UNIVERSITY OF LIVERPOOL

Computer Science and Electronic Engineering MEng

COURSE DETAILS

- A level requirements: AAB
- UCAS code: GHK6
- Study mode: Full-time
- Length: 4 years

KEY DATES

- Apply by: 25 January 2023
- Starts: 25 September 2023

Course overview

Smart devices shape the way we live, both now and in the future. Study Computer Science and Electronic Engineering at Liverpool and ensure you're a part of the rapid technological development taking place globally.

INTRODUCTION

This programme combines the core elements of electronic engineering with those of computer science, which is the intellectual discipline underlying all aspects of software development.

Combining elements from these two disciplines will equip you with an added breadth of knowledge and greater specialisation. Our graduates are in demand because of their fluency both in the language of electronic engineers, as well as that of computer scientists, enabling you to bridge the gap between software systems and the real world.

You'll be taught by staff who are actively engaged in research, most with international reputations, ensuring you'll receive the most up-to-date and commercially-relevant education.

The MEng degree programme provides added depth to the BEng (Hons), and you will study a greater range of subjects. It is the best preparation for either graduate-level employment or undertaking a research degree. It is also a quicker route to Chartered Engineer status.

WHAT YOU'LL LEARN

- A broad educational background in electronics and computing
- Critical thinking
- Teamwork
- The practical application of concepts and theory, always with awareness of their relevance to the real world
- How to take projects from conception, through to design, implementation and operation
- Use of industry standard tools, technologies and working methods

---

ACCREDITATION

Accredited by the Institute of Engineering and Technology (IET)

Course content

Discover what you'll learn, what you'll study, and how you'll be taught and assessed.

YEAR ONE

During year one you will be introduced to the fundamentals of electronics as well as the underlying principles and theory of computing. Your lecture modules will cover the core subjects of electronic circuits, digital electronics, Java programming and data structures.

In addition, you will take modules such as mathematics and spend one day a week doing practical work in both the computer and electronics laboratories. This will give you excellent practical and transferable skills vital for subsequent years of the programme and invaluable in your future career.

COMPULSORY MODULES

ELECTRICAL CIRCUITS & SYSTEMS (ELEC142)

Credits: 15 / Semester: whole session

Fundamental course on circuit analysis techniques.

DIGITAL & INTEGRATED ELECTRONICS DESIGN (ELEC143)

Credits: 15 / Semester: semester 2

The module comprises of two parts Digital Electronics and Integrated Electronics. For the Digital part, students are provided with the knowledge of number systems, laws of Boolean algebra and introduced to the basic methods for designing combinational and sequential logic circuits. For the Integrated part, students are introduced to various silicon electronic devices and provided with the opportunity to understand the basic principles of silicon microelectronics designs processes including designing layouts for simple circuit.

ELECTRONIC CIRCUITS (ELEC104)

Credits: 15 / Semester: whole session

This module aims to introduce students to fundamental electronic devices (diodes and transistors), and how these devices are used in amplifier and switching circuits. The module is assessed via two laboratory sessions (20%) and two coursework online assignments (80%).

ENGINEERING SKILLS (ELEC171)

Credits: 15 / Semester: whole session

Introductory module that teaches practical skills for electrical engineering students, focusing on basic laboratory skills. The practical skills are linked with theory presented in other Year 1 modules including those on analogue and digital electronics, and electromagnetics. The module includes an introduction to a technical programming language (MATLAB) and an introduction to the ethical and sustainability issues that face modern engineers.

OBJECT-ORIENTED PROGRAMMING (COMP122)

Credits: 15 / Semester: semester 2

The intention of COMP122 is to introduce students to the concepts and methodology of object-oriented programming using the Java programming language. Topics covered include hierarchical structures, polymorphism, collections and iterators, exception handling, and graphical user interface design. Basic concepts of software design methodology, testing, and version control are also included in the module. It is normally expected that students have prior programming experience.

MATHEMATICS A FOR ELECTRICAL ENGINEERS (ELEC191)

Credits: 15 / Semester: semester 1

Mathematics for students registered in the Department of Electrical Engineering and Electronics, to support their technical modules.

MATHEMATICS B FOR ELECTRICAL ENGINEERS (ELEC192)

Credits: 15 / Semester: semester 2

Basic mathematics for students registered in the Department of Electrical Engineering and Electronics, concentrating on those groups of students who have, on the average, weaker preparation for University level Maths such as entrants with the BTEC qualification (but not limited to that group). Exam practice is another important component of this module. This module follows on from ELEC191

OPTIONAL MODULES

INTRODUCTION TO PROGRAMMING (COMP101)

Credits: 15 / Semester: semester 1

The module provides an introduction to procedural programming using current language platforms. The module incorporates program design, problem solving, the importance of maintainable, robust software and testing as well as introducing procedural language main programming constructs. Students gain practical experience with program design, programming and testing during weekly laboratory sessions.

PROGRAMMING LANGUAGE PARADIGMS (COMP105)

Credits: 15 / Semester: semester 1

This module is for students that already have some programming skills. Students will learn about the two main programming paradigms: imperative programming and functional programming. Since most introductory programming courses teach imperative programming, this module will focus on the functional paradigm. Students will learn how to program in Haskell, a popular functional programming language. They will learn how to formulate programs in a functional way, and the common techniques and idioms that are used to solve problems in functional programming.

Programme details and modules listed are illustrative only and subject to change.

YEAR TWO

The second year builds on the first with core modules in software engineering, database development, digital electronics, and signals and communication systems. More time is spent in the electronics laboratory doing practical work to consolidate the knowledge learnt in lectures and partaking in an extended team project.

COMPULSORY MODULES

COMMUNICATION SYSTEMS (ELEC202)

Credits: 7.5 / Semester: semester 2

This module will teach fundamental knowledge on communication systems.

DATABASE DEVELOPMENT (COMP207)

Credits: 15 / Semester: semester 1

This module introduces students to the problems arising from databases, including concurrency in databases, information security considerations and how they are solved; the integration of heterogeneous sources of information and the use of semi-structured data; non-relational databases and the economic factors involved in their selection and to techniques for analysing large amounts of data, the security issues and commercial factors involved with them.

DIGITAL ELECTRONICS & MICROPROCESSOR SYSTEMS (ELEC211)

Credits: 15 / Semester: semester 2

This module covers two areas. In digital electronics, it covers topics which build on the basic knowledge gained in the first year digital electronics programme and learning some hardware description language (HDL) programming. In microprocessor systems, it introduces the topic from the basics describing how a microprocessor works and learning some assembly language programming.

ELECTRONIC CIRCUITS AND SYSTEMS (ELEC271)

Credits: 15 / Semester: semester 2

The module concerns the understanding of how electronic amplifier circuits work and some basic ideas on how to design them. This requires an appreciation of linear small-signal equivalent circuits based on device physics and how to use them to assist the design process. Students will also learn how to break down complex circuits into simpler building blocks and how these blocks in turn, represented by linear equivalent circuits, can be combined to achieve the desired functionality. How negative feedback can be applied to produce high performance, stable circuits with high tolerance. The current state of the art is emphasised together with a historical perspective, noting some of the pioneers in the field.

INSTRUMENTATION & CONTROL (ELEC207)

Credits: 15 / Semester: whole session

This module covers the design and operation of instrumentation devices as well as the design of continuous time control systems.

PROJECT, PROBLEM SOLVING & INDUSTRIAL AWARENESS (ELEC222)

Credits: 7.5 / Semester: whole session

The aim of this module is to provide students with practical work which underpins, confirms and gives application focus for academic study, while testing a wide range of skills.

SIGNALS AND SYSTEMS (ELEC270)

Credits: 15 / Semester: semester 1

Introduces continuous and discrete signal operations and analysis, the frequency domain and spectral analysis, including Fourier Series and Fourier, Laplace and z Transforms. Introduces system quantification and analysis, including pole-zero plots, feedback, basic stability criteria and block diagrams.

SOFTWARE ENGINEERING I (COMP201)

Credits: 15 / Semester: semester 1

This module deals with the issues associated with the analysis, design, implementation and testing of significant computing systems (that is, systems that are too large to be designed and developed by a single person).

DISTRIBUTED SYSTEMS (COMP212)

Credits: 15 / Semester: semester 2

This module covers the concepts of distributed systems and the underlying principles of distributed computing and discusses the issues and various solutions proposed in the distributed computing community. Specifically, communication and broadcast, election algorithms, synchronization and concurrency, fault-tolerance and security related issues will be discussed in the lectures. Where applicable practical implementations of the concepts will be introduced.

Programme details and modules listed are illustrative only and subject to change.

YEAR THREE

You will undertake an extended individual project during this year. Recent projects have included real-time GPS tracking of a vehicle fleet by mobile phones, and mobile multi-user dungeon (MUD) game using SMS messaging. You can choose lecture-based modules from both Electronic Engineering and Computer Science.

COMPULSORY MODULES

MENG PROJECT (ELEC440)

Credits: 30 / Semester: whole session

Individual project for MEng students

APPLICATION DEVELOPMENT WITH C++ (ELEC362)

Credits: 15 / Semester: semester 1

This course will help student to understand the object-oriented design concept and to gain knowledge and practical skills of C++ as an advanced programming language.

On successful completion of the module, students should be able to understand/design/develop C++ applications (both console and GUI-based) with a specific emphasis on developing GUI-based applications.

EMBEDDED COMPUTER SYSTEMS (ELEC370)

Credits: 15 / Semester: semester 1

In this module students gain an understanding of the construction and operation of embedded computer systems and their components. Furthermore they gain an understanding of how computer performance is dependent upon the design of computer architectures and sub-circuits.

HONOURS YEAR COMPUTER SCIENCE PROJECT (COMP390)

Credits: 30 / Semester: whole session

The honours year project gives students the opportunity to study independently on an extended piece of work under the guidance of an academic supervisor. Many diverse projects are available for selection, inspired by the research of the department. Each student is encouraged to propose a project in an area that meets their own personal needs, whether it's related to their career aspirations or simply an interesting academic pursuit. The project consolidates learning from the taught part of the course, with authentic assessment that is designed to encourage communication of complex ideas via a range of media. On completion of the module, students will have the confidence to pursue their career, having developed proficiency in their chosen topic and an ability to communicate clearly and effectively.

NEURAL NETWORKS (ELEC320)

Credits: 7.5 / Semester: semester 2

Introduction to neural network theory, applications and artificial intelligence.

OPTIONAL MODULES

ADVANCED MODERN MANAGEMENT (MNGT352)

Credits: 7.5 / Semester: semester 1

ANTENNAS (ELEC312)

Credits: 7.5 / Semester: semester 2

This module is to introduce antenna theory and applications.

Students will learn the fundamentals of the antenna theory and design, and understand the most important antennas.

DIGITAL AND WIRELESS COMMUNICATIONS (ELEC377)

Credits: 15 / Semester: semester 1

This module provides an extensive coverage of the theory and practice of digital and wireless communication systems, to allow the students to be able to design and develop digital and wireless communication systems, with an awareness of all the main factors involved and of existing and emerging technologies.

DIGITAL CONTROL AND OPTIMISATION (ELEC303)

Credits: 15 / Semester: semester 2

A broad range of topics are covered. Case studies and example tutorials emphasise the practical aspects of digital control design and optimisation.

DRIVES (ELEC331)

Credits: 7.5 / Semester: semester 1

This module introduces students to a range of electrical machines (AC & DC) using the concepts of rotating magnetic fields and co-energy. This allow students to model their behaviour and select the most appropriate electrical machine for their application.

ELECTROMAGNETIC COMPATIBILITY (ELEC382)

Credits: 7.5 / Semester: semester 2

This module is aimed at developing an in-depth understanding of EMC, the scope of EMC, standards, typical EMC problems and solutions.

Based on the theory, the students are expected to be able to analyse and solve EMC problems, and also use relevant equipment for conducting EMC measurements.

ELECTRONICS FOR INSTRUMENTATION & COMMUNICATIONS (ELEC317)

Credits: 15 / Semester: semester 2

The module introduces basic concepts of the electronic circuits required for instrumentation and communication. It deals with a wide range of amplifiers and the problems that might be encountered in a actual application. It also deals with circuitry needed in communication for example oscillators and phase-locked-loops.

FORMAL METHODS (COMP313)

Credits: 15 / Semester: semester 2

IMAGE PROCESSING (ELEC319)

Credits: 7.5 / Semester: semester 1

This module covers the fundamentals of how images are generated, represented, compressed and processed to extract features of interest.

INTRODUCTION TO COMPUTATIONAL GAME THEORY (COMP323)

Credits: 15 / Semester: semester 1

This module is an introduction to the area of algorithmic game theory, which is a novel area in the intersection of economics and computer science. It provides tools for dealing with and analysing problems related to applications motivated by the Internet. Examples involve various Internet auctions and e-commerce systems, like, Google's sponsored search, Ebay auctions, recommendation systems, etc.

MULTI-AGENT SYSTEMS (COMP310)

Credits: 15 / Semester: semester 2

PHOTONICS AND OPTICAL INFORMATION SYSTEMS (ELEC313)

Credits: 15 / Semester: semester 1

The aims of this module are: To introduce students to the fundamental principles of opto/electronic systems for the transfer of information. To introduce the duality of light as both wave and ray. To show intensity and phase related optical principles. To demonstrate optical information transfer through a number of applications.

RF ENGINEERING AND APPLIED ELECTROMAGNETICS (ELEC311)

Credits: 7.5 / Semester: semester 1

This module will introduce students to the fundamental concepts of high frequency electromagnetics, and circuit design techniques that must be considered in the design of high frequency circuits and systems.

Students will learn in-depth knowledge of transmission lines, the Smith Chart, standing waves and scattering parameters etc.

After this module, students will be able to appreciate the microwave and RF circuit design for contemporary communication systems.

SIGNAL PROCESSING AND DIGITAL FILTERING (ELEC309)

Credits: 15 / Semester: semester 2

This module is aimed at developing the basic framework for signal processing and to demonstrate its applications. Also, the module provides students with a good understanding of the types, behaviours and design of FIR and IIR digital filters.

Teaching and learning are provided through a variety of means like formal lectures, problem sheets, supplementary questions, along with formative and summative online tests (through CANVAS, the electronic VLE system).

Assessment is carried out by means of two assignments and final (written) exam.

SOFTWARE ENGINEERING II (COMP319)

Credits: 15 / Semester: semester 1

The overall aim of this module is to introduce students to a range of advanced, near-research level topics in contemporary software engineering. The actual choice of topics will depend upon the interests of the lecturer and the topics current in the software engineering research literature at that time. The course will introduce issues from a problem (user-driven) perspective and a technology-driven perspective where users have new categories of software problems that they need to be solved, and where technology producers create technologies that present new opportunities for software products. It will be expected that students will read articles in the software engineering research literature, and will discuss these articles in a seminar-style forum.

TECHNOLOGIES FOR E-COMMERCE (COMP315)

Credits: 15 / Semester: semester 2

YEAR FOUR

During this year, students continue compulsory modules, choose further options, and undertake an extended group project. The project would normally require both hardware and software components.

COMPULSORY MODULES

ADVANCED ALGORITHMIC TECHNIQUES (COMP523)

Credits: 15 / Semester: semester 2

This module aims to teach basic algorithmic methods for design and analysis of algorithms.

COMMUNICATIONS NETWORKS (ELEC461)

Credits: 15 / Semester: semester 2

This module introduces the principles of communications networks, thier components and protocols.

Students are provided with basic concepts about network architectures, the reference models used to describe them, the major protocols used at each communications layer, and the tools to analyse the performance of link layer, median access control, Network and Transport layer protocols.

The main protocols for routing packets over the Internet are also introduced, along with an overview of the packet switching architectures used in the core of today's routers.

DIGITAL SYSTEM DESIGN (ELEC473)

Credits: 15 / Semester: whole session

This module introduces students to the digital design techniques used in industry and research. The methods for describing digital systems using the Verilog Hardware Description Language (HDL) are introduced. Students will examine the operation of the MIPS Processor and will also be introduced to Altera's NIOS-II Processor. The module is assessed via four assignments and two class tests. Altera's Quartus package is used for sythesising the digital systems.

INFORMATION THEORY AND CODING (ELEC415)

Credits: 7.5 / Semester: semester 2

This module is aimed to provide an extensive overview of the information theory and coding. Different source codes and channel codes are discussed. Cryptography is also covered.

KNOWLEDGE REPRESENTATION (COMP521)

Credits: 15 / Semester: semester 1

The module introduces formalisms to reason about knowledge and information. One such formalism is epistemic logic, where one can explicitly represent of what an agent (robot, human, system) knows about the world or about others, as in "I have sent a message, how do I know that it has been received, and that the receiver knows I know this?"

MANAGEMENT OF DESIGN (MNGT413)

Credits: 7.5 / Semester: semester 2

MENG GROUP PROJECT (EEE) (ELEC450)

Credits: 30 / Semester: whole session

Final Group Project for MEng students

OPTIONAL MODULES

ADVANCED EMBEDDED SYSTEMS (ELEC470)

Credits: 15 / Semester: whole session

This module covers material for understanding and designing advanced embedded computer systems.

Key topics include computer architecture, low-power design, hardware/software co-design and synthesis techniques.

The module prepares students for research and employment in the leading research groups and embedded system companies in the world.

ADVANCED SIGNAL PROCESSING (ELEC474)

Credits: 15 / Semester: whole session

The module will teach students advanced techniques of signal processing.

COMPUTATIONAL INTELLIGENCE (COMP575)

Credits: 15 / Semester: semester 2

Biologically inspired optimisation and introduction to neural networks for artificial intelligence.

DIGITAL AND WIRELESS COMMUNICATIONS (ELEC477)

Credits: 15 / Semester: semester 1

This module provides an extensive coverage of the theory and practice of digital and wireless communication systems, to allow the students to be able to design and develop digital and wireless communication systems at an advanced level, with an awareness of all the main factors involved and of existing and emerging technologies.

RENEWABLE ENERGY & SMART GRID (ELEC435)

Credits: 15 / Semester: semester 2

Core module for MSc Energy and Power Systems about knowledge of renewable energy source, energy conversion, smart grid and micro grid

HIGH VOLTAGE ENGINEERING (ELEC407)

Credits: 15 / Semester: semester 2

This is an advanced, research led course on high-voltage engineering and electrical insulation. It covers the theories, principles and test methods in relation to the operation of power network and electrical apparatuses. In addition to standard lectures students will be given opportunities to visit the high power test laboratory in the Department which is unique among UK universities and a transmission/distribution substation to equip them with first-hand experience in high voltage testing and power delivery.

INTEGRATED CIRCUITS - CONCEPTS AND DESIGN (ELEC472)

Credits: 15 / Semester: whole session

To understand the reasons for the predominance and importance of silicon-based microelectronics to the semiconductor industry. To understand how materials, devices and circuit issues are inter-related and exploited to make the microchips that underpin the information age. To gain experience in using a simulation tool (Multisim) in the design, simulation and analysis of digital and analogue circuit designs. To prepare students for entering the Silicon semiconductor industry.

MEASUREMENT, MONITORING AND SENSORS (ELEC421)

Credits: 15 / Semester: whole session

The module aims to provide an understanding of measurment and monitoring and the sensors that are used in power systems. It focusses on a limited number of examples in order to demonstrate the problems encountered in deploy measurement and monitoring systems.

MICROPROCESSOR SYSTEMS (ELEC422)

Credits: 15 / Semester: semester 2

This module will cover three aspects of ARM Cortex M Microprocessors.

The general functionality of the Cortex M series will be introduced along with the Instruction Set Architecture (ISA) Assignment one will be based on Assembly Language Programming.

The internal bus operation of the AHB-Lite interface will be introduced. For Assignment two students will be expected to interface a peripheral to the AHB-Lite bus using a Cortex-M0 soft core. The peripheral and the interface will be coded using Verilog. They will then be required to write a program to verify the operation of their peripheral3. The final aspect will be on using Real-Time operating systems. This will include how synchronisation, communication and resource sharing is implemented using the RTX real-time operating system.

The third and final assignment will be on using RTX to implement a multi-threaded papplication.

PRIVACY AND SECURITY (COMP522)

Credits: 15 / Semester: semester 1

The module "Privacy and Security" covers topics such as: identification and authentication, monitoring protocols, attacks and defences, legal and ethical issues and future directions.

RADIO PROPAGATION FOR WIRELESS SYSTEMS (ELEC411)

Credits: 7.5 / Semester: semester 2

This module is aimed for the students to gain a good understanding of radio propagation for wireless systems such as mobile radio and radar. The radio propagation characteristics and theories will be introduced and discussed. Radio propagation models in various medium and scenarios will also be introduced and discussed, and then applied to some systems.

SAFETY AND DEPENDABILITY (COMP524)

Credits: 15 / Semester: semester 2

Safety and Dependability will cover techniques for the validation of systems against formal specifications. In a first part, safety specifications (something bad never happens) using the Hoare calculus and safe abstraction are covered. A second part refers to termination (something good eventually happens), exploiting well foundedness. In a third part, Markov chains and decision processes are studied, extending the qualitative safety and termination problems from the first part to qualitative/probabilistic properties, and extending them to a simple probabilistic specification language, PCTL. As part of the module, the ability of formulating (probabilistic) models as Markov chains and decision processes are taught, as well as the use of of-the-shelf tools like PRISM or IscasMC for their analysis.

ENGINEERING PROGRAMMING (ELEC431)

Credits: 15 / Semester: semester 1

This module gives a comprehensive coverage of two most popular programming languages, C++ and MATLAB. It aims to help students to gain an understanding of the Functional Decomposition method for program design, and practical skills of designing and coding software for engineering applications based on a problem specification.

POWER SYSTEMS ANALYSIS & DYNAMICS (ELEC402)

Credits: 15 / Semester: semester 1

The module is composed of two parts:

The first part, power system analysis, focuses on the steady state behaviour of power systems. It introduces the techniques required to perform power flow and fault calculations. Additionally, it introduces the concept of frequency control and regulation in interconnected power systems.

The second part, power system dynamics, deals with the behaviour of power systems under conditions such as sudden changes in load or generation, or during faults. It also explores the design and operation of the controls available to maintain power system stability.

THE INTERNET OF THINGS: ARCHITECTURE AND APPLICATIONS (ELEC423)

Credits: 15 / Semester: semester 1

This module covers two areas. An introduction to the "Internet of Things" which introduces the topic from the basics describing its evolution, its architecture and its application to real-life scenarios. Students will then develop a real IoT application which builds on the basic knowledge of embedded systems and programming, obtained in a EEE or related B.Eng degree which includes knowledge of digital electronics and microprocessor systems and the ability to programme in C.

ADVANCED SYSTEMS MODELLING & CONTROL (ELEC476)

Credits: 15 / Semester: semester 1

This module will provide advanced modeling, simulation and control techniques and to develop student's skill of considering engineering problem in a system point of view.

Programme details and modules listed are illustrative only and subject to change.

HOW YOU'LL LEARN

Programmes are taught over two semesters, with examinations at the end of each semester. Modules vary from those which are assessed by examination only, to others which are continuous assessment only. All programmes incorporate a substantial practical component, with an increasing emphasis on project work as you progress through to the final year.

HOW YOU'RE ASSESSED

Assessment on this course will include a mix of exams, coursework and projects.

LIVERPOOL HALLMARKS

We have a distinctive approach to education, the Liverpool Curriculum Framework, which focuses on research-connected teaching, active learning, and authentic assessment to ensure our students graduate as digitally fluent and confident global citizens.

Careers and employability

Some of our graduates go on to work in the industrial sector, in government and in education, whilst others enter non-technical professions such as banking, accountancy, management and law.

Specific career paths are many and varied, and have previously included design engineer, systems engineer, medical physicist, postdoctoral research scientist, and radio frequency scientist.

100% **OF ELECTRICAL ENGINEERING AND ELECTRONICS STUDENTS ARE IN WORK AND/OR FURTHER STUDY 15 MONTHS AFTER GRADUATION.**

Discover Uni, 2018-19.

Many graduates have moved on to have careers with employers such as:

- ARM Holdings Ltd
- British Nuclear Group
- Deva Electronic Controls
- Energetix Group PLC
- Ericsson Ltd
- Heap and Partners Ltd
- Logica CMG
- Marconi
- Ministry of Defence
- Royal Liverpool University Hospital (Clinical Engineering)
- Science and Technology Facilities Council
- Daresbury Laboratory
- Scottish Power
- The Highways Agency
- United Utilities PLC
- Siemens UK

PREPARING YOU FOR FUTURE SUCCESS

At Liverpool, our goal is to support you to build your intellectual, social, and cultural capital so that you graduate as a socially-conscious global citizen who is prepared for future success. We achieve this by:

- Embedding employability within your curriculum, through the modules you take and the opportunities to gain real-world experience offered by many of our courses.
- Providing you with opportunities to gain experience and develop connections with people and organisations, including student and graduate employers as well as our global alumni.
- Providing you with the latest tools and skills to thrive in a competitive world, including access to Handshake, a platform which allows you to create your personalised job shortlist and apply with ease.
- Supporting you through our peer-to-peer led Careers Studio, where our career coaches provide you with tailored advice and support.

Fees and funding

Your tuition fees, funding your studies, and other costs to consider.

TUITION FEES

Tuition fees cover the cost of your teaching and assessment, operating facilities such as libraries, IT equipment, and access to academic and personal support. Learn more about tuition fees, funding and student finance.

UK fees **Also applies to Channel Islands, Isle of Man and Republic of Ireland**	
Full-time place, per year	£9,250
Year in industry fee	£1,850
Year abroad fee	£1,385

International fees	
Full-time place, per year	£25,750

*Fees stated are for the **2023-24** academic year.*

ADDITIONAL COSTS

We understand that budgeting for your time at university is important, and we want to make sure you understand any course-related costs that are not covered by your tuition fee. This may include a laptop, books or stationery. All safety equipment, other than boots, is provided free of charge by the department.

Find out more about the additional study costs that may apply to this course.

SCHOLARSHIPS AND BURSARIES

We offer a range of scholarships and bursaries to help cover tuition fees and help with living expenses while at university.

Scholarships and bursaries you can apply for from the United Kingdom

Select your country or region for more scholarships and bursaries.

Entry requirements

The qualifications and exam results you'll need to apply for this course.

Your qualification	**Requirements** About our typical entry requirements
A levels	AAB Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is **ABB** with **A** in the EPQ. You may automatically qualify for reduced entry requirements through our contextual offers scheme.
GCSE	4/C in English and 4/C in Mathematics
Subject requirements	A level Mathematics and a science subject (Chemistry, Computer Science, Further Mathematics, Physics or Electronics). For applicants from England: For science A Levels that include the separately graded practical endorsement, a Pass is required.
BTEC Level 3 Subsidiary Diploma	Distinction* in BTEC (any subject) plus AB in A Levels. A Levels must include Mathematics and a science subject (Chemistry, Computer Science, Further Mathematics, Physics or Electronics).
BTEC Level 3 Diploma	D*D* in a relevant BTEC considered alongside grade B in A Level Mathematics.
BTEC Level 3 National Extended Diploma	D*D*D* and grade B in A Level Mathematics.

Your qualification	**Requirements** About our typical entry requirements
International Baccalaureate	35 overall, including 5 in Higher Level Mathematics and 5 in a Higher Level science subject.
Irish Leaving Certificate	H1, H1, H2, H2, H2, H3 including H2 or above in Mathematics and a science subject (Chemistry, Computer Science, Further Mathematics, Physics or Electronics).
Scottish Higher/Advanced Higher	AAB in Advanced Highers including Mathematics and a science subject (Chemistry, Computer Science, Further Mathematics, Physics or Electronics).
Welsh Baccalaureate Advanced	Accepted at grade B alongside A Level grades AA in Mathematics and a science subject (Chemistry, Computer Science, Further Mathematics, Physics or Electronics).
Cambridge Pre-U Diploma	D3 in Cambridge Pre U Principal Subject is accepted as equivalent to A-Level grade A M2 in Cambridge Pre U Principal Subject is accepted as equivalent to A-Level grade B Global Perspectives and Short Courses are not accepted.
Access	Considered if taking a relevant subject. 42 Level 3 credits at Distinction, including 15 Level 3 credits in Mathematics is required. GCSE English and Mathematics grade C/4 or above also required. Students will be required to take an online Mathematics assessment, please contact the University for further information.
International qualifications	Select your country or region to view specific entry requirements. Many countries have a different education system to that of the UK, meaning your qualifications may not meet our entry requirements. Completing your Foundation Certificate, such as that offered by the University of Liverpool International College, means you're guaranteed a place on your chosen course.

ALTERNATIVE ENTRY REQUIREMENTS

- If your qualification isn't listed here, or you're taking a combination of qualifications, contact us for advice
- Applications from mature students are welcome.

THE ORIGINAL REDBRICK