### Programme Specification

<table>
<thead>
<tr>
<th>Awarding Body/Institution</th>
<th>Queen Mary, University of London</th>
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<tbody>
<tr>
<td>Teaching Institution</td>
<td>Queen Mary, University of London</td>
</tr>
<tr>
<td>Name of Final Award and Programme Title</td>
<td>MSc Mobile and Wireless Networks with Industrial Experience</td>
</tr>
<tr>
<td>Name of Interim Award(s)</td>
<td>PG Certificate and PG Diploma</td>
</tr>
<tr>
<td>Duration of Study / Period of Registration</td>
<td>24 Months FT</td>
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<tr>
<td>QM Programme Code / UCAS Code(s)</td>
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<tr>
<td>QAA Benchmark Group</td>
<td>Engineering</td>
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<tr>
<td>FHEQ Level of Award</td>
<td>Level 7</td>
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<tr>
<td>Programme Accredited by</td>
<td></td>
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<tr>
<td>Date Programme Specification Approved</td>
<td></td>
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<tr>
<td>Responsible School / Institute</td>
<td>School of Electronic Engineering &amp; Computer Science</td>
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### Schools which will also be involved in teaching part of the programme

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

### Programme Outline

This programme is aimed at graduates who wish to develop careers in the wireless telecommunications sector, especially those concerned with the radio aspects. It covers topics ranging across all layers in the wireless and mobile networking fields, but with particular emphasis on the physical layer of wireless cellular telephony, ad-hoc networks and wireless LANs. You will also study antenna design for mobile networks and electromagnetics as appropriate. At the end of the programme you will be equipped with the skills needed for a wide range of jobs in the expanding telecommunications industry, with particular emphasis on those that are relevant to the needs of wireless equipment manufacturers and operators. The programme includes a year in industry between the taught component and the project.

### Aims of the Programme

To produce high quality masters level graduates in mobile and wireless networks  
To provide the students with the background and skills needed for careers in related technologies  
To provide an in-depth understanding of mobile network infrastructures, wireless networks and satellite communications  
To provide an understanding of advanced mathematical, including fundamentals of DSP, an understanding of applicable CAD techniques, and an understanding of antennas for mobile applications and radio wave propagation for wireless communications
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Specific aims include the ability to identify major challenges in mobile networking; solve selected performance problems in mobile networks; identify appropriate strategies for mobile network planning and management; identify and compare communications strategies; identify and construct logical sub-tasks from a larger project.

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?
- Identify and compare physical layer strategies in communication systems that are appropriate for mobile networks
- Identify key issues and challenges in access to mobile and wireless networking
- Solve well-formulated performance problems in all packet mobile and wireless networks
- Compare strategies for optimal planning and management of mobile networks
- Identify and construct logical sub-tasks from a larger project oriented at mobile and wireless systems

Academic Content:

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<tbody>
<tr>
<td>A1</td>
<td>Theory, principles, concepts and methodologies fundamental to the engineering of mobile and wireless networks.</td>
</tr>
<tr>
<td>A2</td>
<td>Current developments in mobile and wireless networks engineering, in particular within a range of research-led specialities concentrated around mobile and wireless telecommunications networking.</td>
</tr>
<tr>
<td>A3</td>
<td>A range of research-led specialities concentrated around mobile and wireless networking.</td>
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Disciplinary Skills - able to:

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<tr>
<td>B1</td>
<td>Demonstrate comprehension and higher level cognitive skills necessary to solve engineering problems in mobile and wireless networking.</td>
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<tr>
<td>B2</td>
<td>Demonstrate the ability to analyse and evaluate using the appropriate mathematical principles and techniques that underpin the analysis of mobile and wireless networks.</td>
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<tr>
<td>B3</td>
<td>Demonstrate an understanding of the business, management and other contextual issues relevant to the field of mobile and wireless networks.</td>
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Attributes:

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<tr>
<td>C1</td>
<td>Develop a global perspective, particularly with respect to the globalization of wireless networking.</td>
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<tr>
<td>C2</td>
<td>Learn to engage critically with knowledge, and particularly with respect to measured network data in which many parameters are uncertain or non-stationary.</td>
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<tr>
<td>C3</td>
<td>Understand the importance of learning continuously in a fast-moving world of networking.</td>
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</table>
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How Will You Learn?

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.

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 places 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?

The programme is structured to enable students to have some choice within the programme, while covering core themes of the field. The programme is structured as follows:

Semester 1
- ECS701P Communication Theory
- ECS702P Mobile & WLAN Technologies
- ECS703P 21st Century Networks
- ECS704P Radio Wave Propagation for Wireless Communications

Semester 2
- ECS721P Next Generation Mobile
- ECS723P Antennas for Mobile Applications

Plus two options from the following:
- ECS732P Real-Time DSP
- ECS722P Sensors & Internet of Things
- ECS724P Network Modeling & Performance
- ECS725P Mobile Services
- ECS728P Business Technology Strategy

Year in industry
- ECS7xxP MSc Industrial Placement Project
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Semester 3
ECS750P Project

Academic Year of Study

<table>
<thead>
<tr>
<th>Module Title</th>
<th>Module Code</th>
<th>Credits</th>
<th>Level</th>
<th>Module Selection Status</th>
<th>Academic Year of Study</th>
<th>Semester</th>
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What Are the Entry Requirements?

The entry requirements are a good Honours degree (first or upper-second class honours) in Electronic Engineering, Computer Science, Mathematics or a related discipline. Applicants with unrelated degrees will be considered if there is evidence of significant relevant industrial experience.

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.

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.

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

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

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.

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, IBM, The National Physical Laboratory, National Instruments, PA Consulting, Rohde and Schwarz, O2, Cisco Systems, ARM, Selex and BAE Systems.

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. Merrill 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.
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<table>
<thead>
<tr>
<th>Programme Specification Approval</th>
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<tbody>
<tr>
<td><strong>Person completing Programme Specification</strong></td>
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<tr>
<td><strong>Person responsible for management of programme</strong></td>
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<tr>
<td><strong>Date Programme Specification produced/amended by School Learning and Teaching Committee</strong></td>
</tr>
<tr>
<td><strong>Date Programme Specification approved by Taught Programmes Board</strong></td>
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