Take Control Of Your Future.

Courses for careers in systems engineering.
“At the university, my lecturers actually make me think and read beyond the content being taught in the lectures, helping increase my knowledge base. The ACSE department is run in such a way that all first years study the same modules; this means that we are taught a wide range of modules and we gain knowledge of things that may not be directly related to our individual courses but will be very useful to us as young engineers.”

Yetade Ayleka
1st Year, MEng Computer Systems Engineering

Automatic Control & Systems Engineering
We are the largest department in the UK dedicated to the study of Control and Systems Engineering. Our research is at the frontiers of knowledge, and our courses are aimed at producing graduates of the highest calibre.

Excellent Teaching
We were awarded full marks (24/24) in the last national Teaching Quality Assessment. We are unique in offering undergraduate and postgraduate degrees with a Systems and Control theme.
Welcome

Dear Student,

Welcome to the Department of Automatic Control and Systems Engineering at the University of Sheffield. In what follows, we try to give you an insight into the very modern world of Systems and Control Engineering and the opportunities that we can provide to study these subjects. Our degrees are available in a variety of forms to suit the needs of our students and the many careers available in industry and commerce worldwide. Our graduates find employment in well-known organisations, with many reaching senior positions.

Many of you will not be familiar with Systems and Control Engineering. This is not surprising because it has only recently grown from simple roots in the mid-20th Century to a position of great importance in almost all aspects of our lives. Modern life depends crucially on systems that have to operate independently to achieve a specified purpose accurately and safely. Examples include that of a wind turbine which can be seen as a machine designed to operate without human intervention to maximise the energy captured from the wind whilst ensuring safe and reliable operation. Another example is a robot designed to search a new landscape, detect and avoid obstacles and complete a specified task. The common features of these and other examples are that the machines are a complex connection of electromechanical components and computer systems each of which is simple in its own right but which, together, have the "intelligence" to achieve a complex objective with minimal human intervention. The analysis and design of such systems is the job of the Systems and Control Engineer.

Systems and Control Engineering is in everyday use. It is used in domestic equipment such as washing machines and CD players, in cars and aircraft, in marine systems and the robots that assemble cars, explore the depths of the sea or the surface of planets. The list of applications is endless and I can confidently say that, without Systems and Control and engineers educated to understand its principles, the world as we know it would be a very different, less safe and a far less interesting place. You may be interested to know that Systems and Control Engineering also plays an important role in the design and operation of medical equipment and in the design of aids for people with mobility problems.

Given its widespread use in industry, commerce and the professions, Systems and Control Engineers benefit from a study of skills in a wide range of subjects. This is needed because most modern systems consist of many different types of elements. It is essential therefore that a student obtains an understanding of aspects of computing, electronics, mechanical engineering and control principles supported by relevant aspects of other topics such as aeronautics, biomechanics and techniques for the analysis and design of complex systems and data. The precise mix of topics will depend on the degree choice and the specialisation selected.

A university education is about you, the student, supported by an enthusiastic community of professional teaching and research staff. If you decide to study Systems and Control Engineering here at Sheffield, you will benefit from our known high quality teaching, supported by highly competent academic staff, research staff and support staff. You will also meet the staff and students in research groups working at the leading edge of the technologies, often supported by national and international industrial links. Our teaching and project work facilities are excellent and continue to benefit from large investments in state of the art IT and real-time computing systems.

Our degrees are very flexible with options to include aspects of Business and Management if this suits your needs. They are accredited by the Institution of Engineering and Technology and the Institute of Measurement and Control so you can be confident that the outside world will recognise your qualification as an excellent preparation for your chosen career.

I hope that you find the information in this brochure useful and that it encourages you to apply to study Systems and Control Engineering here at Sheffield. Whatever your choice, I would like to wish you well in your future studies.

Professor Visakan Kadirkamanathan
Head of Department
Systems Engineering has a widespread impact on many industries, so career opportunities are excellent. It combines a wide variety of subject areas, including computing, electronics, mechanical engineering, control, aeronautics, biomechanics and complex systems. As a student at the University of Sheffield, you will benefit from high teaching quality and from studying with academic staff and research groups who are at the leading edge and have strong industrial links.

Many items in daily use are relatively complex systems including mechanical components, electronic components, computer hardware/software and possibly other components as well. Systems engineers study the whole rather than one particular component within these. This involves mathematical modelling, design, analysis and implementation and in particular ensuring that the system is designed so that all components interact together in an efficient way to achieve a specific and possibly a complex objective.

System modelling, design and analysis skills can also be applied in many disciplines outside engineering, for instance weather forecasting, economic system modelling, financial forecasting and the analysis of geological and medical data. This means that our graduates are highly employable both within engineering and in numerous other fields. There are still too few systems engineers to meet the demands of employers, so graduates are in demand in a buoyant careers market.

The Department of Automatic Control and Systems Engineering, better known as ACSE, offers an extensive range of multi-disciplinary undergraduate degree courses, postgraduate degree courses, and continuing professional development opportunities.

ACSE is well known internationally for the quality of research performed by all its staff; this was recognised in the latest Research Assessment Exercise. Having internationally leading researchers as teachers brings huge benefits to our students, not only due to the staff enthusiasm for their topics, but also their ability to incorporate leading edge subjects direct into the curriculum. Our many industrial partners in this research also contribute to the student experience through final year projects and seminars on current industrial problems.

ACSE also stands out for the high quality of its teaching, recognised by the award of full marks (24/24) in the last national Teaching Quality Assessment and feedback from all our graduates. We are committed to giving students the best experience possible by continually improving teaching standards and by releasing major investment in up-to-date equipment and modern technology. Our students enjoy a dedicated state of the art PC laboratory, two new undergraduate teaching laboratories, a flight simulator and access to project facilities in the research laboratories. We are also at the forefront of faculty developments in teaching standards and optimising the use of modern technology to support student learning.
Meet some of the academic staff

**Professor Stephen A Billings**
The Department of Automatic Control and Systems Engineering is the largest separate department dedicated to Systems and Control in both the UK and Europe with 29 academic staff and extensive teaching and research facilities. Our research strength, which ranges from research on engineering systems, control systems, space systems, neuro-imaging and stem cells, is reflected in all aspects of our teaching and final year projects. Our department welcomes undergraduates who wish to study systems engineering based subjects. The courses that we offer provide a broadly based study of systems with separate degree courses in systems and control, computer, electronic, medical, mechanical, and mechatronic and robotic systems. Systems engineering is one of the broadest based engineering subjects with a wide range of job opportunities in many sectors of industry, finance and commerce.

**Professor Peter J Fleming**
Our close associations with industry bring enormous benefits both to students and staff in the department and the companies involved. We undertake industrially relevant research and are exposed to novel and challenging problems. For example, Rolls-Royce, the aeroengine manufacturer, has funded the Rolls-Royce University Technology Centre for Systems and Control Engineering in the department since 1993. Undergraduates, Masters students and researchers all work within the Centre on fascinating projects that arise from company requirements. One such project arose because it is commercially attractive to both supplier and customer for the company to hire its engines to airlines rather than sell them. We have devised schemes to make better use of the feedback data gathered during real-time engine control and have worked with Rolls-Royce to develop a global system for performance optimisation and maintenance of their engines over their entire lifetime. Experience of working with industry on projects such as these also enables us to better inform our teaching, ensuring that we can keep our students in touch with the latest thinking in industry.

**Dr Zi Q Lang**
Before becoming a full time lecturer, I had previously joined the Department of Automatic Control and Systems Engineering at the University of Sheffield as an overseas student from China. The reputation of the Department in the areas of Systems and Control Engineering contributed a lot to my choice of University. Also, all students are very well supported throughout their training period via a robust and effective tutorial scheme which includes both pastoral and academic assistance. This is particularly vital in the first year at university as it represents such an important and exciting transitional period.

**Dr George Panoutsos**
I have been in the Department of Automatic Control and Systems Engineering since 2002 and I have experienced and appreciated various aspects of the academic life, from the student experience and the academic research to my current position as a lecturer. This experience allows me to better understand, engage and interact with our students and at the same time shows our Department’s investment in new pedagogies to improve our students’ expertise and benefits our students. A paradigm of our breadth of expertise can be found in our research centres and range of projects that our students are getting involved with. Most of our projects benefit from strong industrial links that show the impact of what we do, the impact of Systems Engineering, to the real world. The true multidisciplinary nature of Systems Engineering reflects upon our graduates who can use the knowledge and skills developed in our programmes to build careers in traditional engineering disciplines such as in Computer Systems, Mechanical Systems and Mechatronics, and also in very diverse disciplines such as Financial Systems Modelling, Weather Forecasting, Biomedical Systems as well as the Energy and the Environment.

**Dr Simon A Pope**
I have been a member of the Department of Automatic Control and Systems Engineering since 2000. I initially studied for an MEng degree and subsequently a PhD, both in the department. Since 2008 I have been a member of staff, progressing to the position of lecturer in 2009. The unique, but widely applicable fields of control and systems engineering which the department specialises in are what initially attracted me here, together with the strong links to industry and high class teaching and research. I didn't expect to progress to a career in academia, however it is testament to the strength and breadth of the department that I have stayed in ACSE.

**Dr Robin Purhouse**
I graduated from the Department of Automatic Control and Systems Engineering with an MEng in 1999 and a PhD in 2004, I recently returned to the Department as a lecturer, after an early career spanning both industry and academia. For me, the biggest benefits of doing a degree in systems and control engineering are both the strong analytical skills and the cross-disciplinary perspective that it will help you develop. You’ll be able to apply these skills to support people in solving problems in a wide variety of areas, and you’ll often find yourself embodying the vital bridge between the different disciplinary specialists on a project. My degrees from the Department have helped me play an effective role in many multi-disciplinary teams: for example, optimising drug pricing strategies for a major pharmaceutical company, developing the economic and financial models for major government investment programmes, shaping the development of innovative components for nuclear reactors, and assessing the likely impact of alcohol pricing regulations on the nation’s health.
## Overview of courses

All of our MEng and BEng degree programmes share a common theme of Systems and Control Engineering but also offer great flexibility. You can choose from Control Systems, Computer Systems, or Mechatronic and Robotic Systems. You can also combine our established Systems and Control programme with Management studies or a foreign language.

<table>
<thead>
<tr>
<th>Programme</th>
<th>UCAS code (BEng/MEng)</th>
<th>Description</th>
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<tbody>
<tr>
<td>Systems and Control Engineering</td>
<td>H690/H660</td>
<td>The aim of this course is to cover advanced control system design technologies as well as standard approaches to systems engineering and computer control. The primary application of control systems engineering is in industrial systems, but it can also be applied in many other disciplines. For example, ideas that can help a systems engineer design a modern aircraft flight control system can also be applied to complex biological processes, economic systems and environmental control.</td>
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<tr>
<td>Computer Systems Engineering</td>
<td>H130/G500</td>
<td>This course is designed for students who wish to add a greater knowledge and understanding of computers to their basic Systems Engineering skills. You will take the core modules on systems and can choose from a range of computer hardware and software engineering modules. The emphasis in this course is on developing an understanding of the use of computers, both in design and programming, within complex engineering systems and in many diverse applications. This distinguishes the course from more conventional computer science and software engineering courses.</td>
</tr>
<tr>
<td>Mechatronic and Robotic Engineering</td>
<td>H361/H360</td>
<td>The course of Mechatronic and Robotic Engineering studies devices that combine mechanical and electronic components with control and software engineering. Mechatronics engineers are in great demand from a wide range of industries, including automotive, aerospace, medical, defence and manufacturing. Via our balanced but challenging range of modules you’ll learn how to design, analyse and evaluate robots, autonomous vehicles and other complex electro-mechanical systems. The course also covers how to control robotic systems using modern hardware and microprocessor technology.</td>
</tr>
<tr>
<td>Systems Engineering with a Foundation Year</td>
<td>H653/H659</td>
<td>If you have non-standard entry qualifications this could be your route to a systems engineering degree. Successful completion of the relevant foundation programme guarantees entry onto our degree programmes.</td>
</tr>
<tr>
<td>Systems and Control Engineering (Engineering Management)</td>
<td>HN62/ HINF</td>
<td>You will register for our established MEng degree in Systems and Control Engineering and will initially concentrate on the technical engineering subjects required for a professional Engineering career. You will then have the option, subject to progression requirements, to transfer to the Engineering plus Management option of the degree at the end of the second year. The third year contains enhanced management content, and the final (fourth) year involves a substantial element of management study in our internationally renowned Management School.</td>
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All of our programmes are accredited by the Institution of Engineering and Technology (IET) and the Institute of Measurement and Control (InstMC).

Please visit our website for more information on the differences between our MEng and BEng programmes, related options and course details. [www.shef.ac.uk/acse/](http://www.shef.ac.uk/acse/)
Entry requirements

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<tr>
<th>Entry requirements</th>
<th>BEng</th>
<th>MEng</th>
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<tbody>
<tr>
<td>GCE/VCE A Levels</td>
<td>ABB</td>
<td>AAB</td>
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<tr>
<td>Scottish Highers</td>
<td>AAAB</td>
<td>AAAA</td>
</tr>
<tr>
<td>Irish Leaving Certificate</td>
<td>AABBB</td>
<td>AAABB</td>
</tr>
<tr>
<td>International Baccalaureate</td>
<td>33 points</td>
<td>35 points</td>
</tr>
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</table>

A Levels should include Maths and Physics (or a similar subject).

If your qualifications are not listed here please don’t hesitate to contact us and we will consider you on an individual basis.

English language qualifications

If English is not your first language you’ll need IELTS/TOEFL (IELTS minimum 6.0 – with at least 5.5 in each component – and TOEFL minimum: paper 550, Computer 213, IBT 79-80)

Professional accreditation

All our courses are fully accredited by the Institution of Engineering and Technology and the Institute of Measurement and Control. This means that when you graduate, after gaining some experience in industry, you’re eligible to apply for either Incorporated (IEng) or Chartered Engineer (CEng) status. Both are internationally recognised and will enhance your career prospects.

Degree Structure

Core disciplines

High employment prospects

More than 90% of our first degree graduates were in graduate level occupations or further study six months after completing their degree.

(National Student Survey, 2012)
Major industrial links and research centres

When you become an ACSE student, you join a department that attracts some of the biggest names in industry. On this page are just some of the companies who work in close partnership with us. You’ll have the opportunity to work with these and other companies in your final year project.

Rolls-Royce
The Rolls-Royce University Technology Centre in Control and Systems Engineering is based here in the department. At the Centre our teams carry out important research for Rolls-Royce into gas turbine control and monitoring. They have been directly involved in many exciting projects including the Boeing Dreamliner and Joint Strike Fighter.

IMMPETUS
Partly based in our department, IMMPETUS is a consortium of various companies involved in new approaches to processing metals. Our staff and researchers provide input in the areas of through-process modelling, optimisation and control.

Centre for Signal Processing and Complex Systems
Several of our academic staff are involved in this research centre which connects to various space projects and missions. One of our recent MEng graduates is now playing a key role in Venus Express, the current European Space Agency (ESA) mission to Venus.

For more information please visit our research centres webpages at www.sheffield.ac.uk/acse/research/centres
Study Abroad

All ACSE students can apply for the Study Abroad programme, so you could spend a year of your course studying at a university in the USA, Canada, Australia, Hong Kong, Mexico or Singapore, without paying any extra fees.

MEng students can also apply for the Erasmus programme, which allows you to spend a semester (about three months) of your fourth year at a European university. We have partner universities in Germany, France, Spain, Malta, Poland, Romania, Finland and Turkey.

Career opportunities include

- Biomedical Systems
- Power Systems and Electronics
- Aerospace and Automotive
- Autonomous Guided Vehicles
- Manufacturing and Process Control
- Medical Instrumentation and Information Technology
- Space Weather and Climate Change
- Financial Markets Forcasting

Spend a year in industry

It is possible to spend a year of your degree on placement with an engineering company. This can be a great boost to your career prospects, giving you a head start when you graduate.

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

You are expected to find your own placement, but there’s plenty of help and advice available from University staff. Work placements are subject to the approval of the department – in other words if your tutors don’t think the placement is worth your while they won’t let you waste your time!

www.sheffield.ac.uk/placements

Venus Express, courtesy: ESA

Courtesy: Rolls-Royce
What and how will I study?

We believe in continuous development and improvement of our courses, our teaching, and the total student experience. We are at the forefront in developing new approaches to module delivery. In particular, we make good use of web-based student support and innovative ways of integrating the various components of a degree. We regularly introduce new modules to respond to current research developments, the requirements of the career market and student demand.

In addition to academic knowledge, our courses provide the transferable and personal skills which are increasingly in demand by employers. You will develop these abilities through varied individual and group projects as well as a personal development planning programme. In your final year you will work on an individual project which often engages with leading edge research or industry.

For a summary of current module titles, please see our website.

Students with special requirements

If you need any special requirements to help you study, please let us know as soon as possible so we can help. For further information about our facilities, or to request a copy of this brochure in a different format:
T: 0114 222 1303 E: disability.info@sheffield.ac.uk

International students

The University of Sheffield has over 3,000 international students, from around 120 different countries. In our department, we usually have around 30 new international undergraduates each year, plus about 80 postgraduates. Sheffield is a great place for a student coming to England for the first time. It’s very friendly and easy to get to know. www.sheffield.ac.uk/international

Mature students

We welcome applications from students of any age. If your qualifications are different from those specified here, or if you have completed an access course, please contact us for advice.

Careers

Your career prospects as a systems engineering graduate are excellent. You will be very employable in areas as diverse as aerospace, automotive and marine engineering, the chemical and nuclear industries, finance, research and the manufacturing industry.

Our courses cover the essential aspects of electrical, electronic, mechanical, computer hardware/software, and control components that are required by systems engineers. We also take advice from our industrial partners to ensure that our graduates are equipped with skills that meet their needs.
Our graduates have gone on to careers with distinguished international companies and organisations including Able Instruments and Controls, Akzo Nobel, Bechtel, BAE Systems, BNFL, CB&J John Brown Limited, Corus-TATA Steel Group, Costain Group, Department for Transport, ExxonMobil, Fujitsu, Harbeth Acoustics, HSBC, IBM, ICI, MW Kellogg, KPMG, Logica, McDermott International, NNC, Northern Foods, Pearl Assurance, Philips, Premier Brands, Premier Lifts, RAF, Rolls-Royce and the Wellcome Foundation.

What is the University like?

Students choose Sheffield because they want to have a good education leading to a satisfying career. They are taught by academics who have a reputation for excellence, so they enjoy their studies as well as their free time. This is why Sheffield has the 3rd lowest dropout rate in the UK, after Oxford and Cambridge. A study placed the University 3rd in Britain for teaching quality, with 29 subjects awarded an ‘Excellent’ rating.

For studying and living, the University of Sheffield is a great first choice. It combines outstanding academic achievement with a safe environment and an excellent social life. The teaching is first rate, and prospective employers recognise Sheffield graduates as among the best in the country.

The Information Commons (IC) was born out of completely fresh thinking about learning resources for the 21st century student, it contains a whole range of study spaces within a single spectacular building. The IC’s primary objective is to deliver high quality IT-enabled study space and 24 hour access to heavily-used student materials.

www.shef.ac.uk/infocommons/

Our Union of Students

Voted as the best Students Union in Britain by the Virgin guide and winner of countless awards. In the Union you can find live music, club nights, a 400-seat cinema, shops, an advice centre, travel agent, banks and much more. There are more than 150 different clubs and societies to get involved with, so you’ll never be short of something to do.
The University sports facilities are conveniently located between the campus and the Student Villages.

Our fully-equipped activity rooms host a range of classes from aerobics to martial arts, or you can work out in the high-tech S10health fitness centre. Other attractions include three full-size synthetic pitches, squash courts, a sports hall, a full-size six-lane swimming pool, floodlit tennis courts, and a bouldering wall.

Progress in your favourite sport, try something new, or both. If you’ve never been involved in a sport before, studying at Sheffield provides the ideal opportunity to get started.

Investment in the city centre continues, with exciting developments like the Winter Garden creating new types of public space for all to enjoy.

Our accommodation is in two areas. The brand new Endcliffe Village is in the suburbs just to the west of the city, only a ten-minute bus ride from campus. The area is very leafy and pleasant while the social scene is vibrant.

Our City and Central Campus accommodation is convenient for ACSE students as the department is based on the edge of the city centre. Our award-winning Students’ Union is somewhere between the two, so whichever you choose you’re never far from the action.

They vary in size. There are standard study bedrooms with shared facilities, standard en-suite and deluxe rooms. The one pictured here is a standard study bedroom in the Endcliffe Village. Come and see for yourself on one of our Open Days (page 12).

In 2010–11, rents ranged from around £75 to £130 per week, depending on the type of room. When you apply for a place on a course, we’ll send you a brochure with details. For the latest info, see our website: www.sheffield.ac.uk/housing
Greenest
City in England
(150 woodlands & 50 public parks)

Safest
Among the safest major cities in the UK
(Home Office statistics)

‘Five stars’
“Sheffield is a top university across the board”
The Virgin 2011 Alternative Guide to British Universities
Our Open Days

If we offer you a place on a course, we’ll invite you to one of our departmental Open Days, which are usually held between November and March. Don't miss this chance. It’s a great way to get a feel for the place. You’ll get a full tour of the campus, talk to staff and students and see the accommodation. In the meantime, you’re welcome to attend one of the University Open Days which take place between June and September.

www.shef.ac.uk/opendays/

How to apply

All applications are made online via UCAS:

www.ucas.com

Contact

ACSE Admissions Team
Department of Automatic Control and Systems Engineering
The University of Sheffield
Mappin Street
Sheffield S1 3JD
United Kingdom

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

www.sheffield.ac.uk/acse
“The thing I enjoy most about my course is the hands on approach that it takes. Not only do you learn all the theory behind systems you can actually apply it in the labs that we get. This helps you learn more about the subject as you actually have to apply it to real systems instead of just seeing a page full of equations. The IT facilities available in the ACSE department building (Sir Henry Stephenson) are some of the best in the university. They offer all the programmes you need as well as being available throughout most of the day. The department also supports us through our online learning environment, all members of staff upload lecture slides podcasts etc which are very useful if you didn’t grasp a concept the first time round. My personal tutor is very helpful with any problem and is always happy to help.”

Paul J C Hughes
1st Year, MEng Computer Systems Engineering

Final Year Project: Investigating ‘Robot Swarming’

Highly ranked by our students
The Times Higher Education student experience survey 2012, ranked 3rd across the UK

National Student Survey 2012, student satisfaction 96% Mechatronic and Robotic Engineering (one of the best course profiles in the Russell Group of Universities).

Excellent Research
We have been ranked sixth amongst UK Electrical & Electronic Engineering departments in the 2008 Research Assessment Exercise and 25% of our work is considered “world-leading”.
