The University Of Sheffield.

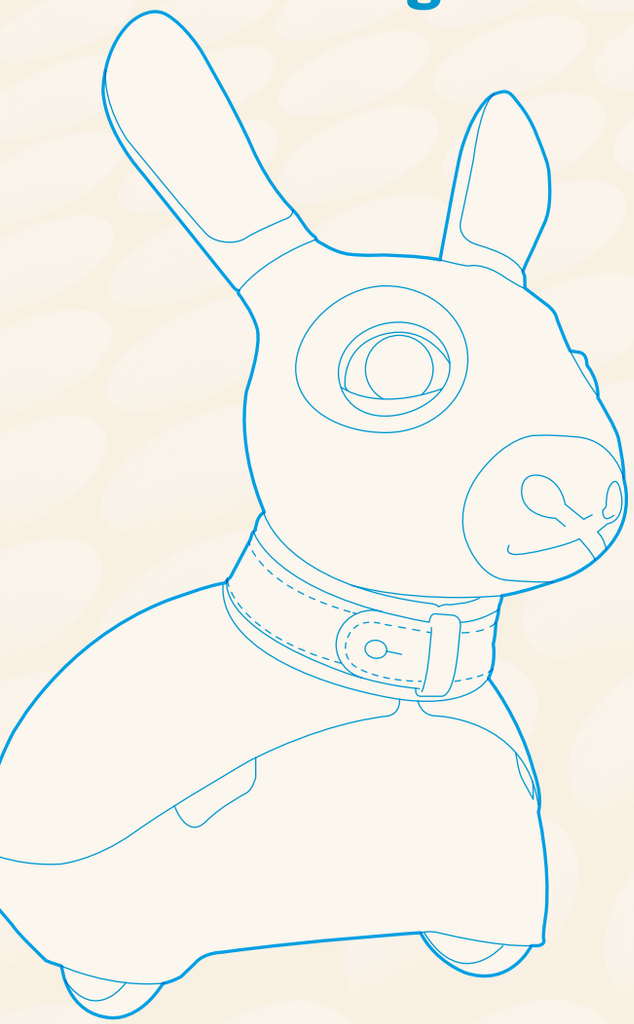
Department Of Computer Science.

Computing. The Future.

Undergraduate Degrees in Computer Science.

“I enjoy the fact that our assignments involve building something that actually have use behind them, and that they require creativity to design and execute.”

James Milton
Computer Science
with a Year in Industry



All you need to succeed

Computers are at the forefront of developments in all areas of modern life, from data analysis at the Large Hadron Collider, to modelling the human body; from the internet and e-Commerce, to arts such as films, music, and computer games. A degree from our Department of Computer Science is an excellent investment for your future. It will sharpen your analytical skills, stretch your creative talents, and equip you with the technical abilities you need to succeed in the career of your choice.

You will learn the basics of the subject, such as how to design algorithmic solutions to problems, and the theoretical limits to the problems that computers can solve; how to program computers, and how to engineer reliable software; and discover the applications of computers in areas such as machine learning, language processing, speech synthesis, robotics, computational biology, 3D graphics and many others. We can even teach you how to run your own IT-based business, or how to manage someone else’s.

Stand out from the crowd

What makes us unique? As well as covering all the basic and advanced areas of Computer Science we believe in giving you hands-on experience in a real professional environment. So, by the time you graduate you’re more than ready for the world of work. In the careers market, you will stand out from the crowd. We are consistently among the top departments in the country for graduate employment.

First-Class **Facilities.**

The Departmental teaching space has recently undergone a refurbishment. It provides teaching and social space together with a laptop loan system where you can borrow a laptop to work on your assignments or to use during a class being taught in the space. The University has excellent library services and you will also have access to specialist hardware and state-of-the-art facilities in The Diamond.

Exciting hardware

The Department uses some exciting hardware devices in its teaching. Our NAO humanoid robots, which are used by researchers around the world for robotics challenges such as the Robot Soccer World Cup, are available for project students to use. Our fleet of Lego Mindstorm NXT robots is used extensively for teaching the Java programming language, as well as in third year projects. We have facilities and equipment exclusively for software development on mobile devices including phones and tablets. Members of the Department are also affiliated with the Sheffield Centre for Robotics, which has cutting-edge robotics hardware residing in dedicated lab space within the Pam Liversidge Building.

The Diamond

You will use cutting edge facilities in The Diamond. As a Computer Science student you will have access to the latest hardware, software and operating systems in our dedicated computer labs. Virtual reality facilities, high-spec graphics PCs, a robot arena, media editing suites and a recording studio are all available.

Siemens MindSphere Lounge in The Diamond

The MindSphere Lounge, co-created by Siemens and the University of Sheffield, aims to boost digital skills and promote technology and knowledge exchange between students, academics and industry. It provides an inspiring collaboration space alongside access to Siemens technology, MindSphere - an industry leading, cloud-based, Internet of Things platform. Through MindSphere, machines and physical infrastructure can be connected to the digital world in order to harness big data from billions of intelligent devices (or indeed just a single one) and uncover innovative digital solutions to real, industry challenges.

iForge Run by students for students

An innovative facility on campus - the iForge - gives students the opportunity to collaborate, create and 'make' outside of their academic studies. Believed to the first of its kind in a UK university, the Forge is run by a team of ambitious Engineering students. Together, the iForge Reps train and supervise other student users, as well as procuring and maintaining equipment, developing links with alumni and industry, and running special events.

Academic **Excellence.**

Be led by the best

We have 50 academic staff, 17 of them professors, engaged in a wide variety of research. Their research shapes and inspires what you're taught. The most recent Research Excellence Framework (REF), conducted in 2014, recognised the high quality of research carried out in the Department of Computer Science. 92% of our research was rated world leading or internationally excellent in terms of its originality, significance and rigour. This puts us 5th out of 89 computer science departments in the UK. This means that many of your lecturers are computer scientists with international reputations. It also means that what we teach you is relevant, today and tomorrow.

Innovative teaching

We have a reputation for pioneering teaching. Our courses are designed to challenge you and prepare you for a career in industry, commerce, research, teaching or management.

In your first year you will gain a thorough grounding in the mathematical foundations of computer science. You will be introduced to networks and computer architectures and get practical experience of how big businesses work by taking part in a software engineering group project.

"Don't be afraid to ask questions or ask for help. Take advantage of any opportunity you are given. Expand your skillset by doing something else which you can't find in a typical Computer Science degree. This is what makes studying at the University of Sheffield unique and this is what will make you stand out as an individual. Learn something new every day."

Sanziana Chiorescu
Artificial Intelligence and Computer Science with a Year in Industry at Siemens PLC

The second year builds on what you learned in the first year. Topics such as functional programming, logic, computation and pattern recognition are covered as well as the more advanced aspects of software engineering. You will get your first experience of working for an external client, working in small teams to manage and develop a software project, gaining awareness of customer needs and improving your problem solving skills.

In your third and fourth year you will have the opportunity to specialise in your chosen degree subject. You will undertake an individual research project. Individual projects might result in software to solve an identified problem, or might involve more fundamental contributions to Computer Science, such as developing a new, more efficient algorithm to solve a hard computational problem.

Genesys **Solutions.**

Genesys: our student-led software development organisation

Our fourth-year undergraduate and masters students operate Genesys as a professional software development organisation, the first one of its kind in the UK, where they form customer-facing teams to build custom web applications. The students are supported by staff from epiGenesys, a subsidiary company of the University that specialises in agile software development for the education and health research sectors.

“Genesys and the Software Hut place students at the heart of projects, and test their skills, ingenuity and teamwork. They have to solve real business problems for demanding clients within tight timescales, managing all aspects of the project. In short, Sheffield graduates leave the University prepared for the challenges of working life.”

Mandy Chessell
IBM Academy of Technology

epiGenesys
A University of Sheffield Company

Genesys gives you the opportunity to gain industrial experience with considerable personal responsibility. It offers the chance to:

- Work as part of a team in a professional software engineering environment
- Collaborate with a customer to solve a real business problem
- Apply agile software engineering practices and make use of industrial tools
- Boost your employability by gaining experience in areas such as project management, software testing, and user experience design

www.epigenesys.org.uk/genesys

> **“I aspire to help make the world a better place with what I am learning. As an international student from Egypt, coming to the UK was a big step for me. I plan to make use of my knowledge to help improve my country.”**
>
> **John Ayad**
> Computer Science with a Year in Industry

Your Future.

Your prospects are great

When it comes to getting well-paid jobs, our graduates are highly successful. Some of our recent graduates have gone on to work for companies such as Amazon, Google, IBM, Microsoft, Goldman Sachs and many others.

Our graduates consistently rate among the top in the country when it comes to securing graduate-level jobs. 100% of our MComp graduates are in graduate level employment or doing further study within 6 months of graduating* (*correct at date of publication).

We support you

Our degrees are designed to give you the skills needed to succeed in your chosen career path. Individual project work, group work and working in interdisciplinary teams on real life problems will develop your skills in problem solving and teamwork.

Throughout the year you have the opportunity to attend a series of events including careers fairs, where you can meet and network with staff from companies and recruitment agencies.

Experience Industry

Year in industry

Degrees with a Year in Industry are a great way to gain experience in the workplace while you are a student, and will give you a distinct advantage in the job market when you graduate. Having completed a placement you will have the opportunity to apply what you have learned during the remainder of your degree course.

Contact with industry experts

From early on in your degree programme you are exposed to working with and for external clients on projects. In your second year you may have the opportunity to take the Software Hut project where you will receive training from visiting industry experts and work on a software project for a client. In your third year you could have the opportunity to work with an industry expert on an external dissertation project where you may help to solve problems in a creative way. If you take Genesys in your fourth year you will develop and maintain software for clients.

Global Engineering Challenge

First Year

The Faculty of Engineering’s Global Engineering Challenge is a week-long interdisciplinary activity that gives you the opportunity to tackle real-world engineering problems, whilst developing team working and problem solving skills. Alumni from the Faculty are on hand to offer support, guidance and feedback to you.

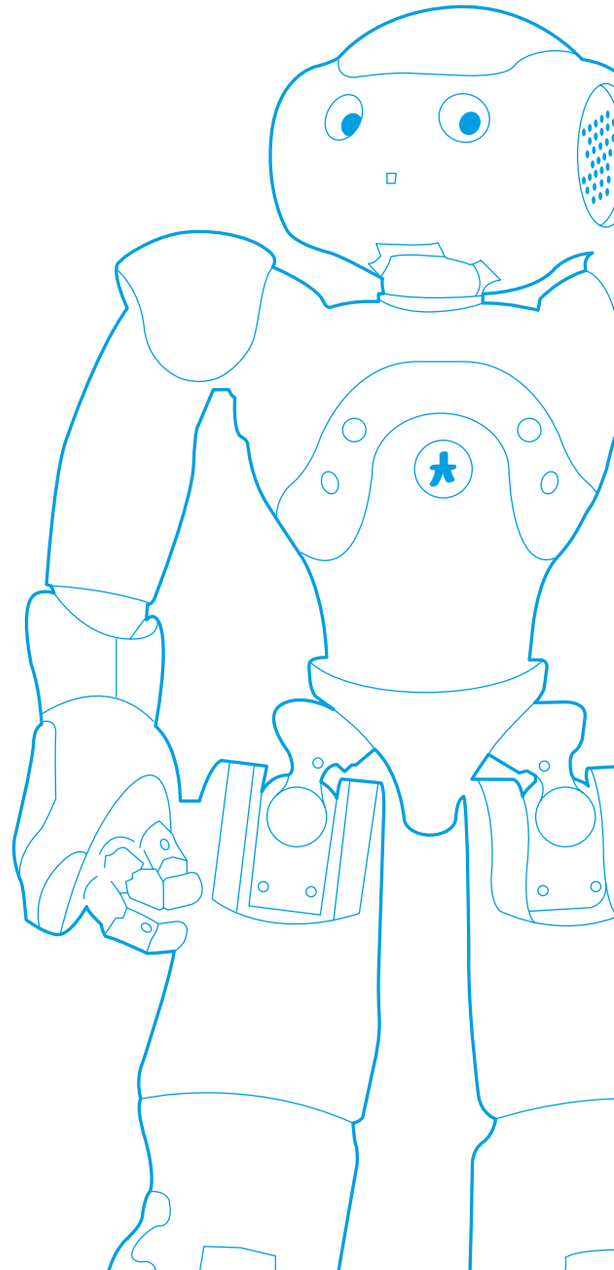
Engineering You’re Hired!

Second Year

Engineering You’re Hired! is a week long activity that builds on the first year project week, Global Engineering Challenge. You will work on a project in multidisciplinary teams and bring your own discipline knowledge to collaboratively propose a design and a plan to take it to the “proof of concept” stage. Many of the projects are suggested by industry which creates a current and relevant opportunity for you to apply your academic learning to industry. Mentors from industry will support you throughout the project giving you insights and real life experience into how to approach the problems proposed.

Accreditation

All our established MComp and MEng degrees receive full professional accreditation from the British Computer Society. All our established single honours BSc and BEng degrees meet the requirements for partial accreditation **www.sheffield.ac.uk/dcs/undergraduate/accreditation**



www.sheffield.ac.uk/dcs

Five-star social life

Sheffield is famously laid back, but you're not likely to find yourself at a loose end. The nightclubs are famous; the music scene legendary. We have the largest regional theatre complex in the UK and the biggest independent cinema outside London.

About the University

The University of Sheffield is one of the leading Russell Group Universities in the UK. Originally founded in 1879 as Firth College the University now has 54 academic departments and more than 27,000 students.

Sheffield.

Our city is your city

Sheffield is England's fourth-largest city. It's located roughly in the centre of the country, on the edge of the Peak District National Park, about 2.5 hours by train from London. Those are the facts. Then there's the way we feel about the place. We're just as proud of our city as we are of our campus. We love the fact that although Sheffield is a major city it has kept its sense of community. This is a friendly city, a place where you can make yourself at home.

We are international

Nearly a quarter of the students at the University of Sheffield are international coming from over 150 different countries. Sheffield is a diverse global city, with our international students totally ingrained in city life. We celebrate and benefit from the breadth and diversity of our student population and all that brings with it. From economic prosperity and work placements to volunteering and cultural enrichment, we're proud of the difference made by students from all over the world.

Our Union of Students

It's the best. Winner of multiple awards, our Union has live music, club nights, a 400-seat cinema, shops, an advice centre, travel agent, banks and much more. There are over 150 different clubs and societies to get involved with, so you will never be short of something to do or someone to do it with. The University's sports facilities include a 33m swimming pool with sauna and steam room, bouldering wall, synthetic pitches, squash and tennis. You won't have to look off-campus for a high-tech gym either – we've got one of our own. With so much local culture, and our world-class sporting facilities, you're going to find it hard to stay in. And many of our graduates like it so much here, they never leave.

Feel at home

Sheffield is a friendly place and we run a friendly department. If you're not too busy with all the activities run by the Students' Union and the attractions of the city, our Computer Science Society, run by current students, organises regular social events and talks by external speakers. We work hard to create a happy environment so that you can have the best experience possible.

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The University Of Sheffield.

Department Of Computer Science.

Computer **Science**

BSc/MComp Computer Science (G402/G400) with a Year in Industry (G403/G404)

Computer Science is the scientific study of computation and information, and the design of practical computing systems. Computer scientists are needed to extract knowledge from data which comes from businesses, social media, government agencies and even systems used in buildings and vehicles. They require a deep understanding of mathematical concepts such as logic and probability. Computer scientists also drive developments in many aspects of society including robotics, virtual reality, healthcare and bioinformatics.

What you'll study

You will have the option to study a range of core and optional modules in the following subject areas:

Theoretical foundations

Discrete mathematics; set theory, logic, proof. Continuous mathematics; linear algebra, probability, statistics. Algorithms and data structures, complexity. Theory of computation. Concurrency, process algebra and verification.

Programming

Imperative programming in Java and JavaScript. Object-oriented programming in Java, Python and Ruby. Functional programming in Haskell. Logic programming in Prolog. Concurrent programming for the web, using Java applets and servlets, Tomcat and JBoss.

Software engineering

The software lifecycle, tools and models for software development. Notation using UML. Agile methods. Information systems, databases, and human-computer interaction. Industrial projects in which you develop software for external clients. On-the-job experience in Genesys, our unique student-run software company.

Computer systems

Computer architecture, network architecture. Mainframe computing tutored by experts from IBM, Computer security, encryption and forensics.

Enterprise culture

The web and the internet. Mobile app development. The next generation of intelligent web-based systems and cloud services.

Digital media

2D and 3D graphics. User interfaces. Virtual reality, games technology and the latest research on computer simulation. Novel user interfaces based on speech input and motion tracking.

Project skills

Collaborative teamwork skills. In your masters year, you will take Darwin, a group research project where you have the opportunity to publish your research findings. You will also have the option of joining Genesys Solutions, our very own student-run software house, to take part in a commercial software development project for an external customer.

The University Of Sheffield.

Department Of Computer Science.

Software **Engineering**

BEng/MEng Software Engineering (G600/G650) with a Year in Industry (G604/G654)

The Software Engineering programme focuses on the more practical aspects of engineering complex software systems. The course teaches you state-of-the-art software design and programming technologies and also lets you practice your skills in project management, teamwork and working with people.

What you'll study

You will have the option to study a range of core and optional modules in the following subject areas:

Software engineering

The software lifecycle, tools and models for software development. Notation using UML. Agile methods. Information systems, databases, and human-computer interaction. Industrial projects in which you develop software for external clients. On-the-job experience in Genesys,Solutions, our unique student-run software company.

Programming

Imperative programming in Java and JavaScript. Object-oriented programming in Java, Python and Ruby. Functional programming in Haskell. Logic programming in Prolog. Concurrent programming for the web, using Java applets and servlets, Tomcat and JBoss.

Professional skills

Legal concepts, intellectual property, contract law, professional ethics, computer misuse and data protection law.

Computer systems

Computer architecture, network architecture. Mainframe computing, tutored by experts from IBM. Computer security, encryption and forensics.

Enterprise culture

The web and the internet. Mobile app development. The next generation of intelligent web-based systems and cloud services.

Theoretical foundations

Discrete mathematics; set theory, logic, proof. Continuous mathematics; linear algebra, probability, statistics. Algorithms and data structures, complexity. Theory of computation. Concurrency, process algebra and verification.

Digital media

2D and 3D computer graphics, virtual reality, user interfaces, and the latest research on computer simulation. Novel user interfaces based on speech input and motion tracking.

Project skills

Collaborative teamwork skills, group software engineering projects. In your masters year, you will join Genesys Solutions, our very own student-run software house, to take part in a commercial software development project for an external customer.

The University Of Sheffield.

Department Of Computer Science.

Artificial Intelligence **and Computer Science**

BSc/MComp Artificial Intelligence and Computer Science (GG74/G700) with a Year in Industry (GG75/G704)

Artificial Intelligence (AI) and Computer Science introduces you to aspects of natural intelligence early on, with modules in either Psychology or Philosophy. This course focuses on AI, its relationship to biological intelligence and its use in engineering systems. You will learn core computer science and software engineering topics which are combined with more specific AI topics for example investigating how AI is used in speech recognition, language processing and robotics.

What you'll study

You will have the option to study a range of core and optional modules in the following subject areas:

Theoretical foundations
Discrete mathematics; set theory, logic, proof. Continuous mathematics; linear algebra, probability, statistics. Algorithms and data structures, complexity. Theory of computation.

Psychology
Cognitive psychology. Mathematical modelling for cognitive science. Neuroscience.

Philosophy
Mind, brain and personal identity. Logic. Reference and truth. Philosophy of science, mind, and psychology.

Programming
Imperative programming in Java and JavaScript. Object-oriented programming in Java, Python and Ruby. Funcational programming in Haskell. Logic programming in Prolog. Concurrent programming for the web, using Java applets and servlets, Tomcat and JBoss.

Artificial intelligence
Bio-inspired computing and robotics; adaptive intelligence; machine processing of speech, images and text. Virtual reality, games technology and the latest research on computer simulation.

Project skills
Collaborative teamwork skills. In your masters year, you will take Darwin, a group research project where you have the opportunity to publish your research findings. You will also have the option of joining Genesys Solutions, our very own student-run software house, to take part in a commercial software development project for an external customer.

The University Of Sheffield.

Department Of Computer Science.

Degrees with a **Year in Industry**

Degrees with a Year in Industry are a great way to gain experience in the workplace while you are a student, and will give you a distinct advantage in the job market when you graduate.

You will undertake a 12-month industrial placement between the second and third years of study (this can also be done between the third and fourth years of study in the case of our four-year MComp and MEng courses).

Undertaking a placement year will allow you to:

- gain insight into a particular industry or role
- decide if this is the right career path for you
- take on real responsibility and increase your confidence
- develop transferable skills and enhance your employability
- network and gain valuable references and contacts

When you come back to study in your final year you can apply the skills and experience gained during your placement to your studies and many students find that they are offered a graduate position or further work experience as a result of their placements.

Support

The Faculty Employability Team are on hand to offer guidance throughout the placement application process as well as during your year on placement. They offer support which includes helping you find a placement, CV and application sessions, preparatory sessions and events, support and monitoring throughout the year and support when you return from your placement.
www.sheffield.ac.uk/faculty/engineering/employability

You will also have access to the University's dedicated Careers Service. Their services range from advertising placement opportunities to helping you discover and develop your skills which will help you when applying for placements and eventually your first job as a graduate.
www.sheffield.ac.uk/careers

> **"I worked as a software engineer for a year at Rolls-Royce after my second year at university. My year working really allowed me to get a taste of working life and think about what I want from my future careers."**
>
> **James Milton**
> Computer Science with Employment Experience

The University Of Sheffield.

Department Of Computer Science.

Degrees with a **Foundation Year**

Computer Science with a Foundation Year (G401)

Software Engineering with a Foundation Year (G651).

If you want to study in the Department of Computer Science, but you don't meet the entry requirements to go straight into year one, our Science and Engineering Foundation Year could be the route for you. This year-long course will equip you with the mathematical and scientific knowledge needed to progress onto your chosen degree through a varied programme of teaching and learning. You will study modules in, Engineering, Further Maths and Physics, each taught by academic specialists from the respective departments.

What you'll study

To be a great computer scientist you will need to have an excellent understanding of mathematical principles, know how to present to a scientific audience, work in groups and on your own to undertake research and understand how to solve problems.

Mathematics

In order to gain the mathematical background you will need to undertake your chosen degree, you will study two modules in mathematics, including the following topics: Mathematical presentation. Algebra. Functions and Graphs. Trigonometry, Co-ordinate Geometry. Exponentials and Logarithms Introduction to Vectors. Sequences and Series. Differential Equations. Differentiation. Integration. Complex numbers, advanced calculus, numerical methods.

Foundation in Physics

You will cover a selection of topics in Physics, designed to introduce you to scientific theory and methodology. Topics covered include Kinematics and Dynamics , Electricity and Magnetism , Properties & Thermal Physics.

Engineering

This module aims to develop practical investigate skills relevant to scientific activities, to appreciate the range of research activities undertaken in universities, to understand science in context of practical case studies, to develop skills in group work, presentations, and problem solving. Assessment includes lab reports, as well as a group project where you will produce a poster and give an oral presentation on a hot topic in Computer Science (current examples include Self-driving cars, Big Data, Computer Security and Malware). You will also learn the essential skills of scientific writing when you produce an individual essay relating to a second Computer Science related topic.

After successfully completing the foundation year, you are guaranteed to progress onto any of the three year BSc/BEng or four year MComp/MEng degree courses offered by the Department of Computer Science.

www.sheffield.ac.uk/sefy

The University Of Sheffield.

Department Of Computer Science.

Entry **Requirements**

MEng/MComp: Computer Science, Software Engineering, Artificial Intelligence (Includes Year in Industry)

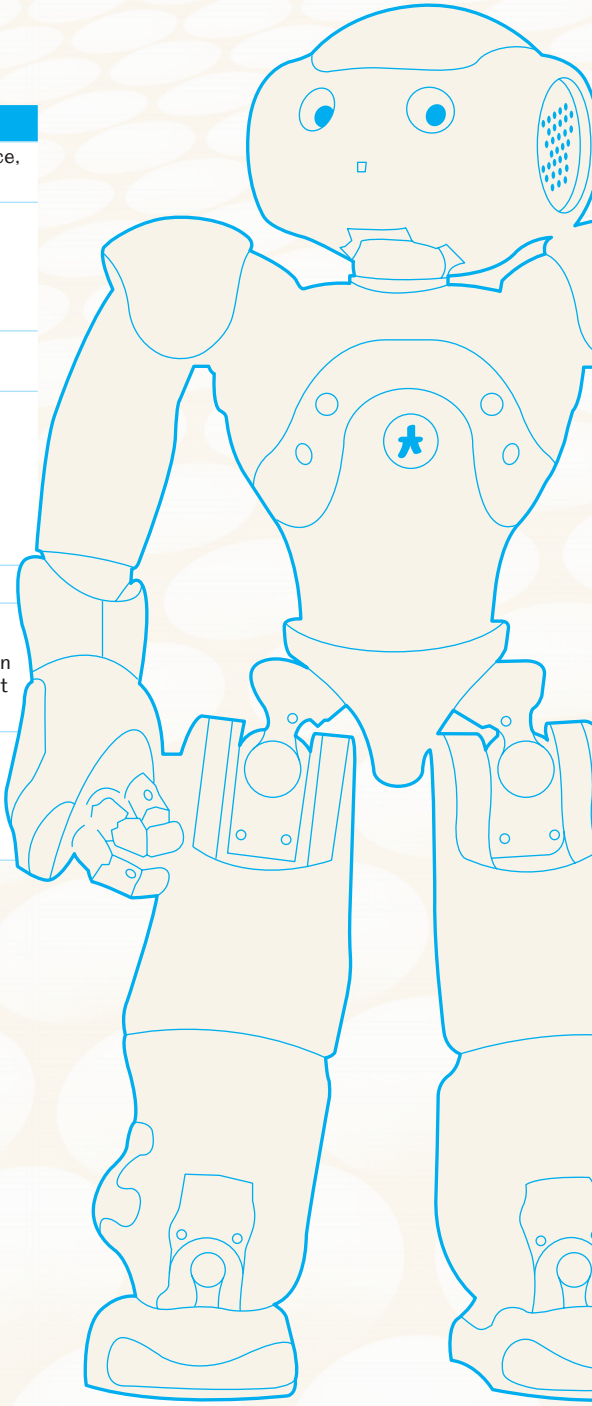
Qualification	Entry Requirements
A Levels	A*AA including Mathematics
A Levels + Extended Project Qualifications	AAA including Maths + A. The Extended Project should be in a relevant subject
International Baccalaureate	38 points including 6 points in Higher Level Mathematics
BTEC	**Information Technology, Engineering or Computer Science/ Computing:** Diploma DD or Extended Diploma DDD plus A Level Mathematics, grade A*
Cambridge Pre-U	D2 D3 D3 including Mathematics M
Advanced Diploma	Engineering, grade A, Information Technology, grade A. Plus A Level Mathematics, grade A*

BEng/BSc: Computer Science, Software Engineering, Artificial Intelligence (Includes Year in Industry)

Qualification	Entry Requirements
A Levels	AAA including Mathematics
A Levels + Extended Project Qualifications	AAB including Maths + B. The Extended Project should be in a relevant subject
International Baccalaureate	36 points including 6 points in Higher Level Mathematics
BTEC	**Information Technology, Engineering or Computer Science/ Computing:** Diploma DD or Extended Diploma DDD plus A Level Mathematics, grade A
Cambridge Pre-U	D3 D3 D3 including Mathematics M
Advanced Diploma	Engineering, grade A, Information Technology, grade A. plus A Level Mathematics, grade A

Foundation Year

Qualification	Entry Requirements
GCSE	Mathematics and Science, grade B
A Levels	ABB (any acceptable A Level subject) BBB (if A Level subjects are science and maths subjects)
International Baccalaureate	33
BTEC	Engineering: Extended Diploma DDD (with Distinction in Maths) Computing/Computer Science or Information Technology: Extended Diploma DDD*
Cambridge Pre-U	D3 M2 M2
Advanced Diploma	Engineering, grade A. Information Technology, grade A. Plus grade B in an acceptable A level subject
	* An additional Maths test might be required. Please contact the Department for more information.



The University Of Sheffield.

Department Of Computer Science.

Women in **Computer Science**

A great place to work and study

We are dedicated to making our department a great place for people to come to study regardless of gender. We have been awarded the prestigious Athena SWAN silver award in recognition of our continued commitment to diversity and equality.

> **"This award confirms that diversity and equality are embedded firmly in the culture of the Department of Computer Science, making it a great place for all of us to work and study."**
>
> **Professor Guy Brown**
> Head of Department

Support and opportunities

The Department has an appointed Diversity and Equality Champion, Dr Heidi Christensen. "I am committed to making our department the best possible place to study and work for all. We are very proud to have been awarded the prestigious Athena SWAN silver award in recognition of our continued effort to increase equality and diversity for everyone. I like to meet with our women students during their first week in Sheffield. It's a great way for me to introduce you to some of our activities, and I also like to hear about your expectations."

There are lots of opportunities for you to engage in fun outreach activities. The Women in Engineering Society works closely with local schools, recruitment and public engagement fairs and also takes part in other events around the UK. Our students are given the opportunity to work as ambassadors at open days and other outreach events where you get to meet prospective students – like yourself!

Each year a group of female students are invited to participate in the BCSWomen Lovelace Colloquium. This event is for women to showcase their project work, network and listen to industry talks from women who have careers related to computer science.

> **"When I graduate, what I will remember from my time here won't be just the research-driven and multidisciplinary teaching. I will remember the staff members and how helpful they've always been to everyone. I will remember the picturesque campus with its red brick buildings in the sunset. I will remember all the things that make Sheffield everything that reminds me that coming to study here was the best choice I ever made."**
>
> **Sanziana Chiorescu**
> Artificial Intelligence and Computer Science with a Year in Industry