University of Sheffield

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. As the content of the University's degree programmes is constantly being developed the information contained in this document is liable to change.

Programme Details

1. Programme title	Artificial Intelligence for Engineering		
2. Final award (e.g. BA, MEng or MSc)	Type: Master of Science	Duration: 1 year	
3. Intermediate/exit awards	Title (if different from main award):		
	Type: Postgraduate Diploma	Duration: 1 year	
	Title (if different from main award):		
	Type: Postgraduate Certificate	Duration: 1 year	
4. Framework for Higher Education Qualifications level	FHEQ Level 7		
5. Faculty	Engineering		
6. School / Department	Electrical and Electronic Engineering		
7. Other schools/depts (providing credit bearing modules for the programme)	Computer Science		
8. Accrediting Professional or Statutory Body	Institution of Engineering and Technology Inst MC		
9. Mode(s) of study	Full-time		
10. HECoS code(s) *Select between one and three codes from the HECoS vocabulary.*	100757	100166	100366
11. Relevant Subject Benchmark Statements	Engineering		
Programme Code(s) (Internal use)	ELET005 / ACST52		

12. Programme aims

The programme aims to:	
A1	educate to the highest possible standard, students from a wide variety of educational, social and cultural backgrounds.
A2	provide a supportive environment for continuing personal and professional development.
A3	enable students to pursue an MSc degree and engage in research-type modules, by providing research training in fundamental or applied research to the highest international standard.
A4	provide access to a graduate Engineering degree course and Continuing Professional Development (CPD) for all individuals with a suitable level of academic ability.
A5	deliver a degree programme with a level of choice, to support industry and fulfil a diversity of individual aspirations.
A6	ensure that teaching is underpinned and inspired by the research attainment and scholarship of staff.
A7	promote in individuals a desire for continuing self-improvement and development of interpersonal and transferable skills.
A8	provide appropriate teaching methods which follow sound pedagogy, but which are suitable to meet the requirements of remote learners.
A9	provide appropriate assessment methods suitable for testing individuals' competencies and skills.
A10	support individuals within their professional career in the field of control and systems engineering and to provide opportunities for career advancement.
A11	deliver masters-level training to upgrade knowledge and skills appropriately beyond BEng degree level offering opportunities for individuals to seek Chartered Engineer status.
A12	enable graduates qualified in other engineering or scientific disciplines to convert to this discipline.
A13	develop conceptual skills for critical analysis of complex engineering problems.
A14	develop knowledge and understanding to analyse and manage a wide range of engineering tasks.
A15	develop and apply subject specific skills in control systems engineering analysis and design.
A16	provide research training to those undertaking research modules or an MSc project and dissertation
A17	prepare students for a professional career in the field of artificial intelligence, as applied to engineering, including the provision of suitable interpersonal skills.
A18	support individuals within their professional career in the field of Autonomous and Intelligent Systems and to provide opportunities for career advancement.

13. Programme learning outcomes

Knowledge and understanding (K) On successful completion of the programme, students will be able to demonstrate knowledge and understanding of:	
K1	Fundamental principles of engineering science relevant to broad-based artificial intelligent systems.
K2	Sound understanding of how to use acquired knowledge effectively and efficiently in all aspects of work in the relevant areas of engineering.
K3	Sound knowledge and understanding of how to apply advanced techniques to problems at the frontiers of knowledge.
K4	Deep knowledge and advanced understanding of specialist areas within applied artificial intelligence
K5	Advanced understanding of the use of information technology for analysis, synthesis and design.
K6	Advanced understanding of the analytical and design methods used in autonomous systems.
K7	Advanced understanding of the essential and advanced concepts of artificial intelligence specific to engineering.
K8	Deep knowledge and understanding to explain broad based techniques for examining autonomous system issues.
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:	
S1	Gather, organise and critically evaluate information needed to formulate and solve problems, having a critical understanding of this process.
S2	Analyse and interpret experimental and other numerical data.
S3	Display creativity and innovation in solving unfamiliar problems.
S4	Exercise creativity, independent thought and judgement demonstrated in an item of individual advanced project work.
S5	Demonstrate oral and written communication appropriate for the presentation of technical information and interaction with specialists in other areas of engineering.
S6	Demonstrate ability in observation, measurement and the design and conduct of experiments through practical experience in the laboratory.
S7	Write computer programs to perform analysis of engineering problems.

S8	Use commercial computer software for analysis, synthesis and design.
S9	Demonstrate skills in personal organisation, time management and self-motivation.
S10	Work collaboratively with others through the development of team skills.
S11	Use IT tools effectively, including industry standard software such as Simulink and Matlab.
S12	Communicate effectively both orally and in writing relating to both qualitative and quantitative information, designed to present essential scientific and technical concepts, of autonomous and intelligent systems.
S13	The ability to apply research methodology.

Students leaving with a PGCert or PGDip exit award will have met all learning outcomes except K4, S3, S4, S13

14. Learning and teaching methods *(this should include a summary of methods used throughout the programme, including any unique features)*

During the taught element of the programme, students will quickly consolidate their mathematical, scientific and computing knowledge along with the fundamentals of systems engineering. They will develop a more extensive knowledge and deeper understanding of artificial intelligence and related subjects during the autumn semester and will be able to select and apply established methods of analysis to solve more difficult problems. They will undertake more detailed design work and students' practical and transferable skills will be further developed. During the spring semester, students will be exposed to advanced methods of analysis for systems engineering problems and will have the opportunity to test their understanding of these methods by applying them to real-world examples. Their knowledge and understanding of professional issues and management will be enhanced.

Over the summer, students will undertake an individual research project, which will allow students to demonstrate the full range of personal, communication and academic skills met within their programme of study. Assessment of the project is primarily based on the quality of the final project report produced by the student although other factors such as the oral presentation, personal qualities demonstrated, etc are taken into account too.

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

The main teaching, learning and assessment methods adopted for each learning outcome are shown below. In most cases a combination of methods is used. In the early modules lectures are the principal means of imparting knowledge, and understanding is gained through a combination of tutorials, example classes, design classes and coursework assignments.

LEARNING OUTCOME	Lectures	Practical classes	Coursework assignments	Tutorials / example classes	Individual investigative project
K1	X	X	X	X	
K2	X	X	X	X	X

K3	X	X	X	X	X
K4		X	X		X
K5	X	X	X	X	
K6	X	X	X	X	X
K7	X	X	X	X	X
K8	X	X	X	X	X
S1	X		X	X	X
S2	X	X	X	X	X
S3					X
S4			X		X
S5		X	X		X
S6		X	X	X	
S7	X	X	X		
S8		X	X	X	X
S9			X		X
S10			X		
S11					X
S12			X		X

S13					X

15. Assessment and feedback methods *(this should include the range of types of methods used)*

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

Knowledge and understanding are primarily assessed in written examinations. However, in the later modules further knowledge and understanding is gained through project work and assessed in written reports and oral presentations. Skills are acquired mainly through coursework and individual or group projects.

LEARNING OUTCOME	Written examinations	Coursework submissions	Class tests	Oral presentations / interviews	Individual project reports
K1	X	X			
K2	X	X	X	X	X
K3	X	X	X	X	X
K4	X	X		X	X
K5	X	X	X		
K6	X	X		X	X
K7				X	X
K8				X	X
S1	X	X			
S2		X			X
S3				X	X
S4		X		X	X

S5	X	X		X	X
S6		X	X		
S7		X	X		
S8		X	X		X
S9	X	X			
S10	X	X			X
S11		X			
S12			X		X
S13		X		X	X

16. Programme structure, progression and assessment regulations

16a. Standard Programme Information (pre-populated for all programmes)

All programmes are expected to adhere to the University of Sheffield's General Regulations. Details of the University's General Regulations can be found here: http://www.sheffield.ac.uk/calendar/

Details of the programme structure and current modules can be found here:

https://www.sheffield.ac.uk/calendar/regs

Further information about studying at The University of Sheffield can be accessed via our web pages at:

https://www.sheffield.ac.uk/study

16b. Progression and assessment requirements *(this should capture information about e.g. progression hurdles, PSRB requirements, resit of component parts, module capping etc)*

Candidates for this degree will follow the requirements outlined in the General Regulations for Higher Degrees. In addition, the award of a degree accredited by the Institution of Engineering and Technology and Inst MC is subject to additional requirements as outlined in the programme regulations.

17. University scheme on optional Year Abroad or Placement Year

Students on this programme may not undertake any of their study abroad because this is a single year Masters' degree programme.

Version Number:	Purpose / Change:	Date:
1	Major amendment inc Title Change	February 2025