Programme Specification and Curriculum Map for MSc Software Engineering

1. Programme title	MSc Software Engineering
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University
4. Programme accredited by	
5. Final qualification	MSc
6. Academic year	2009/10
7. Language of study	English
8. Mode of study	Full Time or Part Time or Thick Sandwich

9. Criteria for admission to the programme

Applicants should normally have one of the following:

- A second class or higher honours degree in a computing discipline awarded by a UK university or a qualification deemed by the University to be equivalent.
- A second class or higher honours degree in an appropriate discipline (e.g. engineering or mathematics) with relevant knowledge of computing and industrial experience.

International students whose first language is not English or who have not been taught in the English medium throughout, and whose first degree is not from a British university, must achieve an IELTS score of 6.5 or TOEFL 575 (paper based) 233 (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 provide students with:

- The knowledge and skills required to handle the challenges and complexities of the development and operation of large-scale software systems.
- The ability to critically appraise a range of issues appertaining to the software development process, including the professional, legal and ethical framework within which the software engineer operates.
- The expertise to conduct analysis and specification, create and evaluate design solutions, develop and test software systems and make informed decisions in the management of software projects
- The values, attitudes and competence to apply the principles and concepts learnt in the programme when undertaking CPD and self-directed learning throughout their careers.

11. Programme outcomes	
A. Computing-related cognitive abilities On completion of this programme, the successful student will be able to; 1) justify a disciplined approach to the management of software systems development; 2) appraise a range of software engineering concepts, tools, and techniques; 3) critically evaluate software systems against a range of criteria; 4) appraise the professional, legal and ethical framework within which a software engineer must operate.	**Teaching/learning methods** Students gain computing-related cognitive abilities through a combination of traditional lecture delivery, small group discussions, small group and individual exercises, lab sessions and the group 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** Students' computing-related cognitive abilities are assessed by coursework (which includes group and individual work, presentation and viva) and unseen examination. Outcomes A1 -3 are assessed by examination. Outcomes A1-4 are assessed by coursework (including project).
B. Computing-related practical abilities On completion of this programme the successful student will be able to; 1) plan and apply a range of software engineering concepts, tools and techniques to the solution of complex software engineering problems; 2) employ appropriate project management approaches within complex software engineering environments; 3) develop software artefacts using appropriate programming paradigms; 4) plan and execute a challenging and substantial computing project by application of appropriate research methods	**Teaching/learning methods** Students develop computing-related practical skills through the above teaching and learning programme. These abilities are nurtured in particular by self directed learning, small group teaching and discussions, small group and individual exercises, laboratory sessions and the group project. Seminar sessions provide an opportunity to address questions, queries and problems. **Assessment** Students' computing-related practical abilities are assessed by coursework (which includes group and individual work, presentation and viva) and unseen examination. Outcomes B1-4 are assessed by coursework (including project).
C. Additional Transferable Skills On completion of this programme the successful student will be able to; 1) learn effectively and independently to acquire new knowledge and skills for the purpose of continuing professional development throughout their career;	**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 process.

2) analyse complex problems systematically and implement effective solutions; 3) communicate effectively in writing, verbally and by presentation; 4) effectively manage time and other resources; 5) reflect critically on his/her own work and that of colleagues. 6) display effective teamworking skills to make a positive contribution, as a member or leader, to the work of a group.	**Assessment** Students' transferable skills are assessed as follows: Outcome C1 is assessed primarily through coursework, examinations, presentations and the project report. Outcome C2 is assessed primarily through coursework and the project report. Outcome C3 is assessed primarily through examinations, coursework, presentations and viva. Outcome C4 is assessed primarily through the project report. Outcome C5 is assessed primarily through individual coursework and the project report. Outcome C6 is assessed primarily by coursework and the project.

12. Programme structure (levels, modules, credits and progression requirements)
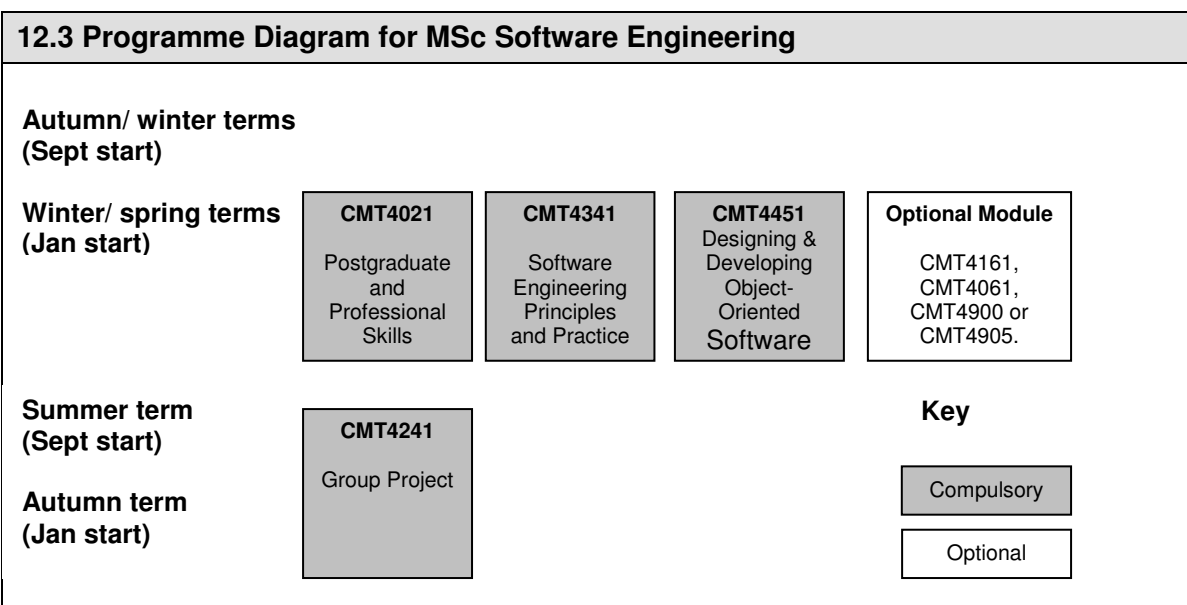
12. 1 Overall structure of the programme

The programme is available in full-time and part-time mode in the UK.

The programme comprises four 30 credit taught modules and a 60 credit postgraduate project module. Three of the taught modules are compulsory and the fourth is chosen from a number of options. Students may begin studying the programme in the autumn term (September) or the winter term (January). Full-time students study the four 30-credit modules in parallel over a period of 24 weeks (autumn and winter terms for September starters and winter and spring terms for January starters). They then undertake the project module (60 credits) over the spring and summer terms (September starters) or summer and autumn terms (January starters) to complete the programme in one calendar year. Part-time students study two 30-credit modules in their first academic year of study followed by two further 30-credit modules (one of which must be the Postgraduate and Professional Skills module) in the autumn and winter terms of their second year and would complete the project over the following spring, summer and autumn terms. Students are normally required to pass 120 taught credits before starting the project.

Details of each module can be found at the back of this Handbook

12.2 Levels and module	
COMPULSORY[1]	OPTIONAL[2]
Students must take all of the following: CMT4021 Postgraduate and Professional Skills CMT4341 Software Engineering Principles and Practice CMT4451 Designing and Developing Object-oriented Software CMT4241 Group Project	Students must take one of the following: CMT4161 Internet Programming CMT4061 Internet Media and Technology CMT4900 Data Analysis CMT4905 Modelling and Simulation

12.3 Non-compensatable modules.
There are no compensatable modules in this programme

12.3 Programme Diagram for MSc Software Engineering

Autumn/ winter terms (Sept start)

Winter/ spring terms (Jan start)

CMT4021 Postgraduate and Professional Skills	CMT4341 Software Engineering Principles and Practice	CMT4451 Designing & Developing Object-Oriented Software	Optional Module CMT4161, CMT4061, CMT4900 or CMT4905.

Summer term (Sept start)

Autumn term (Jan start)

CMT4241 Group Project

Key

Compulsory

Optional

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[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.

[2] Optional modules are those from which a specified minimum number must be taken, that is, the qualification cannot be awarded unless this specified minimum number of optional modules has been successfully completed. Each of the possible combinations of optional modules will make a similarly unique contribution to the achievement of the learning objectives of the programme.

14. Information about assessment regulations

- Information on how the University formal assessment regulations work, including details of how award classifications are determined, can be found in the University Regulations at www.mdx.ac.uk/regulations/.
- Practical aspects of the programme are often assessed via coursework that may be carried out using specialist software and may include lab tests.
- Theoretical material is assessed by coursework and examinations.
- Grades are awarded on the standard University scale of 1–20, with Grade 1 being the highest. To pass a module all components, both coursework and examination, must be passed individually with a minimum grade of 16. Failure in one of the components will result in the failure of the module.

For additional information on assessment and how learning outcomes are assessed please refer to the individual module narratives for this programme.

15. Placement opportunities, requirements and support

All Postgraduate students have the opportunity to go on Industrial Placement. Industrial Placements are encouraged as this valuable experience enhances a student's future career prospects. Additionally students normally achieve better results in their final year. In brief:

- The placement provides a years experience as an appropriately paid graduate trainee.
- Industrial placement is conditional on the successful completion of all taught modules. therefore students need 120 credits before they are able to embark on an industrial placement.
- Obtaining a placement is co-ordinated through the School of Engineering and Information Sciences Placement Officer, G.X.Davies@mdx.ac.uk.
- Each placement will be assigned to an industrial tutor who will visit the student on placement.
- On graduation the degree will be qualified with the term "…with approved industrial experience".
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The placement option is not available to direct-entry students in their final year.

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.

- The majority of graduates are employed in IT posts relevant to the subject.
- Over 20% of students pursue further postgraduate study or research.

The employer links with the School are encouraged in a number of ways e.g. 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 through alumni both in the UK and overseas

Campus Careers Offices can be found on each campus for advice, support and guidance – or go to www.mdx.ac.uk/careers

17. Particular support for learning

The School's Teaching and Learning Strategy is compliant with those of the University, in seeking to develop learner autonomy and resource-based learning. In support of the students 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 (LR) 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
- New students are provided with a CD containing the schools Subject Handbook at enrolment (electronic copies for all students can also be found at http://www.mdx.ac.uk/24-7/cs. If you require a hard copy of this Subject Handbook please request them from Graham Davies (G.X.Davies@mdx.ac.uk or 020 8411 6079)
- New and existing students are given module handbooks for each module they study. Soft copies of all module handbooks can be found on Oasis. Web-based learning materials are provided to further support learning
- Extensive library facilities are available on all campuses. WebCT pages are available as learning resources through the Oasis system
- Students can access advice and support on a wide range of issues from the Student Services Counter and the Student Information Desk. Student Advisers aligned to subject areas offer confidential one to one advice and guidance on programme planning and regulations
- Placements are supported by Campus Placement Offices and School academics; please refer to section 15 of this programme specification
- High quality specialist laboratories equipped with industry standard software and hardware where appropriate, for formal teaching as well as self-study
- Access to campus based teaching and learning support drop in sessions, arranged by the school to provide assistance and guidance
- School Academic Advisers for each subject offering personal academic advice and help if needed. Rotas for the operation of Academic Advice Rooms at each campus can be found at http://www.mdx.ac.uk/24-7/cs/index.htm#tutor
- 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 for all modules 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, which can provide individual students with ad-hoc opportunities to work with academics on some aspect of research

Middlesex University encourages and supports students with disabilities. Some practical aspects of School of Engineering and Information Sciences 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) or contact Natalie Costa on 020 8411 2514.

18. JACS code (or other relevant coding system)	G600
19. Relevant QAA subject benchmark group(s)	Computing

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
- QAA/QAAS guidelines for programme specifications
- QAA code of practice for the assurance of academic quality and standards in he
- University's regulations
- Module narratives
- British computer society (BCS) guidelines for exemption and accreditation
- 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).

This is a new programme which will be submitted for partial BCS exemption from the Certificate, Diploma and Diploma Project

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 Software 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

Knowledge and understanding		Practical skills	
A1	Justify a disciplined approach to the management of software systems development;	C1	Learn effectively and independently to acquire new knowledge and skills for the purpose of continuing professional development throughout their career;
A2	Appraise a range of software engineering concepts, tools, and techniques;	C2	Analyse complex problems systematically and implement effective solutions;
A3	Critically evaluate software systems against a range of criteria;	C3	Communicate effectively in writing, verbally and by presentation;
A4	Appraise the professional, legal and ethical framework within which a software engineer must operate.	C4	Effectively manage time and other resources;
A5		C5	Reflect critically on his/her own work and that of colleagues;
A6		C6	Display effective teamworking skills to make a positive contribution, as a member or leader, to the work of a group.
Cognitive skills			
B1	Plan and apply a range of software engineering concepts, tools and techniques to the solution of complex software engineering problems;		
B2	Employ appropriate project management approaches within complex software engineering environments;		
B3	Develop software artefacts using appropriate programming paradigms;		
B4	Plan and execute a challenging and substantial computing project by application of appropriate research methods		

Programme outcomes													
A1	A2	A3	A4	B1	B2	B3	B4	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

Module Title	Module Code by Level	Programme outcomes													
		A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6
Postgraduate and professional skills	CMT4021				•				•	•		•		•	•
Software Engineering Principles and Practice	CMT4341	•	•	•	•	•	•								
Designing and developing object-oriented software	CMT4451		•			•		•							
Internet media and technology	CMT4061								•	•		•			
Internet programming	CMT4161							•							
Modelling and simulation	CMT4905										•				
Data analysis	CMT4900										•				
Group project	CMT4241					•			•	•	•	•	•	•	•

* *Italics denote optional module*