Queen Mary
University of London

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 in Sound and Music Computing with Industrial Experience
Name of Interim Award(s)	
Duration of Study / Period of Registration	24 Months FT
QM Programme Code / UCAS Code(s)	H6M1
QAA Benchmark Group	Engineering
FHEQ Level of Award	Level 7
Programme Accredited by	The Institution of Engineering and Technology
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

N/A

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

N/A

Programme Outline

Based on our Digital Signal Processing (DSP) programmes, but incorporating specialist modules and a specialised project, this masters will help to you to understand not only how today's audio and music technology works, but also to become a leader in developing the next generations of these technologies.
The programme includes a year in industry between the taught component and the project.

Aims of the Programme

The overall aims are to provide engineering students with training in advanced music and audio technologies, and in particular to give them the background and skills they need for careers in the technical aspects of audio production, audio engineering, and broadcasting.

Specific aims include the completion of a broad range of advanced study in methods of processing, analysis, synthesis and

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manipulation of musical signals. This involves the use of both established and specialised data analysis and signal processing techniques, an understanding of acoustics and basic music theory, and of standards, formats, broadcasting and transmission methods, and multimedia systems.

There are two tracks: Sound and Music Computing with DSP or Sound and Music Computing with Multimedia.

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?

Discipline-specific skills
• An understanding of the fundamentals of digital signal processing and of the techniques needed for real time digital signal processing
• An ability to use modern digital techniques for the analysis of speech, music, video and image transmission and processing
• An appreciation of the techniques underlying the use and transmission of multimedia images, voice and data
• An understanding of the general signal processing techniques appropriate to the processing of musical signals such as automatic music transcription, computational auditory scene analysis, and music information retrieval.
• An understanding of automatic music transcription, computational auditory scene analysis, and music information retrieval.
• A demonstration of the use of taught knowledge via the successful completion of a project in digital music processing or a cognate subject.

Digital Music Processing with DSP:
• Knowledge of the algorithms for pattern recognition in audio and symbolic representations of music.
• Knowledge of the relative merits of the various modern approaches to signal processing of audio and music.
• An understanding of the statistical properties of speech and music.
• The ability to implement statistical approaches to the modeling and filtering of musical signal analysis.
• A general and theoretical understanding of musical signal analysis using the full range of statistical, intelligent and/or real-time processing methods.

Digital Music Processing with Multimedia:
• An understanding of how audio is streamed, transmitted, or broadcast.
• An understanding of the role of audio and music in the context of a multimedia system.
• An understanding of how music processing fits into the greater scheme of multimedia processing.
• Knowledge of the standards bodies and standards used for audio and music.
• Knowledge of the copyright issues involved with music and its distribution.
• An understanding of the issues related to the use of audio in a video broadcasting system, including satellite, terrestrial, and cable broadcasting.

Academic Content:	
A1	An ability to use modern digital techniques for the analysis of speech, music, video transmission and processing.
A2	An understanding of automatic music transcription, computational auditory scene analysis, and music information retrieval and other aspects of sound and music processing by humans and machines.
A3	The ability to implement statistical and rule-based approaches to musical analysis and synthesis.
A4	A general and theoretical understanding of musical analysis using the full range of statistical, intelligent and/or real-time processing methods.

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Disciplinary Skills - able to:	
B1	Analyse information and experiences, formulate independent judgements, and articulate reasoned arguments through reflection, review and evaluation
B2	Source, navigate, select, retrieve, evaluate, manipulate and manage information from a variety of sources
B3	Carry out extended critical and analytic writing through a dissertation on their research project.
B4	Take a practical approach to designing empirical experiments for testing hypotheses, including selection of appropriate methods, stimuli, participants, and methods for analysis.

Attributes:	
C1	Work independently on a practical or research-based project under supervision
C2	Analyse complex, novel and diverse situations, and identify appropriate methods of working and communicating
C3	Able to engage confidently with others in identifying and communicating problems, identifying goals and solutions and work with others and individually towards achieving them.

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 compulsory modules cover

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the essential themes. The programme structure is as follows:

Year 1

Semester 1
ECS707P - Fundamentals of DSP (required if equivalent background is missing)
ECS741P Music Perception and Cognition

Plus maximum one of:
ECS749P Sound Recording and Production Techniques
ECS742P Interactive Digital Multimedia Techniques

Plus further option(s) from:
ECS708P Machine Learning (highly recommended)
ECS765P Big Data Processing

Semester 2
At least two from:
ECS730P - Digital Audio Effects
ECS731P - Music Analysis & Synthesis
ECS732P - Real-Time DSP
ECS792P - Music & Speech Modelling

Plus further option(s) from:
ECS733P - Interactive System Design
ECS735P - The Semantic Web

Semester 3
ECS750P Project

Year 2
ECS768P MSc Industrial Placement Project

Academic Year of Study

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

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, 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	

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