At the heart of modern engineering.

Postgraduate Degrees in Systems & Control Engineering

www.sheffield.ac.uk/acse
MSc Advanced Control & Systems Engineering

Course Structure

Control and Systems Engineering is an all encompassing discipline which can be utilised in almost every industry from aerospace and transport to energy and the environment; from life sciences and healthcare to manufacturing and robotics. It is at the very heart of modern society and demand for control and systems engineers is increasing as more systems become digitised.

This course is suitable for graduates from a variety of engineering and scientific backgrounds, including Maths, Physics or another science related subject. It is structured to support students as they gain a comprehensive introduction to systems and control engineering, whilst also teaching you about the latest developments and future expansion in this field.

There is a strong focus on the generality of these concepts ensuring that you will be equally prepared for careers in a variety of disciplines that rely on control and systems engineering. An emphasis is also placed on the development of your practical and transferable skills, through laboratory work, working with advanced control and systems software packages, and project work.

What will you learn?

In the first semester, you will also learn about state-space, non-linear and optimal control as well as signal processing and estimation including the following:
- Introductory Maths and MATLAB,
- Systems Modelling and Simulation,
- Control Systems Analysis and Design,
- Digital Control Systems.

In the spring semester, you will have the opportunity to pick from a range of specialist modules.

How do we teach?

You will be taught in lab sessions and lectures. As well as conventional labs, we have portable equipment that you can use to explore core concepts away from the normal teaching environment.

A third of your assessment will be a major project, which will be comprised of a mix of theoretical, practical and industry-related work. The project is an ideal opportunity for you to focus on an area of particular interest to you.

Key Facts

Duration: 12 months
Entry requirements: 1st or upper 2nd class honours degree (or equivalent). Alternatively you might be an experienced professional, thinking about updating your knowledge of the subject.

Please note: You will need to have excellent mathematical notation and basic computer programming skills to thrive on this course.

Language requirements: IELTS 6.5 (6 in each competency)

Fees:
- UK/EU: £11,650
- International Students: £21,450

Get more out of your MSc

MSc in Advanced Control & Systems Engineering with Industry Placement

This option comes with the opportunity of an industry placement. It still offers the same exciting mix of theory, practice and research but will also provide you with the hands on experience of a real-life engineering environment.

You are expected to find your own placement, but there is plenty of support from University staff, including specialist staff within the Department of ACSE. During your placement you will stay in regular contact with the Department, and will be visited by the Placements Tutor or Course Director.

MSc in Advanced Control & Systems Engineering with Industrial Management

Adding on the Industrial Management option to the standard MSc will not only teach you about the fundamental and advanced concepts of modelling, simulation, control, optimisation and systems engineering, but also provide you with a range of management techniques, including:
- project management,
- risk management,
- professional skills,
- effective management of innovative development.
**Our new MRes in Control and Systems Engineering provides you with an excellent introduction to research methods while benefiting from lectures and lab work to consolidate your knowledge in the discipline.**

During your MRes, you will subsidise your knowledge with taught modules while having the freedom to pursue a research topic of your choosing. You will specialise in an area of Control and Systems Engineering you are passionate about.

There are a wide range of research areas for you to study. Working with your project leader, you will learn vital skills needed for you to succeed in a career in research. You will cover researching techniques, collating data, report writing and presentation skills.

You will want to research a specific area of control and systems engineering. What will you learn?

The majority of your study will be dedicated to your research project. Taught modules will allow you to gain knowledge in:

- State-space, optimal control and nonlinear systems
- Signal processing and estimation

You will also develop key research skills which you will use while completing your year-long control research project.

**How we teach.**

You will receive training in research skills and will undertake a major project of your own - allowing you to specialise even further. There will also be opportunities to contribute to other projects throughout the course.

Our teaching uses lectures, tutorials, laboratory work and individual assignments.

**Key Facts**

- **Duration:** 12 months
- **Entry requirements:** 1st class honours degree (or equivalent).
- **Language requirements:** IELTS 6.5 (6 in each competency)
- **Fees:**
  - UK/EU: £11,650
  - International Students: £21,450
- **How to Apply:** See www.sheffield.ac.uk/acse/masters/apply
MSc Robotics

Course Structure

Our MSc in Robotics moves beyond the traditional approaches to robotics and enters a new phase of autonomous Robotics and Systems (RAS). While studying on the MSc, you will take an interdisciplinary perspective to the advanced knowledge, understanding and skills of the next generation of autonomous systems.

In this era dominated by information and intensive data exchanges, RAS is promising to deliver a step change in the way we live, work and interact on a day-to-day basis.

Governments across the globe are encouraging industries to focus on the long awaited fourth industrial revolution, the so-called Industrie 4.0, where cyber-physical systems, including RAS, the ‘internet of things’ and cloud computing, will play a significant role. The challenge will be to translate academic research in RAS into applications that will satisfy the needs for such a revolution. The scope for these applications are limitless across all industries and sectors from manufacturing to defence, healthcare to finance.

Our MSc in Robotics will provide you with the opportunity to translate and develop your existing knowledge, understanding and skills to become an expert in RAS. You will specialise in one or more aspects of RAS which will allow you to focus on your own particular interests which will then lead into your advanced project.

The course is delivered by world-leading experts in Engineering and Science drawn from several University of Sheffield Departments, including the Departments of Automatic Control & Systems Engineering (leading department), Computer Science, Electronic and Electrical Engineering, and Psychology. You will work with academic and research staff within the department during the duration of your MSc.

Who should take this course?

You will be looking to specialise in robotics in a specific area. You will be passionate about developments in robotics and the potential for autonomous systems to transform the way we live. You will have the ambition to become a research or industrial leader in your field. Students with a background in engineering, mathematics or science, such as physics or biology, will thrive on this course.

What will you learn?

During the course you will develop a broad understanding of the key pillars of RAS: sensing and perception, cognition and autonomy, control (action) and robotic devices. Students will undertake a range of modules related to robotics, including:

- State Space Control Design
- Feedback Systems Design
- Multisensor and Decision Systems
- Real-Time Embedded Systems
- Mobile robotics, and computational neuroscience.

You will take four core modules covering key aspects of the subject area. You will also be able to specialise in depth in one or more aspects of RAS, taking modules to allow you to develop an advanced knowledge and understanding in areas of your choice. This range of choice allows you to focus on your own particular interests which will then lead into your advanced project.

Further details about module information and course structure can be found on the ACSE website.

How do we teach?

You will be taught and assessed through a variety of methods, including; lectures and seminars, practical and laboratory classes, tutorials and problem-solving, coursework assignments (which can be individual or connected exercises) and design classes.

Set course texts and background materials are available through the University libraries and via the Internet. Active learning is fostered and promoted through engagement in practical work, such as exercises.

Key Facts

Duration: 12 months
Entry requirements: 1st or upper 2nd class honours degree (or equivalent).
Alternatively you might be an experienced professional, thinking about updating your knowledge of the subject.
Language requirements: IELTS 6.5 (6 in each competency)
Fees: UK/EU: £11,650
International Students: £21,450
How to Apply: See www.sheffield.ac.uk/acse/masters/apply
MSc in Autonomous & Intelligent Systems

Course Structure

As the need and scope for robots in all aspects of society grows, so does the market for those trained in Control and Systems Engineering, especially those with a background in Autonomous and Intelligent Systems. From manufacturing lines to healthcare, many systems in industry and the public sector are becoming self-managing and are required to be adaptable to ensure safety and efficiency.

The MSc in Autonomous and Intelligent Systems covers all major aspects of Control and Systems Engineering with an emphasis on system autonomy and intelligence. Autonomous systems is a fast changing area and has applications in a range of modern engineering disciplines including computer science, mechanical engineering, electrical and electronic engineering and materials science engineering.

You will develop an extensive understanding of the field of autonomous and intelligent systems, studying subjects such as artificial intelligence, autonomous agents, evolving intelligent systems, and intelligent control theory.

Who should take this course?

You will have a background in control and systems engineering with a degree in the discipline or equivalent experience. Alternatively, you could have studied a degree in mechatronics and robotics or computer systems engineering.

You will have a keen interest in autonomous and intelligent systems, their development, and their application in society. Our students will be looking to pursue a career in industry or research relating to the discipline.

The MSc is aimed at people who understand concepts in control theory and have experience in building complex control systems. You will have knowledge in engineering, mathematics and computer science.

What will you learn?

You will begin your studies looking at a range of autonomous and intelligent systems including:

- Multivariable Control Systems
- Agent based modelling and multi-agent systems
- Data modelling and machine learning

In the spring semester, you will study core modules including Intelligent and Vision Systems and Cybersecurity for Control Systems. You will also have the opportunity to pick from a range of specialist modules.

How we teach.

Our teaching uses lectures, tutorials, laboratory work and individual assignments.

You will receive training in research skills and will undertake a major project of your own - allowing you to specialise even further. This will form part of your final assessment. There will also be opportunities to contribute to other projects throughout the course.

Key Facts

Duration: 12 months

Entry requirements: 1st or upper 2nd class honours degree (or equivalent). Alternatively you might be an experienced professional, thinking about updating your knowledge of the subject.

Please note: You will need to have excellent mathematical notation and basic computer programming skills to thrive on this course.

Language requirements: IELTS 6.5 (6 in each competency)

Fees:
- UK/EU: £11,650
- International Students: £21,450

How to Apply: See www.sheffield.ac.uk/acse/masters/apply
Careers and Further Study

In the Destinations of Leavers from Higher Education (DHLE) survey 2016/17, 83% of our students went into employment or further study after completing their Masters with us.

**MSc in Control and Systems Engineering**
Our flagship MSc in Control and Systems Engineering has been running for over 40 years. During this time our graduates have succeeded in becoming leaders in their fields and achieved stellar positions in both industry and academia world-wide.

As an ACSE graduate you are well placed to pursue a career in a range of Engineering fields. These include Manufacturing, Power generation, Aerospace and Healthcare. Many of our graduates go on to work for large international organisations and company’s such as; Jaguar Land Rover, IBM, Rolls – Royce and Unilever.

Alternatively, you may decide you want to pursue a career in academia or research. Many of our graduates continue their study here at the University of Sheffield to pursue a PhD.

**MSc in Robotics & MSc in Autonomous & Intelligent Systems**
The breadth and depth of these MScs will ideally prepare students to either move onto further study for a PhD and Research career or those aiming to move into a career in industry. Our MSc courses have attracted interest from a variety of sectors including manufacturing, healthcare, aerospace and marine.

Both of the MSc courses cover the technical knowledge, understanding and skills along with wider professional skills such as critical thinking, independence, initiative, reflection, project management and communication in order for graduates to excel in their chosen career.

Our students have worked in collaboration with Sheffield Robotics - an institute dedicated to robotic research based at the University of Sheffield - and the Centre for Assistive Technology and Connected Healthcare (CATCH) to find solutions to real issues in industry.

**MRes in Control & Systems Engineering**
After completing your MRes in Control and Systems Engineering, you will be ready to embark on a career in Research and Development or in academia.

This MRes will give you many skills you would need to become a PhD student, and could help you towards a future career as a Research Associate, Research Fellow or lecturer.

For further information about the PhD opportunities we offer, see the ACSE website.

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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.

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.

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

For more information, please contact disability.info@sheffield.ac.uk or call +44 (0)114 222 1303.

**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.

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 https://su.sheffield.ac.uk/advice-support/children-s-services/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 Multi-faith Chaplaincy website at www.sheffield.ac.uk/ssid/chaplaincy/index.
The Department of Automatic Control & Systems Engineering

The Department was established in 1968 in response to the growing importance of Automatic Control and Systems Engineering to all branches of industry world-wide. We have since grown to become the largest Control and Systems Engineering Department in Europe. Our growth has been due to the increasing demand for education in the area and the effects of rapid changes in engineering, computing and technology.

"Advanced Control and Systems Engineering is a very interesting course as it touches on a number of important fields such as Artificial Intelligence, Robotics, Process Engineering and Computer Science. The course has a nice blend of theoretical, practical and lab based work - taught by experts in their respective fields."

Vishanth Vijayakumar, ACSE Graduate - MSc in Advanced Control and Systems Engineering

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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 this course. If there is any inconsistency between this publication and www.sheffield.ac.uk/acse, the information on our website should be taken as correct.