

Programme Title: MSc Internet of Things (Data) with Industrial Experience



## 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 Internet of Things (Data) with Industrial Experience
Name of interim award(s):	PG Certificate and PG Diploma
Duration of study / period of registration:	24 Months
QMUL programme code(s):	I1T1
QAA Benchmark Group:	Computing
FHEQ Level of Award:	7
Programme accredited by:	
Date Programme Specification approved:	
Responsible School / Institute:	School of Electronic Engineering & Computer Science

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

NA

Institution(s) other than QMUL that will provide some teaching for the programme:

NA

### Programme outline

IoT focuses on a vision of more connected, different, things (or digital devices) than in previous visions of Internet. More things are part of the physical world that connect to form smart environments. Humans will use more different things (sensors, tags, cards, phones, actuator, wearables) to interact with the world. Machine to machine interaction will allow more physical things to interact with other things without human intervention.

There are several important indicators that there is a need for skilled graduates with IoT skills: the increasing number of heterogeneous connected things, the perceived increase in market revenue, the increasing range of IoT products from startups, the range of major established high-tech companies with IoT divisions, the interest in developing IoT standards, and specific IoT jobs are increasingly being advertised.

QMUL School of Electronic Engineering and Computer Science is well placed to deliver this programme as we have strong R&D centres of excellence in core subject areas comprising Networks, Cognitive Science, Antennas together with cross-cutting centres such as the Centre for Intelligent Sensing (CIS) and the Centre for Digital Music (C4DM).

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This programme includes a year in industry in year 2.

### Aims of the programme

The MSc in IoT is designed to meet the demand for a new kind of IT specialist with skills - those who can:

1. Engineer new interactive products – things and
2. Interconnect and embed these things into larger diverse systems and architectures;
- 3: Intelligently sense multi-modal data in physical and human environments;
4. Intelligently fuse and analyse the data collected.

Programme graduates will be able to pursue careers in IoT positions in Industry, as well as initiate research in multiple scientific domains that rely on performing advanced IoT.

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?

Knowledge and understanding of the following items:

#### Academic Content:

A 1	Evaluate the scientific, mathematical and software 'tools' relevant to the problem domain of IoT System Engineering
A 2	Master the programming tools and techniques for processing heterogeneous things, including the wide use of tags, sensors and other Things in the physical world.
A 3	Apply methods and techniques for automated and manual interaction with IoT devices, their services and their data

#### Disciplinary Skills - able to:

B 1	Evaluate the scientific, mathematical and software 'tools' relevant to the problem domain of IoT system engineering
B 2	Develop novel techniques for interconnecting things, sensing the environment and processing the data there from.
B 3	Establish hypotheses on sensing the world, embedding and connect new things through relating physical world models with theoretical models

#### Attributes:

C 1	Engage critically with knowledge in the domain of IoT System Engineering, intelligent sensors and data analytics
C 2	Develop a global perspective on how to engineer new things, intelligently sense the environment and analyse the data
C 3	Develop new information, communication technology expertise in the domain

### How will you learn?

Each non-project-based module normally 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 during the summer months under the supervision of an academic member of staff with whom there are normally 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. A number of industrial-linked projects may be offered each year, which students can apply for.

### How will you be assessed?

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

The final year project is examined on the basis of a written report, a formal oral presentation, and a demonstration of the piece of software developed or the insights from the data analysis carried by the student. The projects will have two examiners each, with a third if there is disagreement.

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 place 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 applicable). The description should be sufficiently detailed to fully define the structure of the diet.

The programme is delivered over three semesters, the first two being the taught courses and the 3rd being the project; although students will start some preparation work for their projects in semesters 1 and 2.

Year 1

Semester 1

ECS782P Introduction to IOT

ECS783P Enabling Communication Technologies for IOT

ECS764P Applied Statistics

Plus one from the following:

ECS708P Machine Learning

ECS765P Big Data Processing

ECS766P Data Mining

Semester 2

ECS725P Mobile Services

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ECS726P Security and Authentication

ECS784P Data Analytics

Plus one from the following:

ECS735P The Semantic Web

ECS757P Digital Media and Social Networks

ECS781P Cloud Computing

Semester 3

ECS750P – Project

Year 2

ECS774P Industrial Placement Project

Academic Year of Study FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Introduction to IOT	ECS782P	15	7	Compulsory	1	Semester 1
Enabling Communication Technologies for IOT	ECS783P	15	7	Compulsory	1	Semester 1
Applied Statistics	ECS764P	15	7	Compulsory	1	Semester 1
Machine Learning	ECS708P	15	7	Elective	1	Semester 1
Big Data Processing	ECS765P	15	7	Elective	1	Semester 1
Data Mining	ECS766P	15	7	Elective	1	Semester 1
Mobile Services	ECS725P	15	7	Compulsory	1	Semester 2
Security and Authentication	ECS726P	15	7	Compulsory	1	Semester 2
Data Analytics	ECS784P	15	7	Compulsory	1	Semester 2
The Semantic Web		15	7	Elective	1	Semester 2
Digital Media and Social Networks		15	7	Elective	1	Semester 2
Cloud Computing		15	7	Elective	1	Semester 2

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Project	ECS750P	60	7	Core	1	Semester 3

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Industrial Placement Project	ECS774P	0	7	Core	2	Semesters 1-3

**What are the entry requirements?**

Further information on the entry requirements can be found at <http://www.eecs.qmul.ac.uk/postgraduates/entry-requirements/>

**How do we listen to 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 Student Experience Learning Teaching And Assessment (SETLA) Committee .

The School's SETLA 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

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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.

### What academic support is available?

All students will be assigned a tutor, with whom they will have bi-weekly meetings. In addition the students will have all the standard induction, advice and supervisory arrangements normally offered to students within EECS.

The school handbook will be provided (and made accessible at all times) to students, where all the channels of support will be outlined. These include the support channels within the school and also those available at College level.

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

### Programme-specific rules and facts

### 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 staff involved in the IoT MSc have strong links and research collaboration with industrial partners including IBM, HP, BBC, and Tech City IT startups. Several of these companies will be involved in the teaching activities, providing guest lectures, as well as business use cases for applying IoT Engineering techniques.

Additionally, several of the MSc projects offered to the students will be performed in collaboration with an industry partner, including summer placement opportunities.

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## Programme Specification Approval

Person completing Programme Specification:

Rupal Vaja

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**Person responsible for management of programme:**

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

**Date Programme Specification approved by Taught  
Programmes Board:**