Programme Title: MSci Computer Science

Programme Specification

Awarding Body/Institution	Queen Mary University of London
Teaching Institution	Queen Mary University of London
Name of Final Award and Programme Title	Master of Science (MSci) Computer Science
Name of Interim Award(s)	Master of Science (MSci)
Duration of Study / Period of Registration	4 years FT
QM Programme Code / UCAS Code(s)	G401
QAA Benchmark Group	Computer Science
FHEQ Level of Award	Level 7
Programme Accredited by	British Computer Society and IET
Date Programme Specification Approved	
Responsible School / Institute	School of Electronic Engineering & Computer Science

Schools which will also be involved in teaching part of the programme
N/A

Institution(s) other than Queen Mary that will provide some teaching for the programme
N/A

Programme Outline

This broad degree programme provides a solid foundation for a number of IT careers, including programming and systems analysis and design. You will cover core topics such as software engineering, computer systems and applications. You can specialize in subjects such as computer graphics, artificial intelligence and distributed systems. You will gain practical experience in building a variety of computer systems in progressively more demanding contexts.
The MSci follows the same structure as the BSc, with the inclusion of a team project in the third year. It incorporates an additional year of specialization in such topics as computer vision, human-computer interaction, and the semantic web. You can transfer onto the MSci from the BSc until the end of the second year, subject to satisfactory performance.

Aims of the Programme

The overall aims of this programme are to produce graduates with a sound understanding of the discipline of computer science, good software engineering knowledge and skills and a range of advanced skills and knowledge in selected advanced areas.

The programme has three main themes: software engineering, computer systems and applications. The aim is to provide a good

coverage of the foundations of these areas along with the opportunity for students to develop a deeper knowledge of the topics that particularly interest them.

The programme has a strong practical character and students gain experience in building a variety of computer systems in a range of progressively demanding situations.

Alongside this the programme pays attention to the wider context of computing and the development of transferable skills such as writing, presentation and team work. The programme is under continual revision to ensure it matches the needs of both students and their future employers.

What Will You Be Expected to Achieve?

The programme provides opportunities for students to develop and demonstrate knowledge, understanding and skills in the following areas. The outcomes are informed by the QAA subject benchmark statement in Computing, the requirements of the BCS and IEE for CEng accreditation and the ACM Computing Curricula 2001.

Software Engineering
- knowledge of the basic theory of programming languages and of the main classes of languages
- experience in using several programming languages
- appreciate the importance of simplicity, robustness and systematic organization in program design
- knowledge of fundamental algorithms and the notion of complexity
- experience in applying a range of methods in the development of large-scale software systems
- knowledge of the software life-cycle, software design methodologies and software development tools
- understanding of database principles and techniques and they role they play in information management

Computer Systems
- knowledge of computer system components and architecture
- understanding of the principles of operating systems and networks and the techniques required for their implementation
- knowledge of specific operating systems including experience in implementing parts of an operating system
- knowledge of the common protocols used in networks

Applications
- knowledge and understanding of some major application areas in the sciences, medicine, industry and commerce
- knowledge of some advanced application techniques and experience with using them in practice
- knowledge of usability principles and the ability to apply them in practice

Generic Knowledge and Transferable Skills
- experience in problem-solving
- work effectively as a member of a design team
- knowledge of project management skills
- appreciate the presence of risk in engineering practice
- produce well-written technical reports
- understanding of the mathematical, scientific and engineering elements of computer science
- understanding of the historical, social and professional context of computer science

Academic Content:	
A 1	Knowledge and skills related to the key field of software engineering, including the ability to design, implement and test algorithms and larger programmes in a rigorous and principled way, and detailed understanding of the software development life-cycle, relevant methodologies and tools.
A 2	Knowledge and skills related to the key field of computer systems, including understanding of the principles of computer architecture, operating systems and networks, and the ability to use specific techniques for small-scale implementations.

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A 3	Knowledge and skills related to the key field of applications, including understanding of some of the major application areas in the sciences, medicine, industry and commerce, and the ability to grasp and apply appropriate usability principles and techniques for these areas.

Disciplinary Skills - able to:	
B 1	Analyse and solve technical problems effectively, both individually and as part of a design team
B 2	Understand and apply technical project management techniques and skills
B 3	Demonstrate awareness and understanding of the mathematical, scientific and engineering foundations of the discipline of computer science
B 4	Demonstrate awareness and understanding of the historical, social, professional, industrial and ethical context of the discipline of computer science
B 5	Communicate technical detail effectively to a variety of audiences, both through production of well-written technical reports and through oral presentation / demonstration
B 6	Work with a high degree of independence to define a problem area; perform appropriate research; understand and work within the broader context including client / user needs, constraints and resources; manage the project effectively and efficiently; justify and evaluate the outcomes

Attributes:	
C 1	Connect information and ideas within the broader context of the discipline of computer science
C 2	Acquire and apply knowledge in a critical way, evaluating its reliability and relevance, in order to investigate and solve unfamiliar problems
C 3	Explain complex technical concepts clearly in a variety of settings, to a variety of audiences, using a variety of media
C 4	Develop a strong sense of intellectual and professional integrity
C 5	Think and work creatively, using information and experience as the basis for decision-making
C 6	Identify, select, apply and evaluate appropriate scientific and engineering principles, techniques and tools in the development, usage, maintenance and modification of information systems

QMUL Model Learning Outcomes - Level 4:	
D 1	Identify and discuss their own career aspirations or enterprise skills and knowledge and how they impact on others
D 2	Identify and discuss what their own role in their programme and/or subject discipline might mean to them for future e
D 3	Consider the role of their discipline in diverse cultural and global contexts

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How Will You Learn?

All taught courses involve lectures, problem-solving coursework and practical sessions. Lectures are used to introduce principles, methods and techniques and, through the use of examples, to illustrate how they can be applied in practice. Coursework allows students to develop their own skills in design and problem-solving and gain extensive practical experience of building computer systems using a wide range of tools and techniques. Practical sessions provide students with the guidance and help required to achieve this. These sessions take the form of programming laboratories, design studios, exercise classes and project consultancy meetings run by academic staff with the assistance of postgraduate students. On all our courses, students mostly 'learn through doing' and can expect to spend far longer in the teaching laboratory than in lectures. Some core units include short essay writing coursework to develop the skills that are vital for effective presentation of project work.

How Will You Be Assessed?

The assessment of the taught course units takes place through a written examination and coursework.

The final year project is examined on the basis of a written report, a formal oral presentation, and a demonstration of the piece of software developed by the student. Students can also put in some business flavour into their final year projects. In addition to the final year project, other modules introduce project and group working skills.

How is the Programme Structured?

Please specify the full time and part time programme diets (if appropriate).

Year 1 Modules
Semester 1
ECS401U Procedural Programming (15 credits)
ECS404U Computer Systems and Networks (15 credits)
ECS407U Logic and Discrete Structures (15 credits)
ECS427U Professional and Research Practice (15 credits)
Semester 2
ECS414U Object Oriented Programming (15 credits)
ECS417U Fundamentals of Web Technology (15 credits)
ECS419U Information Systems Analysis (15 credits)
ECS421U Automata and Formal Languages (15 credits)
Semester 1 and 2
ECS422U Skills for Electronic Engineering and Computer Science (non-credit bearing module)

Year 2 Modules
Semester 3
ECS505U Software Engineering (15 credits)
ECS509U Probability and Matrices (15 credits)
ECS510U Algorithms and Data Structures in an Object Oriented Framework (15credits)
ECS524U Internet Protocols and Applications (15 credits)
Semester 4
ECS506U Software Engineering Project (15 credits)
ECS518U Operating Systems (15 credits)
ECS519U Database Systems (15 credits)
ECS522U Graphical User Interfaces (15 credits)

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Year 3 Modules
Semester 5
ECS636U Team Project (30 credits)
Plus three modules from:
ECS604U Entrepreneurship in Information Technology (15 credits)
ECS607U Data Mining (15 credits)
ECS610U Computer Graphics (15 credits)
ECS639U Web Programming (15 credits)
ECS640U Big Data Processing (15 credits)
ECS642U Embedded Systems (15 credits)
ECS650U Semi-Structured Data and Advanced Data Modelling (15 credits)
ECS651U Computability, Complexity and Algorithms 15 credits)
Semester 6
ECS636U Team Project (30 credits cont'd)
Plus three modules from:
ECS612U Interaction Design (15 credits)
ECS624U C++ for Image Processing (15 credits)
ECS629U Artificial Intelligence (15 credits)
ECS637U Digital Media and Social Networks (15 credits)
ECS641U Communicating and Teaching Computing (UAS) (15 credits)
ECS647U Bayesian Decision and Risk Analysis (15 credits)
ECS652U Compilers (15 credits)
ECS655U Security Engineering (15 credits)
ECS656U Distributed Systems (15 credits)

Final Year Modules
Semester 7
ECS771U Project (30 credits)
Plus three modules from:
ECS708U Machine Learning (15 credits)
ECS709U Introduction to Computer Vision (15 credits)
ECS712U Design for Human Interaction (15 credits)
ECS713U Functional Programming (15 credits)
ECS715U Program Specifications (15 credits)
IPLM701U Introduction to Law for Science and Engineering (15 credits) (pre requisite for IPLM702U)
Semester 8
ECS771U Project (30 credits cont'd)
Plus three modules from:
ECS727U Real-Time and Critical Systems (15 credits)
ECS728U Business Technology Strategy (15 credits)
ECS733U Interactive Systems Design (15 credits)
ECS734U Techniques for Computer Vision (15 credits)
ECS735U The Semantic Web (15 credits)
ECS736U Information Retrieval (15 credits)
ECS737U Software Analysis and Verification (15 credits)
ECS763P Natural Language Processing (15 credits)
ECS784U Data Analytics (15 credits)
IPLM702U Foundations of Intellectual Property Law and Management (15 credits) (must have taken IPLM701U)

Progression Criteria
To progress from one developmental year to the next, a student must meet any programme and pathway requirements and take and pass modules as detailed below. There shall also be an approved threshold requirement, specifying an average mark higher than the pass mark that is required to progress to the next year of the integrated masters. This mark shall be set as standard at a minimum of 50.0. Individual programme regulations may specify higher thresholds, and/or that the threshold mark should be calculated across multiple developmental years.

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i. foundation year to developmental year one: take modules to the value of 120 credits, and pass modules to the value of 90 credits;
ii. developmental year one to developmental year two: take modules to the value of 120 credits, and pass modules (excluding modules at Level 3) to the value of 105 credits from developmental year one;
iii. developmental year two to developmental year three: take modules to the value of 120 credits, and pass modules (excluding modules at Level 3) to the value of 210 credits from developmental years one and two;
iv. developmental year three to developmental year four:
Take modules to the value of 120 credits, pass modules (excluding modules at Level 3) to the value of 300 credits from developmental years one, two, and three, and meet any approved threshold requirement that specifies a higher average level achievement than the pass mark;

QMUL Model

Students are required to undertake the equivalent of one module (15 credits in 2017/18) per year of study which has been identified as meeting the requirements of the QMUL Model. Each of these modules has been designed to combine the best of QMUL's academic excellence with your ability to identify and develop your skills, networks and experience. This will help to ensure you become a graduate who can undertake further study or secure graduate employment in areas that interest you, and will support your ability to position yourself to find the right job or opportunity for you. The relevant module for your first year of study in 2017/18 is indicated below.

Where more than one module is specified, this is because pertinent elements from these modules have been identified as being appropriate to the QMUL Model and when studied together, deliver the equivalent content of one 15-credit QMUL Model module.

The QMUL Model modules for future years and associated Learning Outcomes will be identified as your studies continue.

Should Professional, Statutory and Regulatory Body requirements apply to your programme of study, these will be taken into account in the specification of QMUL Model requirements.

Academic Year of Study FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Professional and Research Practice	ECS427U	15	4	Compulsory	1	Semester 1	Yes

What Are the Entry Requirements?

General entry requirements
• A-levels: Our A-level entrance requirements are based on 3 A-levels, or 2 A-levels and 2 AS-levels. We are delighted to receive applications from students who have studied Computer Science at GCSE or A-Level (often called Computing by the examination boards), and in general we prefer Maths and Science based A-levels, though we will consider other combinations of subjects.
• Advanced diplomas: The School warmly welcomes applications from students taking Advanced or Extended (level-3) Diplomas in Information Technology or Engineering. We require 320-360 UCAS Tariff points (320 for BSc Computer Science and Mathematics, 340 for BSc(Eng) and BEng, 360 for BSc, MSci and MEng programmes) and applicants must also have passed GCE A-

level Mathematics at grade C or above. Grade B or above for BSc Computer Science and Mathematics.
• Vocational or applied A-levels: Vocational A-levels are acceptable and are subject to the above tariff requirements for A/AS-levels. They should be subject-related: electronic engineering or engineering for MEng and BEng programmes. Grade B GCSE Mathematics minimum.
• Key skills: Results of key skills tests will not normally form part of an offer of a place.
• BTEC National Diploma (18 units): The BTEC National Diploma is acceptable on its own and combined with other qualifications with minimum grade requirements: DDM for BEng, MEng, DDD (with Distinctions in all modules) for BSc(Eng), BSc. Your BTEC National Diploma must be subject-related: engineering, electronic engineering for MEng and BEng programmes, computing or related subject for BSc programmes. The IT practitioners Diploma is only accepted for BSc(Eng) programmes. Additionally, we require a minimum Grade C GCSE in mathematics.
• International Baccalaureate: We require a minimum of 32 points overall for BEng and BSc programmes, 34 points for MEng and BSc(Eng) programmes. Subjects must include mathematics HL at least five points for all MEng and BEng programmes and at least six points for all BSc programmes; physics is required for selected MEng and BEng programmes; see programme details.
• European Baccalaureate: We require 80% including grade eight minimum Mathematics for all MEng and BEng programmes. Physics at grade eight required for selected MEng and BEng programmes as per A-level subject requirements, please see programmes for specific requirements.
• Access to HE Diploma: Applicants will be considered on a case-by-case basis. Please contact the School for guidance.
• European and international qualifications: The College accepts a wide range of EU and International qualifications, for information please contact the School.
• Other qualifications: The College welcomes applications from those holding qualifications not listed above. The School will be happy to advise you as to the acceptability of your qualification.

Specific programme entry requirements
• GCSE Grade Mathematics grade B or higher required.

International students - English Language entry requirements
For international students, English Language skills are required to a recognised standard. The minimum requirement is IELTS 6.0 or equivalent.

How Do We Listen and Act on Your Feedback?

The Staff-Student Liaison Committee provides a formal means of communication and discussion between Schools and its students. The committee consists of student representatives from each year in the school/institute together with appropriate representation from staff within the school/institute. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. Staff-Student Liaison Committees meet regularly throughout the year.

Each school operates a Learning and Teaching Committee, or equivalent, which advises the School/Institute Director of Taught Programmes on all matters relating to the delivery of taught programmes at school level including monitoring the application of relevant QM policies and reviewing all proposals for module and programme approval and amendment before submission to Taught Programmes Board. Student views are incorporated in this Committee's work in a number of ways, such as through student membership, or consideration of student surveys.

All schools operate an Annual Programme Review of their taught undergraduate and postgraduate provision. The process is normally organised at a School-level basis with the Head of School, or equivalent, responsible for the completion of the school's Annual Programme Reviews. Schools/institutes are required to produce a separate Annual Programme Review for undergraduate programmes and for postgraduate taught programmes using the relevant Undergraduate or Postgraduate Annual Programme Review pro-forma. Students' views are considered in this process through analysis of the NSS and module evaluations.

Academic Support

All students are assigned an academic adviser during induction week. The adviser's role is to guide advisees in their academic development including module selection and to provide first-line pastoral support.

In addition, the School has a Senior Tutor for undergraduate students who provides second-line guidance and pastoral support as well as advising staff on related matters.

The School also has a Student Support Officer who is the first point of contact regarding all matters.

Every member of Teaching Staff holds 2 open office hours per week during term time.

Programme-specific Rules and Facts

Students must Pass their Final Year Project in order to obtain the MSc. Students who do not pass their Final Year Project will exit with an alternate award.

Specific Support for Disabled Students

Queen Mary has a central Disability and Dyslexia Service (DDS) that offers support for all students with disabilities, specific learning difficulties and mental health issues. The DDS supports all Queen Mary students: full-time, part-time, undergraduate, postgraduate, UK and international at all campuses and all sites.

Students can access advice, guidance and support in the following areas:
• Finding out if you have a specific learning difficulty like dyslexia
• Applying for funding through the Disabled Students' Allowance (DSA)
• Arranging DSA assessments of need
• Special arrangements in examinations
• Accessing loaned equipment (e.g. digital recorders)
• Specialist one-to-one "study skills" tuition
• Ensuring access to course materials in alternative formats (e.g. Braille)
• Providing educational support workers (e.g. note-takers, readers, library assistants)
• Mentoring support for students with mental health issues and conditions on the autistic spectrum.

Links With Employers, Placement Opportunities and Transferable Skills

The School of Electronic Engineering & Computer Science has a wide range of industrial contacts secured through research projects and consultancy, our Industrial Experience programme and our Industry Panel.

The Industry Panel works to ensure that our courses are state of the art and match the changing requirements of this fast moving industry. The Panel includes representatives from a variety of Computer Science oriented companies ranging from SMEs to major blue-chips. These include: Microsoft Research, Royal Bank of Scotland, BT Labs, Oaklodge Consultancy, Intel Research, The Usability Company, Hewlett Packard Labs and Arclight Media Technology Limited.

Recent graduates have found employment as programmers, Systems Analysts, Software Engineers, database developers, IT consultants and web developers with well known multinational companies throughout the UK and Europe, the Americas and Asia,

Merril Lynch, Microsoft, Nokia, Barclays Capital, Logica, JPMorgan and Bear Sterns are among the organizations that have recently employed graduates of EECS programs.

Career Opportunities

Graduates can enter many different disciplines and vocations such as banking, mobile phone companies, the NHS, newspapers, schools, IT consultancies and financial consultancies.

A significant proportion of graduates obtain jobs in the software industry - as systems analysts, programmers, database

managers or working in e-commerce - in a variety of companies. Others find employment in jobs that make use of their communication and analysis skills such as management consultancy.

Programme Specification Approval

Person completing Programme Specification	
Person responsible for management of programme	
Date Programme Specification produced/amended by School Learning and Teaching Committee	
Date Programme Specification approved by Taught Programmes Board	