Programme Specification

This specification provides a summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if they take full advantage of the learning opportunities that are provided.

The content of our courses is reviewed annually to make sure it's up-to-date and relevant. Individual modules are occasionally updated or withdrawn. 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. In the event of any change we will inform students and take reasonable steps to minimise disruption.

Programme Details

1. Programme title	Robotics		
2. Award type	Master of Science		
3. Programme details	**FHEQ Level:** 7	**Mode of Study:** Full time	**Duration:** 1 year
4. Faculty	Faculty of Engineering		
5. School	**Owning:** School of Electrical and Electronic Engineering		
6. Accrediting Professional or Statutory Body	Engineering Council Institute of Engineering and Technology (IET) Institute of Measurement and Control (InstMC)		
7. HECoS code *Select between one and three codes from the HECoS vocabulary.*	**Code:** 100170 **Percentage:** 50	**Code:** 101355 **Percentage:** 50	**Code:** **Percentage:**
Programme code (internal use)	ELET002		

9. Programme aims

The programme aims to:	
	Programmes offered by the department are designed to fulfil the University's mission to provide students from diverse backgrounds with the highest quality education in a research-led environment, maximising employability, innovation and globally-recognised graduate skills, putting graduates at the cutting edge of their discipline and equipping them for their future. The programmes are also designed to fulfil the educational requirements of the Engineering Council for Chartered Engineer status. The aim of the MSc in Robotics programme is to create graduates who will become future leaders and innovators in the engineering economy by:
A1	Providing teaching that is informed and invigorated by the research and scholarship of the departments' staff and alert to the benefits of student-centred learning.
A2	Enabling graduates qualified in other engineering, mathematical and scientific disciplines to develop expertise in the area of robotics.
A3	Providing a comprehensive knowledge and understanding of, and subject specific skills in, robotics.
A4	Developing a systematic and creative approach to solving complex problems including deciding on and evaluating appropriate methodologies and taking account of a wide range of factors and uncertainty.
A5	Developing in students initiative, independence of thought, critical thinking, intellectual curiosity, ethical awareness and the business and wider skills necessary for a professional in engineering or a related field.
A6	Developing in students a diverse range of subject-specific and generic skills appropriate to graduate employment both within and outside engineering, including personal responsibility.
A7	Enabling students to maximise their potential and imparting in them a commitment to lifelong learning and continuing professional development.
A8	Satisfying the academic and practical requirements for the award of Chartered Engineer status by meeting the latest accreditation requirements of the Engineering Council UK-SPEC (UK Standard for Professional Engineering Competence).

10. Programme learning outcomes

Knowledge and understanding (K) On successful completion of the programme, students will be able to demonstrate knowledge and understanding of:	
	On successful completion of the programme, students for the MSc, PGDip and PGCert will have the knowledge and understanding of:
K1	Scientific principles and methodologies that underpin robotic systems and related disciplines.
K2	Mathematical, computational and statistical methods and models relevant to engineering and robotic systems in particular, including an appreciation of their limitations.
K3	Design processes and methodologies used in robotic systems.

K4	Business, customer and user needs, including considerations such as the wider commercial, economic and social context of engineering processes and the requirement for engineering to promote sustainable development.
K5	The need for a high level of professional and ethical conduct in engineering, professional codes of conduct and how ethical dilemmas can arise.
K6	Management techniques, including project and change management, their limitations and how they may be applied appropriately in engineering; different roles within an engineering team.
K7	Risk issues, including health & safety, environmental and commercial risk, and risk assessment and management techniques.
K8	Relevant legal requirements governing engineering activities, including personnel, health and safety, contracts, intellectual property rights, product safety and liability issues and an awareness that these may differ internationally.
K9	Key drivers for business success, including innovation, calculated commercial risks and customer satisfaction.
K10	Characteristics of particular equipment, processes, or products and a wide range of engineering materials and components.
K11	Technical literature and other information sources.
K12	Current practice, its limitations and likely new developments, appropriate codes of practice, industry standards and awareness of quality issues and their application to continuous improvement.
K13	Undertaking a significant research-led project in a particular aspect of robotics (MSc only).
Skills and other attributes (S) *When considering the skills and attributes developed in this programme, please refer to the Sheffield Graduate attributes (SGAs). SGAs can be found here* On successful completion of the programme, students will be able to:	
	Upon successful completion of the programme, students will be able to demonstrate the ability to:
S1	Apply and integrate knowledge and understanding across a range of engineering and non-engineering disciplines and the ability to evaluate them critically and apply them effectively in robotics projects including investigating new and emerging technologies.
S2	Apply engineering principles, analytical methods and modelling tools to undertake critical analysis of key engineering processes including identifying, classifying and describing the performance of robotics systems and components.
S3	Apply quantitative and computational methods, including understanding their limitations, in order to solve robotics problems.
S4	Apply an integrated or systems approach to solving complex robotic systems problems.
S5	Extract and evaluate pertinent data, to apply engineering analysis techniques to the solution of unfamiliar robotic systems problems, to work with information that may be incomplete or

	uncertain and understand how to mitigate against this.
S6	Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health and safety, security and risk issues; intellectual property; codes of practice and standards.
S7	Apply advanced problem-solving skills, technical knowledge and understanding to establish rigorous and creative solutions that are fit for purpose for all aspects of the problem including production, operation, maintenance and disposal.
S8	Apply and adapt design processes and methodologies to generate innovative designs for products, systems, components or processes to fulfil new needs and in unfamiliar situations; plan and manage the design process, including cost drivers; evaluate outcomes and commercial risk.
S9	Communicate their work to technical and non-technical audiences.
S10	Apply relevant practical and laboratory skills.
S11	Apply engineering techniques taking account of a range of commercial and industrial constraints.
S12	Exercise initiative and personal responsibility as a team member or leader including monitoring and adjusting a personal programme of work; plan self-learning and improve performance.

11. Learning and teaching methods *(this should include a summary of methods used throughout the programme, including any unique features and should be written with a student focus as this information will display to current students and applicants i.e. prospectus)*

Development of the learning outcomes is promoted through the following teaching and learning methods:

Lectures and Seminars are presentations to a class of students by a lecturer. The purpose of a lecture is to motivate interest in a subject, to convey the core concepts and information content succinctly and to point students towards further sources of information. Lectures are interactive and students are encouraged to ask questions at suitable points. Students are expected to take notes during lectures, adding detail to published course materials (which should be printed and brought to the lecture, when provided in advance on electronic media).

The transition to self-motivated learning is encouraged through specialist teaching materials such as lecture handouts or copies of lecture slides, supplied via the University's VLE. Set course texts and background materials are available through the University libraries, at bookshops and also via the Internet. Active learning is fostered and promoted through engagement in practical work, such as exercises, assignments and projects.

Practical/Laboratory Classes introduce experimental methods and provide opportunities for developing team working and communication skills. Students gain essential practical skills in the use of equipment, design and conduct of experiments, and use of appropriate analysis tools. Includes computer laboratories where students learn to work with computers, programming, software engineering or use of software tools. Laboratories also reinforce lecture material and demonstrate theoretical concepts in a practical context and are subject to limitations and uncertainty.

Tutorials and Problem-Solving Classes are sessions conducted by a lecturer with a class of students, in which exercises are completed interactively and solutions are provided within the period. The purpose of such a class is to help students engage with, and assimilate the material presented in lectures, start to apply this knowledge and develop problem solving skills. These classes also provide students with the opportunity

to resolve issues with their understanding of the lecture material.

Coursework Assignments can be individual or connected exercises in which the student is tasked with conducting a study, the design and implementation of a software system to perform a given task or the researching of a body of information. The results of this work are evaluated by the student and a report submitted of the work carried out.

Design Classes enable students to work on 'open-ended' and often loosely-defined problems related to real engineering situations. They also provide good opportunities for developing team-working and communication skills as well as individual skills.

Individual Investigative Project (for MSc only) is an individual research and/or industrial project at the frontiers of engineering. It is completed under the supervision of a member of academic staff and provides an excellent opportunity for a student to pull together every aspect of their development during the degree. Students will be expected to demonstrate initiative, creativity and a wide range of technical knowledge and understanding and skills appropriate to the project.

12. Assessment and feedback methods *(this should include the range of types of methods used and should be written with a student focus as this information will display to current students and applicants i.e. prospectus)*

Opportunities to demonstrate achievement of the learning outcomes are provided through the following assessment methods:

Written Examinations are used in many modules as the major assessment method and assess students' knowledge and understanding and problem-solving skills.

Laboratory Exercises are assessed in some modules (or may be assessed via associated coursework assignments – see below). These are used to assess the development of skills, appropriate use of laboratory equipment and experimental design. These can be formative, summative or pass/fail.

Coursework Assignments are widely used in design studies, computational exercises, laboratory reports, essays or other work designed to assess the understanding of the module. Assignments are mainly undertaken on an individual basis but are sometimes carried out in small groups. Some modules use coursework assignments as the only or main method of assessment whilst others have this as a minor part with a written examination forming the major part of the overall assessment.

Oral and Poster Presentations are used in some coursework assignments and projects in order to assess the development of presentation and communication skills. These can be conducted by individuals or groups.

In-Class/Online Tests are small tests conducted either during the main teaching periods or in students' own time to assess progress and understanding; they supplement more formal examinations. These can be formative or summative.

Individual Investigative Project (MSc only) is assessed on the student's commitment and progress throughout the project, technical knowledge and understanding, professional and wider skills including critical analysis, independence and initiative. Specific assessment will include reports and presentations.

Self/Peer assessment is used in some modules to assess individual contributions during group work. Students peer assess each other using well defined methodologies, e.g. WebPA. The lecturer will oversee this process and moderate peer assessment as appropriate.

The main teaching, learning and assessment methods adopted for each learning outcome are shown below. In most cases a combination of methods is used.

Version Number:	Purpose / Change:	Cohort affected: (academic year and level)	Date change approved:
1			March 2024
2	Major Amendment	26/27	October 2025

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