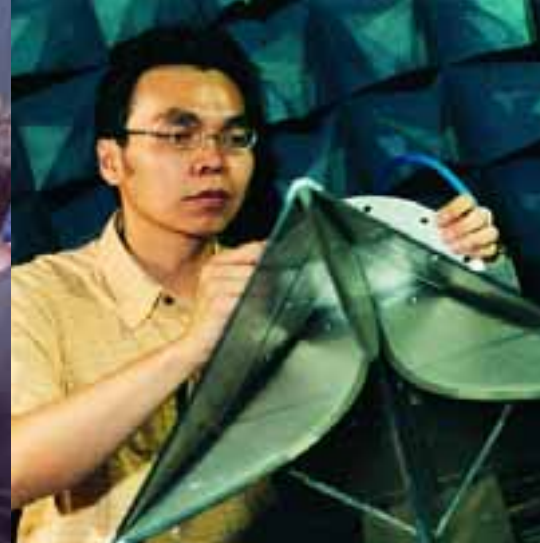
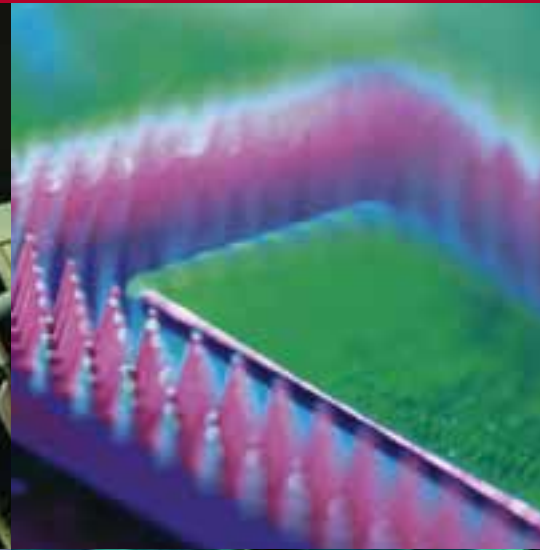


# Department of Electronic Engineering Graduate Studies



  
the graduate school  
Science and  
Engineering

# Introduction



Professor Laurie Cuthbert  
Head of Department

The Department of Electronic Engineering was established at Queen Mary over 100 years ago and has always enjoyed a reputation for research excellence. It holds many research grants in the areas of antennas, telecommunications, intelligent systems, digital signal processing and multimedia, from organisations such as EPSRC, the EU, industry and Government. This research is supported by a full range of modern laboratories and equipment. The benefit of studying for an MSc in a research-active department is that subjects are taught by people who are at the cutting edge of research in their field.

One aspect of current telecommunications research is on the technologies underlying the worldwide explosive growth in the Internet and e-Commerce; another is on mobile communications, not only the radio aspects but also the use of advanced artificial intelligence to manage the networks. In digital signal processing there are world-leading activities in digital music and in multimedia and vision.

As a research-active department, we have strong links with industry, both within the UK and internationally. Currently, we hold many research grants from organisations including the UK Research Council, the European Union, the US Government and industry in the areas of antennas, telecommunications, intelligent systems and signal processing.

Queen Mary is ranked in the top 100 universities in the world and this recognises not only the work in the College, but also the international standing of the staff; the Department is no exception to this. Academic staff regularly take leading roles in professional activities (such as conferences) round the world and in a ground-breaking set of initiatives, the Department has established joint international postgraduate activities: joint MSc degrees by Research with BUPT in Beijing and UESTC in Chengdu as well as joint research laboratories in Beijing, Shanghai and Macao.

The wide range of research interests characterises the policy of the Department – we encourage excellence and innovation in whatever field it arises. All our research groups do work of international importance... if you join us as an MSc or PhD student you will be exposed to the very latest concepts and ideas, and will work with some of the leading international figures in the area.

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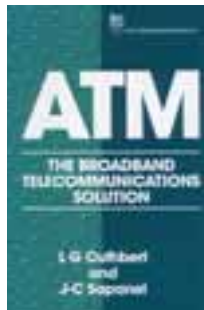
The information given in this brochure is correct at the time of going to press. The College reserves the right to modify or cancel any statement in it and accepts no responsibility for the consequences of any such changes.

# What is Electronic Engineering?

With a little thought, most people can produce a list of products of the electronic engineering and computer industries. The list would certainly include consumer electronics products like PCs, mobile phones, DVDs, and perhaps also public services like radio and TV broadcasting. But consumer products are only a small part of the industry. Probably ninety per cent of electronic and computer engineering, like all engineering, is not seen by the public – it is not secret, but it is unnoticed and taken for granted. Most electronics and software engineers are not designing consumer products but creating the electronic and computer systems that run the factories; nor are they designing mobile phones but working on the networks and computers to operate mobile phone systems or the Internet.

The electronic and computer engineering industry is principally concerned with providing the myriad of specialist electronic instruments and systems that make life safer, more convenient, more reliable, and more interesting. It is concerned with flight simulators and body scanners, global positioning satellites and remote sensors, computer information networks and e-Commerce.

These special applications are what British industry and British universities are so good at – so if you think you could develop and manage tomorrow's technology, and you have



Some of the many Electronic Engineering Staff Publications

talent and vision, this is the career for you.

## Masters degrees

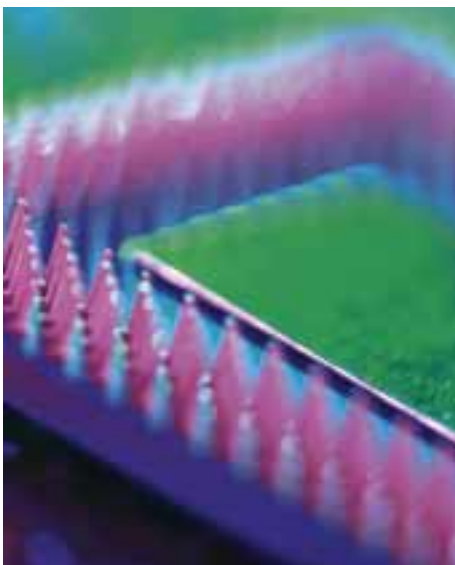
The advanced MSc is awarded by the University of London and both operates under the College modular Masters regulations. MSc students study eight taught course units, and also undertake an individual project (four taught course units).

The aim of the MSc project is to give you the opportunity to apply the techniques and technologies that you have learned to a significant advanced project. Projects are either development based or have a research focus. All projects are expected to either investigate, or make use of, techniques that are at the leading edge of the field. Projects by industrially-based or part-time students may be carried out in industry, jointly supervised by a member of academic staff.

## Postgraduate Diploma

With the exception of Telecommunications with Law (all pathways) and MSc by Research all of the Department's Advanced MSc programmes are available as a Postgraduate Diploma (PgDip). The PgDip is a nine-month taught programme (eighteen months part-time) from September to June and consists of the same eight taught units as the Advanced MSc. Unlike the MSc, PgDip students graduate in July and do not go on to complete an individual project.

There are no optional courses within a programme. The choice of courses studied is made by selecting the programme or pathway itself: the list of courses is shown with the entry for each programme. Students have the option to change their programme of study in the first semester only, at the discretion of the Programme Manager.



# Programmes of study

## Telecommunications

Telecommunications networks are changing to use Internet Protocol (IP) and this is the first major change since they went digital. Today's networks operate with high expectation on bandwidth, Quality of Service (QoS), choice of access (wired and wireless) and cost efficiency. Together with the emergence of multimedia, m-commerce and e-commerce applications in recent years, networks have become heterogeneous and complex.

MSc (and PgDip) in Telecommunications includes an essence of network research in the Department, which started back in the early 1980s. The programme is offered with three pathways covering all major topics, but with each of them focusing on a different area of the network protocol stack:

- **Telecommunications** (Networks pathway)
- **Telecommunications** (Internet Computing pathway)
- **Telecommunications** (Applications pathway)

### Networks Pathway

The Networks pathway has a focus on the actual infrastructure and operation of different telecoms systems (i.e. bottom layers of the protocol stack), both wired and wireless. In addition, the programme also includes performance evaluation issues related to modern telecoms networks. Graduates will have clear concepts of how existing and future systems work and how to optimise their careers as a network engineer, designing future networks and developing standards.

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, from designing infrastructure and services for the new 3G mobile networks to working on the expansion of the Internet with new technologies and protocols.

### Semester 1

Either Java Programming or Advanced Software Technologies (1)  
*As determined by the Department to suit the applicant's academic and professional profile*

Digital Broadcasting (1)

Internet Infrastructure

Security and Authentication

### Semester 2

Network Modelling and Performance

Satellite Communications

Multimedia Systems (1)

Wireless Networks (1)

### May-September

Project (MSc only)

(1) = This course is taken in the first year of part-time or distance learning study.

### Internet Computing Pathway

The growth of the Internet has led to the emergence of new industries, services, and products that were unimaginable only a few years ago. With this growth has come the need for employees with the special skills required to build and deploy industrial-strength Internet computing systems. They are currently in very short supply.

### Semester 1

Advanced Software Technologies (1)

Network Computing and Internet Technologies (1)

Internet Infrastructure

Security and Authentication

### Semester 2

Network Modelling and Performance

Multimedia Systems (1)

Intelligent Agents and Multi-Agent Systems

Internet Databases (1)

### May-September

Project (MSc only)

(1) = This course is taken in the first year of part-time or distance learning study

The Internet Computing pathway can be seen as a combination of Networks and Applications, covering the major topics throughout the whole protocol stack. This programme will be ideal for those who wish to learn the "hot topics" in the whole telecoms sector without looking in so much detail in particular areas, or for those who wish to update their telecoms knowledge.

### Applications Pathway

The Applications pathway has a focus on the development of applications in modern telecoms networks (i.e. the top layers of the protocol stack), and hence, there is a substantial amount of high-level object oriented programming involved, together with other technical issues related to the development of e-commerce applications, issues such as security, complex database structures and management and the use of artificial intelligence. This programme is therefore aimed at those who wish to continue their careers as an e-commerce application developer, creating applications for such systems as online banking systems as well as applications for mobile devices (eg mobile phones, PDA, iPod).

At the end of the programme, you should be able to construct software to deliver e-Commerce applications over the Internet, understand how the different types of infrastructure affect design and commercial decisions.

### Semester 1

Advanced Software Technologies (1)

Network Computing and Internet Technologies (1)

Internet Infrastructure

Security and Authentication

### Semester 2

Intelligent Agents and Multi-Agent Systems

Mobile Services (1)

Protocols for the Electronic Marketplace

Internet Databases(1)

### May-September

Project (MSc only)

(1) = This course is taken in the first year of part-time or distance learning study.

# Programmes of study (cont)

## Wireless Networks

A convergence of technologies is currently underway. The technologies behind wide area wireless networking and mobile telephony infrastructures are in the process of merging to provide an infrastructure that offers ubiquitous access to information, anywhere, anyplace, and anytime.

The whole area of wireless networks is now of enormous importance in the telecommunications and computing industries, from 3G mobile communications, to wireless LANs and newer technologies like WiMax. To cover this breadth, the Wireless networks MSc and PgDip is now offered in two pathways:

- **Wireless Networks** (Physical Pathway)
- **Wireless Networks** (Networks Pathway)

### Physical Pathway

This pathway is aimed at graduates planning to work in wireless the telecommunications sector, especially those concerned with the radio aspects. The programme 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. In-depth studies on antenna design for mobile networks and electromagnetics aspects are included.

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.

### Semester 1

Fundamentals of DSP  
Security and Authentication  
Internet Infrastructure  
CAD Techniques for RF Electromagnetics



### Semester 2

Satellite Communications  
Wireless Networks  
Antennas for Mobile Applications  
Radio Wave Propagation for Wireless Communications

### May-September

Project (MSc only)

This programme is not available for part-time or distance learning study.

### Network Pathway

In the network stream, you will study the architectures, applications and protocols for modern wireless networks, including mobile networks, wireless LANS, WiMax and ad hoc networks. Security is also included (a crucial aspect of making these networks safe to use, for users and operators alike) and the latest concepts in mobile services, including personalised location-based services.

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, especially those for network operators, service providers and content providers.

### Semester 1

Either: Java Programming(1) or Advanced Software Technologies(1)

*As determined by the Department to suit the applicant's academic and professional profile.*

Digital Broadcasting(1)  
Internet Infrastructure  
Security and Authentication

### Semester 2

Satellite Communications  
Wireless Networks (1)  
Mobile Services (1)  
Ad-hoc Broadband Wireless

### May-September

Project (MSc only)

(1) = This course is taken in the first year of part-time or distance learning study.

## Digital Music Processing

The programme in Digital Music Processing is taught by members of the world leading research group, the Centre for Digital Music (C4DM). C4DM has about 35 researchers and a current research budget of more than £3 million. With the aid of a major investment by Queen Mary, the Centre now has a state-of-the-art Listening Room, which can be used for research and for recording and performance. Additionally, there is a 32-processing computing cluster.

Based on our Digital Signal Processing programme but incorporating specialist courses and a specialised project (MSc only), this programme will help 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. Graduates have gone on to study for a PhD, work for a startup company, and for a major audio technology company.

MSc students on the programme will have the opportunity for an internship-based project with one of our industrial partners. Currently that includes: Creative Labs in California, Sensaura/Creative in London, Sony Computer Entertainment Europe in London, Sonoptics in High Wycombe, Philips Research Eindhoven, fxPansion in London – this list is growing all the time.

From 2007, several lectures on the DMP programme were made available as podcasts, enabling students to go through the material again at their own pace, whenever and wherever it suits them. Students are also invited to attend the regular research seminars offered by the Centre. Because seminar speakers are leading experts from other universities and from industry, students are exposed to the very latest technologies and applications in Digital Music.

College and other scholarships are available for this programme for exceptional students.

The two options, Digital Music Processing with DSP or with Multimedia, have slightly different aims. The DSP option delves further into the techniques that can be used for processing, analysis and synthesis. It will provide you with a strong background

for further DSP work or research. The Multimedia option incorporates a more general understanding of how music processing is performed in broadcasting systems and in relation to other media. This option also emphasises many of the technical issues currently of concern to industry, such as watermarking, copyright protection and Internet streaming.

You should indicate your preferred option (DSP or Multimedia) on the application form.

#### Semester 1

Fundamentals of DSP (1)  
Advanced Transform Methods  
Java Programming (1)  
Digital Broadcasting

#### Semester 2

Music and Speech Processing  
Music Analysis and Synthesis  
Digital Audio Effects (1)  
Machine Learning (DSP option) or  
Multimedia Systems (Multimedia  
option) (1)

#### May-September

Project (MSc only)

(1) = This course is taken in the first year of part-time or distance learning study.



## Digital Signal Processing

This programme is also taught by staff in the Centre for Digital Music (C4DM). It is specifically intended to respond to a growing skills shortage in industry for engineers with a high level of training in signal processing, and, in particular, to support Internet, multimedia, broadcast, communications and consumer industries.

The programme will provide core knowledge of basic DSP theory and its implementation in hardware, as well as providing the opportunity to further specialise in areas such as multimedia and intelligent signal processing. The taught courses are fully supported, with computing and laboratory work.

The MSc and PgDip are intended both for graduates in a related discipline, who wish to enhance and specialise their skills in the area, and also for industrialists with some experience of working with signal processing in the IT sector, who wish to obtain a formal qualification.

#### Semester 1

Fundamentals of DSP (1)  
Advanced Transform Methods  
Digital Broadcasting  
Java Programming (1)

#### Semester 2

Multimedia Systems (1)  
Speech and Music Processing  
Video and Image Processing  
Machine Learning (1)

#### May-September

Project (MSc only)

(1) = This course is taken in the first year of part-time or distance learning study.

## Internet Signal Processing

Internet Signal Processing is an exciting new field that covers all applications of Digital Signal Processing (DSP) to the Internet (and vice versa). This Masters degree is the first of its type in the United Kingdom and is intended for graduates who wish to enhance and specialise their skills in DSP while aiming to apply these skills to Internet related problems and projects. The programme of study responds to a skills shortage in industry for digital technologists able to meet the demands of the real-time Internet.

Graduates of the programme will understand both the signal processing and web technologies involved in storing, indexing and delivering content-rich and real-time media over wired and wireless Internet. This is of importance to infrastructure companies, service and content providers, companies involved in the broadcast, new media and multimedia industries, as well as intelligent information retrieval and digital libraries.

The programme provides core knowledge of basic DSP theory and the fundamentals of the Internet. The taught course units are fully supported with computing and laboratory work using state-of-the-art DSP hardware and software to provide the students with hands-on experience of DSP development and design.

#### Semester 1

Java Programming (1)  
Internet Infrastructure  
Fundamentals of Digital Signal  
Processing (1)  
Advanced Transform Methods

#### Semester 2

Network Modelling and Performance (1)  
Multimedia Systems (1)  
Music and Speech Processing  
Image and Video Processing.

#### May-September

Project (MSc only)

(1) = This course is taken in the first year of part-time or distance learning study.

# Programmes of study (cont)

## Multimedia Systems Technology

Multimedia Systems Technology has been developed by staff in the renowned Multimedia and Vision (MMV) Research Group within the Electronic Engineering Department. World class research in both this and the Centre for Digital Music (C4DM) has led to the development of this programme which focuses on new and emerging technologies associated with the ever-expanding Multimedia industry.

Multimedia Systems Technology responds to a growing skills shortage in industry for engineers with a high level of training in multimedia technologies, and in particular to support broadcast, entertainment, surveillance, gaming, Internet, communications and consumer industries.

The programme will provide a core knowledge of multimedia theory and its implementation, in particular:

- Digital signal processing and multimedia communications
- Current digital multimedia technologies
- The convergence of different media, computer and communications and
- The social significance of this convergence.

Multimedia Systems Technology is intended both for graduates in a related discipline, who wish to enhance and specialise their skills in the area, and for industrialists with some experience of working with signal processing, who wish to obtain a formal qualification.

### Semester 1

Fundamentals of DSP  
Advanced Transform Methods  
Internet Infrastructure  
Digital Broadcasting

### Semester 2

Multimedia Systems  
Video and Image Processing  
Music and Speech Processing  
Multimedia Data Retrieval, Protection and Authentication

**May-September**  
Project (MSc only)

This programme is not available for part-time study.

## Business Environment Options

Telecommunications in the Business Environment also has the same three pathways as described for Telecommunications. However, with the 'Business Environment' options each pathway combines the specialised technical courses with advanced business courses relevant to the Telecommunications industries.

**The Networks pathway** is aimed at graduates planning to work in telecommunications and telecommunications applications, for example the integration of voice and data applications, within a business context. The programme combines in-depth coverage of the main technical aspects of telecommunications with advanced business courses.

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 business/financial needs, particularly in the small business and start-up sector.

**The Internet Computing pathway** is aimed at graduates planning to work at providing underlying Internet software and infrastructure in a business context. To do this requires knowledge of Internet protocols and applications, an understanding of how the Internet fits into, and benefits, business and how the underlying infrastructure can enhance or limit possibilities. The programme combines in-depth coverage of the software technologies for the Internet, as well as advanced business courses.

**The Applications pathway** is aimed at graduates with an entrepreneurial approach, who see themselves working in e-Commerce applications in small businesses or start-up companies, where a knowledge of both the applications software, infrastructure and business issues is necessary. The programme combines in-depth coverage of the applications and software technologies for e-Commerce as well as advanced business courses relevant to the technology sector.

By the end of the programme, students should be able to demonstrate that they can construct e-Commerce applications that are relevant to business needs.

### Semester 1 is common for the Internet Computing and Applications pathways:

Advanced Software Technologies  
Network Computing and Internet Technologies  
Internet Infrastructure  
Operational and Financial Management

### Semester 1 – Networks Pathway

Either: Java Programming or Advanced Software Technologies.

*As determined by the Department to suit the applicant's academic and professional profile.*

Digital Broadcasting  
Internet Infrastructure  
Operational and Financial Management

### Semester 2

#### Internet Computing pathway:

Multimedia Systems  
Internet Databases  
Entrepreneurship  
Business Technology Strategy

#### Applications Pathway:

Intelligent Agents and Multi-Agent Systems  
Protocols for the Electronic Marketplace  
Entrepreneurship  
Business Technology Strategy

#### Networks Pathway:

Satellite Communications  
Wireless Networks  
Entrepreneurship  
Business Technology Strategy

### May-September

Project (MSc only)

These programmes are not available for part-time or distance learning.

## Law Options

The Telecommunications with Law programme is a joint collaboration between the Electronic Engineering Department and the Centre for Commercial Law Studies (CCLS) and has the three same pathways as described for Telecommunications and Telecommunication in the Business Environment. Each pathway consists of eight taught course units: five of these are technical and three concentrate on legal issues. In addition students also undertake a compulsory law orientation weekend and a preparatory law course, before starting the three legal courses.

**The Networks pathway** is aimed at graduates planning to work in telecoms and telecommunications applications, for example integration of voice and data applications. This programme combines in-depth coverage of the main technical aspects of telecoms plus advanced law courses.

At the end of the programme you will be equipped with the skills needed for a wide range of jobs in the expanding telecoms industry, with particular emphasis on those that also require knowledge of the legal sector.

**The Internet Computing pathway** is aimed at graduates planning to work at providing underlying Internet software and infrastructure. To do this requires knowledge of Internet protocols and applications, an understanding of how the Internet fits into, and benefits, business and how the underlying infrastructure can enhance or limit possibilities. The programme combines in depth coverage of the software technologies for the Internet plus advanced law courses relevant to the commercial and IT sector.

**The Applications pathway** is aimed at graduates with an entrepreneurial approach who see themselves working in e-commerce applications in small businesses or start-up companies where a knowledge of the applications software, infrastructure and legal issues is necessary. The course combines in-depth coverage of the applications and software technologies for e-Commerce plus advanced law courses relevant to the sector.

### Semester 1 September – December

#### Internet Computing and Applications pathways

Advanced Software Technologies  
Network Computing and Internet Technologies

Internet Infrastructure

Law Orientation Weekend – compulsory but not assessed as part of the degree

#### Networks Pathway

Either: Java Programming\* or Advanced Software Technologies\*.

*\*As determined by the Department to suit the applicant's academic and professional profile.*

Digital Broadcasting

Internet Infrastructure

Law Orientation Weekend – compulsory but not assessed as part of the degree

### Semester 2 – January-April

#### Internet Computing pathway:

Multimedia Systems  
Internet Databases

#### Applications pathway:

Intelligent Agents and Multi-Agent Systems

Protocols for the Electronic Marketplace

#### Networks pathway:

Satellite Communications

Wireless Networks

In addition to the above modules, students will be expected to undertake a short Law Preparatory course. This will be compulsory but not assessed as part of the degree

### May-September

Project

### Semester 3 – August-December

A choice of three Law courses<sup>#</sup> from the following list of options:

- Computer Crime
- IT Outsourcing
- Internet Content Regulation
- Intellectual Property Foundation
- European Telecoms Law
- International Telecoms Law
- Privacy and Data Protection
- Trade Marks and Domain Names
- e-Commerce

<sup>#</sup>Subject to availability

These programmes are available for part-time, distance learning study (please make further enquiries).

## MSc by Research

An MSc by Research will provide you with the necessary skills to undertake research, either in an academic or industrial environment and is ideal for anyone considering PhD study in the future. You will study four taught course units and undertake a major research project in conjunction with any of the research groups in the Department; the expectation is that every graduate from the degree publishes at least one conference paper as part of the research.

### Core taught module

- Research Methods

### Options

Any three courses, chosen with the approval of your supervisor, from within the Advanced MSc programmes to fit your research area to provide background skills and knowledge.

The written examination for each of the course units must be passed in addition to the project.

### Research Groups

Applicants should specify on their application in which of the following they wish to do their research:

- Antenna and Electromagnetics Research Group
- Networks Research Group
- Centre for Digital Music (C4DM)
- Multimedia and Vision (MMV) Research Group

Full details of the topics covered by each group can be found at [www.elec.qmul.ac.uk/research/](http://www.elec.qmul.ac.uk/research/)

This MSc is not available for part-time study or by Distance Learning, except as part of special arrangements with a partner university.

# Modes of study

## Part-time

If you are in full-time employment you may take the following MSc or Postgraduate Diplomas part-time, either in attendance or by Distance Learning:

- Telecommunications (all pathways)
- Digital Signal Processing
- Digital Music Processing
- Internet Signal Processing
- Wireless Networks (Network pathway only)

Part-time students take two courses per semester, with the project (MSc only) taken over a six-month continuous period. This means the MSc takes two years to complete and the Postgraduate Diploma, eighteen months. The choice of courses in a particular year is fixed.

If you take the part-time attendance option then you should expect to attend Queen Mary for lectures for two days a week as an absolute minimum; in some cases you would need to attend for two and a half days.

## Distance Learning

Distance Learning is available to students in the UK or those in other countries where there is a partner institution (currently Hong

Kong, Macao and Portugal). Distance Learning can also be available to students from other countries, but these applications will be considered on an individual basis. We welcome enquiries from applicants in other countries and would be happy to discuss individual cases. Distance learning applicants should apply in the usual way. More information is also available from our web page:

[www.elec.qmul.ac.uk/study/msc/dl](http://www.elec.qmul.ac.uk/study/msc/dl)

### Degrees available by distance learning

- Telecommunications (all pathways)
- Wireless Networks (Network pathway only)
- Digital Signal Processing
- Digital Music Processing
- Internet Signal Processing
- Telecommunications with Law (Networks and Applications pathways only)\*

\*These programmes are only available to students in Hong Kong.

These degrees will be studied part-time so they will take a minimum of 18 months (PgDip) or two years (MSc) to complete.

### Requirements

The *academic* entry requirements for study by distance learning are exactly the same as

those for study in attendance and you should apply in the normal way (see How to apply), using the specific programme code for the distance learning option. In addition there are *facility* requirements that you must meet; these are in place to ensure that you have the facilities in order to be able to complete the degree.

These are:

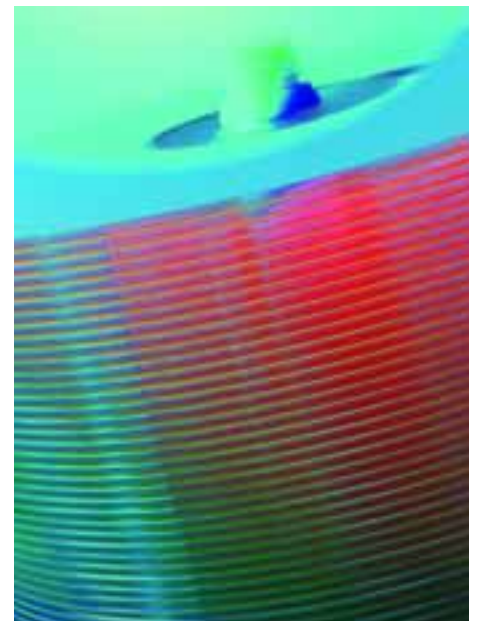
- A PC running Windows 2000, Windows XP Professional or Windows Vista with a webcam and headset/microphone.
- A broadband connection, via one of:
  - an ADSL or Cable Modem connection; OR
  - a fast Internet connection at work with permission from your employer to use it; OR
  - the ability to come to Queen Mary at weekends or evenings.
- Willingness to attend Queen Mary or a local centre at certain defined times.

More detailed information on this mode of study, including expected attendance and the overall study approach is available from our web page:

[www.elec.qmul.ac.uk/study/msc/dl](http://www.elec.qmul.ac.uk/study/msc/dl)



A lecture being recorded by Distance Learning



# Entry requirements

## General

You should have a first or upper-second class degree 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. Applicants with lower-second class degrees may be considered if the undergraduate degree specialised in the relevant subjects.

## International Students

Please refer to country pages on the International Students' website:

[www.qmul.ac.uk/international/index.html](http://www.qmul.ac.uk/international/index.html)

For information about entrance requirements

## Programming ability

In addition to the above general entry requirements applicants to all programmes (except the Wireless Networks Physical pathway) should have basic programming skills in some language, ideally, an object-oriented language. You should be able to take a straightforward problem, such as those commonly set on undergraduate programming courses and confidently create the solution in code, using common data structures such as arrays and trees. Most people know themselves whether they can program. They know the tools at their disposal in the chosen language and can write the instructions to use them effectively.

## Subject specific requirements

### **Telecommunications (Networks) (including 'in the Business Environment' and 'with Law' options) and Wireless Networks (Networks)**

In addition to the general entry requirements, you will need some basic programming experience (preferably an object-oriented language) such as C or C++ and a basic knowledge of telecommunications networks.

### **Telecommunications (Internet Computing) and Telecommunications (Applications) (including 'in the Business Environment' and 'with Law' options)**

In addition to the general entry requirements applicants to these programmes are required to have good Java programming skills at undergraduate degree level. The Department consider basic Java programming skills to consist of:

- the ability to perform top-down problem decomposition
- the ability to compile and execute Java programs
- an understanding of the following Java language features:
  - the use of variables, classes, objects, primitive data types and casting between types
  - how to control flow of execution, ie constructs for sequence, selection, iteration and exception handling
  - how to call methods, use of parameter lists, constructors, overloading and recursion.
  - the use of arrays, file handling and string manipulation
  - an appreciation of different types of data structures (eg queues, stacks, linked lists and trees) and how they may be realised in Java
  - the ability to apply the above Java language features to create and debug your own programs to satisfy a problem description.

If you lack these basic Java skills but have prior programming experience in a procedural high-level language (such as C), then you may wish to consider Telecommunications (Network pathway) or Wireless Networks (Network pathway)

### **Digital Signal Processing, Digital Music Processing and Internet Signal Processing**

In addition to the general and programming requirements applicants to the above programmes should have completed an undergraduate course in at least 1 of the following areas:

- Signals and Systems
- Control
- Analogue Filters

### **Wireless Networks (Physical)**

In addition to the general requirements applicants should have a first degree that included Electromagnetics and be familiar with such topics as Maxwell's Equations and basic antenna theory.

### **MSc Multimedia Systems Technology**

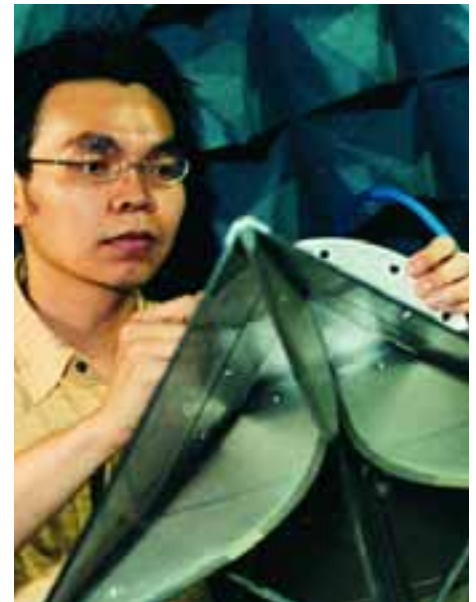
Applicants should have good knowledge of programming (preferred languages are C,

C++ or Java), as well having experience of digital signal processing (DSP) in their undergraduate degree.

### **MSc by Research**

You should have a first or good upper second in your initial degree, which must be in an appropriate area for the research being undertaken. For instance, a Physics degree would be an acceptable alternative to one in Electronic Engineering for a student wishing to do research in electromagnetics.

Please note that, in common with other MSc degrees, entry is only in September of each year.



# Equipment and facilities

Postgraduate students have their own computing laboratory on the first floor. The laboratory is equipped with a large number of workstations and all machines are fully networked. All areas are covered by a Wireless LAN and students can use their own laptops for the purpose of college work. Advice on laptop specifications can be found on our web page: [www.elec.qmul.ac.uk/study/msc/faq.html#q26](http://www.elec.qmul.ac.uk/study/msc/faq.html#q26)

Students have access to the lab from 8am to midnight every day, during term time.

Specialist labs for multimedia, digital signal processing and microwave antennas also exist within the Department.



# Career opportunities

Many career paths and opportunities are open to the graduate in electrical, electronic or computer engineering, with something to suit all personalities and aptitudes.

You may wish to work on the research and development of new technologies and applications – either in the laboratories of a large manufacturer or in a smaller contract research and development company where there would be opportunities to work with a variety of clients. For this type of work, career progression is through project leadership into positions of increasing technical challenge and responsibility. Alternatively, you may prefer to work on large projects that require organisation and leadership skills. Initially this might involve working at a junior level in support of major projects, but with increased experience the career path opens into senior project and company management.

Whether you are interested in a career that stays very close to the latest technologies or one in which you use your technical skills to move into engineering management, you can be sure of a career that is absorbing and creatively satisfying. There is no need to worry about finding a job either – there is a great shortage of professional engineers in the UK and the competent and motivated graduate is likely to receive many offers for well paid jobs.

We have over 700 companies on our database of current graduate opportunities in Electrical Engineering and Information Technology, and Queen Mary has an outstanding Careers Office that will help you to focus on the right career and give practical advice for completing job applications and preparing your CV.



# PhD research opportunities

Altogether, there are about 100 PhD students and about 20 research assistants and engineers all working on today's leading edge research in our labs. Research funding over the past five years amounts to £9.5 million, being sourced from UK Research Councils, EU, Industry and Government organisations. Over this same five-year period the Department's staff have published nearly 250 journal papers and over 750 conference papers.

The Department is organised into four research groups, each with its own focus.

- Antenna and Electromagnetics Research Group
- Networks Research Group
- Centre for Digital Music
- Multimedia and Vision Research Group

## Antenna and Electromagnetics Group

Antenna research at Queen Mary was established in 1968 and since then has built an international reputation for its research in the areas of microwave antennas and electromagnetic analysis. The Laboratory's mission statement is 'High Quality Research backed up by High Quality Measurements'. Comprehensive experimental facilities are available at Queen Mary and are housed in the Antenna Measurement Laboratory. The group has strong links with industry ranging from providing MSc summer project placements, through providing PhD studentships, to collaborative research contracts.

### Research is divided into the following themes:

- Antennas for Mobile Communications: Multi-band handset antennas; multiple antennas for Multiple Input Multiple Output (MIMO) applications; use of Electromagnetic Band Gap (EBG) substrates; semi-smart base station antennas; antennas and radio propagation for wireless wearable computers and ubiquitous computing
- Theory and Application of Metamaterials: Computational Electromagnetic models for left-handed materials; design and applications of EBG structures and left-handed materials in microwave engineering.

- Quasi-optics and Millimetrewave Antennas: Development of new computational verification tool based on diffracted Gaussian beams; development of a tri-reflector Compact Antenna Test Range (CATR); CAD and experimental verification of a 90GHz integrated active antennas on silicon; active integrated conical horn antennas; theoretical and experimental characterisation of dichroic plates
- Interaction of Electromagnetic Waves with Biological Tissue: Dosimetry and development of full body SAR model for handset antennas
- CEM applied to Microwave Electron Tube Devices: CEM design of magnetrons; low power phase locking of high power magnetrons (Faraday Partnership)
- Antenna Theory: Conformal FDTD; Discrete Green's function FDTD; satellite earth station clutter modelling using 'Power Coupling Theory'; FDTD based antenna array analysis
- Antenna Metrology: Research is focused around the major antenna measurement facilities of the Antenna Measurement Laboratory: two compact antenna test range operating from 5GHz to 300GHz; Fully screened anechoic chamber for mobile communications antenna applications (750MHz to 5GHz); NSI Planar near-field range operating to 100GHz; 100GHz quasi-optical test bench; 9m x 3m x 3m anechoic chamber for feed measurements and radome characterisation

## Networks Group

Networks research has a long history at Queen Mary. Founded in 1987, the Group was originally funded to research the emerging ATM protocol and associated techniques for analysis and simulation. Since then research focus has expanded greatly and now includes, for both fixed and wireless networks:

- Intelligent resource management for configuration, accounting, and security, where resources can include networks, computers, data and people
- Advanced models to safeguard resources, based on trust, security, privacy and anomaly models

- Ubiquitous computing systems and applications including home-networks, mobile data and communication systems, location-aware systems and services
- Semantic and agent based services for information access and integration
- Resource management for wireless networks
- Packet level network measurement, and prediction of key performance indicators
- Capacity planning
- Network performance evaluation
- Mapping network topologies and the predicting the effect of topological structures on network performance
- Evaluation of CoS / QoS technologies - techniques for performance bounding and prediction
- Network simulation and accelerated simulation
- Network optimisation and performance "health checks"
- Protocols including IP, MPLS and traffic engineering, and optical burst switching.

The Group has an international reputation for excellence in bringing intelligence and performance assessment techniques to both fixed and mobile communication networks. Group members are key players in several international collaborative projects, including:

**CRUMPET** – Ubiquitous Computing

**EDEN-IW** – Semantic Web for water data



Passenger Support System of ADAMANT – Interactive map with your real time location.

# PhD research opportunities (cont)

**ADAMANT** – Distributed optimal control of wireless LAN resources

**TORRENT** – Intelligent Access Networks

**SAFEGUARD** – Security and Survivability of Large Scale Critical Infrastructures

The Networks Group has also attracted funding from the USA for its pioneering work on cooperative load balancing in wireless networks.

Over the years, companies such as BT, Lucent, Motorola, Nokia, and Nortel have supported PhD research in the Networks Group, often in conjunction with EPSRC funded initiatives or projects. The Group has a long-standing inter-disciplinary collaboration with the School of Mathematical Sciences at Queen Mary, supported by a succession of EPSRC (and most recently, EU) funded projects. This encompasses areas such as non-linear dynamics and experimental design, and their application to traffic and topology behaviours in packet-based networks.

## Centre for Digital Music (C4DM)

Our research into technologies for audio and music has a long and successful history, starting with Mark Sandler's PhD in Digital Power Amplification in 1984. Today, digital amplifier chips, broadly similar to the team's proposals of the early 1990s are finding a healthy take-up in a variety of consumer goods from DVD players to laptops.

Our research covers the field of Music and Audio Technology from record/replay equipment in the home or studio, to the simulation and synthesis of instruments and voices, acoustic space simulation, music understanding, delivery and retrieval. The developing role of MPEG standards and the convergence of computers, communications and signal processing in multimedia mean that broadcast, transmission, coding and storage of audio and music will pervade our work for the coming years. The interface between audio and music, and representations for them both form a particular current focus for our work.

Over the years we have collaborated with many companies, including Solid State Logic, Klark-Teknik, B&W Loudspeakers, BT, Sony Broadcast & Professional, Motorola, Texas Instruments, Crystal Semiconductor, Philips Research. Research into scalable audio codecs resulted in the spinout of insonify, which was funded by Silicon Valley individuals.

The signal processing techniques at the heart of the Groups's work include: Time-frequency and Time-Scale Analysis, Neural Networks, Hidden Markov Models, Matching Pursuits, Transient Analysis and Independent Component Analysis. In every project, we seek not only to investigate new applications of Digital Signal Processing, but also to push forward the frontiers of DSP itself.

These days, our projects often involve developing signal processing techniques to extract meaningful feature sets from music. We are also increasingly interested in how to represent these features, and recognise the increasing importance of MPEG7.

## Multimedia and Vision Research Group (MMV-Group)

The Multimedia and Vision Research Group is renowned for its research in video processing and computer vision. During the last five years the MMV-Group has produced several research works in cutting edge areas including scalable video coding, watermarking, object segmentation and tracking for surveillance, semantic inference and visual information retrieval. The Group is attracting strong interest from industry and research funding bodies in the UK and beyond. The members of the group have published over 200 technical papers, several of them in the highest ranked journal including the IEEE Transactions on image processing, circuits and systems for video technology and Multimedia.

The MMV-group is currently cooperating with top academic institutions and industrial players world-wide, including the school for telecommunications Paris (France), INRIA research centre (France), the Heinrich Hertz



# What the students think

Institute for Communication Technology Berlin (Germany), the Technical University Munich (Germany), The University of Glasgow (UK), The Northwestern University Chicago (USA), British Telecom (UK), Philips research centre Eindhoven (The Netherlands), Telefonica research (Spain) and Motorola research Labs (UK).

The Group has developed practical applications for relevant multimedia systems including a complete framework for Scalable Video Coding, which is considered as reference software in the ISO MPEG standardisation forum.

The Group is also contributing to the emerging JPSearch standardisation activity.

The current research portfolio consists of a healthy mixture of basic and industrial oriented research. The main research activities revolve around the following areas:

- Integration of knowledge, semantics and low-level multimedia processing
- Visual information retrieval
- Scalable video source and channel coding
- Object segmentation and tracking
- Image and video watermarking
- Stereo imaging and mixed reality

Currently, the Group is coordinating the IST Network of Excellence K-Space and the European COST292 action. The MMV-Group is one of the main contributors and steering member of the FP6 IP projects aceMedia and MESH. The group is also involved in the MPEG-4/7/21 activities and participates in EPSRC supported Multimedia Knowledge Management Network.

**Name:** Rupert Ogilvie

**Age:** 22

**Nationality:** British

**Programme of study:**

BEng Computer Engineering (lower second), MSc Internet Computing (Distinction) and PhD in Telecommunications (current).

**Research interests:** Network simulation, measurement and analysis.

## **Why did you choose to study at Queen Mary?**

It was the only London College that I visited that was all on one campus and as a result I got a much greater sense of community from the students. The staff were all very approachable and this helped me to enjoy my studies as any problems I had, academic or otherwise, were easily sorted out.

## **What are your plans for the future, and how will your degree from Queen Mary help you?**

I plan to go into industry. The links that Queen Mary has with companies such as Cisco will help me find the career that I want, and most companies have a good opinion of Queen Mary so hopefully that will reflect well on my CV.

## **Would you recommend Queen Mary to other students? Why?**

Yes, because on the single campus, you get to meet a wide range of people from different disciplines.

## **Have you made friends at Queen Mary and developed your own skills and interests?**

I spent two years in the Hockey Club where I made lots of friends and even though I've left now, I still know people there who update me on how the club is doing. I've kept in touch with those who graduated with me on the BEng programme as well as friends from other disciplines.



**Name:** Touseef Javed Chaudhery

**Age:** 22

**Nationality:** Pakistani

**Programme(s) of study:**

BEng Computer Engineering (First Class Honours) and PhD Telecommunications (current).

**Research interests:** Currently working in the Network Performance area.

## **How long have you been living in the UK?**

I have been living in the UK for four years, in different areas of London and also for one year in Canterbury, Kent. At the moment I live in Mile End, which is a three minute walk to the campus.

## **Why did you choose to study at Queen Mary?**

Queen Mary has a very good research department for telecommunications.

## **What were your first impressions of Queen Mary University?**

That it was multicultural, with students studying here from all over the world, for example from the USA, Greece, UAE and Pakistan.

## **What does graduating from Queen Mary mean to you?**

It means that I'll gain a qualification that is internationally recognised, and part of the University of London.

## **Would you recommend Queen Mary to other students?**

Yes, as it has a firm foundation in the Telecommunication area. The facilities are very good, with plenty of computers around the campus. The Department has increased dramatically in size over the past three years, which shows how popular this subject area is. The staff are friendly and have an open door policy which makes it easy to solve problems with coursework or projects. My personal tutor and project supervisor were helpful throughout my undergraduate degree, and I will hopefully be attending a conference this summer – which I'm looking forward to!



# What the students think (cont)

**Name:** Fernando Ramos

**Age:** 25

**Nationality:** Portuguese

**Programme of study:** MSc in Telecommunications by Distance Learning (Distinction)



**Research interests:** Telecommunications, specifically the issue of providing broadband everywhere, considering problems such as costs of the emergent services, and difficulties reaching certain rural areas.

## **What were your first impressions of Queen Mary University?**

That it was a well organised and reputable institution, and also a place with an interesting mix of different cultures.

## **What were your first impressions of the staff in the Department?**

Since I was a Distance Learning student, I didn't have much live contact with the staff, but some, of whom I had the privilege to meet, were marvellous. The attitude of the staff was very good, one of help, comprehension, and even friendship. My supervisor is an extraordinary person, very helpful and 'always there'.

## **What are your career aspirations, plans for the future?**

Because of my MSc from Queen Mary I will be able to start an academic career in Lisbon, Portugal, as a teaching assistant. I hope to continue researching and teaching in or outside of Portugal. Let's wait and see what the future brings...

## **Would you recommend Queen Mary to other students? Why?**

Yes, because it is an excellent university, well organised, with fantastic professors. The programme was very good and focused on the course objectives.

## **What was your overall experience of Distance Learning in the Department?**

It was very good. It was a complete Distance Learning course, and had everything that I needed to learn. It felt like I was actually there.

## **Would you recommend Distance Learning to other students?**

Yes, because I was able to continue my work and study at the same time. I could watch the lectures whenever I wanted to, which allowed me to manage my time much better.

## **Did you feel that the technology and staff available to support the Distance Learning programme was adequate?**

Absolutely.



Name: Yan Sun

Age: 27

Course:  
MSc e-Commerce

Year: 2003

Level of study:  
Postgraduate Taught

Country: China



**If you could only bring three items with you to the UK, what would they be? (Not including clothes or money)**

Camera...

Books...

Pencils and Paper (for pencil sketching)

**What do you think is the best thing about London?**

The ancient architecture that remains and the contrasting atmospheres of contemporary fashion and tradition – walking in the sunshine, sometimes you can feel lost in history.

**Who's the most interesting person you've met since you came to Queen Mary?**

Professor Laurie Cuthbert.



**How did you find out about Queen Mary, University of London?**

As a student at the Beijing University of Posts and Telecommunications (BUPT).

**Why did you decide to do this particular course?**

To widen my technical view and knowledge. I had a good fundamental background in telecommunications from BUPT but by choosing a commercial related MSc, I improved my capabilities which has helped further my career greatly.

**Once you arrived in the UK, how easy or difficult for you was it to find somewhere to live?**

At the very beginning, I was placed in residences and I stayed there for a month. During this month, I searched for a house outside the campus which I could share with

other students. I got a lot of help and suggestions from previous EE students and the up-to-date vacancy news on the Residences bulletin provided valuable information. I really didn't have much difficulty in finding a place to live.

**What are your career plans and what would you like to do in the future?**

Now I am working in a global telecoms company as a 3G network product manager. My main responsibility is product planning. It is a very interesting job because it covers not only the technical but the business areas. Many of the soft skills I developed at Queen Mary, such as communications, presentations, timing management etc. are also the key factors to make the work more successful. Maybe in the future, I will run my own business after I learn enough.



# Accommodation at Queen Mary

Finding suitable accommodation while studying at Queen Mary is easy as the College's own facilities are both extensive and competitively priced. The opening of the new student village in September 2004 created the largest self contained campus within the University of London. The College has a total of 2,145 bed spaces to offer new and returning students, provided in self catered houses, flats and maisonettes. Queen Mary students also have access to 40 designated places in the fully catered intercollegiate halls in central London, which are owned by the

University of London. Additionally, there is a range of private housing in the East End area surrounding the campus. If you would prefer to find private accommodation, the College can help, by providing you with guidance notes and lists of available addresses.

Queen Mary offers accommodation to all single first-year postgraduate students who apply, with priority given to overseas applicants. If you live close enough to the College to commute, you will normally be expected to live at home.

Once you have firmly accepted an offer of a place at Queen Mary, an application form and booklet giving full details of available accommodation will be sent to you. You can apply for accommodation at any stage before the academic year starts, however places for postgraduates are allocated on a 'first come, first served' basis, so the earlier you apply the better your chances will be.

## Fully-catered residences

For those students wishing to live in a fully catered hall, there is the option of the three University of London Intercollegiate Halls of Residence (for postgraduates), all located in central London.

### Intercollegiate halls of residence

Queen Mary currently has about 40 places reserved in these halls for first-year postgraduates. Located in central London close to its popular cinemas, theatres and museums, these halls offer the opportunity to meet students from other colleges of the University of London, whilst still being within 30 minutes travelling time of the Mile End Campus.

All halls offer breakfast and evening meals daily, with lunch at weekends, except Lilian Penson Hall which offers a 'pay as you go' eat scheme.

- Commonwealth Hall, Cartwright Gardens, WC1 (male and female)
- International Hall, Brunswick Square, W1 (male and female)
- Lilian Penson Hall, Talbot Square, W2 (male, female and some couples).



## Self-catering halls of residence

With the opening of the new student village, there are now two styles of self-catered housing on the Mile End campus. The village provides 995 single en-suite places for students, in six new residential buildings, arranged in flats and maisonettes housing between four to nine students, with each unit sharing kitchen/dining facilities. There are 15 specifically designed en-suite for wheelchair users.

Rents are estimated to be between £93-£107 per week for the 2006-07 academic year. The other style of on-campus housing provides 700 single non en-suite places in flats, or houses, shared between three and six students. Students share kitchen/dining facilities, bathrooms and toilets, although most rooms will have hand washbasins. Rents are estimated to be between £85-100 per week (2006/07 academic year)

In both styles of housing, en-suite and non en-suite, all bedrooms are carpeted, equipped with a single bed, bookshelves, desk, chair, desk lamp and storage space. All rooms are centrally heated and have computer data connections. Kitchens are fully equipped with refrigerators/freezers, cookers, microwave ovens, washing up facilities, storage cupboards, food preparation surfaces and dining areas. Students are required to provide their own crockery, cutlery and cooking utensils. Bed linen and towels are not provided, but can be purchased by first-year overseas students if required. Launderettes are situated in or close to all self-catering residences. There are no car parking facilities available to students living in the Queen Mary Mile End Campus self-catering residences.

### **For more information, contact the Residences Office:**

Tel: +44 (0)20 7882 5522  
Fax: +44 (0)20 8981 8630  
email: [residences@qmul.ac.uk](mailto:residences@qmul.ac.uk).

Further details can also be found on the web at: [www.admin.qmul.ac.uk/ccrs/residences/](http://www.admin.qmul.ac.uk/ccrs/residences/)



# Queen Mary, University of London

Queen Mary is one of the largest multi-faculty colleges of the University of London and is located on attractive campuses at Mile End and Whitechapel in east London, only 20 minutes by tube from the West End, and at Charterhouse Square in the City. We have around 12,500 students studying in four faculties plus Barts and The London, Queen Mary's School of Medicine and Dentistry. Of these, more than 1,600 are following postgraduate courses and undertaking research.

The Mile End campus is a distinguishing feature of the College and is a pleasant surprise for visitors. It is a peaceful, secure and friendly environment only a few yards from the bustle of Mile End Road, with landscaped squares and a host of facilities together on one site: cafés, bars and restaurants, the Students' Union, canal-side accommodation in our Student Village, a

bank and a travel agency. The academic facilities are housed in pleasantly architecturally-diverse buildings, ranging from the Victorian Queens' Building to the modern, award-winning Informatics Teaching Laboratory and a striking new building that houses an integrated Learning Resource Centre alongside state-of-the-art laboratories.

Over the last decade, £100 million has been invested in building and refurbishment programmes providing many specially designed and attractive facilities for both academic study and recreational use. In addition to the extensive student accommodation on campus, the comprehensive student village around a 'village green' which incorporates cafes, shops and other facilities has been built next to the existing waterside campus student residences.

## Our roots

Queen Mary was formed from the merger of Queen Mary College and Westfield College, both members of the University of London.

The campus is historically the home of Queen Mary College which began life in 1887 as the People's Palace, a philanthropic centre for the intellectual and cultural improvement of east Londoners. Westfield College was founded in 1882 in Hampstead as a pioneering college for the higher education of women.

In 1995 the College merged again, this time with two leading medical colleges, to create Barts and The London School of Medicine and Dentistry within Queen Mary.

## Academic standards and research excellence

For postgraduate study to be a rewarding experience, it needs to take place in the context of a vibrant research community, reflecting the cutting-edge work of academic staff. Queen Mary provides such an experience and we take pride in the quality of our academic research. The 2001 Research Assessment Exercise (RAE) confirmed Queen Mary's excellence in a broad range of fields and the fact that research performance is continually improving. The College saw a 100 per cent increase in the number of departments achieving the highest 5 and 5\* ratings since the last RAE in 1996 – a total of 60 per cent of all departments in the College were in these bands. Over 80 per cent of staff



were judged to be in departments ranked as 4, 5 or 5\* meaning that they were of national or international excellence, compared to a national average of 64 per cent. To add to Queen Mary's achievement, we submitted one of the highest percentages of staff of any institution in the country for the RAE – 90 per cent of staff were selected for submission.

Queen Mary is in the top 100 in the latest world university rankings, published by *The Times Higher Education Supplement*. The College is also in Europe's top 50 universities, ranked at 41. The College was also ranked as one of London's top ten universities in *The Sunday Times University Guide 2006*. Queen Mary is also ranked in the top ten for both 'best student/staff ratio' and 'highest graduate starting salaries' – with average starting salaries of £20,902.

## The University of London

The federal University of London is a wide-ranging body made up of more than 40 institutions which together form the largest and most diverse university in Britain. The University of London has an outstanding international reputation founded on the quality of its teaching and research.

Although Queen Mary is self-governing, all the University of London's central facilities, including Senate House Library which contains 1.4 million volumes, are available to our students, adding to the richness of the environment for postgraduate study.

## An international community

Twenty per cent of our students are from overseas, representing more than 100 countries, so we are a truly multicultural community. We have links with a variety of international institutions, and exchanges are available to the United States and many European countries.

[www.qmul.ac.uk/international/index.html](http://www.qmul.ac.uk/international/index.html)



# London and the East End

Queen Mary is situated in the heart of the East End, an area of London with a rich past, but also one which has become one of the capital's most vibrant and exciting areas today. The East End is an area of immense contrast: busy street markets, followed by peaceful walks along Regent's Canal, lively ethnic cafés and restaurants within a stone's throw of modern bars and clubs, quaint terraced houses against a backdrop of Canary Wharf – Britain's tallest landmark – and historic Old Wapping traversed by the space-age Docklands Light Railway. But however you choose to spend your time out and about, there is no escaping the East End's kaleidoscope of different cultures and traditions.

Nearby Brick Lane has become one of London's most frequented places for curry houses, 24-hour bagel shops, internet cafés, 'happening' pubs and a wonderfully eclectic market. Columbia Road flower market attracts visitors from all over the capital, as do exhibitions at the Chisenhale and Whitechapel Art Galleries and the Museum of Childhood in Bethnal Green – a branch of the world-famous Victoria & Albert Museum. Studios in former warehouses in Spitalfields, Shoreditch and Hoxton have become home – residential and business – to designers, artists and musicians alike, while some of London's most avant-garde entertainers perform at the Jongleurs comedy club, ten minutes' walk from the College. Turn back towards the College and you'll find yourself passing by Mile End Park, where a green walkway along the canal takes you to a play arena, a terraced garden, and children's and sports parks.



# How to apply

## Online applications

For full details on how to apply please go to our web page [www.elec.qmul.ac.uk/study/msc/msc-stud.htm](http://www.elec.qmul.ac.uk/study/msc/msc-stud.htm) where you can download an application form and reference request forms.

If you are not able to access the Internet then you can request a hard copy of the application form from the Postgraduate Admissions Secretary. Please remember to give your full postal address.

Instructions for the completion of the application form are contained within the text of the form. Please read them carefully.

Additional information that needs to be sent with your application form:

- Two references (one must be an academic reference). See the reference request form at: [www.elec.qmul.ac.uk/study/msc/](http://www.elec.qmul.ac.uk/study/msc/)
- Full degree transcript
- Personal statement
- Evidence of English language proficiency (IELTS, TOEFL)

For English Language requirements see: [www.qmul.ac.uk/international/languagerequirements/index.html](http://www.qmul.ac.uk/international/languagerequirements/index.html)

## Sending in your application

Once you have completed all sections of the application form and included the additional information listed opposite you should send your application form to:

### Admissions and Recruitment Office

Queen Mary, University of London  
Mile End Road  
London  
E1 4NS  
Tel: +44 (0)20 7882 5533  
Fax: +44 (0)20 7882 5588  
email: [admissions@qmul.ac.uk](mailto:admissions@qmul.ac.uk)

### International Office

Queen Mary, University of London  
Mile End Road  
London  
E1 4NS  
Tel: +44 (0)20 7882 3066  
Fax: +44 (0)20 7882 5556  
email: [international-office@qmul.ac.uk](mailto:international-office@qmul.ac.uk)  
Please allow 28 days from receiving your application for us to consider your application and reply to you. We receive many applications for these programmes, and each one must be considered very carefully.

If you have not had a reply from us after 28 days, or if you have any additional queries, please contact the Postgraduate Admissions Secretary, to check on the progress of your application or try our list of frequently asked questions on our website: [www.elec.qmul.ac.uk/study/msc/faq.html](http://www.elec.qmul.ac.uk/study/msc/faq.html)

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For enquires regarding PhD Study please contact:

Mrs Theresa Willis  
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**Queen Mary**  
University of London

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The Department welcomes informal enquiries  
about any aspect of its Postgraduate programmes.  
For further information please contact:  
Postgraduate Admissions Secretary  
Electronic Engineering Department  
Queen Mary, University of London  
Mile End Road  
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E1 4NS  
Tel: +44 (0)20 7882 5346  
Fax: +44 (0)20 7882 7997  
email: [enquiries@elec.qmul.ac.uk](mailto:enquiries@elec.qmul.ac.uk)  
[www.elec.qmul.ac.uk](http://www.elec.qmul.ac.uk)