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	BSc Digital & Technology Solutions
Name of Interim Award(s)	N/A
Duration of Study / Period of Registration	4 years professional pathway
QM Programme Code / UCAS Code(s)	G4DT
QAA Benchmark Group	Computing
FHEQ Level of Award	Level 6
Programme Accredited by	Tech Partnership
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
School of Business & Management

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

Programme Outline

This programme has been developed under the auspices of the government's degree apprenticeship initiative (see, for example, https://www.gov.uk/government/publications/apprenticeship-standard-digital-technology-solutions-professional). Degree apprenticeships are intended to capitalise on the strengths of both higher education and vocational education. The model is that the degree apprentice is employed in a substantive job role, while also pursuing a degree.

A recent BIS factsheet highlights the advantages of the initiative for employers, degree apprentices and HEIs. Employers can attract new talent who might otherwise not apply to them until they have studied for a degree - this allows the employer to shape their development as they work. Degree apprentices will be free from significant debt, since their studies are funded by the government / their employer, and get a head start in their chosen profession compared with their peers. HEIs can develop and strengthen links with local employers, and get access to a wider range of mature and motivated students.

The Digital and Technology Solutions degree apprenticeships are being supported by Tech Partnership (formerly e-Skills UK) under the Tech Industry Gold framework - see https://www.thetechpartnership.com/recruit-and-train/degree-apprenticeships/. All degrees endorsed by Tech Partnership must combine coverage of the following components:
1. Technology
2. Project management

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3. Personal and interpersonal skills
4. Business skills

The Tech Industry Gold 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. Employers already taking on degree apprentices include: Accenture, Bright Future, BT, Capgemini, CGI, Ford, Fujitsu, GlaxoSmithKline, HMRC, HP, IBM, Lloyds Banking Group and Thales.

Aims of the Programme

The Digital and Technology Solutions degree apprenticeship is centred on a real job within business that extends the learning beyond the classroom and into the workplace. The principal aim is to integrate academic learning at degree level and on-the-job practical training to provide a holistic programme of education and training to meet the skills needs of employers now and into the future.

More specifically, this programme aims to:
* Give the degree apprentices the opportunity to gain experience in the workplace with top employers while earning their degree
* Help the degree apprentices to grow practical technology expertise with project management, interpersonal and business skills
* Help new-start degree apprentices to kick-start their position in the jobs market by earning the relevant experience that leading employers are looking for, meaning that they are fully equipped with the academic knowledge and work experience needed to get ahead when they graduate
* Help degree apprentices who are already employed find new opportunities for career progression
* Widen participation and relieve fees pressure on students
* Offer study opportunities tailored to the jobs market through the roles of IT Consultant, Business Analyst and Data Analyst.

What Will You Be Expected to Achieve?

Through studying this programme, a typical degree apprentice is expected to develop the following core characteristics, identified in the QAA Benchmark Statement for Computing 2007:
* Understanding of computing and information systems, including awareness of underlying concepts, analytical ability and knowledge of related operational issues
* Ability in computational thinking
* A balance of theoretical knowledge and practical competencies, such that practical experience is supported by an understanding of the underlying principles
* Transferable skills developed in the context of computing but applicable in many other contexts
The degree apprentices then supplement these core characteristics with exposure to industry standard, tailored training and larger-scale problem-solving in their employment.

The above characteristics also map to the areas identified in the SEEC Credit Level Descriptors 2010, which are:
* Development of Knowledge and Understanding
* Cognitive/Intellectual skills
* Practical skills
* Key/transferable skills

The educational approach taken in the programme is incremental development through levels 4, 5 and 6 (see the Framework for Higher Education Qualifications in England, Wales and Northern Ireland 2008), culminating in:
* Knowledge at the boundaries of the discipline, including state-of-the-art
* Advanced critical analysis techniques and problem-solving skills
* Ability to evaluate evidence, arguments and assumptions, and reach sound conclusions
* Ability to make decisions in novel, complex and unpredictable circumstances
* Effective communication in a range of situations and with a range of stakeholders
* A strong sense of personal and professional responsibility

The programme has a strong emphasis on graduate attributes, as summarised in the QMUL Statement of Graduate Attributes.

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In addition, unusually, the degree apprentice has the opportunity to put these attributes into practice in their employment context simultaneously, thereby reinforcing their importance.

Academic Content:	
A1	Understanding of business operations, procedures and culture applicable to a sustainable career as a Digital & Technology Solutions professional
A2	Critical understanding and analysis of the theoretical, conceptual and practical issues central to the practice of developing, implementing and maintaining technology solutions
A3	A real workplace learning pedagogy in order to develop the competences required by employers
A4	Knowledge of project, people and resource management principles and techniques

Disciplinary Skills - able to:	
B1	Demonstrate competence and independence in technology solutions to form a solid foundation for further development
B2	Identify, select, apply and evaluate advanced problem-solving and modelling skills appropriate to developing technology solutions for business
B3	Demonstrate advanced practical skills in the chosen area of IT occupational competence
B4	Appreciate the challenges associated with industry standard methodologies, processes, techniques and tools associated with the chosen area of IT occupational competence

Attributes:	
C1	Able to engage effectively with staff all levels in the organisation
C2	Motivated to learn from experience in a technology solutions project oriented environment
C3	Able to manage own personal and professional development
C4	Able to display initiative and resilience in the face of new challenges

How Will You Learn?

The programme contains a mixture of campus-based and work-based modules. Degree apprentices will study their campus-based modules alongside degree apprentices from other employers and students from related campus-based programmes, to ensure that they experience academic life more broadly, and avoid isolation. The teaching and learning strategies are tailored to the learning outcomes of the different modules.

For campus-based modules, strategies 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

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methods and critical analysis. Presentations and group work will enhance their team-working and communication skills. 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. 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 Tech Partnership endorsement criteria.

For work-based modules, learning materials comparable to those for the equivalent campus-based module are provided, along with appropriate additional study guidance. Supplementary tailored individual support is provided through supervision by the employer and the module lecturer. Asynchronous and synchronous support may be provided, as appropriate,

The degree apprentices are also assigned an academic adviser / tutor, who is responsible for determining any additional individual / small group academic support needs, in conjunction with the relevant employer(s). Support is tailored and flexible as far as possible, e.g. through measures such as Skype sessions with TAs, "online office hours" for key staff, and employability-linked support to help the degree apprentices understand the links between their study and employment, as well as implications for their personal and professional development.

How Will You Be Assessed?

Campus-based 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.

Assessment for work-based modules is project-based, with QMUL and the employer each contributing 45% to the assessment profile, and the remaining 10% consisting of an oral presentation to both QMUL and employer. QMUL applies standardised project marking criteria, as used in other project-based modules in the School. The employer evaluates the degree apprentice's performance against objectives that are agreed with the degree apprentice, aligned with module learning outcomes and contextualised in the degree apprentice's specific workplace situation. This process is akin to the tried and tested process used in the School's Industrial Experience Placement projects, and may be moderated by the School as necessary.

In addition to summative assessment, the programme provides regular opportunities for formative feedback, e.g. through the submission of a draft report for project-based 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).

The programme comprises a common set of core modules with four occupational pathway options for the following roles:
IT Consultant
Data Analyst
Business Analyst
Software Engineer

The core modules focus on the study of IT in business and include a blend of technology, business, project and transferable skills.
They cover the following topics:
• Foundations of Information Technology Systems
• Systems Development Fundamentals
• Data Fundamentals
• Information and Cyber Security Fundamentals
• Business Organisation Fundamentals
• IT Project Management Fundamentals
• Computer Systems and Network Fundamentals
• Interpersonal and Foundation Skills Fundamentals

The occupational pathways are tailored to employer and degree apprentice needs, enabling the degree apprentices to become confident, competent and capable independent Digital & Technology Solutions Professionals. The pathways each have a fixed module diet and are described in detail below.

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The programme is structured around a "professional pathway" model, in which the degree apprentices take 90 credits per academic year, in order to accommodate their work commitments.

IT CONSULTANT PATHWAY

Yr 1 Sem 1: ECS401U Procedural Programming, ECS404U Computer Systems & Networks, ECS4??W Work-Based Project (NEW WORK-BASED MODULE)
Yr 1 Sem 2: ECS419U Information System Analysis, BUS017 Economics for Business, ECS418W Business Modelling (WORK-BASED VARIANT OF ECS418U)

Yr 2 Sem : ECS505U Software Engineering, BUS021 Financial Accounting, ECS402W Professional & Research Themes in EECS (WORK-BASED VARIANT OF ECS402U)
Yr 2 Sem 2: ECS522U Graphical User Interfaces, BUS011 Marketing, ECS508W Business Information Systems (WORK-BASED VARIANT OF ECS518U)

Yr 3 Sem 1 : ECS646U Software Development and Quality, ECS524U Internet Protocols & Applications, ECS609W Project Risk Management (WORK-BASED VARIANT OF ECS609U)
Yr 3 Sem 2: ECS519U Database Systems, ECS622U Product Development, ECS523W ICT Group Project (WORK-BASED VARIANT OF ECS523U)

Yr 4 Sem 1: BUS204 Strategy, ECS619U Network Planning, Finance and Management, ECS635W Project (WORK-BASED VARIANT OF ECS635U)
Yr 4 Sem 2: BUS324 Management of Human Resources, ECS608U Distributed Systems & Security, ECS635W Project (WORK-BASED VARIANT OF ECS635U contd)

DATA ANALYST PATHWAY
(note that degree apprentices on this pathway will already be specialising in their workplace context, and therefore some modules at higher academic levels are offered in lower developmental years on this pathway

Yr 1 Sem 1: ECS401U Procedural Programming, ECS404U Computer Systems & Networks, ECS4??W Work-Based Project (NEW WORK-BASED MODULE)
Yr 1 Sem2: ECS419U Information System Analysis, ECS417U Fundamentals of Web Technology, ECS418W Business Modelling (WORK-BASED VARIANT OF ECS418U)

Yr 2 Sem 1: ECS505U Software Engineering, ECS524U Internet Protocols & Applications, ECS402W Professional & Research Themes in EECS (WORK-BASED VARIANT OF ECS402U)
Yr 2 Sem 2: ECS519U Database Systems*, ECS622U Product Development**, ECS508W Business Information Systems (WORK-BASED VARIANT OF ECS518U)

Yr 3 Sem 1: ECS507U Website Design & Authoring, ECS650U Semi-Structured Data and Advanced Data Modelling**, ECS609W Project Risk Management** (WORK-BASED VARIANT OF ECS609U)
Yr 3 Sem 2: ECS612U Interaction Design, ECS647U Bayesian Decision & Risk Analysis, ECS523W ICT Group Project (WORK-BASED VARIANT OF ECS523U)

Yr 4 Sem 1: ECS607U Data Mining, ECS640U Big Data Processing, ECS635W Project (WORK-BASED VARIANT OF ECS635U)
Yr 4 Sem 2: ECS6??U Data Analytics (NEW MODULE), ECS608U Distributed Systems & Security, ECS635W Project (WORK-BASED VARIANT OF ECS635U contd)

* level 5 but included in developmental year 1 in this pathway
** level 6 but included in developmental year 2 in this pathway

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BUSINESS ANALYST PATHWAY

Yr 1 Sem 1: ECS401U Procedural Programming, ECS404U Computer Systems & Networks, ECS4??W Work-Based Project (NEW WORK-BASED MODULE)
Yr 1 Sem 2: ECS419U Information System Analysis, BUS017 Economics for Business, ECS418W Business Modelling (WORK-BASED VARIANT OF ECS418U)

Yr 2 Sem 1: ECS505U Software Engineering, BUS021 Financial Accounting, ECS402W Professional & Research Themes in EECS (WORK-BASED VARIANT OF ECS402U)
Yr 2 Sem 2: ECS417U Fundamentals of Web Technology, BUS011 Marketing, ECS508W Business Information Systems (WORK-BASED VARIANT OF ECS518U)

Yr 3 Sem 1: ECS507U Website Design & Authoring, ECS524U Internet Protocols & Applications, ECS609W Project Risk Management (WORK-BASED VARIANT OF ECS609U)
Yr 3 Sem 2: ECS519U Database Systems, ECS622U Product Development, ECS523W ICT Group Project (WORK-BASED VARIANT OF ECS523U)

Yr 4 Sem 1: BUS204 Strategy, ECS619U Network Planning, Finance & Management, ECS635W Project (WORK-BASED VARIANT OF ECS635U)
Yr 4 Sem 2: BUS324 Management of Human Resources, ECS608U Distributed Systems & Security, ECS635W Project (WORK-BASED VARIANT OF ECS635U contd)

SOFTWARE ENGINEER PATHWAY
(note that degree apprentices on this pathway will already be specialising in their workplace context, and therefore some modules at a higher academic level are offered in a lower developmental year on this pathway)

Yr 1 Sem 1: ECS401U Procedural Programming, ECS404U Computer Systems & Networks, ECS402W Professional and Research Themes in EECS (work-based)
Yr 1 Sem 2: ECS414U Object-Oriented Programming, ECS419U Information System Analysis, ECS418W Business Modelling (work-based)

Yr 2 Sem 1: ECS407U Logic and Discrete Structures, ECS524U Internet Protocols and Applications, ECS505W Software Engineering (NEW WORK-BASED VARIANT OF ECS505U)
Yr 2 Sem 2: ECS519U Database Systems*, ECS518U Operating Systems, ECS506W Software Engineering Project (NEW WORK-BASED VARIANT OF ECS506U)

Yr 3 Sem 1: ECS501U C Programming, ECS510U Algorithms and Data Structures in an Object-Oriented Framework, ECS646W Software Development and Quality (NEW WORK-BASED VARIANT OF ECS646U)
Yr 3 Sem 2: ECS522W Graphical User Interfaces (NEW WORK-BASED VARIANT OF ECS522U), ECS639U Web Programming, ECS652U Compilers

Yr 4 Sem 1: ECS650U Semi-Structured Data and Advanced Data Modelling, ECS640U Big Data Processing, ECS635W Project
Yr 4 Sem 2: ECS608U Distributed Systems and Security, ECS647U Bayesian Decision and Risk Analysis, ECS635W Project (contd)

* level 5 but included in developmental year 1 in this pathway
** level 6 but included in developmental year 2 in this pathway

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Academic Year of Study

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester

What Are the Entry Requirements?

The entry requirements are equivalent to those for other UG programmes offered within EECS.

A/AS-levels - Tariff/Grades requirement: ABB(320 points) GCSE Maths grade B or above.
Vocational or applied A-levels -Acceptability: Accepted and subject to the above tariff requirements for A/AS-levels.
Must be in related subject, ICT/Computing.
BTEC Extended Diploma - Pass with D*D*D in ICT/Computing with grade B GCSE Maths.
BTEC Diploma (120 Credit)- Pass with D*D in ICT/Computing with grade B in A-level Maths.
BTEC Subsidiary Diploma (60 Credit)- Pass with D*. These qualifications are acceptable ONLY if offered with two appropriate A-levels, ie Maths/ICT grade B.
HNC - These qualifications will be considered on a case by case basis.
HND - These qualifications will be considered on a case by case basis.
Access - Pass with 45 credits in Access in Computing at level 3, of which 30 credits must be Distinction and 15 credits at Merit or Higher. An additional entry maths test will be required if you do not hold GCSE Mathematics grade B.
International Baccalaureate - Acceptability: Acceptable on its own and combined with other qualifications. Subjects and grades required: 34 points overall. Must include either HL English grade 4 or SL English grade 4 or above.

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

Personal Tutor
All students are allocated a personal tutor for each academic year. Tutors are members of academic staff who provide advice and support to students. They have two main roles: academic and pastoral. First year students will meet their tutor for a weekly tutorial.
In their academic capacity, tutors advise on, and approve, programmes of study.
If a student is considering changing their programme of study, or taking a module that does not appear on your recommended programme, they must discuss this with their tutor. Any other academic-related concerns, e.g. general academic progress, should be discussed with their tutor in the first instance. In EECS, the role of tutor is separate from that of Senior Tutor.
In their pastoral capacity, tutors are the first point of contact in case of personal problems or concerns. Tutors recognise that personal problems can severely affect a student's academic performance, and they will provide a sympathetic and non

judgmental ear, as well as practical help. They can also direct students to other College support services, where appropriate. Discussions with students will always be treated in confidence. However, in cases where academic performance is affected by personal problems, the School must be officially informed, and tutors can also guide students through the correct procedures for doing this.

Tutors can be asked to provide academic references for students for job and other applications after leaving university, and this is another good reason for building and maintaining a good student/tutor relationship.

Senior Tutor

The School has two Senior Tutors. A Senior Tutor is a member of the academic staff who acts as a further point of reference for problems and decisions faced by students. Like tutors, the Senior Tutor has two main roles: academic and pastoral. Students should usually contact their own tutor first for advice, but a tutor may recommend that a student consult the Senior Tutor for either academic or pastoral reasons. If a student finds difficulty talking to their own tutor, they may consult the Senior Tutor directly. The Senior Tutor also serves as the Chair of the Student-Staff Liaison Committee (SSLC).

Employer Support

All degree apprentices have a line manager / task manager at their employer, who has been involved in the recruitment decision and is also responsible for ensuring that the degree apprentice has sufficient time to attend classes on the required days and to keep up with their studies on a regular basis. The line manager / task manager works with the degree apprentice's academic adviser / tutor at QMUL to ensure that the degree apprentice can see the interaction between their everyday employment and their degree, address any problems that the degree apprentice encounters in their studies, and refer the degree apprentice on to more specialised support if needed. Many larger employers also have a separate mentor system for the employees, through which training and development needs are identified - the mentor is included in the discussion loop between QMUL and employer, as appropriate.

Programme-specific Rules and Facts

The programme is structured around a "professional pathway" model, in which the degree apprentices take 90 credits per academic year, in order to accommodate their work commitments. In each academic year, students take 60 credits of campus-based modules and 30 credits of work-based modules.

Normal academic regulations apply to this programme, including equivalent regulations governing progression (no more than 30 credits may be failed in any academic year, no more than 45 credits may be failed overall) and award (calculation of the College Mark).

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 apprenticeship has been developed by Tech Partnership as a collaboration between some of the

UK's leading companies and universities. It offers the degree apprentices a unique opportunity to contextualise their academic study in their workplace environment.

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 EECS++ Society, the School's Annual Programming Competition and external competitions with support from the School.

An Employer Links Management Committee (ELM) oversees the strategic development of the programme and monitors its future progress, with a particular focus on listening to employers' perspectives. ELM also has oversight of other relevant School initiatives, to ensure joined-up thinking and sharing of good practice. ELM includes representatives from EECS and the School of Business and Management, Tech Partnership and employers involved in relevant QMUL initiatives. ELM meets at least annually at QMUL, with necessary communication between meetings being conducted electronically, by email or conference call as appropriate.

Programme Specification Approval

Person completing Programme Specification	Jane Reid
Person responsible for management of programme	Jane Reid
Date Programme Specification produced/amended by School Learning and Teaching Committee	15 Jan 2016
Date Programme Specification approved by Taught Programmes Board	

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