Programme Title: MSc Electrical and Electronic Engineering (conversion masters)

Programme Specification

Awarding Body/Institution	Queen Mary University of London
Teaching Institution	Queen Mary University of London
Name of Final Award and Programme Title	MSc Electrical and Electronic Engineering
Name of Interim Award(s)	PG Certificate, PG Diploma
Duration of Study / Period of Registration	12 Months FT, 24 Months PT
QM Programme Code / UCAS Code(s)	H606
QAA Benchmark Group	
FHEQ Level of Award	Level 7
Programme Accredited by	Institute of Engineering and Technology (IET)
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 Electronic Engineering & Computer Science
School of Engineering & Materials Science

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

Programme Outline

This conversion masters programme builds on the strengths of the Queen Mary University School of Electronic Engineering and Computer Science. These strengths include world-leading research in: networks, antenna design and electromagnetics, computer vision and computer theory. This conversion masters programme features a common first semester of: analogue electronics, digital systems design (incorporating an on-line pre-sessional module in digital circuit design), control systems, embedded systems (incorporating C programming). In the second semester the electronic engineering stream features choices from: advanced control systems, critical systems, integrated circuit design, real-time DSP, while the electrical engineering stream features choices from: Bioelectricity, Microwave and Millimeterwave Communication Systems, Power Electronics, and Electrical Power Engineering. Both streams have a Project / industrial project during the 3rd (summer) semester.

Aims of the Programme

This is a conversion programme at masters level, delivered by EECS and SEMS.

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The programme provides the required curriculum to develop appropriate programme level learning outcomes supporting the development of engineers at postgraduate level, taking in graduate scientists in biology, chemistry, physics and maths. The programme has been developed with a view to encouraging science and maths graduates to engage with the subject area, under a UK Government initiative funded by HEFCE. The programme title and employment prospects have been considered, both internally within QM and externally through industrial contacts.

The programme is offered F/T, P/T and F/T with industrial experience. There is a pre-sessional module in digital electronics. Semester 1 has 4 compulsory modules: Basic electronics (analogue), Digital Systems Design, Control Systems, and Embedded Systems. Semester 2 has 4 modules to be taken out of: Advanced Control Systems, Critical Systems, Integrated Circuit Design, Real-Time DSP, for the electronic engineering pathway. For the electrical engineering pathway the options are: Electrical Power Engineering, Bioelectricity, Microwave and Millimeterwave Communication Systems, Real-Time DSP. Both pathways have Project / industrial project in semester 3.

This programme will develop science graduates to become engineers, concerned with applying scientific knowledge, mathematics and ingenuity to develop solutions for technical, societal and commercial problems. The masters graduates will be able to design systems while considering the limitations imposed by practicality, regulation, safety and cost. There will be an option in each of the programmes for students to incorporate a year in industry (after the taught material, before the project). This is an established model for programmes in EECS, which has been well received by students and employers.

What Will You Be Expected to Achieve?

Students who successfully complete this programme will be able to construct:
designs for analogue electronic circuits
designs for digital systems and electronics by using the supporting logic
designs for control systems schematically
designs for embedded and critical systems
designs for electrical power systems, power electronic circuits, using associated engineering design principles
Students who successfully complete this programme will be able to understand:
the principles underlying the design of integrated circuits
the principles of digital signal processing
the principles bioelectricity
the principles communication systems based on microwaves and millimeterwave technology

Academic Content:	
A 1	Analogue electronics design principles
A 2	Digital electronics design principles
A 3	Principle theorems of digital signal processing
A 4	Principle theorems of power systems design
A 5	Principle theorems of embedded and critical systems, incorporating integrated circuit design principles

Disciplinary Skills - able to:	
B 1	Design electronic systems using both analogue and digital technology

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B 2	Understand the principles of the design of embedded systems and systems of integrated circuits
B 3	Understand the fundamental principles of electrical power engineering, both machines and electronics

Attributes:	
C 1	Engage critically with engineering knowledge and design principles
C 2	Have a global perspective of the value of electrical and electronic engineering, particularly with respect to its use and value in the global networked society
C 3	Demonstrate rounded intellectual development

QMUL Model Learning Outcomes - Level 4:	
D 1	
D 2	
D 3	

How Will You Learn?

By attendance at lectures (typically 16 hours per week), tutorials (typically 8 hours per week), and labs (typically 8 hours per week). Each non-project-based module 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 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 are 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.

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How is the Programme Structured?

Please specify the full time and part time programme diets (if appropriate).

Semester 1
ECS791P Digital Electronics (0 credits) (pre sessional)

(Maximum of 4 modules to be taken in Semester 1)
ECS777P Electronics (15 credits)
ECS615P Digital Systems Design (15 credits)

Select two from:
ECS788P Control Systems (15 credits)
ECS642P Embedded Systems (15 credits)
ECS643P Power Electronics (15 credits)
ECS644P Microwave and Millimetrewave Electronics (15 credits)

Semester 2
(Maximum of 4 modules to be taken in Semester 2)

Select four from:
DENM302 Principles & Applications Biochemistry (15 credits)
ECS727P Real-Time Critical Systems (15 credits)
ECS732P Real-Time DSP (15 credits)
ECS778P Advanced Control Systems (15 credits)
ECS645P Microwave and Millimetrewave Communications Systems (15 credits)
ECS787P Integrated Circuit Design (15 credits)
ECS790P Electrical Machines and Systems (15 credits)

Semester 3
ECS750P Project (60 credits)

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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

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

What Are the Entry Requirements?

The entry requirements are a good Second Class honours degree or equivalent in Physics, Maths, Biology, Chemistry or Computer Science. We also need evidence of mathematical ability equivalent to UK GCSE Grade B, and that you have completed an individual project as proof of your ability of study independently.

For international students, English Language skills are required to a recognised standard. The minimum requirement is: IELTS 6.5 or TOEFL (IBT) 92. For students not quite meeting this requirement (e.g. IELTS 6.0), enrolling on a one month pre-sessional English Language course is required. These conditions are higher than standard College conditions.

How Do We Listen 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 Learning and Teaching Committee.

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The School's Learning and Teaching 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.

Academic Support

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.

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

Programme-specific Rules and Facts

The programme adheres to the standard Academic Regulations for taught postgraduate programmes.

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 School has a wide range of industrial contacts secured through research projects and consultancy, our Industrial Experience

programme and our Industrial Advisory Panel.

The Industrial Advisory Panel works to ensure that our programmes are state-of-the-art and match the changing requirements of this fast-moving industry. The Panel 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.

Transferable skills are developed through a variety of means, including embedding of QM Graduate Attributes in taught modules and the summer 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	Jennifer Richards
Person responsible for management of programme	Rupal Vaja
Date Programme Specification produced/amended by School Learning and Teaching Committee	18th Jan 2017
Date Programme Specification approved by Taught Programmes Board	