Programme Title: BSc Software Engineering for Business with Industrial Experience

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) Software Engineering for Business with Industrial Experience
Name of Interim Award(s)	CertHE, DipHE, BSc
Duration of Study / Period of Registration	4 year FT
QM Programme Code / UCAS Code(s)	I1N1
QAA Benchmark Group	Computing
FHEQ Level of Award	Level 6
Programme Accredited by	
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

Software professional roles are the fastest-growing in the sector, so there is increased demand for employable and productive software engineering/design graduates. To meet this demand and address the technical skills gap, e-skills UK has collaborated with employers and universities to design the framework for this Tech Industry Gold degree programme. See http://www.softwaredevelopmentforbusiness.com/ for further details.

The content of this programme is divided into four main areas:
1. Technology
2. Project management
3. Personal and interpersonal skills
4. Business skills

Tech Industry Gold degrees are unique because:
* The undergraduate skills requirements curriculum has been designed with input from leading employers to ensure it is relevant to the needs of today's businesses. Employers involved include Accenture, BT, Capgemini, CA Technologies, Cisco Systems, Enternships, IBM, Logica, Ministry of Justice, and the NHS.

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* Students receive employer support and engagement throughout their degree in the form of employer/student events, CV clinics, real project case studies, work placements and 'guru' lectures to enhance their employability and develop their professional skills.
* Employers can use these activities to gain early access to students and recruit the graduates who fit their business.
* Students have access to a wider online community beyond their university, enabling them to network with peers from other establishments and employers involved in the programme.
* Universities currently involved with e-skills degrees have seen an increase in student numbers, an increase in student numbers, an improvement in the gender balance on the course and a significant increase in employability rates.

This programme provides the opportunity for you to undertake a one-year industrial placement between the second and final years of study. Support for identifying and applying for placements is provided by a dedicated Industrial Placement Manager.

Aims of the Programme

Develop your technical skills: You'll study how software is built from start to finish, including: identifying problems that software can solve; finding out what your users need; developing software to solve these issues; testing the quality of the software; and documenting how to use it. With input from employers, the programme will also cover the latest technologies – hot topics like cloud computing, big data and cyber security.

Teach you project management skills: You'll learn how businesses manage large projects, and develop the skills you need to plan, design and deliver new software on time and within budget – key skills that employers look for.

Enhance your personal and interpersonal skills: Most software development is done in teams. The degree will prepare you for this, by boosting your interpersonal skills – how well you work with other people.

Expose you to opportunities to develop business skills: For long term success in your career, you'll not only need good technical skills, you'll also need to negotiate and communicate effectively with colleagues and customers; lead teams and projects; and understand how companies operate profitably. You'll learn these skills through the programme.

What Will You Be Expected to Achieve?

Students who successfully complete the programme will be able to:

Academic Content:

A1	Demonstrate understanding of the entire software development lifecycle from design through to deployment and maintenance
A2	Demonstrate broad knowledge of the software development sector, from both a technical and a business perspective
A3	Demonstrate technical knowledge and skills in key areas identified by contributing employers, and adapt this to new situations and contexts
A4	Understand and articulate business principles, structures, operations, procedures and cultures applicable to a career in a software development environment
A5	Show awareness of project, people and resource management principles and techniques

Disciplinary Skills - able to:

B1	Undertake problem-solving and modelling tasks relevant to software development

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B 2	Work closely and communicate with employees in non-IT related areas of an organisation
B 3	Investigate, select, analyse, manipulate and manage information from a variety of technical and non-technical sources
B 4	Apply the technical skills learned in the taught component of the programme while on placement, and, vice versa, apply the technical skills learned while on placement when back in the final year of study
B 5	Appreciate the challenges associated with industry standard software development

Attributes:	
C 1	Have a global perspective and engage with the professional world
C 2	Learn continuously and develop the skills to influence, negotiate and lead
C 3	Display initiative and resilience in the face of new challenges
C 4	Use information for evidence-based decision-making and creative thinking
C 5	Apply different forms of communication in various social, professional and cultural settings

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

How Will You Learn?

The teaching and learning strategies are tailored to the learning outcomes of the different modules. These will
include lectures, lab and tutorial sessions, practical and library-based research, presentations and group work. Lectures are used to introduce principles and methods and also to illustrate how they can be applied in practice, e.g. through examples and case studies. Lab and tutorial sessions will allow students to put these theoretical principles and methods into practice. Practical and library-based research will allow them to develop skills in review, investigative methods and critical analysis. Presentations and group work will enhance their team-working and communication skills. The overall profile of teaching and learning strategies is designed to foster the development of (i) Graduate Attributes, as captured in Queen Mary's Statement of Graduate Attributes and (ii) key skills, as captured in the e-skills UK endorsement criteria.

In addition, the programme includes a significant component of industrial input and experience. The series of "guru" lectures offers the opportunity for students to increase their awareness of the broader context of their discipline, hear a range of industrial speakers and ask questions. The industrial placement offers a real-world opportunity for them to apply the technical skills that they have learnt in the taught component of the programme. Students will receive full training in preparation for the placement, supported by the dedicated Industrial Placement Manager, who also provides support while they are out on placement.

Learning materials will be hosted on Queen Mary's tailored virtual learning environment, QMPlus. This will also provide access to announcement and discussion forums used for asynchronous support.

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How Will You Be Assessed?

Taught modules are usually assessed through a combination of examination and coursework, as appropriate for the content and focus of each individual module. Laboratory-based modules are often assessed through practical coursework, while more theoretical modules may be assessed through in-class tests, exercise sheets or written assignments. Project work, both group and individual, forms a significant component of the assessment - project modules are assessed on the basis of a written report, oral presentation and demonstration of the concrete outcomes of the module, e.g. developed software. The assessment for the placement year includes an employer evaluation and the production of a reflective learning log, in addition to a report and oral presentation.

In addition to summative assessment, the programme provides regular opportunities for formative feedback, e.g. through the submission of a draft report for project modules. The School has a feedback policy, which stipulates standard requirements for acceptable types and timing of feedback. The School also uses the TurnItIn plagiarism detection system, and students will have the opportunity to submit some formative assignments to TurnItIn for feedback on the correctness and effectiveness of their referencing.

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)
ECS418U Business Modelling (15 credits)
ECS419U Information Systems Analysis (15 credits)
Semester 1 and 2
ECS422U Skills of Electronic Engineering and Computer Science (non-credit bearing module)

Year 2 Modules
Semester 3
ECS501U C Programming (15 credits)
ECS505U Software Engineering (15 credits)
ECS510U Algorithms and Data Structures in an Object-Oriented Framework (15 credits)
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)
ECS639U Web Programming (15 credits)
ECS646U Software Development and Quality (15 credits)
Plus one module from:
ECS607U Data Mining (15 credits)
ECS609U Project Risk Management (15 credits)

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ECS610U Computer Graphics (15 credits)
ECS640U Big Data Processing (15 credits)
ECS642U Embedded Systems (15 credits)
ECS650U Semi-Structured Data and Advanced Data Modelling (15 credits)
Semester 8
ECS635U Project (cont) (30 credits)
Plus three modules from:
ECS612U Interaction Design (15 credits)
ECS622U Product Development (15 credits)
ECS624U C++ for Image Processing (15 credits)
ECS629U Artificial Intelligence (15 credits)
ECS637U Digital Media and Social Networks (15 credits)
ECS647U Bayesian Decision and Risk Analysis (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.

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

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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/institutes 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/institute 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 the committee's work in a number of ways, such as through student membership, or consideration of student surveys.

All schools/institutes operate an Annual Programme Review of their taught undergraduate and postgraduate provision. APR is a continuous process of reflection and action planning which is owned by those responsible for programme delivery; the main document of reference for this process is the Taught Programmes Action Plan (TPAP) which is the summary of the school/institute's work throughout the year to monitor academic standards and to improve the student experience. 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.

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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

N/A

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 framework for this degree has been developed by e-Skills UK as a collaboration between some of the UK's leading companies and universities. It is a unique programme and it has proved over the last seven years that there is a clear demand from students and industry for a degree that combines business and technical learning objectives with business skills in order to produce graduates who are ready for the workplace.

The School of Electronic Engineering & Computer Science also has a wide range of industrial contacts secured through research projects and consultancy, our well-established Industrial Experience programmes and our Industrial Advisory Board. The Industrial Advisory Board 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 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.

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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