

Programme Specification

Awarding Body/Institution	Queen Mary University of London
Teaching Institution	Queen Mary University of London
Name of Final Award and Programme Title	MEng (Hons) Electrical and Electronic Engineering
Name of Interim Award(s)	Cert HE, Dip HE, BSc(Eng),MEng
Duration of Study / Period of Registration	4 years
QM Programme Code / UCAS Code(s)	H608
QAA Benchmark Group	Engineering
FHEQ Level of Award	Level 7
Programme Accredited by	IET (pending)
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 Engineering & Materials Science

School of Mathematical Sciences

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

N/A

Programme Outline

The programme offers the opportunity to gain in-depth technical knowledge of electrical and electronic engineering, practical and hands-on experience to prepare you for real-world applications, and develop important transferable skills through individual and group project work. This programme will provide both the foundations and specialist knowledge you will need for a wide-range high-quality electrical and electronic engineering careers across a variety of sectors, in industry, business and R&D.

The choice of modules available allows you to get a general grounding in the science and mathematics underlying electrical and electronic engineering, like engineering mathematics, analog and digital electronics, electromagnetism, signals and systems, communications, computing. In later years you will be offered an increasing number of options to choose from to develop your own specialisation in subjects that interest you. By the end of the programme, successful students will have the skills to analyse, develop, design, and build electrical and electronic systems within their own specialisation of choice. In this programme you will develop skills that enable you to be creative, innovative and flexible in devising engineering solutions; knowledge and techniques to break problems into manageable chunks to solve issues in a systematic manner; and you will

learn how to apply your numerical, computational, analytical and technical skills, using appropriate tools, in that process.

The first three years of the programme are common with the BEng in Electrical and Electronic Engineering. Transfer to and from the BEng is possible up to the end of the second year. Progression on the MEng is subject to satisfactory end-of-year performance. In year 4 you will have a wide range of options to choose from, and an advanced group project, which may be scoped and sponsored by one of our industrial partners.

Aims of the Programme

This is one of our MEng programmes, which is an integrated masters programme that both include technical content beyond normal first degree level and additional content on economic, social and environmental issues. In addition they provide enhanced experience of project management in a group activity.

The programme aims to provide a broad yet deep knowledge and understanding in the area of electrical and electronic engineering that prepare the graduates for the wide range of high-end professional careers in the relevant industries, such as electronics, power and electrical systems, automation and control, mobile and satellite communications, network engineering, embedded systems engineering, where they will be able to take on a variety of roles, for example, in research and development, systems engineering, systems integration, operations, technical consultancy and education. Graduates from the programme will also have an excellent grounding to continue their education at a postgraduate level, should they wish to do so.

The programme addresses the skills gap in the UK industry and responds to the international demand for a broad-based yet thorough high-level education sought after by employers world-wide. Apart from specialised knowledge, great emphasis is given to transferable skills that impact on graduates' employability, such as management of own workload, team working, effective communication, integrated thinking, leadership of projects and teams, and risk management.

What Will You Be Expected to Achieve?

Graduates from the programme will be expected to have:

Academic Content:

A 1	Knowledge of the scientific and engineering principles necessary to underpin an education and career in electrical and electronic engineering
A 2	Understanding of mathematical principles underpinning electronic and electrical engineering, in addition to the mathematical methods, tools and notations used in the analysis of electrical and electronic engineering problems.
A 3	An understanding of concepts from a range of areas including some outside electrical and electronic engineering, and the ability to apply them effectively in electronic and electrical engineering projects.
A 4	An awareness of developing technologies related to electrical and electronic engineering.
A 5	Knowledge of the regulatory, ethical, economic and environmental issues underpinning engineering professions, especially associated with electrical and electronic engineering, and how an engineer must operate within these.
A 6	Knowledge of the design process and understanding of project management principles and tools.
A 7	Awareness of market drivers within sub-specialisations of electrical and electronic engineering.
A 8	Project management skills.
A 9	Understanding of engineering principles and the ability to apply them to undertake critical analysis of key engineering processes, esp. as pertaining to electrical and electronic engineering.

Disciplinary Skills - able to:	
B 1	Apply engineering principles to analyse problems in electrical and electronic engineering.
B 2	Extract data pertinent to an unfamiliar problem, analyse it, and interpret results, particularly in relation to the electrical and electronic engineering.
B 3	Apply numerical / quantitative methods and computer software relevant to engineering disciplines, to solve problems in electrical and electronic engineering.
B 4	Learn new theories, concepts, methods etc. in unfamiliar situations.
B 5	Use fundamental knowledge to investigate new and emerging technologies.
B 6	Work effectively with computing tools for data analysis and processing, as well as modelling, simulation and design.
B 7	Plan and perform safe experimental work in laboratory settings.
B 8	Use laboratory instrumentation correctly.
B 9	Develop, monitor and update a plan, to reflect a changing operating environment.
B 10	Exercise professional judgement in electrical and electronic engineering-related problem solving, considering ethical, economic and environmental issues.
B 11	Apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline and the ability to evaluate learnings from other disciplines critically and to apply them effectively.
B 12	Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context and public perception.
B 13	Communicate their work to technical and non-technical audiences.
B 14	Demonstrate the ability to generate an innovative design for products, systems, components or processes to fulfil new needs.

Attributes:	
C 1	Develop the necessary transferable skills to be effective in the workplace.
C 2	Engage critically with knowledge, and apply it in a rigorous way.
C 3	Critically evaluate the reliability of information from different sources.
C 4	Use information for evidence based decision making.
C 5	Use quantitative data confidently and competently.
C 6	Use a range of communication technologies to engage with a range of audiences.
C 7	Develop an awareness of Health and Safety.

C 8	Be able to isolate the key facts from complex, often contradictory information.
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QMUL Model Learning Outcomes - Level 4:	
D 1	Identify and discuss their own career aspirations or enterprise skills and knowledge and how they impact on others
D 2	Demonstrate connections between different theoretical perspectives within your discipline
D 3	Demonstrate connections between different theoretical perspectives within your discipline

How Will You Learn?

Learning will be realised through a range of techniques and delivery methods. Teaching materials are delivered through a combination of lectures, problem solving classes, and laboratory exercises which will form both formative and summative assessment across various modules. Coursework will cement knowledge gained, and will take forms of on-line and class tests, laboratory and technical reports, and laboratory notes. Problem-based learning plays a significant role in the first three years.

Electronics laboratory is a dedicated space that will be heavily utilised throughout the study, for various labs and project work. ITL is EECS-only space dedicated to both teaching and self-directed learning, equipped with the necessary tools and software environments that will be used across a number of modules for teaching and learning.

Students will undertake a group "design and build" project in the second year, a major individual project in the third year, that can be research-based, design and build, service or product integration, or an application development, and a substantive group project (either research or design and build) in the fourth year. The latter could be sponsored by one of our industrial partners. All projects are designed to help students integrate, assimilate and apply knowledge and skills gained throughout the degree, and give them an opportunity to develop and practice transferable employability skills such as group and team working, project planning, time management, written and oral communication of technical content to a mix of audiences. The projects will also help students acquire generic engineering professional skills such as research methods, design and development methods, product or service testing, market assessment and business case presentation.

Associated with each 15-credit module is 150h of study time, one third of which, on average, will be delivered through lectures, tutorials and laboratory exercises, and the rest is expected to be student-driven self-study using library, Internet and other resources. Materials of all modules are provided on QMPlus. In the final year, some of the modules will have invited lectures given by experts from industry. We will also be using our strong base of industrial partners to generate substantial advanced group projects in the final, fourth year.

How Will You Be Assessed?

Assessment is continuous throughout the degree, with written reports, projects, presentations, group work and exams (exams take place in the summer only). The degree programme has eight modules per year split over two semesters, and most are assessed by a combination of coursework and an end of year exam. Some modules will also have an element of in-class tests, that will be form part of assessment for those modules.

Individual research or design projects in the third year counts as two modules and lasts through both semesters. In the third and fourth year, students can select from a range of module options allowing them to tailor their degree to specific areas of interest within their degree programme.

The 3rd and final year projects are examined on the basis of a written report, a formal oral presentation, and a demonstration of the piece of software or hardware developed by the student(s).

How is the Programme Structured?

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

We are offering only a FT diet of the programme.

The MEng in Electrical and Electronic Engineering is an integrated 4 year programme accredited by the Institution of Engineering and Technology. This means students will have satisfied the academic requirements for progression to chartered engineer status (CEng).

First three years are in common with the existing BEng in Electrical and Electronic Engineering. The first two years are foundation years, covering a wide range of essential subjects for the discipline, such as engineering mathematics, fundamentals of analog and digital electronics, circuit theory, signals and systems, communications and networks, computing with programming, electromagnetics. Third and fourth year offer greater range of options, where students can learn in more depth and specialise in sub-branches of electrical and electronic engineering, such as electrical and power systems, electronics, networks and telecommunications, microprocessor systems, digital signal processing. Projects in years 2, 3 and 4 will allow students to tackle progressively more complex and challenging engineering problems through both group and individual work. All elective modules will be subject to availability.

Students will be able to transfer between BEng and MEng programmes in Electrical and Electronic Engineering until year 2, with transfer to MEng subject to satisfactory academic performance in years 1 and 2.

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 FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
PROCEDURAL PROGRAMMING	ECS401U	15	4	Compulsory	1	Semester 1	No
ELECTRONIC ENGINEERING MATHEMATICS 1	ECS408U	15	4	Compulsory	1	Semester 1	No

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
DIGITAL CIRCUIT DESIGN	ECS412U	15	4	Compulsory	1	Semester 1	<input type="checkbox"/> No
ELECTRONIC ENGINEERING MATHEMATICS 2	ECS423U	15	4	Compulsory	1	Semester 2	<input type="checkbox"/> No
SIGNALS AND INFORMATION	ECS411U	15	4	Compulsory	1	Semester 2	<input type="checkbox"/> No
Analogue Electronic Systems	ECS409U	15	4	Compulsory	1	Semester 2	<input type="checkbox"/> No
Communications & Networks	ECS403U	15	4	Compulsory	1	Semester 2	<input type="checkbox"/> No
Skills for EECS (LABS + Tutorials)	ECS422u	0	4	Study only	1	Semesters 1 & 2	<input type="checkbox"/> No
Professional and Research Themes	ECS402U	15	4	Compulsory	1	Semester 1	<input type="checkbox"/> Yes

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Electronic Devices & Applications	ECS517U	15	5	Compulsory	2	Semester 1	<input type="checkbox"/> No
Microprocessor Systems Design	ECS502U	15	5	Compulsory	2	Semester 1	<input type="checkbox"/> No
C Programming	ECS501U	15	5	Compulsory	2	Semester 1	<input type="checkbox"/> No
Internet Applications & Protocols	ECS524U	15	5	Compulsory	2	Semester 1	<input type="checkbox"/> No
Design & Build Project	ECS514U	15	5	Compulsory	2	Semester 2	<input type="checkbox"/> No
Signals & Systems Theory	ECS515U	15	5	Compulsory	2	Semester 2	<input type="checkbox"/> No
Telecommunications Systems	ECS525U	15	5	Compulsory	2	Semester 2	<input type="checkbox"/> No
Electric & Magnetic Fields	ECS504U	15	5	Compulsory	2	Semester 2	<input type="checkbox"/> No

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Academic Year of Study FT - Year 3

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Project	ECS625U	30	6	Core	3	Semesters 1 & 2	No
Control Systems	ECS601U	15	6	Elective	3	Semester 1	No
Digital Systems Design	ECS615U	15	6	Elective	3	Semester 1	No
Embedded Systems	ECS642U	15	6	Elective	3	Semester 1	No
Data Mining	ECS607U	15	6	Elective	3	Semester 1	No
Microwave and Millimetrewave Electronics	ECS644U	15	6	Elective	3	Semester 1	No
Microwave and Millimetrewave Communications	ECS645U	15	6	Elective	3	Semester 2	No
Integrated Circuit Design	ECS617U	15	6	Elective	3	Semester 2	No
Electrical Machines and Systems	ECS649U	15	6	Compulsory	3	Semester 2	No
Power Electronics	ECS643U	15	6	Elective	3	Semester 2	No
Distributed Systems and Security	ECS608U	15	6	Elective	3	Semester 2	No
Compilers	ECS652U	15	6	Elective	3	Semester 2	No
Advanced Control Systems	TBD	15	6	Elective	3	Semester 2	No
Entrepreneurship in Information Technology	ECS604U	15	6	Elective	3	Semester 1	No
Product Development	ECS622U	15	6	Elective	3	Semester 2	No
Project Risk Management	ECS609U	15	6	Elective	3	Semester 1	No

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Academic Year of Study FT - Year 4

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Advanced Group Project	TBD	30	7	Core	4	Semesters 1 & 2	<input type="checkbox"/>
Mobile and WLAN Technologies	ECS702U	15	7	Elective	4	Semester 1	<input type="checkbox"/>
Fundamentals of DSP	ECS707U	15	7	Elective	4	Semester 1	<input type="checkbox"/>
Introduction to IOT	ECS782U	15	7	Elective	4	Semester 1	<input type="checkbox"/>
Enabling Communication Technologies for IoT	ECS783U	15	7	Elective	4	Semester 1	<input type="checkbox"/>
Engineering Methods	DENM114	15	7	Elective	4	Semester 1	<input type="checkbox"/>
Mobile Services	ECS725U	15	7	Elective	4	Semester 2	<input type="checkbox"/>
Security and Authentication	ECS726U	15	7	Elective	4	Semester 2	<input type="checkbox"/>
Real-Time DSP	ECS732U	15	7	Elective	4	Semester 2	<input type="checkbox"/>
DEN406 Clinical Measurements	DEN406	15	7	Elective	4	Semester 2	<input type="checkbox"/>
DEN7600 Energy Storage Engineering	DEN7600	15	7	Elective	4	Semester 2	<input type="checkbox"/>
DEN7601 Introduction to Solar Energy	DEN7601	15	7	Elective	4	Semester 2	<input type="checkbox"/>
MTH739P Topics in Scientific Computing	MTH739P	15	7	Elective	4	Semester 2	<input type="checkbox"/>
Energy Economics and Management of Sustainable energy	DEN433	15	7	Elective	4	Semester 2	<input type="checkbox"/>
Business Technology Strategy	ECS728U	15	7	Elective	4	Semester 2	<input type="checkbox"/>
Foundations of Intellectual Property Law and Management	IPLM702U	15	7	Elective	4	Semester 2	<input type="checkbox"/>
Advanced Flight Control and Simulation of Aerospace Vehicles	DEN7001	15	7	Elective	4	Semester 1	<input type="checkbox"/>

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester	QMUL Model
Next Generation Mobile	ECS721U	15	7	Elective	4	Semester 2	No

What Are the Entry Requirements?

Minimum Entry Requirements are:
A/AS-levels:
Tariff/Grades requirement: AAB from 3 A levels incl A level Maths/Physics/Biology/Chemistry/Electronics/Computing grade B

Vocational or applied A-levels
Acceptability: Accepted and subject to the above tariff requirements for A/AS-levels. Additional information: Must be in related subject, Engineering OR Applied Science.

BTEC Extended Diploma
Pass with D*D*D* in Engineering or Applied Science with grade B in A-level Maths.

BTEC Diploma (120 Credit)
Pass with D*D* in Engineering or Applied Science with grade B in A-level Maths or Science.

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
For 1st year only. 120 credits at level 4. Must have distinction overall.

HND
2nd year possible. 240 credits at level 5. Pass HND with distinction overall.

Access
Pass with 45 credits in Access in Engineering 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 A level Mathematics.

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. HL Maths and Physics must be at least 6.

IELTS 6.0(5.5 in all components)

How Do We Listen and Act on Your Feedback?

The Staff-Student Liaison Committee provides a formal means of communication and discussion between the Schools and its students. The committee consists of student representatives from each year of the programme, together with appropriate representation from staff within the Schools. It is designed to respond to both the general needs of students, and subject specific concerns, as well as act as a forum for discussing programme and module developments. Staff-Student Liaison Committees meet regularly throughout the year.

The chair of the SSLC sits on the School's SETLA Committee (Student Experience, Teaching and Learning), which advises the School's Director of Taught Programmes on all matters relating to the delivery of taught programmes at School level, and ensures that student feedback is fed into the reviewing of modules and programmes. Student views are also incorporated in the Committee's work in other ways, such as through the National Student Survey (NSS), student module evaluations and module forums. We also use the forums to listen to student feedback on an individual module basis and develop materials and support

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classes to address comments or requests suggested in the forum. In addition, the school also has Senior Tutors dedicated for UG students who will be the first point for pastoral and general programme and teaching & learning issues.

All Schools operate an Annual Programme Review (APR) 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's work throughout the year to monitor academic standards and to improve the student experience.

Academic Support

Academic support for individual modules is the responsibility of the module organiser and co-organiser(s). These are supported by Demonstrators and post-graduate students, many of whom will have studied the modules themselves as undergraduates in the School. In addition there is technician support available for practical sessions in labs.

Academic support for the programme as a whole, including choosing optional modules and possible transfer between programmes is provided in the first instance by the Personal Tutor, with further guidance available from the Senior Tutor and Programme Coordinator, the latter having overall responsibility for the programme structure.

We additionally have a Teaching Services team, with many student-facing staff available to support student learning and one full time Student Support Officer. These staff members will help with coursework submission, time tabling concerns and other general administration as well as providing pastoral support and further guidance on dealing with extenuating circumstances. We also have staff designated to support students in achieving industrial placements and providing careers advice.

Programme-specific Rules and Facts

See Academic Regulations, www.arcs.qmul.ac.uk

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

EECS industrial advisory board meets bi-annually to discuss the areas of the School activities that impact on graduate employability and development of their transferable skills, as well as to discuss areas of collaboration with industry, both in terms of research and education development. We also host one or two research showcases a year, where external partners and

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potential employers are invited to learn about the research and development work done at EECS by our postgraduate students. These events are open to all and provide opportunities for our undergraduate students to gain an insight to state-of-the-art developments, as well as meet industrial partners and forge relationships that may help them finding work post-graduation. We place a strong emphasis on supporting our students in achieving quality graduate positions at the end of their degrees, and therefore offer a range of compulsory and elective modules that aim to develop transferable and operational skills. We have a wide range of industrial contacts some of whom are keen to sponsor projects at a masters level for students to have a taste of real-world problems, and an opportunity to be supervised by engineering professionals working in industry. There are general career events focused on CV and job application writing, interviewing skills, and other aspects of employability, that are open to all students, and we also organise similar events tailored just to EECS students in conjunction with Careers Service of QMUL.

Programme Specification Approval

Person completing Programme Specification

Tijana Timotijevic

Person responsible for management of programme

Tijana Timotijevic

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

15 June 2017

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

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