Queen Mary
University of London

Programme Specification

Awarding Body/Institution	Queen Mary University of London
Teaching Institution	Queen Mary University of London
Name of Final Award and Programme Title	Bachelor of Science (BSc) Computer Science with Industrial Experience
Name of Interim Award(s)	Cert HE, DipHE
Duration of Study / Period of Registration	4 year FT
QM Programme Code / UCAS Code(s)	G402
QAA Benchmark Group	Computing
FHEQ Level of Award	Level 6
Programme Accredited by	Chartered Institute for IT (BCS), Institution of Engineering and Technology (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 programme includes a year in industry between the second and final years of study.

Aims of the Programme

The overall aims of this programme are to produce graduates with a sound understanding of the discipline of computer science and the knowledge and skills that will enable them to develop rapidly into professional software designers and engineers

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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.

The year in industry supports the students in learning about the application of computer science in an organisational context. The aims of the placement year are to:
• Ground the taught components of the programme in practical experience at a scale not possible within the College;
• Improve career preparation, giving students a better understanding of future career options and enhancing their career prospects.

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 IET 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:

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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.
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

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

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
D 3	Consider the role of their discipline in diverse cultural and global contexts

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How Will You Learn?

Each non-project-based module involves lectures, problem solving coursework and practical sessions. Lectures are used to introduce principles and methods and also to illustrate how they can be applied in practice. Coursework allows students to develop their skills in problem solving and to gain practical experience. Practical sessions provide students with guidance and help while solving a problem. These lessons take the form of exercise classes and programming laboratories that allow the students to learn-by-doing in order to complement the lectures.

Individual projects are undertaken throughout the year under the supervision of an academic member of staff with whom there are weekly consultancy meetings. These are used for students to report on their progress, discuss research and design issues and plan their future work. This develops and reinforces students' ability to communicate technical ideas clearly and effectively. The Projects Coordinator also runs a thread of taught sessions to support the project module.

How Will You Be Assessed?

The assessment of taught modules normally consists of a combination of written examination and coursework.

Project modules are normally examined on the basis of a written report, a formal oral presentation, and, where applicable, a demonstration of any software and/or hardware developed.

The industrial placement is assessed by a combination of written report, viva, learning journal and 2 employer evaluations. The first employer evaluation takes place a few months into the placement and the second takes places shortly before the end of the placement. Each evaluation involves employer and student jointly setting appropriate objectives within a structured framework of categories; progress is later measured against these objectives using set marking criteria.

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)

Year 3 Modules
Semester 5 and 6
ECS550U Industrial Placement Project (30 credits)

Final Year Modules
Semester 7
ECS635U 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 8
ECS635U 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)

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.

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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 Student-Staff Liaison Committee provides a formal means of communication and discussion between the School and its students. The committee consists of student representatives from each cohort, together with appropriate representation from School staff. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. Student-Staff Liaison Committees meet four times a year, twice in each teaching semester.

Each semester, students are invited to complete a web-based module questionnaire for each of their taught modules, and the results are fed back through the SSLC meetings. The results are also made available on the student intranet, as are the minutes of

the SSLC meetings. Any actions necessary are taken forward by the relevant Senior Tutor, who chairs the SSLC, and general issues are discussed and actioned through the School's Learning and Teaching Committee.

The School's Learning and Teaching Committee advises the 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, including through student membership and consideration of student surveys and module questionnaires.

The School participates in the College's Annual Programme Review process, which supports strategic planning and operational issues for all undergraduate and taught postgraduate programmes. The APR includes consideration of the School's Taught Programmes Action Plan, which records progress on learning and teaching related actions on a rolling basis. Students' views are considered in the APR process through analysis of the NSS and module questionnaires, among other data.

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.

The year in industry is supported by a dedicated Industrial Placements Manager.

Programme-specific Rules and Facts

Students must pass the Final Year Project to be awarded a BSc. 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.

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Links With Employers, Placement Opportunities and Transferable Skills

The School has a wide range of industrial contacts secured through research projects and consultancy, our Industrial Experience programme and our Industrial Advisory Panel.

The Industrial Advisory Panel works to ensure that our programmes 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, IBM, The National Physical Laboratory, National Instruments, PA Consulting, Rohde and Schwarz, O2, Cisco Systems, ARM, Selex and BAE Systems.

Recent graduates have found employment as IT consultants, specialist engineers, web developers, systems analysts, software designers and network engineers in a wide variety of industries and sectors. A number of students also go on to undertake PhDs in electronic engineering and computer science. Merril Lynch, Microsoft, Nokia, Barclays Capital, Logica,, Credit Suisse, KPMG, Transport for London, Sky and Selex ES are among the organizations that have recently employed graduates of EECS programmes.

Transferable skills are developed through a variety of means, including embedding of QM Graduate Attributes in taught modules and the project, together with the opportunity to participate in extra-curricular activities, e.g. the School's E++ Society, the School's Annual Programming Competition and external competitions with support from the School.

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	

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