At the heart of modern engineering.

Department of Automatic Control & Systems Engineering
What is Automatic Control & Systems Engineering?

A control system manages, commands, directs or regulates a system rather like the way the brain controls the body. In everyday life, we use machines which are required to act and react to their changing environment, from factory manufacturing lines to traffic grid systems to monitoring patient’s vitals in hospital. To make sure they complete their jobs efficiently, a control system to regulate their behaviour is needed.

Perhaps the simplest control system can be found in a house with central heating. The thermostat monitors the temperature of the house. If the temperature dips below the set number, the control system will turn on the boiler and heat up the house. When the temperature returns to the optimum level, the boiler will be turned off.

Control Systems are found in every piece of technology. Smartphones, cars, medical equipment, defence systems, manufacturing lines, spacecraft: they all have control systems integrated into their programmes. Control and Systems Engineering is needed to ensure that robots, turbines, engines and other systems work correctly.

Control systems are at the very heart of ACSE. Our academic and research staff have dedicated themselves to consolidating their knowledge and developing their skills in a wide range of applications in the discipline. Our academics embark on projects to create algorithms which launch rockets into space, build pioneering systems for use in additive manufacturing, and create robots that can be used to treat birth defects in infants.

Our students draw technical skills and knowledge from all areas of engineering. They learn key theories and how to put them into practice. All of this combines to make Control and Systems Engineers some of the most employable engineers in the world.

The Department of Automatic Control and Systems Engineering (ACSE) at the University of Sheffield is the only dedicated department to the engineering discipline of control systems.
Mechatronics & Robotics Engineering
BEng H361, YII 2G36 | MEng H360, YII 2S15

Study the integration of mechanical engineering, electronics, sensors, control, computational hardware and software in the design and development of advanced products and processes. This complex interaction and integration are needed to produce products such as unmanned aerial vehicles, search and rescue robots, advanced manufacturing, and intelligent oil drilling platforms.

Gain a solid grounding in systems and control and develop your knowledge and understanding of the different components making up complex mechatronic and robotic systems and how they interact. Our unique focus on systems engineering is widely applicable and will lead onto careers in a range of companies, including: Thales, BMW, BAE Systems or Dyson.

What will you learn?
Over the duration of the course, you will learn how to design, analyse and test robots, autonomous vehicles, and other complex electro-mechanical systems. You will also learn how to control robotic systems using modern microprocessor technology.

Assessments and Teaching
Students will have the opportunity to undertake machine learning modules and work in the Control Lab in the Diamond to use industry-standard equipment for their studies. The development of professional and laboratory skills sits at the heart of our teaching.

You will be assessed in various ways, including project work, lab work, coursework and exams.

Key modules:
- Introduction to Systems Engineering
- Systems Engineering
- Mathematics
- Physical Systems
- Electrical and Electronic Systems
- Systems

Key Facts
Entry requirements:
AAB/BEng
AAA/MEng

Duration: 3 - 4 years

Tuition Fees:
UK/EU: £9,250
International: £20,470
(Fees for 2018/2019. For further information about fees and funding, visit www.sheffield.ac.uk/undergraduate/finance)

Case Study
Eric Perez Ormaza
BEng Mechatronic & Robotic Engineering

“I chose ACSE not just because it is the first and only faculty of Control and Systems in the UK, but due to what they teach and how they do it. I really liked the modules and the facilities we have available. The Diamond is a really amazing building with a lot of advanced equipment.”
Systems and Control Engineering

BEng H690, YII SL16 | MEng H660, YII 0G31

Systems and control lie at the heart of most engineering. Whether you are developing a flight control system for the latest aircraft, controlling the pitch of a wind turbine or researching the future of driverless cars, engineering relies on systems and control to maximise efficiency, performance and safety whilst minimising cost.

You will learn about fundamental and advanced concepts of systems modelling, simulation, control and how to apply these to solve various engineering system performance analysis and control problems. This degree will ideally suit someone looking to specialise primarily in advanced systems and control concepts in engineering leading onto careers at, for example, Airbus, Rolls-Royce, and Jaguar Land Rover.

What will you learn?
Learn how to design, analyse and test various complex control systems from simple feedback control loops to advanced methods for multivariable systems. We’ll also show you how to control intelligent systems using modern microprocessor technology. You can also explore advanced concepts including manufacturing systems, noise and vibration control, spacecraft systems and robot technology.

Assessments and Teaching
You will use the control lab to develop a range of practical skills and use our PC suite to enhance your knowledge on a range of specialist programmes. You will be assessed in a variety of ways including project work, coursework, lab assignments and exams.

Key modules
- Introduction to Systems Engineering
- Systems Engineering Mathematics
- Physical Systems
- Electrical and Electronic Systems

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Accredited by the IET and InstMC.

Case Study
Mukhtar Umar
MEng Control & Systems Engineering

“After having completed my foundation course with the University College, I became familiar with the ACSE department and the courses they offered through an open day visit to the department. The skills I have gained and improved are also very relevant for Systems Engineers, which I am certain will prove to be very useful in a work environment.”
Computing is at the heart of the latest developments and discoveries in engineering, healthcare, biology, neuroscience and finance and is an essential component of advanced engineering products. Whether developing advanced models of next-generation products or embedded systems for the control of advanced engineering this degree will prepare you for your future career.

You will study a variety of tools in software engineering including object oriented design, systems engineering and advanced hardware. Along with core concepts of simulation, modelling, control, and optimisation you will develop the knowledge and understanding to work in advanced computer systems. As with all of our degree programmes, graduating from this degree will prepare you for a wide range of careers.

What will you learn?
You will learn skills from a range of engineering disciplines including Electrical and Electronic Engineering, Mechanical Engineering, and Computer Science. You can also explore advanced concepts including manufacturing systems, drone programming, space weather systems and robotic technology.

Assessments and Teaching
You will use the Control Lab in the Diamond Building to develop a range of practical skills, allowing you to get the vital experience you need to succeed in your chosen career.

You will be assessed in a variety of ways including: project work, coursework, lab assignments and exams.

Key modules
- Introduction to Systems Engineering
- Systems Engineering Mathematics
- Physical Systems
- Electrical and Electronic Systems

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Nicola Richards
MEng Computer Systems Engineering (with a Year in Industry)

I’m on the Computer Systems Engineering integrated masters (MEng) course with a Year in Industry. I originally started on a BEng but swapped to the MEng in my second year. The Global Engineering Challenge week provided me with my first experience of applying my degree to a real world situation and it was also a good opportunity to work on a project with people from lots of different backgrounds - similar to the teams I worked with in industry.
Student Projects

Our students take part in a number of extra curricular projects through their time with us. There are many opportunities for our students to get involved with projects both within the department and in the faculty.

Project SunbYte

A team of University of Sheffield students, including ACSE students, created a prototype telescope which could be launched 80km above the earth to capture clear images of the sun.

The team consisted of undergraduates, postgraduate and PhD students from across the Engineering Faculty, and was supervised by ACSE’s Dr Viktor Fedun.

They designed and built the telescope from scratch, using the University of Sheffield labs to create what they needed.

The telescope was successfully launched on a balloon at the Earsring Space Center In Sweden on Friday 30th October 2017.

SURE Scheme

The Soft Bionic Armbrace was created by ACSE student Aron Webster as part of the University of Sheffield’s SURE Scheme – an undergraduate summer programme to give students the opportunity to take part in research projects.

Over a few months, Aron designed, programmed and built a working prototype of a revolutionary soft exo-suit from scratch, demonstrating how such technologies are capable of helping sufferers of degenerative muscle disorders.

I liked the free reign of the project as first and second year projects in my degree are set within a specific brief, but the SURE Scheme was very flexible and I liked how they didn’t restrict the project.

For me, it’s showed me what the processes of research are and it has helped influence my choices for the future.

Aron Webster
MEng Mechatronic & Robotic Engineering

Working with Industry

We have links with major organisations such as Rolls-Royce, BAE Systems and the European Space Agency. This means our courses are relevant and our graduates develop the skills employers look for.

Spend a year in industry

All of our courses can be combined with a year in industry. This can be a great boost to your career prospects, giving you a head start when you graduate.

If you arrange to go on a placement, you will pay a reduced fee to the University for that year.

You are expected to find your own placement, but there is plenty of help and advice from University staff. Work placements are subject to the approval of the department - in other words if your tutors do not think the placement is worthwhile they won’t let you waste your time.

Placements and projects with industry

Industrial involvement is not restricted to year out placements. Shorter period summer vacation placements and term-time collaborative projects are also possible, and very nice to have on your CV.

Current students within the Department are routinely provided with information about available placements and any Industry partner involvement in undergraduate projects.

I think the placement has put everything I do at university into perspective.

It has given me the context in which the theory I have learned can be put into practice.

Michael Roberts
Computer Systems Engineering
(with a Year in Industry at Airbus)
**Course Content & Structure**

For the full list of modules available, please visit our website at [www.sheffield.ac.uk/acse/current/undergraduates/module-descriptions](http://www.sheffield.ac.uk/acse/current/undergraduates/module-descriptions).

**1st Year:** First year modules are common to all our undergraduate degree programmes. During your first year you will take 120 credits made up of six 20 credit modules. For each 10 credits you will have 10 hours of contact time including lectures, practical lab sessions and tutorials. You will also have the opportunity to take part in the Global Engineering Challenge in the autumn semester.

**2nd Year:** In your second year, you will have the opportunity to specialise in your chosen degree pathway with tailored and more in-depth modules. You will take core modules, including Engineering You’re Hired to give you an overarching knowledge in all areas of practical skills.

**3rd Year:** In your third year, you will have the chance to specialise further in your chosen degree area. BEng students will work on their Individual Project which provides students with the opportunity to undertake a major piece of project work on an individual basis. MEng students will work on a Group Project, providing students with the opportunity to work as a group on a substantial project of relevance to systems and control engineering. You will also study a module on Finance and Law for Engineers.

**4th Year:** Fourth year MEng students will study advanced modules in their chosen area. They will also work on an Advanced Project which will allow them to work individually on an advanced piece of project work.

**Foundation year**

If you do not have the scientific or mathematical background for an engineering degree, a Foundation Year will help you. During the Foundation Year you will study modules in chemistry, mathematics, and physics. After completing the year, you can proceed to any of our BEng or MEng courses.

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**Laboratories**

**The Diamond Electronics and Control Laboratory**

The Electronics and Control laboratory is a cutting-edge facility for practical experiments in the Diamond building. Using the lab, students can design, build, test, and measure an incredible range of modern systems from everyday appliances like mobile phones and laptops to specialist systems used in robots and spacecraft.

The teaching in this lab covers all aspects of electrical, electronic, and control systems hardware and software, from large-scale DC and AC motors, generators, and drive units to precision Computer Aided Designs (CAD).

This method of teaching develops the students’ skills and understanding, whilst providing hands-on, practical experience which relates directly to their chosen career path.

**Amy Johnson Building**

The Amy Johnson Building is the home of ACSE. Since the department was founded in 1968, staff and students have used the building for office and laboratory space. The majority of ACSE Academic, Technical and Support staff can be found in this building.

Students will use the Amy Johnson Building for their personal tutorials. There are also a number of student laboratories for students to use for their individual and group projects. Each lab has all the basic equipment students will need to complete their projects and technicians are in-house to help out with any problems.

Available workrooms for ACSE Students:
- Two group project workrooms
- Undergraduate group project workroom
- Open Access Laboratory
Student Support

If you are struggling with workloads, need financial or professional advice, or are concerned about childcare, there are a number of services available for students to use. Below are a few of the various services provided by the University of Sheffield to help students during their studies.

Practical help
The Student Services Information Desk is in the Students' Union. It's where you come if you need anything; a copy of your exam timetable, a council tax exemption form or advice on money matters – anything.

Professional advice
The Student Advice Centre is a confidential and professional advice service on employment, money and housing as well as academic and welfare matters.

Disability and dyslexia support
The Disability and Dyslexia Support Service provides a friendly, confidential service to support you during your studies.

It is based in the Students' Union on Western Bank. To see an advisor, book an appointment by emailing advice@sheffield.ac.uk or calling +44 (0)114 222 8660.

Health and well-being
We have a purpose-built health centre on campus. The University Health Service is a comprehensive general practice, part of the National Health Service. It’s open all year round. To see the full range of services available, visit www.sheffield.ac.uk/ssid/health-service.

Our Counselling Service also provides confidential support. You can book appointments to see our specialist staff, go online for Self-help, or attend stress busting workshops.

To contact the University Counselling Service, email UCS@sheffield.ac.uk.

Childcare
The Students' Union runs a nursery for children aged six months to five years old. It's Ofsted registered (300762) and offers quality teaching and learning experiences for your child.

Fees are subsidised according to family income. There are also play schemes during the school holidays for children aged 4 to 12 years.

For more information, visit their website at www.sheffield.ac.uk/ssid/nursery

Faith
Sheffield is home to students of all faiths. If you’d like to get in touch with people from a faith group, visit our Multifaith Chaplaincy website at www.sheffield.ac.uk/ssid/chaplaincy/index.

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Frequently Asked Questions

Are the ACSE courses accredited?
All our undergraduate courses are accredited by the Institute of Measurement and Control (InstMC) and the Institution of Engineering and Technology on behalf of the Engineering Council for the purposes of fully meeting the academic requirement for registration as a Chartered Engineer.

What careers/industries do graduates go into?
Our graduates go on to work in a range of industries including manufacturing, power generation and sustainable energy with organisations such as Rolls-Royce, Jaguar Land Rover and Thales. For further information on graduate careers visit our webpage www.sheffield.ac.uk/acse/undergraduates/careers/index. Our graduates also go on to further study staying with us to undertake a Master's degree.

Is there any extra help available to fund my studies?
As a department we offer a wide range of scholarships, further information can be found here www.sheffield.ac.uk/acse/undergraduates/financial-support. The University itself also offers a number of scholarships, awards and bursaries for prospective undergraduate students. For more information visit www.sheffield.ac.uk/undergraduate/finance/help.

Is there any flexibility if I want to swap to a different course after I have started?
There is some flexibility when it comes to being able to change your course at the end of your first year. You must speak to the departments academic advisor before filling out the appropriate form.

How many contact hours will I have a week?
During your first year you will have 120 credits made up of six 20 credit modules. For each 10 credits you will have 10 hours of contact time.

What is the difference between a BEng and an MEng?
A BEng is a Bachelor’s in Engineering and will take three years to complete, while a MEng is a Masters in Engineering and takes four years to complete. Many students undertake the MEng so that they can pursue the necessary training to become a Chartered Engineer.

Can I study part-time?
Unfortunately, due to the structure of the courses, we can not offer part-time study.

Questions

Frequently Asked

Scholarships, further offers a number of scholarships, awards and bursaries for prospective undergraduate students. For more information visit www.sheffield.ac.uk/undergraduate/finance/help.

Is there any flexibility if I don't meet the entry requirements, will my offer still be considered?
If your results have not gone to plan, you can still apply to us through Clearing in August. Please contact us directly if you fail to meet your conditions rather than assuming you haven't secured your place.

How is there any flexibility if I want to swap to a different course after I have started?
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What next?

Visit us at one of our open days which run throughout the year or arrange an informal visit. Contact us and we will arrange a date that is convenient for you.

For more information about courses and modules, see our online prospectus: www.sheffield.ac.uk/undergraduate

Contact:

Department of Automatic Control
and Systems Engineering

W: sheffield.ac.uk/acse
T: +44 (0)114 222 5647
E: adacse@sheffield.ac.uk

Our graduates help shape the world we live in.

The content of our courses is reviewed annually to make sure it’s up-to-date and relevant. This is in response to discoveries through our world-leading research; funding changes; professional accreditation requirements; student or employer feedback; outcomes of reviews; and variations in staff or student numbers. While every effort has been made to ensure the accuracy of the information in this publication, for the reasons detailed above, changes may need to be made to modules, courses, entry requirements and fees between the date of this publication and the start of your course. This publication is correct as at the time of print, but please see www.sheffield.ac.uk/acse for the most up-to-date information about our courses. If there is any inconsistency between this publication and www.sheffield.ac.uk/acse, the information on our website should be taken as correct.