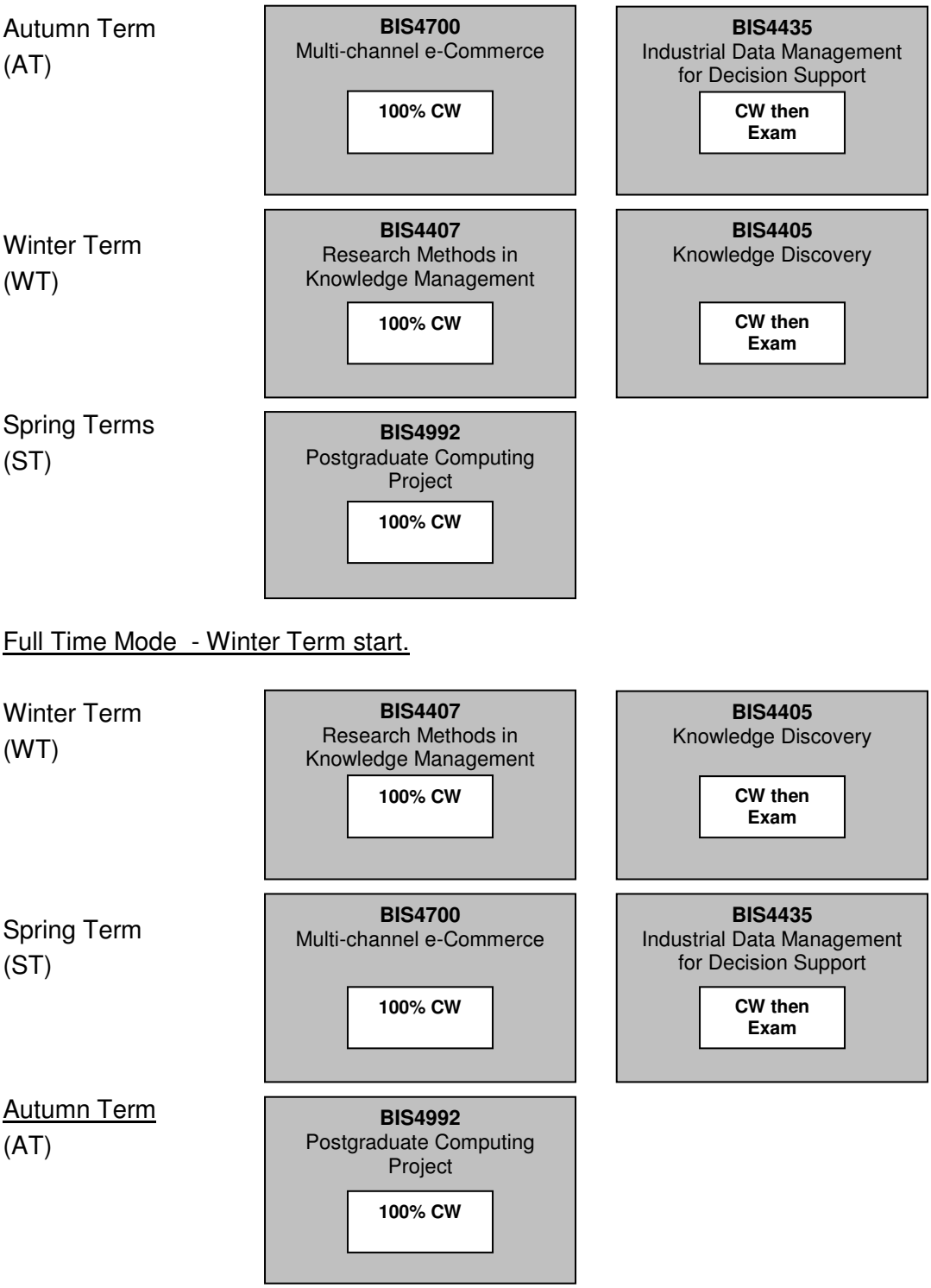
12.3 Non-compensatable modules	
Module level	***Module code***
4	*BIS4992*

[1] Compulsory modules are those that must be taken, that is, the qualification cannot be awarded unless these modules have been successfully completed. Each of these modules makes a unique contribution to the learning objectives of the programme.

12. Programme structure (levels, modules, credits and progression requirements)

12. 1 Overall structure of the programme

Full Time Mode - Autumn Term start.



Full Time Mode - Winter Term start.

Part Time

All part time students will be taking one of the 30 credit modules per term therefore they will need six terms for completion of the whole programme.

Year One

Autumn Term (AT)

BIS4435
Industrial Data Management for Decision Support
CW and Exam

Spring Term (ST)

BIS4405
Knowledge Discovery
CW and Exam

Year Two

Autumn Term (AT)

BIS4700
Multi-channel e-Commerce
100% CW

Winter Term (WT)

BIS4407
Research Methods in Knowledge Management
100% CW

Spring Term (ST)

BIS4992
Postgraduate Computer Project
100% CW

15. Placement opportunities, requirements and support (if applicable)

- Industrial placement opportunities are available for students who wish to work in industry for a maximum period of 12 weeks. This should be done in the student's third term. If the student has an industrial placement the project (BIS 4992) may be postponed for a term.

- Industrial placement is conditional on the successful completion of all taught modules. Therefore 120 credits at level four need to be successfully completed before embarking on an industrial placement.
- The campus Placement Office manages University-industry relations and assists students in obtaining industrial placements. Further information on placement opportunities can be obtained there. Students are visited by an academic from the programme team at least once.

Postgraduate placements are normally a student initiated process for which the University will provide support. However the BIS department recognises the value of placement as an effective means of anchoring, reinforcing and extending the knowledge and skills acquired on its programmes, especially at postgraduate level. Hence an academic with special responsibility for placement has been appointed to actively promote and facilitate placement in the department. Our postgraduate students are thus strongly encouraged to take up placement where possible.

16. Future careers

All programmes in the School of Engineering and Information Sciences – their curricula and learning outcomes – have been designed with an emphasis on currency and the relevance to future employment.

- Campus Careers Offices can be found on each campus for advice, support and guidance – or go to www.intra.mdx.ac.uk/annex/careers/coreered.htm
- The majority of graduates are employed in IT posts relevant to the subject.
- Over 20% of students pursue further postgraduate study or research.
- The School has an Industrial Advisory Group which meets to advise and inform the School.

The employer links with the School are encouraged and occur in a number of ways: by inviting practitioners from industry as guest speakers in lectures; through links with companies where students are employed as part of their Industrial placement and alumni both in the UK and overseas.

17. Particular support for learning

The School's Teaching and Learning Strategy is compliant with that of the University; it aims to develop learner autonomy and to encourage resource-based learning.

In support of the student learning experience:

- All new students go through an induction programme and some have early diagnostic numeric and literacy testing before starting their programme. Learning Resources provide workshops for those students needing additional support in these areas.
- Students are allocated a personal email account, secure networked computer storage and dial-up facilities.
- Extensive library facilities are available on the Hendon campus. WebCT pages are available as learning resources through the Oasis system.
- Campus Student Offices offer advice and support to students through their Student Advice Centres.
- Placements are supported by campus Student Offices and School academics; please refer to section 19 of this programme specification.

- High quality specialist laboratories equipped with industry-standard software and hardware are available for formal teaching and personal study.
- To provide assistance and guidance in support of particular learning needs, campus-based, drop-in sessions are arranged by the School as needed.
- Tutorial sessions for each module, organised for groups of up to 20 students, are provided for additional teaching support.
- Formative feedback is given on completion of student coursework.
- Past exam papers with solutions and marking schemes are available for students in module handbooks and at http://www.mdx.ac.uk/24-7/cs/index.htm
- Research activities of academic staff feed into the teaching programme. The Research methods in Knowledge Management module will bring several researchers outside of the normal instructional staff into contact with the students. Many individual research projects will be based around academic staff's core research areas. All of these activities can provide individual students with ad hoc opportunities to work with academic and industrial researchers on a wide range of research activities.

Middlesex University encourages and supports students with disabilities. Some practical aspects of computing science programmes may present challenges to students with particular disabilities. You are encouraged to visit our campuses at any time to evaluate facilities and talk in confidence about your needs. If we know your individual needs we'll be able to provide for them more easily. For further information contact the Disability Support Service (email: disability@mdx.ac.uk).

18. JACS code (or other relevant coding system)	G500
19. Relevant QAA subject benchmark group(s)	QAA are currently considering the development of a benchmark for computing Masters courses(c.f. http://www.qaa.ac.uk/academicinfrastructure/benchmark/default.asp)

20. Reference points

The following reference points were used in designing the programme:

- QAA Computing subject benchmark statement
- QAA Framework for Higher Education Qualifications in England, Wales and Northern Ireland
- Towards Benchmarking Standards for Taught Masters Degrees in Computing (sponsored by CPHC), May 2004
- QAA/QAAS guidelines for programme specifications
- QAA Code of Practice for the assurance of academic quality and standards in HE
- University Policy, Regulations and Guidelines
- Middlesex University and School of Engineering and Information Sciences Teaching Learning and Assessment policies and strategies
- University policy on equal opportunities

21. Other information

Middlesex University has formal links with 250 institutions world-wide, including student exchange agreements with more than 100 institutions. Currently a number of students both from the UK/EU and overseas take part in such exchanges. For further details please visit http://www.europe.mdx.ac.uk/ or contact Elli Georgiadou, the School of Engineering and Information Sciences coordinator of European Affairs & International Exchanges (email: e.georgiadou@mdx.ac.uk).

British Computer Society (BCS) accreditation will be sought.

BCS guidelines on Course Exemption and Accreditation can be found at http://www.bcs.org/bcs

Please note programme specifications provide a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve if s/he takes full advantage of the learning opportunities that are provided. More detailed information about the programme can be found in the student programme handbook and the University Regulations.

Curriculum map for MSc. in Data and Knowledge Engineering

This section shows the highest level at which programme outcomes are to be achieved by all graduates, and maps programme learning outcomes against the modules in which they are assessed.

Programme learning outcomes

Computing-related cognitive abilities		**Additional transferable skills**	
A1	Reflect on the relationships among knowledge, information and data, appropriately integrating these into activities and decisions.	C1	Understand and master skills for working in teams both face to face and through a range of distance mechanisms.
A2	Analyse the suitability of software tools for particular Knowledge Engineering and Management tasks, taking into consideration past successes of tools and likely future changes.	C2	Critique existing research.
A3	Formalise people's knowledge and analyse their use of it in specific cases.	C3	Critique a range of research methods and reflect on when they are appropriate.
A4	Analyse the role of various stakeholders in Knowledge Engineering and data analysis activities.	C4	Learn independently and critically in familiar and unfamiliar environments.
A5	Evaluate the use of knowledge by organisations and propose improvements at strategic and operational levels.	C5	Pursue independent knowledge management activities.
		C6	Cultivate knowledge networks and communities of practice.
Computing-related practical abilities			
B1	Specify, design and construct data mining, Knowledge Engineering and other intelligent systems.	B4	Use a wide range of knowledge representation and visualisation techniques in applications.
B2	Specify, design, construct, integrate, maintain and evaluate knowledge systems.	B5	Work as a member of a knowledge engineering team.
B3	Develop useful interfaces that highlight different knowledge for different users.	B6	Analyse cases and suggest ways of improving the creation, communication and utilisation of knowledge

Programme outcomes																
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6
Highest level achieved by all graduates																
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

A Curriculum Map Relating Learning Outcomes to Modules

Module Title	Module Code	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6
Industrial Data Management for Decision Support	BIS4435	x	x			x	x					x	x			x		
Multi-channel e-Commerce	BIS4700		x			x			x							x		
Research Methods in Knowledge Management	BIS4407			x								x		x	x	x		
Knowledge Discovery	BIS4405	x		x	x			x		x	x						x	x
Postgraduate Computing Project*	BIS4992													x	x	x		

*Other learning outcomes assessed will depend on the nature of the individual projects, typically including one or more of A1-B6.