

Programme Title: MSc in the Internet of Things (Engineering)



## 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 in the Internet of Things (Engineering)
Name of interim award(s):	PG Certificate and PG Diploma
Duration of study / period of registration:	12 Months
QMUL programme code(s):	I1E0
QAA Benchmark Group:	Computing
FHEQ Level of Award:	Level 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).

This programme is accredited by the Institution of Engineering and Technology on behalf of the Engineering Council as

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meeting the requirements for Further Learning for registration as a Chartered Engineer. Candidates must hold a CEng accredited BEng/BSc (Hons) undergraduate first degree to comply with full CEng registration requirements.

**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.

**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
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C2	Develop a global perspective on how to engineer new things, intelligently sense the environment and analyse the data
C3	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 taught modules normally consists of a combination of written examination and coursework.

The project is examined on the basis of a written report, a formal oral presentation, and, where applicable, a demonstration of any software and/or hardware developed by the student.

### 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

Two from of the following:

ECS642P Embedded Systems

ECS702P Mobile and WLAN Technologies

ECS703P 21st Century Networks

Semester 2

ECS725P Mobile Services

ECS726P Security and Authentication

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Two from the following:  
 ECS724P Network Modeling and Performance  
 ECS727P Real-Time and Critical Systems  
 ECS733P Interactive System Design  
 ECS781P Cloud Computing

Semester 3  
 ECS751P – 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
Embedded Systems	ECS642P	15	7	Elective	1	Semester 1
Mobile and WLAN Technologies	ECS702P	15	7	Elective	1	Semester 1
21st Century Networks	ECS703P	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
Network Modeling and Performance	ECS724P	15	7	Elective	1	Semester 2
Real-Time and Critical Systems	ECS727P	15	7	Elective	1	Semester 2
Interactive System Design	ECS733P	15	7	Elective	1	Semester 2
Cloud Computing	ECS781P	15	7	Elective	1	Semester 2
Project	ECS750P	60	7	Core	1	Semester 3

**What are the entry requirements?**

Further information on our entry requirements can be found at <http://ecs.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 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 are assigned an academic advisor during induction week. The advisor 's role is to guide their advisees in their academic development including module selection, and to provide first-line pastoral support.

In addition, the School has a Senior Tutor for postgraduate students who provides second-line guidance and pastoral support for students, as well as advising staff on related matters.

EEvery member of teaching staff holds 2 open office hours per week during term-time.

Additional academic support is provided to those students who are successful in securing an industrial-linked project.

### **Programme-specific rules and facts**

The programme adheres to the standard Academic Regulations for taught postgraduate programmes, with a special regulation for a progression point after the taught component.

### **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:

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- 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**

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**Person completing Programme Specification:**

Rupal Vaja

**Person responsible for management of programme:**

Stefan Poslad

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

29th January 2018

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