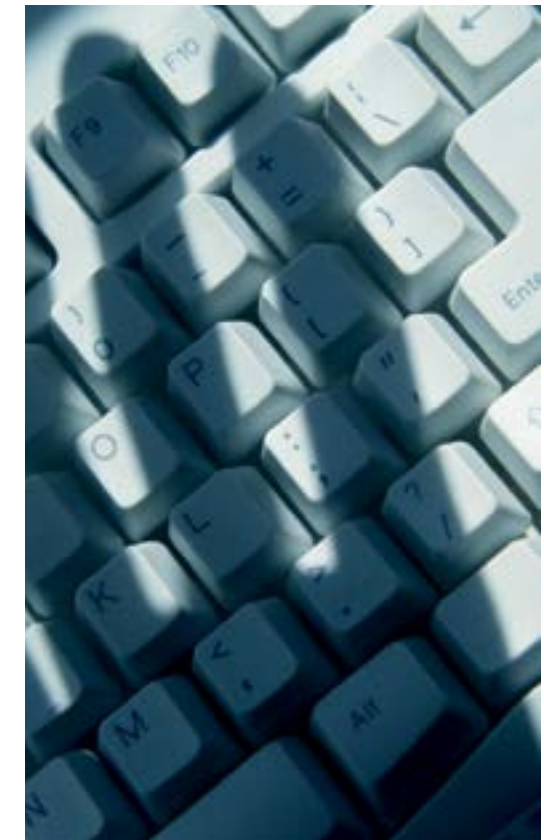


# ELECTRONIC, NETWORK AND COMPUTER ENGINEERING

The postgraduate courses offered by the Department of Engineering provide a unique mix of practical, hands-on learning and short course-based teaching. They have been designed to equip you with the job-related skills required to design, use and develop robotic systems, control systems, embedded systems, medical instrumentation devices, telecommunication systems, satellite and broadband technologies, wireless technologies, digital signal processing systems, network security systems, network communication systems and cloud technologies.

As an engineering student at the University of Westminster, you will benefit from some of the best teaching and facilities available. Our staff and courses are recognised for their excellence in teaching, and our state-of-the-art laboratories are dedicated to our students. Recent graduates have gone to work in fields as diverse as broadcasting, aerospace, chip design, mobile communications, medical electronics, embedded systems, network security, control systems and instrumentation and measurement.

Our former students are now working in companies such as ARM Holdings Ltd, BBC, Broadcom, British Aerospace, BSkyB, BT, Cisco, Dell, Fujitsu, GE, Google Enterprise, HP, Intel, IBM, Mitsubishi, Nokia, Orange, Panasonic, Philips, Rolls Royce, Sony, Virgin, Xilinx and other medium and smaller companies. Our research-active staff work in areas such as digital signal processing, ultra-low-power signal processor design, communication networks, distributed computing, microwave filters and circuit design, satellite navigation, and next-generation communication systems. Furthermore, staff are actively involved with industry and these links, together with the research activity, inform the teaching of these state-of-the-art MSc courses.



Our courses are accredited\* by the **Institution of Engineering and Technology**

\*The Electrical Engineering for Modern Sustainable Transport Systems MSc is currently seeking accreditation.



## ELECTRICAL ENGINEERING FOR MODERN SUSTAINABLE TRANSPORT SYSTEMS MSc

This course is designed in collaboration with transport industry partners to equip you to meet the needs of the rail and road industries. There is an increased demand for advancements in electrical, electronic, control and communication systems for transport, with a particular focus on themes like higher efficiency and sustainability, safety and driving assistance, position and traffic control for smart transport planning.

Modern electrical, electronic, control and communication systems for intelligent transport require today engineers with a combination of skills and solutions from cross-disciplinary abilities spanning electrical, electronic, control and communications. In this context, the overall aim of this Conversion Masters is to provide you with an enriching learning experience, and to enhance your knowledge and skill-base in the area of modern road vehicle and rail transport systems design.

This conversion course is intended both for engineers in current practice and for fresh honours graduates to facilitate their professional development, mobility and employability.

### Course content

This course aims to enhance your knowledge and skills in the area of intelligent and efficient transport systems design. You will develop advanced practical skills that will help you determine system requirements, select and deploy suitable design processes and use the latest specialist tool chains to test and/or prototype a device or algorithm.

The programme will help you acquire the cross-disciplinary skills and abilities that today are vital to be able to implement effective solutions for modern electrical, electronic and communication systems applied to intelligent transport. The broad range of disciplines covered by the course will enable you to enter a career that requires a cross-disciplinary approach with a practical skillset.

The subject areas covered within the course offer you an excellent launch pad which will enable you to enter into this ever expanding, fast growing and dominant area within the electrical engineering sector, and particularly in the area of intelligent and efficient transport systems. Furthermore, the course will provide the foundations required to re-focus existing knowledge and enter the world of multi-disciplined jobs.

**Length of course:** one year full-time or three years block release, starting in September

**Location:** Central London (Cavendish)

**Faculty:** Science and Technology

**Course fees and funding:** see course web page and [westminster.ac.uk/fees](http://westminster.ac.uk/fees)

**Entry requirements:** see page 216

For full and most up-to-date information, see course web page: [westminster.ac.uk/electrical-engineering-for-modern-sustainable-systems-msc](http://westminster.ac.uk/electrical-engineering-for-modern-sustainable-systems-msc)

### Core modules

- Electric Motors and Control for Transport Systems
- Power Conversion and Drives for Transport Systems
- Project
- Sensor, Data Acquisition and Communication for Transport Systems

### Professional recognition

This course is seeking accreditation from the IET – Institute of Engineering and Technology.

### Associated careers

The course provides the foundations required to re-focus existing knowledge and enter the world of multi-disciplined jobs.

Graduates can expect to find employment, for example, as electrical systems design engineers; control systems engineers; transport systems engineers; plant control engineers; electronic systems design engineer; communication systems design engineers; sensor systems engineers; computer systems engineer. examples of typical industries of employment can be: transport; automobile; aviation; electrical systems; electronic systems; assembly line manufacturers; robotics and home help; toy; communication systems; logistics and distribution; consumer industry; life-style industry; security and surveillance; petro-chemical.



## ELECTRONICS WITH EMBEDDED SYSTEMS MSc

The Electronics with Embedded Systems MSc aims to produce postgraduates with an advanced level of understanding in the design of real-time embedded systems for time-critical, power sensitive applications. Practical skillset development is emphasised throughout the course.

You will be taught the theory, protocol and the efficient use of both analogue and digital interfaces and sensor devices together with the principles of and use of Real-Time-Operating-Systems (RTOS). A key focus of the course will be in the implementation of power aware sustainable solutions, the course will provide an in-depth discussion of the underlying power management hardware sub-systems within modern MCUs and will show and use software techniques that will exploit these to reduce power consumption.

Broader consideration of embedded system design will be examined. In particular, the design process, risk assessment, product life-cycle, software life-cycle, safety and regulation will be investigated and used. It is intended that the course will re-focus your existing knowledge in software engineering and hardware engineering and deliver a set of enhanced practical skills that will enable you to fully participate in this multi-disciplined, fast expanding and dominating engineering sector of embedded systems.

### Course content

The course aims to teach advanced system level design, documentation and implementation approaches and provide practical experience in the development and prototyping of embedded systems using innovative product design methodologies, platforms and tools.

You will explore broader issues concerning the design and application of embedded systems including risk analysis, costs, operating environment, product and software life-cycle, regulation, quality insurance processes and design process choices for mission and safety critical embedded systems.

You will also get first-hand experience in the requirements analysis, design, build and test, together with the use of the latest development tools, by getting the student to prototype a stand-alone micro-controller application.



**Length of course:** one year full-time, starting in September

**Location:** Central London (Cavendish)

**Faculty:** Science and Technology

**Course fees and funding:** see course web page and [westminster.ac.uk/fees](http://westminster.ac.uk/fees)

**Entry requirements:** see page 216

For full and most up-to-date information, see course web page: [westminster.ac.uk/electronics-with-embedded-systems-msc](http://westminster.ac.uk/electronics-with-embedded-systems-msc)

### Core modules

- Electronics
- Embedded Systems
- Project

### Options modules

- Cloud Technologies
- Communication Networks
- Computer Networks
- Digital Signal Processing
- Medical Instrumentation
- Robotic and Control Systems
- Satellite and Broadband Communications
- Security
- System-on-Chip Technologies
- Telecommunications
- Wireless Technologies

### Professional recognition

This course is accredited by the IET – Institution of Engineering and Technology.

### Associated careers

Possible job titles that a successful graduate with the relevant background education and experience may aspire to include: electronic systems design engineer, robotic systems design engineer, embedded systems design engineer, system-on-chip embedded systems engineer, measurements and instrumentation engineer, medical electronic design engineer, control systems engineer, plant control engineer, computer systems engineer, software engineer.



# ELECTRONICS WITH MEDICAL INSTRUMENTATION MSc

The Electronics with Medical Instrumentation MSc aims to produce postgraduates with an ability to design and implement medical instrumentation based systems used for monitoring, detecting and analysing biomedical data. The course will provide ample opportunity to develop practical skill sets. You will also develop an in-depth understanding of the scientific principles and use of the underlying components such as medical transducers, biosensors and state-of-the-art tools and algorithms used to implement and test diagnostic devices, therapeutic devices, medical imaging equipment and medical instrumentation devices.

The course broadens the discussion of medical equipment and its design by investigating a range of issues including medical equipment regulation, user requirements, impacts of risk, regulatory practice, legislation, quality insurance mechanisms, certification, ethics and 'health and safety' assessment.

The course will enable you if you have an interest in medical electronics to re-focus your existing knowledge gained in software engineering, embedded systems engineering and/or electronic systems engineering and will deliver a set specialist practical skills and a deeper understanding of the underlying principles of medical physics.

As a graduate from this course you will be able to immediately participate in this multi-disciplined engineering sector of biomedical and medical instrumentation systems design.

## Course content

The course aims to teach advanced system level design, documentation and implementation approaches and provide practical experience in the development and prototyping of medical diagnostic equipment, medical instrumentation and therapeutic equipment using innovative solutions, platforms and tools.

You will explore broader issues concerning the design and application of medical equipment including risk analysis, costs, operating environment, user requirements, product and software life-cycle, regulation, quality insurance processes and design process choices for safety critical medical electronic systems.

You will also get first-hand experience in requirements identification, specification, design, build and test of a low-cost medical device.

**Length of course:** one year full-time, starting in September

**Location:** Central London (Cavendish)

**Faculty:** Science and Technology

**Course fees and funding:** see course web page and [westminster.ac.uk/fees](http://westminster.ac.uk/fees)

**Entry requirements:** see page 216

For full and most up-to-date information, see course web page: [westminster.ac.uk/electronics-with-medical-instrumentation-msc](http://westminster.ac.uk/electronics-with-medical-instrumentation-msc)

## Core modules

- Electronics
- Medical Instrumentation
- Project

## Option modules

- Cloud Technologies
- Communication Networks
- Computer Networks
- Digital Signal Processing
- Embedded Systems
- Robotic and Control Systems
- Satellite and Broadband Communications
- Security
- System-on-Chip Technologies
- Telecommunications
- Wireless Technologies

## Professional recognition

This course is accredited by the IET – Institute of Engineering and Technology.

## Associated careers

Possible job titles that a successful graduate with the relevant background education and experience may inspire to include: electronic systems design engineer, robotic systems design engineer, embedded systems design engineer, system-on-chip embedded systems engineer, measurements and instrumentation engineer, medical electronic design engineer, control systems engineer, plant control engineer, computer systems engineer, software engineer.



# ELECTRONICS WITH ROBOTIC AND CONTROL SYSTEMS MSc

The Electronics with Robotic and Control Systems MSc aims to produce postgraduates with a strong practical skill base that will enable them to model, analyse, design and prototype smart robotic sub-systems. Specialist knowledge and practical skillsets will be taught, extensively developed and practiced in the areas of control systems and the analysis, categorisation and design of robotic systems that facilitate movement with multiple degrees of freedom.

The knowledge and skillsets taught are key enabling skillsets used to implement devices for applications such as security drones, warehouse robots, medical robots and more humanoid like robots.

The course will re-focus and enhance existing knowledge in the areas of software engineering, electronic engineering and real-time embedded systems to enable you to participate in the fast expanding and exciting sector of industrial and consumer robotic systems.

## Course content

The course teaches advanced system level design, documentation and implementation approaches and provides practical experience in the development and prototyping of electronic systems in the context of robotics using innovative product design methodologies, platforms and tools.

You will explore broader issues concerning the adoption and processes of robotic systems and their cognitive systems including legislation for robotic devices, safety considerations and product life cycle.

You will also develop skills in the deployment and programming of real-time control systems and smart instrumentation in robotic systems by providing first-hand experience in prototyping a robotic system.



**Length of course:** one year full-time, starting in September

**Location:** Central London (Cavendish)

**Faculty:** Science and Technology

**Course fees and funding:** see course web page and [westminster.ac.uk/fees](http://westminster.ac.uk/fees)

**Entry requirements:** see page 216

For full and most up-to-date information, see course web page: [westminster.ac.uk/electronics-with-robotic-and-control-systems-msc](http://westminster.ac.uk/electronics-with-robotic-and-control-systems-msc)

## Core modules

- Electronics
- Project
- Robotic and Control Systems

## Option modules

- Cloud Technologies
- Communication Networks
- Computer Networks
- Digital Signal Processing
- Embedded Systems
- Medical Instrumentation
- Satellite and Broadband Communications
- Security
- System-on-Chip Technologies
- Telecommunications
- Wireless Technologies

## Professional recognition

This course is accredited by the IET – Institute of Engineering and Technology.

## Associated careers

Possible job titles that a successful graduate with the relevant background education and experience may aspire to include: electronic systems design engineer, robotic systems design engineer, embedded systems design engineer, system-on-chip embedded systems engineer, measurements and instrumentation engineer, medical electronic design engineer, control systems engineer, plant control engineer, computer systems engineer, software engineer.





## ELECTRONICS WITH SYSTEM-ON-CHIP TECHNOLOGIES MSc

The Electronics with System-On-Chip Technologies MSc will help you develop an advanced understanding of the various routes to implementing systems-on-chip (SoC) and get hands-on experience of the design of such systems using several approaches to their implementation.

The core aim of the course is to become “silicon qualified” by providing you with a complete SoC design experience by setting a framework of activities that allow you to use industry-standard Computer-Aided-Engineering (CAE) software tools for the fast and accurate design, simulation and verification of integrated circuits.

### Course content

The course aims to teach advanced system level design, documentation and implementation approaches and provide practical experience in the development of system-on-chip solutions using popular design methodologies and tools chains used in industry.

You will explore broader issues concerning the design and implementation of system-on-chip solutions and their final application areas including quality insurance, ethics, risk analysis, regulation, legislation, intellectual property rights and lifecycle.

You will become “silicon qualified” thanks to a complete SoC design experience and a framework of activities that will allow you to use industry-standard Computer-Aided-Engineering (CAE) software tools for the fast and accurate design, simulation and verification of integrated circuits.

**Length of course:** one year full-time, starting in September

**Location:** Central London (Cavendish)

**Faculty:** Science and Technology

**Course fees and funding:** see course web page and [westminster.ac.uk/fees](http://westminster.ac.uk/fees)

**Entry requirements:** see page 216

For full and most up-to-date information, see course web page: [westminster.ac.uk/electronics-with-system-on-chip-technologies-msc](http://westminster.ac.uk/electronics-with-system-on-chip-technologies-msc)

### Core modules

- Electronics
- Project
- System-on-Chip Technologies

### Option modules

- Cloud Technologies
- Communication Networks
- Computer Networks
- Digital Signal Processing
- Embedded Systems
- Medical Instrumentation
- Robotic and Control Systems
- Satellite and Broadband Communications
- Security
- Telecommunications
- Wireless Technologies

### Professional recognition

This course is accredited by the IET – Institute of Engineering and Technology.

### Associated careers

Possible job titles that a successful graduate with the relevant background education and experience may inspire to include: electronic systems design engineer, robotic systems design engineer, embedded systems design engineer, system-on-chip embedded systems engineer, measurements and instrumentation engineer, medical electronic design engineer, control systems engineer, plant control engineer, computer systems engineer, software engineer.



## TELECOMMUNICATIONS WITH DIGITAL SIGNAL PROCESSING MSc

The Telecommunications with Digital Signal Processing MSc aims to produce postgraduates with an advanced understanding of communication systems with special emphasis on the application of digital signal processing, which supports and pervades all modern communication systems.

It makes extensive use of MATLAB and Simulink simulation tools to design digital filters that perform noise reduction, signal shaping and channel modelling. Adaptive filters, matched filters, reception and detection algorithms essential for digital communications are also modelled and tested.

### Course content

The course aims to update and extend your knowledge and capabilities in wireless and wired communication systems and their standards. It will enhance to an advanced level your understanding of the theoretical principles underpinning digital signal processing and how it enables digital communication systems to be realised.

You will develop your competence in dealing with the issues specific to the design of communications systems and your understanding of the problems and challenges associated with the implementation of both fixed and mobile wireless communication systems.

You will learn how to design and build digital filters to perform signal shaping and for use as matched filters in white noise and in pole-only noise. The course will also teach you how to analyse and implement key DSP transmission, reception and detection algorithms used in modern-day telecommunications.



**Length of course:** one year full-time, starting in September

**Location:** Central London (Cavendish)

**Faculty:** Science and Technology

**Course fees and funding:** see course web page and [westminster.ac.uk/fees](http://westminster.ac.uk/fees)

**Entry requirements:** see page 216

For full and most up-to-date information, see course web page: [westminster.ac.uk/telecommunications-with-signal-processing-msc](http://westminster.ac.uk/telecommunications-with-signal-processing-msc)

### Core modules

- Digital Signal Processing
- Project
- Telecommunications

### Option modules

- Cloud Technologies
- Communication Networks
- Computer Networks
- Electronics
- Embedded Systems
- Medical Instrumentation
- Robotic and Control Systems
- Satellite and Broadband Communications
- Security
- System-on-Chip Technologies
- Wireless Technologies

### Professional recognition

This course is accredited by the IET – Institute of Engineering and Technology.

### Associated careers

Successful graduates are likely to go into one of the following roles: telecommunication engineer, electronic systems design engineer, robotic systems design engineer, embedded systems design engineer, measurements and instrumentation engineer, medical electronic design engineer, control systems engineer, computer systems engineer, software engineer.



# TELECOMMUNICATIONS WITH SATELLITE AND BROADBAND TECHNOLOGIES MSc

The Telecommunications with Satellite and Broadband Technologies MSc aims to prepare professionals with an advanced understanding of communication systems utilising satellite and broadband elements.

## Course content

The course will enhance your understanding of the theoretical principles underpinning digital communication systems, giving special attention to the problems and challenges associated with the implementation of both fixed and mobile wireless communication systems.

Leading-edge satellite and broadband systems utilising modern architectures are central to this programme of study. The course will develop your competence in dealing with the issues specific to the design of communications systems and your understanding of the problems and challenges associated with the implementation of both fixed and mobile wireless communication systems.



**Length of course:** one year full-time, starting in September

**Location:** Central London (Cavendish)

**Faculty:** Science and Technology

**Course fees and funding:** see course web page and [westminster.ac.uk/fees](http://westminster.ac.uk/fees)

**Entry requirements:** see page 216

For full and most up-to-date information, see course web page: [westminster.ac.uk/telecommunications-with-satellite-and-broadband-technologies-msc](http://westminster.ac.uk/telecommunications-with-satellite-and-broadband-technologies-msc)

## Core modules

- Project
- Satellite and Broadband Communications
- Telecommunications

## Option modules

- Cloud Technologies
- Communication Networks
- Computer Networks
- Digital Signal Processing
- Electronics
- Embedded Systems
- Medical Instrumentation
- Robotic and Control Systems
- Security
- System-on-Chip Technologies
- Wireless Technologies

## Professional recognition

This course is accredited by the IET – Institute of Engineering and Technology.

## Associated careers

Successful graduates are likely to go into one of the following roles: telecommunication engineer, electronic systems design engineer, robotic systems design engineer, embedded systems design engineer, measurements and instrumentation engineer, medical electronic design engineer, control systems engineer, computer systems engineer, software engineer.



# TELECOMMUNICATIONS WITH WIRELESS TECHNOLOGIES MSc

The Telecommunications with Wireless Technologies MSc aims to produce postgraduates with an advanced understanding of communication systems with a focus on wireless technologies. It fosters the student's ability to analyse, design and build RF and microwave systems for wireless communication systems.

Special emphasis is placed on enhancing your ability to model the behaviour of wireless systems from circuits, filters and antennas, and to utilise these models to guide the design and implementation of a variety of communication techniques.

## Course content

The course is designed to update and extend your knowledge and capabilities in wireless and wired communication systems and their standards, and to enhance your understanding of the theoretical principles underpinning digital signal processing and how it enables digital communication systems to be realised.

You will develop an understanding of the problems and challenges associated with the implementation of both fixed and mobile wireless communication systems. You will learn how to design and build digital filters to perform signal shaping and how to analyse and implement key DSP transmission, reception and detection algorithms used in modern-day telecommunications.



**Length of course:** one year full-time, starting in September

**Location:** Central London (Cavendish)

**Faculty:** Science and Technology

**Course fees and funding:** see course web page and [westminster.ac.uk/fees](http://westminster.ac.uk/fees)

**Entry requirements:** see page 216

For full and most up-to-date information, see course web page: [westminster.ac.uk/telecommunications-with-wireless-technologies-msc](http://westminster.ac.uk/telecommunications-with-wireless-technologies-msc)

## Core modules

- Project
- Telecommunications
- Wireless Technologies

## Option modules

- Cloud Technologies
- Communication Networks
- Computer Networks
- Digital Signal Processing
- Electronics
- Embedded Systems
- Medical Instrumentation
- Robotic and Control Systems
- Satellite and Broadband Communications
- Security
- System-on-Chip Technologies

## Professional recognition

This course is accredited by the IET – Institute of Engineering and Technology.

## Associated careers

Successful graduates are likely to go into one of the following roles: telecommunication engineer, electronic systems design engineer, robotic systems design engineer, embedded systems design engineer, measurements and instrumentation engineer, medical electronic design engineer, control systems engineer, computer systems engineer, software engineer.

