Programme Title: MSc Advanced Electrical and Electronic Engineering

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 Advanced Electrical and Electronic Engineering
Name of Interim Award(s)	PGCert, PGDip
Duration of Study / Period of Registration	1 year FT, 2 years PT
QM Programme Code / UCAS Code(s)	H60A , H60C
QAA Benchmark Group	http://www.qaa.ac.uk/en/Publications/Documents/SBS-engineering-15
FHEQ Level of Award	Level 7
Programme Accredited by	The Institute of Engineering and Technology (IET) -will be sought
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
none

Programme Outline

This new 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. The programme emphasizes core electrical and electronic engineering knowledge and skills, which, upon completion, will enable the students to acquire the essential knowledge, skills, competency, and engineering awareness necessary for a successful career in electronics based industries.

The first semester offers a choice from: Fundamentals of DSP, a new module in Electronic Sensing, Control Systems, Embedded Systems, Power Electronics, Microwave & Millimetrewave Electronics. The second semester offers a choice from: Parallel Computing, Integrated Circuit Design, Electrical Machines and Systems, Real-Time and Critical Systems, Real-Time Digital Signal Processing, Advanced Control Systems, Microwave and Millimetrewave Communications Systems, Mobile Services, DENM600 Energy Storage Engineering, DENM601 Introduction to Solar Energy.

This masters programme is comprehensive and includes theory, lab-practice, simulation and project work, all of which are

underpinned by over 125 years of experience in electrical engineering and electronics at Queen Mary. Our programme brings together our teaching, research and industrial contacts to allow the cohort to emphasize either electrical or electronic engineering, or combine the two as best suits their personal requirements.

Aims of the Programme

This programme aims to provide the curriculum to develop appropriate programme level learning outcomes supporting the development of graduate engineers to postgraduate level.

The programme aims to enable students to acquire the knowledge, skills, competency, and engineering awareness necessary for a successful career in many electronics based industries.

This programme aims to develop engineering graduates' expertise so that they develop expertise in applying scientific knowledge, mathematics and ingenuity to develop solutions for technical, societal and commercial problems.

The programme aims to masters graduates who will be able to design systems while considering the limitations imposed by practicality, regulation, safety and cost following the completion of one of the programmes.

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.

The content of this masters programme is comprehensive and includes theory, lab-practice, simulation and project work, all of which are underpinned by over 125 years of experience in electrical engineering and electronics at Queen Mary.
Our programme brings together our teaching, research and industrial contacts to allow the cohort to emphasize either electrical or electronic engineering, or combine the two as best suits their personal requirements.

The programme emphasises analogue and digital circuit design, power electronics and electrical systems, control and microwave and millimetrewave technologies; areas with a major skills shortage worldwide and particularly in the UK.

What Will You Be Expected to Achieve?

Students who successfully complete this programme will, subject to choices, be able to construct:
designs for analogue electronic circuits
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, subject to choices, be able to understand:
the principles underlying the design of integrated circuits
the principles of digital signal processing
the principles energy storage and the provision of solar energy
the principles communication systems based on microwaves and millimeterwave technology.

Academic Content:	
A 1	A comprehensive knowledge and understanding of scientific principles and methodology necessary to underpin their education in electrical and electronic engineering, and an understanding and know-how of the scientific principles of related disciplines, to enable appreciation of the scientific and engineering context, and to support understanding of the relevant historical, current and future developments and technologies.
A 2	Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in their engineering discipline and to enable them to apply a range of mathematical and statistical methods, tools and notations proficiently and critically in the analysis and solution of engineering problems.
A 3	A comprehensive knowledge and understanding of mathematical and computational models relevant to the engineering discipline, and an appreciation of their limitations.

A4	Awareness of developing technologies related to own specialisation.
A5	Understanding of electronic and electrical engineering principles and the ability to apply them to undertake critical analysis of key engineering processes in electronic and electrical engineering.

Disciplinary Skills - able to:	
B1	Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline and the ability to evaluate them critically and to apply them effectively.
B2	Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.
B3	Ability to apply quantitative and computational methods, using alternative approaches and understanding their limitations, in order to solve engineering problems and to implement appropriate action.
B4	Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.
B5	Ability to extract and evaluate pertinent data and to apply engineering analysis techniques in the solution of unfamiliar problems in electronics and electrical engineering.
B6	Ability to investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards.

Attributes:	
C1	Engage critically with engineering knowledge and design principles
C2	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
C3	Demonstrate rounded intellectual development
C4	Be able to communicate their work to technical and non-technical audiences.
C5	Develop research capacity and demonstrate information expertise: Work with information that may be incomplete or uncertain, quantify the effect of this on the design and, where appropriate, use theory or experimental research to mitigate deficiencies.

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 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 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.

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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 appropriate).

Students specifically wanting to emphasize electronic engineering can choose from Electronic Sensing, Fundamentals of DSP, Control Systems, Embedded Systems, Power Electronics, Microwave & Millimetrewave Electronics, Parallel Computing, Integrated Circuit Design, Real-Time and Critical Systems, Real-Time Digital Signal Processing.

Students specifically wanting to emphasize electrical engineering can choose from Embedded Systems, Control Systems, Power Electronics, Microwave & Millimetrewave Electronics, Real-Time and Critical Systems, Advanced Control Systems, Electrical Machines and Systems, Microwave and Millimetrewave Communications Systems, Energy Storage Engineering, Introduction to Solar Energy.

All students have a Project / industrial project during the 3rd (summer) semester.

Academic Year of Study

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Embedded Systems	ECS714P	15	7	Elective	1	Semester 1
Power Electronics	ECS720P	15	7	Elective	1	Semester 1
Microwave and Millimetrewave Electronics	ECS752P	15	7	Elective	1	Semester 1
Fundamentals of DSP	ECS707P	15	7	Elective	1	Semester 1
Control Systems	ECS788P	15	7	Elective	1	Semester 1
Microwave and Millimetrewave Communications Systems	ECS758P	15	7	Elective	1	Semester 2

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Real-Time and Critical Systems	ECS727P	15	7	Elective	1	Semester 2
Real-Time DSP	ECS732P	15	7	Elective	1	Semester 2
Advanced Control Systems	ECS778P	15	7	Elective	1	Semester 2
Parallel Computing	ECS786P	15	7	Elective	1	Semester 2
Integrated Circuit Design	ECS787P	15	7	Elective	1	Semester 2
Electrical Machines and Systems	ECS790P	15	7	Elective	1	Semester 2
Energy Storage Engineering	DENM600	15	7	Elective	1	Semester 2
Introduction to Solar Energy	DENM601	15	7	Elective	1	Semester 2
Project	ECS751P	60	7	Core	1	Semester 3
Electronic Sensing	ECS700P	15	7	Elective	1	Semester 1
Data Mining	ECS766P	15	7	Elective	1	Semester 1

What Are the Entry Requirements?

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

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 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.

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.

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:
• 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.

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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.

Students have the opportunity to undertake an industrial-linked project in the summer - these are very competitive.

Programme Specification Approval

Person completing Programme Specification	John Schormans
Person responsible for management of programme	John Schormans
Date Programme Specification produced/amended by School Learning and Teaching Committee	29th January 2018
Date Programme Specification approved by Taught Programmes Board	

Queen Mary University of London