University of Hertfordshire UH

School of Physics, Engineering & Computer Science

Title of Programme: BEng (Hons) Robotics and Artificial Intelligence

Programme Code: XXXXX

For Collaborative: Franchise at Hertfordshire College, Changzhou Institute of Technology, China

Programme Specification

This programme specification is relevant to students entering:
01 September 2024

Associate Dean of School (Academic Quality Assurance):
Mariana Lilley

Signature

A programme specification is a collection of key information about a programme of study (or course). It identifies the aims and learning outcomes of the programme, lists the modules that make up each stage (or year) of the programme, and the teaching, learning and assessment methods used by teaching staff. It also describes the structure of the programme, its progression requirements and any programme-specific regulations. This information is therefore useful to potential students to help them choose the right programme of study, to current students on the programme, and to staff teaching and administering the programme.

Summary of amendments to the programme:

Section	Amendment

If you have any queries regarding the changes, please email AQO@herts.ac.uk

Programme Specification BEng (Hons) Robotics and Artificial Intelligence

This programme specification (PS) is designed for prospective students, enrolled students, academic staff, and potential employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the teaching, learning and assessment methods, learning outcomes and content for each module can be found in Definitive Module Documents (DMDs).

Section 1

Awarding Institution/Body	University of Hertfordshire
Teaching Institution	Hertfordshire College, CIT
University/partner campuses	Hertfordshire College, CIT
Programme accredited by	Not applicable
Final Qualification	BEng Hons
All Final Award titles (Qualification and Subject)	Robotics and Artificial Intelligence
FHEQ level of award	6

A. Programme Rationale

The BEng (Hons) in Robotics and Artificial Intelligence programme, offered by the University of Hertfordshire through its franchise partner, the Hertfordshire College, CIT, enables students to develop knowledge and skills in a range of topics, such as industrial automation, IoT, Artificial Intelligence, automobile, communications, and computing controls.

Furthermore, as China rapidly advances with its industrialisation initiatives, the presence of qualified professionals in Robotics and Artificial Intelligence becomes crucial, making this programme a timely and valuable option for the Chinese employment context.

Graduates can expect to gain employment within the industries directly associated within the fields of robotics and artificial intelligence. Alternatively, graduates may continue their education to a postgraduate level, and the University of Hertfordshire has a range of taught MSc and research awards that graduates may consider.

B. Educational Aims of the Programme

Diversity and Inclusion

Our programmes are purposefully designed to enable all students to engage meaningfully with the curriculum by being accessible and representative. We will support students to shape their learning experience, removing barriers and enabling them to succeed. The curriculum explicitly includes multiple and representative perspectives, valuing collective identities and individual diversity. Learning, teaching and assessment activities help students to understand how they can enhance outcomes both for themselves and for others. All students belong to a learning community, and during their studies we really want to hear their voices, encourage them to listen to others, and express themselves.

The programme has been devised in accordance with the University's graduate attributes of programmes of study as set out in UPR TL03.

Additionally, this programme aims to:

- provide a high-quality education in robotics engineering;

- provide an education for the individual which enhances his/her prospects of professional employment in engineering and business both in national and international industries;
- provide studies which develop an awareness of, and underpinning knowledge and understanding of a broad range of Robotics and Artificial Intelligence areas of expertise;
- provide studies which enable the student to attain a high level of expertise in a range of topics specific to their named award.

Graduate Attributes
Our graduates will be capable and professional, creative and enterprising, and will build their social and global awareness throughout. In addition to their subject expertise and proficiency, as a University of Hertfordshire graduate, they will be:
- Professionally focused
- Globally minded
- Sustainability driven
- Digitally capable and confident
- Inclusive and collaborative
- Evidence based and ethical

C. Intended Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas. The programme outcomes are referenced to the QAA benchmark statements for Engineering and the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2014) and relate to the typical student. Additionally, the SEEC Credit Level Descriptors for Further and Higher Education (2021) have been used as a guiding framework for curriculum design.

Knowledge and Understanding	Teaching and learning methods	Assessment strategy
A1- Knowledge and understanding of the scientific principles and methodology underpinning robotics engineering & artificial intelligence, and an understanding, to enable appreciation of the scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies. A2- Knowledge and understanding of mathematical and statistical methods underpinning robotics engineering & AI, and to enable the application of a range of mathematical and statistical methods, tools and notations proficiently in the analysis	Acquisition of knowledge and understanding is through the following approaches: Acquisition of A1 and A2 is through a combination of lectures, small group tutorials, coursework and laboratory work at levels 4 and 5 of the programme. Additional support is provided through the Academic Support Hubs which includes English Support Service and Maths Support Service. Specialist aspects of A2 are further developed at level 6. Acquisition of A3 is through a combination of lectures, projects and coursework throughout the programme. Staff deploy a range of teaching and learning strategies in the most appropriate way for each individual module. This will vary	Knowledge and understanding are assessed through combination of unseen examinations and in-course assessments in the form of laboratory reports, essays and phase tests. Some aspects of knowledge and understanding are assessed by design exercises and project reports and presentations. At level 6 some aspects of A3 are assessed by case study reports.

and solution of engineering problems. A3- Ability to apply and integrate knowledge and understanding of other engineering disciplines to support a study of robotics engineering & AI.	depending on the subject nature of a particular module and the level of study. A more didactic approach will tend to be adopted at lower levels, in particular for A1 and A2. An increasingly self-directed and interactive approach will be adopted at higher levels, particularly for A3. Throughout, the learner is encouraged to undertake independent study both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.	
Knowledge and Understanding (Economic, Legal, Social, Ethical & Environmental Context)	Teaching and learning methods	Assessment strategy
A4- Understanding of the need for a high level of professional and ethical production in engineering and a knowledge of professional codes of conduct. A5- Knowledge and understanding of the commercial, economic, and social context of engineering processes. A6- Knowledge and understanding of management techniques, including project management that may be used to achieve engineering objectives. A7- Understanding of the requirement for engineering activities to promote sustainable development and ability to apply quantitative techniques where appropriate. A8- Awareness of the relevant legal requirements governing	The economic, legal, social, ethical, and environmental context of the role of engineers is developed in a series of project-based exercises through the programme, and reinforced by a taught module at the start of the programme	A4 to A9 are assessed by coursework, project reports, technical reports, and presentations.

engineering activities, including personnel, health and safety, contracts, intellectual property rights, product safety and liability issues. A9- Knowledge and understanding of risk issues, including health and safety, environmental and commercial risk, risk assessment and risk management techniques.		
Intellectual skills	Teaching and learning methods	Assessment strategy
B1- Understanding of engineering principles and the ability to apply them to analyse of key engineering processes. B2- Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques. B3- Ability to apply quantitative and computational methods in order to solve engineering problems and implement appropriate action. B4- Understanding of, and the ability to apply, an integrated or systems approach to solving engineering problems.	Engineering analysis skills are developed throughout the programme by the methods and strategies outlined for section A of the intended learning outcomes above, again moving from a more didactic approach to an increasingly self-directed and interactive approach at higher levels, particularly for B2, B3 and B4. Analysis, problem solving and modelling skills are further developed through tutorial work, laboratory work, in-course exercises and project work. Throughout, the learner is encouraged to develop intellectual skills further by independent study.	Engineering analysis skills B1, B2 and B4 are assessed through unseen examination papers, laboratory reports and coursework related to in-course exercises. Engineering analysis skills B3 are assessed through project reports and presentations.
Practical skills	Teaching and learning methods	Assessment strategy
C1- Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics. C2- Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical health, safety, security and risk issues; intellectual property; codes of practice and standards.	Skills for design are developed throughout the programme by the methods and strategies outlined above, again moving from a more didactic approach to an increasingly self-directed and interactive approach at higher levels, particularly for C3 and C4. Feedback is given to all students on all coursework produced. Throughout, the learner is encouraged to develop intellectual skills further by independent study.	C1, C2, C5 and C6 are assessed though unseen examination, coursework, project reports, technical reports, and oral presentations. C3, C4 is assessed by review of group project work.

C3- Work with information that may be incomplete or uncertain, and quantify the effect of this on the design. C4- 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. C5- Plan and manage the design process, including cost drivers, and evaluate outcomes. C6- Communicate their work to technical and non-technical audiences.		
Practical skills (Engineering Practice)	Teaching and learning methods	Assessment strategy
C7- Understanding of contexts in which engineering knowledge can be applied (e.g., operations and management, application, and development of technology, etc.) C8- Knowledge of characteristics of particular materials, equipment, processes, or products. C9- Ability to apply relevant practical and laboratory skills. C10- Understanding use of technical literature and other information sources. C11- Knowledge of relevant legal and contractual issues. C12- Understanding of appropriate codes of practice and industry standards. C13- Awareness of quality issues and their application to continuous improvement. C14- Ability to work with technical uncertainty.	Staff deploy a range of teaching and learning strategies in the most appropriate way for each individual module. This will vary depending on the subject nature of a particular module and the level of study. A more didactic approach will tend to be adopted at lower levels, in particular for C7, C8, C9, C10 and C15. Acquisition of skills for C11, C12 and C13 are through a combination of formal lectures and tutorials, as well as project-based work. An increasingly self-directed and interactive approach will be adopted at higher levels, particularly for C12, C13 and C14.	Engineering practice is assessed through combination of unseen examinations and in-course assessments. Assessments take many forms as appropriate, and include laboratory reports, demonstrations, essays, and phase tests.

C15- Understanding of, and the ability to work in, different roles within an engineering team.		
Transferable skills	Teaching and learning methods	Assessment strategy
D1- Apply their skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities. D2- Plan self-learning and improve performance, as the foundation for lifelong learning/CPD. D3- Plan and carry out a personal programme of work, adjusting where appropriate. D4- Exercise initiative and personal responsibility, which may be as a team member or leader.	Transferable skills are developed through the programme by the methods and strategies outlined in above. D1 is developed through feedback on coursework reports, oral presentations and project reports. D2 is developed in a dedicated module that emphasises the role of such practice. D3 is developed through project work planning and throughout the programme. D4 is developed through group project and assignment work. Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.	Transferable skills are assessed through the following approaches: D1 and D2 are assessed though coursework, individual project and technical reports and oral presentations. D3 and D4 are assessed by review of an individual's progress during individual project work.

D. Programme Structures, Features, Levels, Modules, and Credits

The programme is offered in full-time (3 years) mode, and leads to the award of a BEng Degree with Honours in Robotics and Artificial Intelligence. Other award outcomes are listed in Table 1b. Intake is normally A(September).

Professional and Statutory Regulatory Bodies
N/A

Work-Based Learning, including Sandwich Programmes
N/A

Student Exchange programme
Incoming Exchange
N/A

Study Abroad
N/A

Programme Structure
The programme structure and progression information below (Table 1a and 1b) are provided for the Honours award. Any interim awards are identified in Table 1b. The Programme Learning Outcomes detailed above are developed and assessed through the constituent modules. Table 2 identifies where each learning outcome is assessed.

Table 1a Outline Programme Structure
Mode of study: Full Time

Entry point: Semester A (September)

Level 4

Compulsory Modules Module Title	Module Code	Credit Points	%Test	% Examination	% Coursework	% Practical	Semesters
Introduction to Robotics	4FTC2128	15	40	0	60	0	A
Digital Electronics	4FTC2129	15	40	0	60	0	A
Math for Robotics and Artificial Intelligence	4FTC2130	15	25	50	25	0	A
Robot Design and Build Part A	4FTC2131	15	0	0	100	0	A
Programming	4FTC2132	15	100	0	0	0	B
Professional Engineering	4FTC2133	15	0	0	100	0	B
Digital Computing Principles	4FTC2134	15	100	0	0	0	B
Robot Design and Build Part B	4FTC2135	15	0	0	50	50	B

Progression to level 5 requires a minimum of 90 credits. The maximum study rate in such an instance would be 150 credits and students would be expected to redeem any failed modules at the first available opportunity.

Level 5

Compulsory Modules Module Title	Module Code	Credit Points	%Test	% Examination	% Coursework	% Practical	Semesters
Embedded Systems Design	5FTC2168	15	0	0	100	0	A
Behavioural Robotics	5FTC2169	15	25	0	75	0	A
Artificial Intelligence Principles	5FTC2170	15	25	50	25	0	A
Applied Robotics and AI project	5FTC2171	15	0	0	90	10	A
Electronics Practice for Robotics Applications	5FTC2172	15	0	0	60	40	B
Robot Sensors and Signal Processing	5FTC2173	15	0	50	50	0	B
Mechatronics	5FTC2174	15	0	50	50	0	B
Team Project	5FTC2175	15	0	0	100	0	B

Progression to level 6 requires 210 credits, including 90 credits at level 5. The maximum study rate in such an instance would be 150 credits and students would be expected to redeem any failed modules at the first available opportunity.

Level 6

Compulsory Modules Module Title	Module Code	Credit Points	%Test	% Examination	% Coursework	% Practical	Semesters
Machine Learning	6FTC2178	15	50	0	50	0	A
Visual and Spoken interfaces	6FTC2179	15	0	0	100	0	A
3D Vision	6FTC2180	15	100	0	0	0	A
Industrial Robotics	6FTC2181	15	0	50	50	0	B
Robot Communication	6FTC2182	15	0	50	50	0	B
Mobile Robots and Drones	6FTC2183	15	50	0	50	0	B
BEng Individual Major Project (Robotics & AI)	6FTC2184	30	0	0	80	20	AB

The award of an Honours degree in Robotics and Artificial Intelligence requires 360 credit points including 240 at level 6/5 of which 120 must be at level 6.

Honours classification

The University has approved structure and assessment regulations common to all programmes. Full details are provided in UPR AS14, Section D. However, this programme has specific regulations relating to the determination of Honours classification given under the Programme-Specific Regulations at the end of Section D.

Table 1b Final and interim awards available

The programme provides the following final and interim awards:

Final Award	Award Title	Minimum requirements	Available at end of Level	Programme Learning Outcomes developed (see above)
BEng (Hons)	Robotics and Artificial Intelligence	360 credit points including 240 at level 6/5 of which 120 must be at level 6	6	All programme learning outcomes (see Table 2)

Interim Award	Award Title	Minimum requirements	Available at end of Level	Programme Learning Outcomes developed (see above)
University Certificate		45 credit points at level 4	4	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Certificate of Higher Education		120 credit points at level 4	4, 5	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Diploma of Higher Education		240 credit points including at least 120 at level 5	5, 6	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
BEng	Robotics and Artificial Intelligence	300 credit points including 180 at level 6/5 of which 60 must be at level 6	6	A subset of programme learning outcomes for the award (see Table 2), depending on modules passed.

Programme-specific assessment regulations

The programme complies with the University's academic regulations (in particular, UPR AS11, UPR AS13 and UPR AS14) with the exception of those listed below, which have been approved by the University:

- Students exiting with a BEng (Hons) award shall have their degree classification determined in accordance with UPR AS14 and include the individual project in the calculation of degree.

Course Code	Course Instance	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
XXXXX	XXXXX	BEng (Hons) Robotics and Artificial Intelligence	BEng Individual Major Project (Robotics & AI) 6FTC2184	yes

- Additionally, students who are offered a re-enrolment opportunity on BEng Individual Major Project (Robotics & AI) 6FTC2184, will normally be allocated an entirely different project in their repeat opportunity.

E. Management of Programme & Support for student learning.

Management

The programme is managed and administered through:

- Dean of Hertfordshire College, CIT.
- UH Executive Dean.
- UH SPECS International Franchise Manager.
- Associate Dean (AQA, Learning and Teaching) of Hertfordshire College, CIT.
- Associate Dean (Student Experience) of Hertfordshire College, CIT.
- The Programme Leader at Hertfordshire College, CIT who has overall responsibility for the effective operationalisation of the programme, ensuring that academic standards are maintained, and an effective student learning experience is provided. The Programme Leader is also responsible for chairing the programme committee.
- A Collaborative Partnership Leader, based at UH, to provide support and facilitate communication between UH and Hertfordshire College, CIT.
- Module Leaders at Hertfordshire College, CIT who are responsible for individual modules.
- A Programme committee that includes the above key stakeholders and student representatives.
- An Admissions Tutor at Hertfordshire College, CIT with specific responsibility for admissions and open days, where necessary, liaise with UH CPL and/or admissions tutor regarding special admissions cases.
- A designated administrative team to deal with day-to-day administration associated with the modules within the programme.

Support

Students are supported by:

- An induction week at the beginning of each new academic session.
- A Programme Handbook which provides information about the programme, the support services available and the calendar of events for the year.
- A Student Development Centre that provides advice on issues such as finance, accommodation, University regulations, study abroad, etc.
- A Student Support Hub which includes full-time Personal Tutor(s) and Assistant Programme Leader(s) who will be an important point of contact. Personal Tutor(s) can provide advice on non-academic issues, Assistant Programme Leader(s) can provide one-on-one guidance on academic issues.
- A versatile on-line inter-active intranet and learning environment.
- Guided student-centred learning on Canvas module sites.
- Access to extensive digital and print collections of information resources.
- Attractive modern study environment in library.
- An Academic Support Hub which includes academic English support, Maths support, computer programming support, technical writing support.
- Technical support staff and access to computer and technical laboratories.
- Programme Leader who can advise on programme issues.
- Module teaching teams who provide academic support.
- A project supervisor.
- A Careers and Employment Centre that supports students looking for graduate employment.
- A Special-needs Support Office that assists students with virous special needs.
- Medical Centre.
- Mental Health Advisory Support Centre.
- Changzhou Institute of Technology Student's Union.
- Dedicated programme site.

F. Other sources of information

In addition to this Programme Specification, Hertfordshire College, CIT publishes guidance to registered students on the programme and its constituent modules:

- A dedicated programme site;
- A Definitive Module Document (DMD) for each constituent module;

The Programme Handbook provides information on a wide range of resources and services available at the Hertfordshire College, CIT including academic support, accommodation, fees, funding, wellbeing services and student societies.

As a condition of registration, all students of the University of Hertfordshire are required to comply with the University's rules, regulations and procedures. These are published in a series of documents called 'University Policies and Regulations' (UPRs). The University requires that all students consult these documents which are available on-line, on the UPR web site, at: http://www.herts.ac.uk/secreg/upr/. In particular, UPR SA07 'Regulations and Advice for Students' Particular Attention - Index' provides information on the UPRs that contain the academic regulations of particular relevance for undergraduate and taught postgraduate students.

In accordance with section 4(5) of the Higher Education and Research Act 2017 (HERA), the UK Office for Students (OfS) has registered the University of Hertfordshire in the register of English higher education providers. The Register can be viewed at: https://www.officeforstudents.org.uk/advice-and-guidance/the-register/the-ofs-register/.

G. Entry requirements

The normal entry requirements for the programme are:

Level 4 Entry:

- Applicants should have passed the minimum control line for undergraduates on the National College Entrance Examination (NCEE), which must include Mathematics and Physics.

Plus:

- Demonstrate a proficiency in English to IELTS 6.0 with minimum 5.5 in each band or an equivalent recognised qualification (including pass the Pre-Sessional English course).

Entry is only at level 4.

If you would like this information in an alternative format please contact: cpuadmin@herts.ac.uk

If you wish to receive a copy of the latest External Examiner's Report for the programme, please email a request to aqo@herts.ac.uk

BEng(Hons) Robotics and Artificial Intelligence

Table 2: Development of Intended Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are delivered and assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

			Programme Learning Outcomes (as identified in section 1 and the following page)																														
			Knowledge & Understanding									Intellectual Skills				Practical Skills															Transferable Skills			
	Module Title	Module Code	A1	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	D1	D2	D3	D4
Level 4	Introduction to Robotics	4FTC2128	X			X	X			X					X							X			X	X	X						
	Digital Electronics	4FTC2129							X			X	X						X	X			X										
	Math for Robotics and Artificial Intelligence	4FTC2130		X										X				X	X	X									X	X				
	Robot Design and Build Part A	4FTC2131			X						X		X		X	X	X				X			X	X					X			X	X
	Programming	4FTC2132												X									X								X			
	Professional Engineering	4FTC2133				X	X	X	X	X						X				X		X				X	X	X				X	X	
	Digital Computing Principles	4FTC2134							X			X	X					X	X	X							X				X			
	Robot Design and Build Part B	4FTC2135	X	X	X			X			X		X		X	X	X		X		X			X	X				X	X		X		X
Level 5	Embedded Systems Design	5FTC2168											X	X	X							X	X	X										
	Behavioural Robotics	5FTC2169			X	X									X		X										X							
	Artificial Intelligence Principles	5FTC2170			X									X				X	X										X					
	Applied Robotics and AI project	5FTC2171	X				X	X	X	X	X	X			X	X				X	X				X	X				X	X	X	X	X
	Electronics Practice for Robotics Applications	5FTC2172			X																			X										
	Robot Sensors and Signal Processing	5FTC2173		X	X									X					X									X	X					
	Mechatronics	5FTC2174		X								X	X	X				X				X		X			X	X						
	Team Project	5FTC2175	X			X	X	X	X	X	X				X	X	X			X	X				X	X				X	X	X	X	X
Level 6	Machine Learning	6FTC2178		X					X				X				X		X			X			X								X	
	Visual and Spoken interfaces	6FTC2179	X		X		X	X					X	X				X				X			X						X			
	3D Vision	6FTC2180		X				X				X				X				X			X			X	X							
	Industrial Robotics	6FTC2181	X	X		X				X	X	X		X	X			X			X										X	X		
	Robot Communication	6FTC2182			X								X										X	X			X	X	X					
	Mobile Robots and Drones	6FTC2183			X	X	X	X			X				X	X	X		X	X	X				X	X				X		X	X	X
	BEng Individual Major Project (Robotics & AI)	6FTC2184	X			X	X			X					X							X			X	X	X							

KEY TO PROGRAMME LEARNING OUTCOMES

Knowledge and Understanding

A1. Demonstrate knowledge and understanding of scientific principles and methodology underpinning robotics engineering and artificial intelligence, and an understanding, to enable appreciation of the scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies.

A2. Demonstrate knowledge and understanding of mathematical and statistical methods underpinning robotics engineering and AI, and to enable the application of a range of mathematical and statistical methods, tools, and notations proficiently in the analysis and solution of engineering problems.

A3. Be able to apply and integrate knowledge and understanding of other engineering disciplines to support a study of robotics engineering and AI.

A4. Demonstrate knowledge and understanding of the need for a high level of professional and ethical production in engineering and a knowledge of professional codes of conduct.

A5. Demonstrate knowledge and understanding of the commercial, economic, and social context of engineering processes.

A6. Demonstrate knowledge and understanding of management techniques, including project management that may be used to achieve engineering objectives.

A7. Demonstrate knowledge and understanding of the requirement for engineering activities to promote sustainable development and ability to apply quantitative techniques where appropriate.

A8. Demonstrate knowledge and understanding of relevant legal requirements governing engineering activities, including personnel, health and safety, contracts, intellectual property rights, product safety and liability issues.

A9. Demonstrate knowledge and understanding of risk issues, including health and safety, environmental and commercial risk, risk assessment and risk management techniques.

Practical Skills

C1. Be able to demonstrate understanding and evaluate business, customer, and user needs, including considerations such as the wider engineering context, public perception, and aesthetics.

C2. Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical health, safety, security, and risk issues; intellectual property; codes of practice and standards.

C3. Work with information that may be incomplete or uncertain and quantify the effect of this on the design.

C4. 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.

C5. Plan and manage the design process, including cost drivers, and evaluate outcomes.

C6. Communicate their work to technical and non-technical audiences.

C7. Demonstrate understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, application, and development of technology, etc.)

C8. Demonstrate understanding of characteristics of particular materials, equipment, processes, or products.

C9. Be able to apply relevant practical and laboratory skills.

C10. Be able to use technical literature and other information sources.

C11. Demonstrate knowledge of relevant legal and contractual issues.

C12. Demonstrate understanding of appropriate codes of practice and industry standards.

C13. Demonstrate awareness of quality issues and their application to continuous improvement.
C14. Be able to work with technical uncertainty.
C15. Demonstrate understanding of, and be able to work in, different roles within an engineering team.

Intellectual Skills

B1. Demonstrate understanding of engineering principles and be able to apply these to analyse of key engineering processes.

B2. Be able to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.
B3. Be able to apply quantitative and computational methods in order to solve engineering problems and implement appropriate action.
B4. Demonstrate understanding of, and be able to apply, an integrated or systems approach to solving engineering problems.

Transferable Skills

D1. Apply their skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities.
D2. Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.
D3. Plan and carry out a personal programme of work, adjusting where appropriate.
D4. Exercise initiative and personal responsibility, which may be as a team member or leader.

Table 3: Development of Graduate Attributes in the Constituent Modules

This map identifies where the Graduate Attributes are delivered in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the development of the Graduate Attributes (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own personal and professional development as the programme progresses. [Note that there is no requirement for the Graduate Attributes to be assessed through these modules]

D = Delivered

	Module Title	Module Code	Professionally Focused	Globally Minded	Sustainability Driven	Digitally capable & confident	Inclusive and collaborative	Evidenced based and Ethical
Level 4	Introduction to Robotics	4FTC2128	D			D		D
	Digital Electronics	4FTC2129	D			D		D
	Math for Robotics and Artificial Intelligence	4FTC2130	D			D		D
	Robot Design and Build Part A	4FTC2131	D			D		D
	Programming	4FTC2132	D			D		D
	Professional Engineering	4FTC2133	D	D	D	D	D	D
	Digital Computing Principles	4FTC2134	D			D	D	D
	Robot Design and Build Part B	4FTC2135	D			D		D
Level 5	Embedded Systems Design	5FTC2168	D			D		D
	Behavioural Robotics	5FTC2169	D			D		D
	Artificial Intelligence Principles	5FTC2170	D			D		D
	Applied Robotics and AI project	5FTC2171	D			D		D
	Electronics Practice for Robotics Applications	5FTC2172	D			D		D
	Robot Sensors and Signal Processing	5FTC2173	D			D		D
	Mechatronics	5FTC2174	D			D		D
	Team Project	5FTC2175	D			D	D	D
Level 6	Machine Learning	6FTC2178	D			D		D
	Visual and Spoken interfaces	6FTC2179	D			D		D
	3D Vision	6FTC2180	D			D		D
	Industrial Robotics	6FTC2181	D	D	D	D		D
	Robot Communication	6FTC2182	D	D		D		D
	Mobile Robots and Drones	6FTC2183	D			D		D
	BEng Individual Major Project (Robotics & AI)	6FTC2184	D			D		D

Section 2

Programme management

Relevant QAA subject benchmarking statements	Robotics and Artificial Intelligence
Type of programme	Undergraduate
Date of validation/last periodic review	April 24
Date of production/ last revision of PS	February 2024
Relevant to level/cohort	Level 4 entering September 2024
Administrative School	School of Physics, Engineering & Computer Science
Language of Delivery	English

Table 4 Course structure

Course details			
Course Code	Course Description	HECOS	UCAS
XXXXXX	BEng (Hons) Robotics and Artificial intelligence	100170 (75%) 100359 (25%)	N/A