Undergraduate Pathway: Engineering, Computing, and Technology

- BSc (Hons) Artificial Intelligence
- BSc (Hons) Audio & Music technology
- BSc (Hons) Building Surveying
- BEng (Hons) Civil Engineering
- BSc (Hons) Civil Engineering
- BEng (Hons) Computer Science
- BSc (Hons) Computer Gaming Technology
- BSc (Hons) Computer Networks (Camb)
- BSc (Hons) Computer Networks (Chelm)
- BSc (Hons) Cyber Security
- BSc (Hons) Construction Management
- BEng (Hons) Electronic Engineering
- BEng (Hons) Mechanical Engineering
- BSc (Hons) Quantity Surveying
- BSc (Hons) Software Development (Camb)
- BSc (Hons) Software Development (Chelm)

Do you like to figure out a puzzle, tackle a new challenge, and come up with inventive solutions? Our Pathway in Engineering, Computing, and Technology will target your technical and mathematical skills needed to create new technologies and structures. Students in these disciplines will find it necessary to work confidently in multi-disciplinary teams throughout their careers. A foundation in Engineering, Computing and Technology is structured around projects working with others from different degree programmes, enabling them to begin to develop this extremely important transferable skill.

Develop the knowledge and skills you need to create technologies and applications that will change the world. During your Foundation, you will have opportunities for practical work and experimentation across a range of elements, including engineering design tasks centred on developing simple robots, in order to introduce the challenges and benefits of realising theoretical ideas. There’ll be lectures and seminars combined with work-based learning and plenty of course options to personalise your studies.

Start here to equip yourself for a digital future.

Element Overview:

**Interactive Learning Skills and Communication (ILSC)**

This Element has been designed to help students develop their academic literacy, and research and communication skills in preparation for undergraduate study. The areas of reading, writing, speaking, and listening will be covered. ILSC also helps students understand the institutional culture, practices, norms and expectations of the UK higher education.

A subsidiary aim of this Element is to ensure that students develop transferable skills of effective and professional communication to support ongoing study, as well as providing a basis to foster career and life-building skills.
Information and Communication Technology (ICT)

No previous technical experience is required for this Element, which provides students with an introduction to practical ICT skills. This foundation will be needed for academic success across many areas of higher education. The students will use industry standard office productivity software and techniques to produce presentations, written assignments, and charts and tables in spreadsheets. Alongside practical skills, fundamental topics surrounding technology use will be discussed, together with societal and ethical perspectives. The Element will enable students to discuss the main challenges facing society and consider the implications of their technology use. By the end of the Element, students should have sufficient mastery of the Microsoft Office productivity suite to allow them to plan and produce presentations, use functions and write formula to display, format and analyse quantitative data and produce written assignments to a standard appropriate to higher education.

Critical Thinking

This Element aims to enable candidates to participate in and practice independent learning tasks for deeper thought and investigation as needed for Higher Academic pursuits. This Element is designed to teach, reinforce, and practice independent learning and critical thinking, as opposed to rote memorisation for success in University and professional life. An open-class forum of discussion is used to encourage critical thinking skills within academic and professional-facing contexts.

This Element enables candidates to invest in strategies that will deepen understanding and interpretation of processes, motives, argument, rationale, credibility, and possibilities which will then be applicable to a range of studies. Students will undertake research, based on an issue related to their degree programme, to review the main points of examining an argument in depth. They will learn to create a personal response that analyses the content of the issue under study.

Maths for Scientists

Foundation Maths for Science is a course that ensures students on the extended programmes for degrees in the areas of Life Sciences, Biomedical and Forensic Sciences, and Vision and Hearing Sciences have the necessary basic mathematical skills required for entry to level 4. By the end of the course, students will be able to carry out basic mathematical manipulations and understand the relevant key concepts required in order to progress to their chosen degree course. Each mathematical concept is introduced by a lecture, in which examples of how to use and apply the concept are demonstrated. Students practise problems in a tutorial for each topic, using worksheets given out in advance of the sessions. The worksheets include problems applied to the various degree pathways to which the students will progress, to indicate the importance and applicability of mathematics to their future degrees. The subjects covered are a range of arithmetic skills, algebra, areas and volumes, trigonometry and basic statistics.

Maths for Engineers

Maths for Engineers is intended for students progressing onto engineering and computing degree programmes. Both of these disciplines will make extensive use of calculus, vector and matrix
mathematics. This element is intended to build on basic maths concepts in order to prepare
students for success in Level 4 programs which have a heavy mathematical focus.
The Element will focus on the development of calculus skills, but will also introduce simple vector
and matrix operations. The application of the pure maths to engineering and computing problems
will be highlighted.

**Physics for Engineers**

This element is intended to give students progressing on to Engineering and Computing a suitable
grounding in the physical sciences in order to prepare them for their studies Level 4 and beyond.
The element will be taught using a combination of lectures, demonstrations and in-class exercises,
assisted by online self-study elements. Concepts will be introduced via the online study element and
re-capped in lectures, followed by simple demonstrations and group tasks. Students will then
complete numerical problems relating to the topic in small groups.
By the end of this element, students will be able to analyse the motion of objects in 1 and 2
dimensions with constant acceleration. They will be familiar with friction and its effect in moving and
static systems. Students will be familiar with simple statically determinant systems and able to
calculate forces in equilibrium. Students will be familiar with the concepts of conservation of
mechanical energy and conservation of momentum, and will be able to apply them to simple
situations.

**Fundamentals of Computing**

This Element provides an introduction to basic computer programming using a low level
programming language (C), requiring no prior programming experience. Fundamental issues such as
the structure of a program, syntax of simple statements, data types, functions, files, design and
testing, and problem solving will be discussed. The students will use industry standard tools and
techniques to implement, test and document simple programs. The Element will enable students to
understand the main Elements of a high-level program, laying the foundation for subsequent
Elements in Level 3 and above requiring structured programming ability. Fundamentals of
Computing will emphasise the principles of good programming practice and introduce the
techniques required to develop software that is robust, usable, and efficient. By the end of the
Element, students should have sufficient mastery of the C programming language to allow them to
design, implement and test simple programs. The material taught in the Element is intended to form
skills directly transferable to the workplace, giving a basic foundation to students who will be
expected to apply programming skills in their later studies.

**Engineering Design**

Engineering Design is intended for students progressing to Engineering, Computer Science, or
Architecture degree programmes. The focus of this element is on putting students’ studies into
context in the wider world, in particular by considering how different professions must collaborate
in the world of work. This Element will consider a number of different design processes, and how
they might be implemented by multi-disciplinary teams, as well as how the design activity fits within
the wider business context.