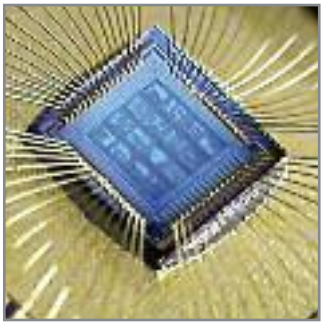
University of Southampton

NEW FROM 2009

MEng Electronic Engineering with Mobile and Secure Systems



This new four-year degree, based on our elite Master of Engineering programme in Electronic Engineering, will provide you with the opportunity to assimilate the wide range of disciplines required for a challenging career in electronics and information technology, and to specialize in two of the most exciting areas of emerging technology.

Developed with input from ARM, BT, IBM, NXP, Oracle and Zarlink, this programme prepares you for a wide range of careers across high-tech business and industry.

In this new programme we take a broad view of **mobile systems**. The course encompasses handheld devices, mobile robots, telemedicine and mobile software agents. All are enabled by a mix of low-power, energy harvesting and wireless technologies.

Your experience of **secure systems** will be similarly broad, ranging over penetration testing of network servers, threats such as viruses, spyware and rootkits and consumer technologies including RFID, Oyster and chip and PIN. Coverage of both the underlying theory coupled with hands-on experience will ensure that you develop real expertise.

The engineering of both mobile and secure systems depends on core concepts in reliability, testing, validation and verification. You will learn to make use of a full range of CAD and simulation tools to exercise your designs before building them.

Year 1

Your first year covers core skills in digital and analogue electronic systems, and programming in C and C♯, and underlying maths and science. In the electronics laboratory you will work with microcontroller systems in C, programmable logic in SystemVerilog and a variety of analogue discrete and op-amp circuits, designing your own PCB and simulating systems using Matlab, Spice and Verilog. A special feature of the course is the dedicated additional laboratory module in the second half of the year. You will program your own multi-user hand-held games using a MEMS controller (like the Nintendo Wii) and develop robot systems based on the iRobot and servo-controlled robot arms.

MEng ELECTRONIC ENGINEERING WITH MOBILE AND SECURE SYSTEMS

Year 2

Your core electronics skills are further developed in the second year with modules in digital design, communications and control. The software development module lets you build your own GPS-based geographical application in C# on PDAs. The electronics laboratories include experiments on novel solar photovoltaic cells developed in Southampton, control of an upside-down pendulum, optical fibre amplifiers (also invented in Southampton) and the design of analogue circuits, and digital modulation systems. There is another specialist laboratory dedicated to mobile and secure systems students. This concentrates on security, with experiments in a dedicated (and isolated) penetration testing laboratory and further investigations of the technology behind such consumer security systems as chip and PIN and ePassport.

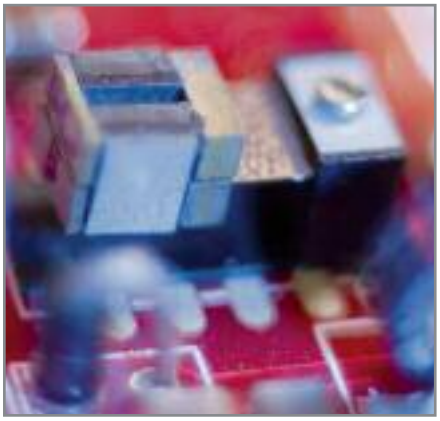
Year 3

Your Individual Project runs throughout your third year. You are directly supervised by one of our leading researchers as you investigate, design and build a novel secure or mobile system.

In the third year, you also have access to a wide range of options, including:

- Advanced Computer Architecture
- Analogue Electronics
- Computer Networks
- Control Systems Design
- Critical Systems
- Digital Control System Design
- Digital Transmission
- Image Processing
- Industrial Law for Engineers
- Integrated Circuit Design
- Intelligent Algorithms
- Languages: Arabic, Chinese, French, German, Italian, Portuguese or Spanish
- Machine Learning
- Management
- Mathematics: Complex Variables and Transforms, Operational Research, Optimisation or Partial Differential Equations
- New Venture Planning
- Principles of Computer Graphics
- Radio Communications
- Signal Processing
- Software Quality Assurance and Project Management
- Speech Processing

You will also take core modules in Digital System Design, Management, Real-time Computing and Embedded Systems and a special module in Mobile and Secure Systems which covers advanced security technology.



Year 4

In your final year, your key activity is the Group Design Project in which, over nine weeks, you will be part of a team of four students working with an industrial customer to design and build a useful mobile or security product. Advanced modules in Year 4 include:

- Advanced Computer Graphics
- Advanced Design
- Advanced Machine Learning
- Analogue and Mixed Signal CMOS Design
- Applications of Security in Information Technology
- Biologically-Inspired Robotics
- Computer Vision
- Cryptography and Data Compression
- Digital Integrated Circuit Design
- Distributed Computing Systems
- Electronic Measurement Techniques
- Evolution of Complexity
- Formal Design of Systems
- Instrumentation and Sensors
- Integrated RF Transceiver Design
- Internet Law: Privacy, Crime, Security
- Medical Electrical and Electronic Technologies
- Music and Audio Technology
- Numerical Methods
- Personal Multimedia Communications
- Radio Communications Engineering
- Radio Communications Networks and Systems
- Real-Time Systems Design
- Statistics for Engineering Systems
- VLSI Design Project
- Wireless Networks

In addition, you will conduct an Individual Research Review, in which you will carry out a critical evaluation of the current research in an advanced area of the discipline.