



Programme Specification (PG)

Awarding body / institution:	Queen Mary University of London
Teaching institution:	Queen Mary University of London
Name of final award and programme title:	MSc Digital and Technology Solutions Specialist
Name of interim award(s):	
Duration of study / period of registration:	2 years part-time degree apprenticeship
QMUL programme code(s):	
QAA Benchmark Group:	Computing
FHEQ Level of Award:	Level 7
Programme accredited by:	Tech Partnership Degrees (currently being sought).
Date Programme Specification approved:	N/A
Responsible School / Institute:	School of Electronic Engineering & Computer Science

Schools / Institutes which will also be involved in teaching part of the programme:

Collaborative institution(s) / organisation(s) involved in delivering the programme:

N/A

Programme outline

This programme is a level 7 degree apprenticeship developed under the approved standard described at <https://www.instituteforapprenticeships.org/apprenticeship-standards/digital-and-technology-solutions-specialist-integrated-degree/>.

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. Employers can attract new talent who might otherwise not apply to them until they had studied for a degree - this allows the employer to shape their development as they work. At level 7, it also allows employers to upskill existing employees. HEIs can develop and strengthen links with local employers, and get access to a wider range of mature and motivated students. As a degree apprentice, you will be free from significant debt, since your studies are funded by your employer. You will get a head start in your chosen profession, or change of profession, compared with your peers.

The Digital and Technology Solutions Specialist degree apprenticeships are being supported by Tech Partnership Degrees under the Tech Industry Gold framework - see <https://www.tpdegrees.com/degree-apprenticeships/>. All degrees endorsed by Tech Partnership Degrees must combine coverage of the following components:

1. Technology
2. Project management

3. Personal and interpersonal skills

4. Business skills

The Tech Industry Gold 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.

The approved standard for the MSc Digital and Technology Solutions Specialist degree apprenticeship is structured as a core set of knowledge, skills and behaviours along with several defined specialisms (e.g. Data Analytics), each with their own specific set of supplementary knowledge, skills and behaviours.

As a Data Analytics specialist, you will acquire the following knowledge and understanding during the degree apprenticeship:

Knows and understands:

- How key algorithms and models are applied in developing analytical solutions and how analytical solutions can deliver benefits to organisations;
- The information governance requirements that exist in the UK, and the relevant organisational and legislative data protection and data security standards that exist. The legal, social and ethical concerns involved in data management and analysis;
- The principles of data driven analysis and how to apply these. Including the approach, the selected data, the fitted models and evaluations used to solve data problems;
- The properties of different data storage solutions, and the transmission, processing and analytics of data from an enterprise system perspective. Including the platform choices available for designing and implementing solutions for data storage, processing and analytics in different data scenarios;
- How relevant data hierarchies or taxonomies are identified and properly documented;
- The concepts, tools and techniques for data visualisation, including how this provides a qualitative understanding of the information on which decisions can be based.

You will also acquire the following skills:

- Identify and select the business data that needs to be collected and transitioned from a range of data systems; acquire, manage and process complex data sets, including large-scale and real-time data;
- Undertake analytical investigations of data to understand the nature, utility and quality of data, and developing data quality rule sets and guidelines for database designers;
- Formulate analysis questions and hypotheses which are answerable given the data available and come to statistically sound conclusions;
- Conduct high-quality complex investigations, employing a range of analytical software, statistical modelling & machine learning techniques to make data driven decisions solve live commercial problems;
- Document and describe the data architecture and structures using appropriate data modelling tools, and select appropriate methods to present data and results that support human understanding of complex data sets;
- Scope and deliver data analysis projects, in response to business priorities, create compelling business opportunities reports on outcomes suitable for a variety of stakeholders including senior clients and management.

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 specified roles including Data Analytics

The programme is structured around a core set of requirements, which are common to all degree apprentices, and a choice of several specialisms. The Data Analytics specialism offered by QMUL will equip degree apprentices with the ability to investigate business data requirements; apply data selection, data curation, data quality assurance and data investigation and engineering techniques; provide advice and guidance to database designers and others in using the data structures and associated data components efficiently; undertake data processing to produce data sets for study; perform investigations using techniques including machine learning to reveal new business opportunities; present data and investigation results along with compelling business opportunities reports to senior stakeholders.

What will you be expected to achieve?

The degree apprenticeship has been developed with reference to:

1. the QAA Subject Benchmark Statement for Masters Degrees in Computing - see https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/sbs-masters-degree-computing.pdf?sfvrsn=c490f681_16
2. the QAA Framework for Higher Education Qualifications (2016) - see <https://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf>
3. the SEEC Credit Level Descriptors for Higher Education (2016) - see <http://www.seec.org.uk/wp-content/uploads/2016/07/SEEC-descriptors-2016.pdf>

Degree apprentices are expected to be able to demonstrate the following specific knowledge, skills and attributes:

Academic Content:	
A 1	Statistical modeling of real data sources for trend detection and prediction
A 2	Programming tools and techniques for processing massive amounts of data such as Map/Reduce and Hadoop
A 3	Methods and techniques for automated classification and pattern recognition
A 4	Data processing techniques to produce data sets for study
A 5	Knowledge of project, people and resource management principles and techniques

Disciplinary Skills - able to:	
B 1	Evaluate the scientific, mathematical and software 'tools' relevant to the problem domain of data science
B 2	Develop novel techniques for analyzing unstructured data sources
B 3	Establish hypotheses on data sources, and validate them through statistical techniques
B 4	Apply data selection, data curation, data quality assurance, and data investigation and engineering techniques
B 5	Appreciate the business challenges associated with industry standard methodologies, processes, techniques and tools applicable to the chosen area of IT occupational competence (data analytics)

B 6	Investigate business data requirements using appropriate techniques and tools in order to identify new business opportunities
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Attributes:	
C 1	Engage critically with knowledge in the domain of data science
C 2	Develop a global perspective on the sources and uses of new data
C 3	Develop information expertise in the domain
C 4	Communicate effectively and appropriately with a wide range of academic and workplace stakeholders
C 5	Manage own personal and professional development
C 6	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 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, labs 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. 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 the competences described in the Tech Partnership Degrees accreditation criteria.

For work-based modules, learning materials comparable to those for the equivalent campus-based module are provided, along with additional appropriate additional study guidance. Supplementary workshop-based or tailored individual support is provided through supervision by the module lecturer.

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.

The project will be undertaken independently under the guidance of a project supervisor, who is an academic member of staff with whom there is normally weekly contact. Contacts 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?

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 primarily project-based, usually comprising a short mid-term test and a more substantial project report. QMUL applies standardised marking criteria, as used in other project-based modules in the School.

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.

The apprenticeship component of the degree apprenticeship is assessed through an End Point Assessment (EPA), which is specified in the approved standard. The EPA consists of 2 parts, listed below, and is conducted by an Independent Assessor:

1. A project report, which outlines work-based evidence of the knowledge, skills and behaviours specified in the approved standard. This will be the same report as is used for assessment of the capstone project, which will include the information required for both purposes.
2. A Professional Discussion, which is a structured discussion with the Independent Assessor.

Apprentices are required to pass both elements in order to pass the EPA.

How is the programme structured?

Please specify the structure of the programme diets for all variants of the programme (e.g. full-time, part-time - if applicable). The description should be sufficiently detailed to fully define the structure of the diet.

The degree apprenticeship is part-time over 2 years, structured as below. There are 2 annual entry dates, one in September and one in January.

SEPTEMBER ENTRY

Year 1 Semester 1 Sep-Jan

ECS764A Applied Statistics

ECS765A Big Data Processing

ECS7015W Project Management for Big Data Analysis

Year 1 Semester 2 Jan - Apr

ECS708A Machine Learning

ECS781A Cloud Computing

ECS784W Data Analytics

Year 2 Semester 1 Sep-Jan

ECS766A Data Mining

ECS7005A Risk and Decision Making for Data Science and AI

Year 2 Semesters 2 and 3 Jan-Aug

ECS7016W Project

Year 2 Semester 3

ECS7014W End Point Assessment (non-credit)

JANUARY ENTRY

Year 1 Semester 1 Jan-Apr

ECS708A Machine Learning

ECS781A Cloud Computing

ECS784W Data Analytics

Year 1 Semester 2 Sep-Jan

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ECS764A Applied Statistics
 ECS765A Big Data Processing
 ECS7015W Project Management for Big Data Analysis

Year 2 Sem 1 Jan-Apr
 ECS766A Data Mining
 ECS7005A Risk and Decision Making for Data Science and AI

Year 2 Semesters 2 and 3 Apr-Dec
 ECS7016W Project

Year 2 Semester 3
 ECS7014W End Point Assessment (non-credit)

Academic Year of Study PT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Applied Statistics	ECS764A	15	7	Compulsory	1	Semester 1
Big Data Processing	ECS765A	15	7	Compulsory	1	Semester 1
Project Management for Big Data Analysis	ECS7015W	15	7	Compulsory	1	Semester 1
Machine Learning	ECS708A	15	7	Compulsory	1	Semester 2
Cloud Computing	ECS781A	15	7	Compulsory	1	Semester 2
Data Analytics	ECS784W	15	7	Compulsory	1	Semester 2

Academic Year of Study PT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Data Mining	ECS766A	15	7	Compulsory	2	Semester 1
Risk and Decision Making for Data Science and AI	ECS7005A	15	7	Compulsory	2	Semester 1
Project	ECS7016W	60	7	Core	2	Semesters 2 & 3

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
End Point Assessment	ECS7014W	0	7	Core	2	Semester 3

What are the entry requirements?

Students will need to have a 2:1 or above in BSc in Computer Science, Electronic Engineering or other Science discipline (e.g. Maths, Physics). Candidates with great learning potential from other related areas (such as Economics) might also be accepted as long as they demonstrate relevant experience in Statistics/Programming. Students with a good lower second class degree may be considered on an individual basis. Applicants with unrelated degrees will be considered if there is evidence of equivalent industrial experience.

For international students we require English language qualifications IELTS 6.5 or TOEFL 92 (internet based).

How will the quality of the programme be managed and enhanced? How do we listen to and act on your feedback?

EECS has a Student Experience Teaching, Learning and Assessment (SETLA) organisational structure which enables programmes to be both managed and enhanced. The organisational structure allows for subject level teaching groups and programme coordinators to regularly evaluate the content and delivery of each programme. Feedback from module evaluations and SSLC meetings are fed into these groups and this provides an opportunity for student feedback to be incorporated into the programmes. Additionally, programme coordinators work with the Director of Education to ensure that each programme is current and can be delivered effectively.

What academic support is available?

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. In their academic capacity, tutors advise on, and approve, programmes of study. If a student is considering changing their programme of study, 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 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 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 study part-time in order to accommodate their work commitments. In addition to the usual academic requirements, the award of the degree is dependent on the degree apprentice passing the End Point Assessment (EPA) specified in the assessment plan associated with the approved standard described at <https://www.instituteforapprenticeships.org/apprenticeship-standards/digital-and-technology-solutions-specialist-integrated-degree/>. This involves the degree apprentice firstly passing the End Point Gateway requirements:

1. The opinion of the employer is that the apprentice is ready for the EPA
2. Completion of all the modules in the MSc Digital and Technology Solution Specialist programme that the Higher Education Institute will develop to cover all the Technical Competencies, Knowledge and Understanding, and behaviours listed on the Digital and Technology Solution Specialist Standard
3. Pass Level 2 English and maths (if not already achieved)
4. Complete a capstone project of 60 credits, in order to inform the project report, which is one of the end point assessment methods
5. Confirmation that the apprentice has produced a portfolio in relation to evidencing the core skills, knowledge and behaviours towards the end of the apprenticeship

and then subsequently passing both components of the EPA itself, which is comprised of:

- (a) A Project Report (a written account of a set of practical tasks undertaken within a work based project context), which the independent assessor assesses and grades. In practice, this report will be the same one used for the capstone project, which will incorporate the information required for both purposes.
- (b) A Professional Discussion (a structured discussion with the independent assessor allowing the apprentice to respond to questions using a portfolio), which the independent assessor assesses and grades.

Apprentices are required to pass both elements in order to pass the EPA.

Students who do not pass the EPA may be eligible for an exit award (MSc Data Science and Engineering) subject to meeting all other requirements for 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 standard for this degree apprenticeship has been developed by Tech Partnership Degrees 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.

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Transferable skills are developed through a variety of means, including embedding of graduate attributes and competences 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.

Programme Specification Approval

Person completing Programme Specification:

Jane Reid

Person responsible for management of programme:

Jane Reid

Date Programme Specification produced / amended by School / Institute Learning and Teaching Committee:

Date Programme Specification approved by Taught Programmes Board:

N/A