Computer Science

What is Computer Science?
Computer Science is concerned with understanding, designing, implementing and using computing systems, ranging in complexity from the components of a single processor to networks as vast as the World Wide Web. The core concepts of computing have their roots in mathematics and logic e.g. what it means to compute, and what problems can or cannot be computed. It also concerns the practical techniques of programming computers to solve real and difficult problems, and there are many links to other subjects, from psychology (how humans interact with computers, how computers can be given human capabilities) to electronics (how to exploit digital circuitry for peak efficiency, the possibilities for parallel and quantum computing). This intellectually challenging subject underpins the core technologies of the 21st century, and can be a route to many different career paths.

Why study Computer Science at Edinburgh?
Edinburgh is one of the leading international centres for computer science, and is the largest, and amongst the oldest, in this field in the UK. It is famous for its strengths in theoretical computer science, which means you will be taught how to think about the fundamentals of computing, not just how to programme. With the rapid pace of change in this field, specific skills can become obsolete, but you will be able to stay in the forefront of the field if you have a good grounding in the theoretical foundations. Our teaching of computer science was rated ‘excellent’ in the latest Teaching Quality Exercise. Our degrees are recognised by the British Computer Society as fulfilling the educational requirement to become a member – this is the UK’s professional qualification for computing.

At Edinburgh, degrees in Computer Science are offered by the School of Informatics, which looks beyond the conventional scope of computing to consider how computation can be applied to explain many natural and artificial systems, including our own thought processes. It unites work in Artificial Intelligence, Computer Science, Cognitive Science and Software Engineering, and you will benefit from the interaction between these areas, with the opportunity to combine them in your degree choice. The School of Informatics came top in the UK in the most recent Research Assessment Exercise, which means you will be taught by world leaders in this field and have the opportunity to be involved in cutting-edge developments, such as new programming languages, intelligent robotics, computer graphics, and e-Science. We have excellent facilities including recently refurbished computer labs, accessible 24 hours.

The University of Edinburgh is a leading international academic centre, with graduates and staff whose quality is recognised worldwide. It has a large student population, and offers excellent and extensive facilities and support services. Students particularly enjoy life in the city of Edinburgh, widely recognised as one of the most beautiful in Europe, with an exciting cosmopolitan atmosphere.

What does the programme involve?
Our BSc Honours and BEng Honours degrees are four years long and flexible in structure (see sample curriculum overleaf). There is also a possibility of direct second year entry for well qualified students.

In first year you will study a general course in Informatics that includes programming, logic, the theory of computation, and the nature of information processing. You will study two other subjects in parallel; one will be a Mathematics course tailored to the subject. Where a combined honours programme is taken with another school, you will also study a first year course in this subject. For single honours, your third subject choice can be from any in the University, subject to availability.

In the second year you will have specific Informatics courses that increase your knowledge of Computer Science (such as formal languages, machine learning, search, decision trees, analysis of algorithms and data structures, computer architectures), further courses in Mathematics, and either your combined degree subject or the possibility to continue an outside subject.

In the third and fourth year (and fifth year for MInf) your studies will be focused on the discipline(s) of your chosen degree. You will choose courses from the wide range we offer in Computer Science (for example Compiling Techniques, Computer Communications and Networks, Computer Graphics, Parallel Programming, Operating Systems, Database Systems). In the third year you will participate in a major group project, and in the fourth year (and fifth year for MInf) complete an individual project. Some examples of projects include: visualisation of algorithms; an analyzer for recursive game graphs; computing roots of univariate polynomials; vectorised video coding; conference management systems; certifying resource bounds for programs; an e-Science experiment builder; and an interactive execution tracer for Java.

What can I study Computer Science with?
You can study Computer Science as a single honours subject or in combination with Management Science, Mathematics, Physics, Artificial Intelligence or Electronics.

Degrees in Science and Engineering

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For more detailed information on degree structure and content, please see: www.ed.ac.uk/schools-departments/student-recruitment/publications-resources/degrees-degree-programmes

For more information on the MInf Informatics degree log onto: www.inf.ed.ac.uk See also separate sheets on Artificial Intelligence, Cognitive Science and Software Engineering
I studied Computer Science and Artificial Intelligence – both subjects are incredibly broad, and from the wide variety of courses offered by the University, you’re bound to find something of interest. The University of Edinburgh has the UK’s best department for research in this area, and the staff are enthusiastic and approachable. The degree is hard work but the workload is manageable and, for the inevitable moments in which motivation for work dwindle, Edinburgh offers plentiful distraction and entertainment

Andrew Phillips,
Computer Science and Artificial Intelligence graduate

What sort of teaching and assessment methods are used?
You will be taught by a mixture of lectures, tutorials, practical classes and projects. Lectures enable an efficient transfer of information from staff to students, and usually include demonstrations of running systems and discussion of extended examples, to complement the presentation of theoretical ideas. Tutorials in small groups (typically 8 to 12 students) offer the opportunity to ask questions and receive personalised explanations. We recognise that understanding and skills in Computer Science are often best acquired by doing, and hence throughout the course you will have practical classes and project work to complete. You will thus develop your analytical and problem-solving skills, be trained in good practice in programming, and learn to present your work in written reports and verbal presentations. Assessment is by a mixture of examinations and coursework.

Typically, in the first two years, your week will contain around 20 timetabled hours of lectures, tutorials and practicals, and you will need about 15 to 20 hours private study to consolidate the material from lectures, prepare for exams, and to work individually on tutorial and practical assignments. In later years the balance tips more towards private study (e.g. with 10 to 15 timetabled hours per week) as you develop independence in thinking and working. You will have individual supervision for your final year project.

The School of Informatics provides a number of support mechanisms to enhance your learning, organised by the Informatics Teaching Organisation (ITO). Each student is assigned a Personal Tutor who oversees their progress and advises on course choices. Lecturers can be approached outside the lecture times to answer questions, and maintain a mailing list or news group to inform and support the students on the course each year. Course materials, including lecture notes, assignment details, and past exam papers and solutions, are always available online.

We also have a helpdesk staffed by Informatics course tutors and graduate students known as InFBase. InFBase offers support and advice on all Informatics taught courses, particularly non-honours courses and Mathematics taught in first and second year.

Are there any opportunities to study abroad?
The School of Informatics encourages students to consider the possibility of spending one year of their undergraduate degree (typically the third) at a university in another country. The School has some specific exchange schemes with foreign universities, but we will consider any other university you wish to attend, as long as certain curriculum requirements are met.

Are there any links with industry and commerce?
The School of Informatics has many links with industry, stemming from its research work. The Scottish economy boasts a strong IT sector, with many companies located in or near Edinburgh. These companies sponsor scholarships, work placements and prizes, and offer jobs to our students.

Are there any bursaries or scholarships available?
The School of Informatics awards merit scholarships (i.e. based on your course performance). The scholarships are sponsored by the global software company, KAL and the Bank of America. There are prizes sponsored by the British Computer Society, Citigroup, Microsoft, Google, JP Morgan, Accenture, FreeAgent and Netcraft. In addition, the University has a range of additional support schemes. For more information please visit: www.scholarships.ed.ac.uk

What can I do after my degree?
Computers are everywhere in modern life. Some of the most interesting – and best-paid – opportunities in the future are open to those who really know about computing, software and information systems.

The advent of pervasive ‘big data’ is changing the way every company works and Informatics is at the heart of this revolution. Graduates with degrees in computing have good prospects of employment. Most of our graduates make direct vocational use of their degree and work in the IT industry but our graduates are also in demand across many other sectors including finance, media and entertainment, mobile systems, user-friendly technology and healthcare. Recent employers include: UBS, Collis Engineering, Shell International, VIS Entertainment, Touchtype and the Civil Service.

We are also proud to say that nearly a fifth of our graduates who are passionate about the subject go on to further training and study.

What are admissions staff looking for?
You will find our most up to date entry requirements at: www.ed.ac.uk/studying/undergraduate/degrees

The simple rule is that we require Higher or A Level Mathematics (or equivalent), at grade A. We do not generally expect or require prior study of computer science or related topics; it is more important that you have an interest in this area, and the ability to think logically and creatively. Well qualified students may also be offered the possibility of direct second year entry. If you are made an offer, you will be invited to visit us and you will have a one-to-one informal chat with one of our members of staff.

How do I find out more?
Visit our website: www.inf.ed.ac.uk
Or contact:
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The University of Edinburgh
Appleton Tower, Crichton Street
Edinburgh EH8 9LE
Tel: 0131 650 5194
Email: ito@inf.ed.ac.uk

Typical degree curriculum: BSc Honours in Computer Science

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Topics

- Computation; logic; data; programming; calculus; algebra
- Computer systems; algorithms and data structures; problem solving, learning and planning; geometry; probability
- A wide choice of modules including a system design project
- A wide choice of modules including a major practical project on which you will write a dissertation

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