

School of Physics, Engineering & Computer Science

Title of Programme: BEng / MEng Honours in Robotics and Artificial Intelligence

Programme Code: ECRAI

Programme Specification

This programme specification is relevant to students entering:
01 September 2023

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



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
Table 1a	Professional Engineering 4ENT2051 replaces Professional Engineering 4ENT1180.
Table 1a	Programming 4ENT2053 replaces Programming 4ENT1179.
Table 1a	Electronics Practice for Robotics Applications 5ENT2057 replaces Operating Systems for Applications 5ENT1138.
Table 1a	Mechatronics 5ENT2052 replaces Mechatronics 5ENT1143.
Table 1a	MEng Individual Major Project (Robotics & AI) 6ENT2055 replaces MEng Individual Major Project (Robotics & AI) 6ENT1185.
Table 1a	BEng Individual Major Project (Robotics & AI) 6ENT2048 replaces BEng Individual Major Project (Robotics & AI) 6ENT1186.

Table 1a	MEng Team Project 7ENT2044 replaces MEng Team Project 7ENT1164.
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If you have any queries regarding the changes please email AQO@herts.ac.uk

Programme Specification

MEng Honours in Robotics and Artificial Intelligence

BEng Honours in 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	University of Hertfordshire
University/partner campuses	College Lane
Programme accredited by	None
Final Qualification	BEng Honours / MEng Honours
All Final Award titles	BEng Robotics and Artificial Intelligence
(Qualification and Subject)	BEng Robotics and Artificial Intelligence (Sandwich) BEng Robotics and Artificial Intelligence with Year Abroad BEng Robotics and Artificial Intelligence with Study Abroad
	MEng Robotics and Artificial Intelligence Technology MEng Robotics and Artificial Intelligence Technology (Sandwich) MEng Robotics and Artificial Intelligence Technology with Year Abroad MEng Robotics and Artificial Intelligence Technology with Study Abroad
FHEQ level of award	6 (BEng), 7 (MEng)

A. Programme Rationale

The School offers a variety of MEng/BEng degrees. The programme has been developed to (i) satisfy the QAA Engineering Benchmark requirements (ii) to fulfil the initial partial academic requirements of UK-SPEC for CEng status and (iii) meet the professional employment needs of industry.

Students study a common portfolio of modules covering a broad range of topics necessary for professional Engineering. BEng students with a sufficient level of achievement during levels 4 and 5 are encouraged to consider transfer to the MEng programme. Progression to the MEng programme requires eligibility for at least an upper second-class BEng Honours exit award as defined in UPR AS14 and including the MEng Individual Project at level 6 in the calculation of degree classification.

The School has close contacts with a wide range of engineering companies and students are encouraged to take the sandwich option spending at least 36 weeks on industrial placement between levels 5 and 6. Alternatively, they may consider Study Abroad options.

This new award in Robotics and Artificial Intelligence builds on existing research and teaching expertise in the School of Engineering and Computer Science and addresses a growing demand by government and employers for graduates with this range of knowledge and skills. The award is structured with a strong emphasis on practical work to build students' skills and confidence in the usage and application of contemporary Robotics and AI technologies. Students will learn the elements needed to build a robot, from simple electronic circuitry, software engineering and control, to high-level robot intelligence and will learn how to develop robotic systems and bring the learning to life.

Graduates can expect to gain employment either within the industries directly associated with their named award or in industries associated with Computer and Electronics Engineering in general. Support from companies such as ABB and Ocado have helped the School to design the course to match industry needs.

Alternatively, graduates may continue their education to a post-graduate level and the University of Hertfordshire has a range of taught MEng and MSc awards or 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 are accredited by one or more of the Professional Engineering institutions;
- 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.

	A. Knowledge & Understanding		Teaching and learning methods	Assessment strategy
	BEng	MEng		
A1	SM1p- 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.	SM1m- A comprehensive knowledge and understanding of the scientific principles and methodology underpinning robotics engineering and artificial intelligence, and an understanding and know-how of the scientific principles of related disciplines, to enable appreciation of the scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies.	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 Study Success Hubs which includes the 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 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/learned and to broaden their individual knowledge and understanding of the subject.	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.
A2	SM2p- 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 and solution of engineering problems.	SM2m- 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 and critically in the analysis and solution of engineering problems.		
A3	SM3p- Ability to apply and integrate knowledge and understanding of other engineering disciplines to support a study of robotics engineering & AI.	SM3m- Ability to apply and integrate knowledge and understanding of other engineering disciplines to support a study of robotics engineering & AI and the ability to evaluate them critically and to apply them effectively.		
A4		SM4m – Awareness of developing technologies related to robotics engineering & AI		

A5		SM5m - A comprehensive knowledge and understanding of mathematical and computational models relevant to robotics engineering & AI, and an appreciation of their limitations.		
A6		SM6m – Understanding the range of concepts from a range of areas, including some outside engineering, and the ability to evaluate them critically and to apply them in engineering projects.		
A. Knowledge & Understanding (Economic, Legal, Social, Ethical & Environmental Context)			Teaching and learning methods	Assessment strategy
	BEng	MEng		
A7	EL1p - Understanding of the need for a high level of professional and ethical production in engineering and a knowledge of professional codes of conduct.	EL1m - Understanding of the need for a high level of professional and ethical production in engineering, a knowledge of professional codes of conduct, and how ethical dilemmas can arise.	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.	A7 to A13 are assessed by coursework, project reports, technical reports and presentations.
A8	EL2 - Knowledge and understanding of the commercial, economic and social context of engineering processes.	EL2 - Knowledge and understanding of the commercial, economic and social context of engineering processes.		
A9	EL3p - Knowledge and understanding of management techniques, including project management that may be used to achieve engineering objectives.	EL3m - Knowledge and understanding of management techniques, including project and change management, that may be used to achieve engineering objectives, their limitations, and how they be applied appropriately.		
A10	EL4 - Understanding of the requirement for engineering activities to promote sustainable	EL4 - Understanding of the requirement for engineering activities to promote sustainable development		

	development and ability to apply quantitative techniques where appropriate.	and ability to apply quantitative techniques where appropriate.		
A11	EL5p- Awareness of the relevant legal requirements governing engineering activities, including personnel, health and safety, contracts, intellectual property rights, product safety and liability issues.	EL5m- Awareness of the 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.		
A12	EL6p- Knowledge and understanding of risk issues, including health and safety, environmental and commercial risk, risk assessment and risk management techniques.	EL6m- Knowledge and understanding of risk issues, including health and safety, environmental and commercial risk, risk assessment and risk management techniques, and an ability to evaluate commercial risk.		
A13		EL7m- Understanding of the key drivers for business success, including innovation, calculated commercial risks and customer satisfaction		
B. Intellectual Skills			Teaching and learning methods	Assessment strategy
	BEng	MEng		
B1	EA1p- Understanding of engineering principles and the ability to apply them to analyse of key engineering processes.	EA1m- Understanding of engineering principles and the ability to apply them to undertake critical analysis of key engineering processes.	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.	Engineering analysis skills B1, B2 and B4 are assessed through unseen examination papers, laboratory reports and coursework related to in-course exercises.
B2	EA2p- Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.	EA2- Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.	Analysis, problem solving and modelling skills are further developed through tutorial	Engineering analysis skills B3 are assessed through project reports and presentations.

B3	EA3p- Ability to apply quantitative and computational methods in order to solve engineering problems and implement appropriate action.	EA3m- Ability to apply quantitative and computational methods, using alternative approaches, and understanding their limitations, in order to solve engineering problems and implement action.	work, laboratory work, in-course exercises and project work.	
B4	EA4p- Understanding of, and the ability to apply, an integrated or systems approach to solving engineering problems.	EA4m- Understanding of, and the ability to apply, an integrated or systems approach to solving complex engineering problems.		
B5		EA5m – Ability to use fundamental knowledge to investigate new and emerging technologies.		
B6		EA6m – Ability to extract and evaluate pertinent data and to apply engineering analysis techniques in the solution of unfamiliar problems.		
C. Transferable Skills (Practical skills)			Teaching and learning methods	Assessment strategy
	BEng	MEng		
C1	D1- Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics.	D1- Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics.	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 through unseen examination, coursework, project reports, technical reports and oral presentations. C3, C4 is assessed by review of group project work.
C2	D2- 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.	D2- 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	D3p- Work with information that may be incomplete or uncertain, and quantify the effect of this on the design.	D3m- Work with information that may be incomplete or uncertain, quantify the effect of this on the design and, where appropriate, use theory or experimental research to mitigate deficiencies.	
C4	D4- 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.	D4- 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	D5- Plan and manage the design process, including cost drivers, and evaluate outcomes.	D5- Plan and manage the design process, including cost drivers, and evaluate outcomes.	
C6	D6- Communicate their work to technical and non-technical audiences.	D6- Communicate their work to technical and non-technical audiences.	
C7		D7m – Demonstrate wide knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations.	
C8		D8m – Demonstrate the ability to generate an innovative design for products, systems, components or processes to fulfil new needs.	

C. Transferable Skills (Engineering Practice)		Teaching and learning methods	Assessment strategy
	BEng	MEng	
C9	P1- Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, application and development of technology, etc.)	P1- Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, application and development of technology, etc.)	<p>Engineering practice is assessed through combination of unseen examinations and in-course assessments.</p> <p>Assessments take many forms as appropriate, and include laboratory reports, demonstrations, essays and phase tests.</p>
C10	P2p- Knowledge of characteristics of particular materials, equipment, processes or products.	P2m- Knowledge of characteristics of particular materials, equipment, processes or products, with extensive knowledge and understanding of a wide range of engineering materials and components.	
C11	P3- Ability to apply relevant practical and laboratory skills.	P3- Ability to apply relevant practical and laboratory skills.	
C12	P4- Understanding use of technical literature and other information sources.	P4- Understanding use of technical literature and other information sources.	
C13	P5- Knowledge of relevant legal and contractual issues.	P5- Knowledge of relevant legal and contractual issues.	
C14	P6- Understanding of appropriate codes of practice and industry standards.	P6- Understanding of appropriate codes of practice and industry standards.	
C15	P7- Awareness of quality issues and their application to continuous improvement.	P7- Awareness of quality issues and their application to continuous improvement.	
C16	P8- Ability to work with technical uncertainty.	P8- Ability to work with technical uncertainty.	
C17		P9m – A thorough understanding of current practice and its limitations,	
		<p>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 C9, C10, C11, C12 and C19.</p> <p>Acquisition of skills for C13, C14 and C15 are through a combination of formal lectures and tutorials, as well as project-based work.</p> <p>An increasingly self-directed and interactive approach will be adopted at higher levels, particularly for C14, C15 and C16.</p>	

C18		and some appreciation of likely new developments. P10m – Ability to apply engineering techniques taking account of a range of commercial and industrial constraints.		
C19	P11p - Understanding of, and the ability to work in, different roles within an engineering team.	P11m - Understanding of, and the ability to work in, different roles within an engineering team, and the ability to exercise initiative and personal responsibility, which may be as a team member or leader.		
C. Transferable Skills			Teaching and learning methods	Assessment strategy
BEng		MEng		
C20	G1 - Apply their skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities.	G1 - Apply their skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities.	Additional general skills are developed throughout the programme by the methods and strategies outlined in above.	Additional general skills are assessed through the following approaches:
C21	G2 - Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.	G2 - Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.	C20 is developed through feedback on coursework reports, oral presentations and project reports. C21 is developed in a dedicated module that emphasises the role of such practice.	C20 and C21 are assessed through coursework, individual project and technical reports and oral presentations.
C22	G3b - Plan and carry out a personal programmes of work, adjusting where appropriate.	G3m - Monitor and adjust a personal programme of work on an ongoing basis.	C22 is developed through project work planning and throughout the programme.F4 is developed through group project and assignment work.	C22 and C23 are assessed by review of an individual's progress during individual project work.
C23	G4 - Exercise initiative and personal responsibility, which may be as a team member or leader.	G4 - Exercise initiative and personal responsibility, which may be as a team member or leader.	Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.	

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

The programme is offered in full-time (3 years), sandwich (4 years), part-time (6 years) modes, and leads to the award of a BEng Degree with Honours. If students progress or enter on the MEng route then this will be for an additional time full-time (4 years), sandwich (5 years) or part-time (8 years).

Entry is normally at level 4 (with A-Level, or equivalent qualifications) but is possible at level 5 with suitable qualifications (e.g. an Edexcel HND in Engineering with appropriate subjects studied). Direct entry into level 6 is also possible, for example following successful completion of two years of a similar BEng or MEng degree programme at another HE institution. In this case, the final award will not be accredited. Intake is normally Semester A (September).

Professional and Statutory Regulatory Bodies

Accreditation by the Institution of Engineering and Technology (IET) will be sought.

Work-Based Learning, including Sandwich Programmes

A designated sandwich programme leads to a University award in the sandwich mode and the word "sandwich" appears on the award certificate. In order for the BEng to lead to an award in the sandwich mode, the student must undertake a period of approved work experience (industrial placement) of not less than 30 weeks, excluding holidays, normally during year 3. A maximum of two (2) separate placements can be taken neither of which should normally be less than 12 weeks in duration. As defined in UPR AS11.

The work experience will normally be completed within the United Kingdom but with approval may be completed within other countries. Progress of the student's training is monitored by visits from University academic staff. Students will be required to document this period of work in accordance with the guidelines produced by the School. Students on industrial placement will be registered on the Placement Year Module (6AAD0015).

Students who have not achieved the minimum progression requirements at the end of level 5 may be prevented from undertaking a sandwich placement. The policy relating to progression onto the placement year from level 5 is given in the School Guidelines on Industrial Placements. Additionally, students on industrial placement but who have level 4 or 5 modules to repeat, will not normally be allowed to re-enrol on these modules until they return from industrial placement. This is to avoid a conflict between UH attendance requirements and the student's commitment to their employer.

Students who do not take the sandwich option, progressing directly to level 6, are automatically transferred to the full-time mode.

All students are required to complete a level 4 15-credit module titled "Professional Engineering" giving them information to prepare for industrial experience and work-based learning.

Study Abroad Options

Students may also opt to take additional studies through the Year Abroad or Semester Abroad options at a partner institution in place of all or part of the sandwich placement year, i.e. between Levels 5 and 6. To be eligible for these options students will be expected to have passed 120 credits at level 4 and 120 credits at level 5 with an average of at least 60%. In order to maintain registration with UH, students studying abroad for a full year will be registered on 6ENT0001 whilst students studying abroad for a single semester will be enrolled on 6ENT1051. In recognition of the extra study, provided a full transcript of their achievement in the host academic institution is submitted to the Board of Examiners, this will lead to an award of a BEng Degree with Honours in one of the named awards as listed in Section 1 "with Year Abroad" or "with Study Abroad" on the award.

Programme Structure

The programme structure and progression information below (Table 1a and 1b) is provided for the

Honours award. Any interim awards are identified in Table 1b. The Unit/Programme Learning Outcomes are developed and assessed through the constituent modules, as identified within the Unit/Programme Specifications listed in Section B, above.

For all awards:

- Progression to level 5 requires a minimum of 90 credits at level 4.
- Progression to level 6 requires of 210 credit points and above with at least 90 credit points at Level 5 to remain on the honours award.
- Industrial Placement, Year Abroad and Study Abroad modules always take place between levels 5 and 6.
- Progression to non-honours level 6 with 180 credits may be permissible. The maximum study rate in such an instance would normally be 120 credits but students would be expected to remedy any failed modules from level 5 in the first instance.

Table 1a Outline Programme Structure

BEng (Hons) Robotics and Artificial Intelligence

Mode of study

BEng Full Time: 3 years; Part-time: 6 years

Entry point Semester A

Level 4

Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Introduction to Robotics	4ENT1177	15	40	0	60	0	A
Digital Electronics	4ENT1175	15	40	0	60	0	A
Math for Robotics and Artificial Intelligence	4ENT1176	15	25	50	25	0	A
Robot Design and Build Part A	4ENT1178	15	0	0	100	0	A
Programming	4ENT2053	15	100	0	0	0	B
Professional Engineering	4ENT2051	15	0	0	100	0	B
Digital Computing Principles	4ENT1181	15	100	0	0	0	B
Robot Design and Build Part B	4ENT1182	15	0	0	50	50	B

Level 5

Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Embedded Systems Design	5ENT1137	15	0	0	100	0	A
Behavioural Robotics	5ENT1139	15	25	0	75	0	A
Artificial Intelligence Principles	5ENT1140	15	25	50	25	0	A
Applied Robotics and AI project	5ENT1141	15	0	0	90	10	A
Electronics Practice for Robotics Applications	5ENT2057	15	0	0	60	40	B
Robot Sensors and Signal Processing	5ENT1142	15	0	50	50	0	B
Mechatronics	5ENT2052	15	0	50	50	0	B
Team Project	5ENT1144	15	0	0	100	0	B

Level 6

Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Machine Learning	6ENT1176	15	0	50	50	0	A
Visual and Spoken interfaces	6ENT1183	15	0	0	100	0	A
3D Vision	6ENT1178	15	100	0	0	0	A
Industrial Robotics	6ENT1179	15	0	50	50	0	B

Robot Communication	6ENT1180	15	0	50	50	0	B
Mobile Robots and Drones	6ENT1181	15	50	0	50	0	B
BEng Individual Major Project (Robotics & AI)	6ENT2048	30	0	0	80	20	AB

Table 1a Outline Programme Structure

BEng (Hons) Robotics and Artificial Intelligence (Sandwich)

Mode of study

BEng Sandwich: 4 years; Part-time: 6 years

Entry point Semester A

Level 4

Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Introduction to Robotics	4ENT1177	15	40	0	60	0	A
Digital Electronics	4ENT1175	15	40	0	60	0	A
Math for Robotics and Artificial Intelligence	4ENT1176	15	25	50	25	0	A
Robot Design and Build Part A	4ENT1178	15	0	0	100	0	A
Programming	4ENT2053	15	100	0	0	0	B
Professional Engineering	4ENT2051	15	0	0	100	0	B
Digital Computing Principles	4ENT1181	15	100	0	0	0	B
Robot Design and Build Part B	4ENT1182	15	0	0	50	50	B

Level 5

Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Embedded Systems Design	5ENT1137	15	0	0	100	0	A
Behavioural Robotics	5ENT1139	15	25	0	75	0	A
Artificial Intelligence Principles	5ENT1140	15	25	50	25	0	A
Applied Robotics and AI project	5ENT1141	15	0	0	90	10	A
Electronics Practice for Robotics Applications	5ENT2057	15	0	0	60	40	B
Robot Sensors and Signal Processing	5ENT1142	15	0	50	50	0	B
Mechatronics	5ENT2052	15	0	50	50	0	B
Team Project	5ENT1144	15	0	0	100	0	B

Level 6

Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Module							
Industrial Placement	6AAD0015	0	0	0	P/F	0	AB

Compulsory Modules Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Machine Learning	6ENT1176	15	0	50	50	0	A
Visual and Spoken interfaces	6ENT1183	15	0	0	100	0	A
3D Vision	6ENT1178	15	100	0	0	0	A
Industrial Robotics	6ENT1179	15	0	50	50	0	B
Robot Communication	6ENT1180	15	0	50	50	0	B
Mobile Robots and Drones	6ENT1181	15	50	0	50	0	B
BEng Individual Major Project (Robotics & AI)	6ENT2048	30	0	0	80	20	AB

Table 1a Outline Programme Structure

BEng (Hons) Robotics and Artificial Intelligence with Year Abroad

Mode of study

BEng Full-time: 4 years; Part-time: 6 years

Entry point Semester A

Level 4

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Introduction to Robotics	4ENT1177	15	40	0	60	0	A
Digital Electronics	4ENT1175	15	40	0	60	0	A
Math for Robotics and Artificial Intelligence	4ENT1176	15	25	50	25	0	A
Robot Design and Build Part A	4ENT1178	15	0	0	100	0	A
Programming	4ENT2053	15	100	0	0	0	B
Professional Engineering	4ENT2051	15	0	0	100	0	B
Digital Computing Principles	4ENT1181	15	100	0	0	0	B
Robot Design and Build Part B	4ENT1182	15	0	0	50	50	B

Level 5

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Embedded Systems Design	5ENT1137	15	0	0	100	0	A
Behavioural Robotics	5ENT1139	15	25	0	75	0	A
Artificial Intelligence Principles	5ENT1140	15	25	50	25	0	A
Applied Robotics and AI project	5ENT1141	15	0	0	90	10	A
Electronics Practice for Robotics Applications	5ENT2057	15	0	0	60	40	B
Robot Sensors and Signal Processing	5ENT1142	15	0	50	50	0	B
Mechatronics	5ENT2052	15	0	50	50	0	B
Team Project	5ENT1144	15	0	0	100	0	B

Level 6

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Module							
Module Title							
Year Abroad	6ENT0001	0	0	0	P/F	0	AB

Compulsory Modules Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Machine Learning	6ENT1176	15	0	50	50	0	A
Visual and Spoken interfaces	6ENT1183	15	0	0	100	0	A
3D Vision	6ENT1178	15	100	0	0	0	A
Industrial Robotics	6ENT1179	15	0	50	50	0	B
Robot Communication	6ENT1180	15	0	50	50	0	B
Mobile Robots and Drones	6ENT1181	15	50	0	50	0	B
BEng Individual Major Project (Robotics & AI)	6ENT2048	30	0	0	80	20	AB

Table 1a Outline Programme Structure

BEng (Hons) Robotics and Artificial Intelligence with Study Abroad

Mode of study

BEng Full-time: 4 years; Part-time: 6 years

Entry point Semester A

Level 4

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Introduction to Robotics	4ENT1177	15	40	0	60	0	A
Digital Electronics	4ENT1175	15	40	0	60	0	A
Math for Robotics and Artificial Intelligence	4ENT1176	15	25	50	25	0	A
Robot Design and Build Part A	4ENT1178	15	0	0	100	0	A
Programming	4ENT2053	15	100	0	0	0	B
Professional Engineering	4ENT2051	15	0	0	100	0	B
Digital Computing Principles	4ENT1181	15	100	0	0	0	B
Robot Design and Build Part B	4ENT1182	15	0	0	50	50	B

Level 5

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Embedded Systems Design	5ENT1137	15	0	0	100	0	A
Behavioural Robotics	5ENT1139	15	25	0	75	0	A
Artificial Intelligence Principles	5ENT1140	15	25	50	25	0	A
Applied Robotics and AI project	5ENT1141	15	0	0	90	10	A
Electronics Practice for Robotics Applications	5ENT2057	15	0	0	60	40	B
Robot Sensors and Signal Processing	5ENT1142	15	0	50	50	0	B
Mechatronics	5ENT2052	15	0	50	50	0	B
Team Project	5ENT1144	15	0	0	100	0	B

Level 6

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Module							
Module Title							
Semester Abroad	6ENT1051	0	0	0	P/F	0	A or B

Compulsory Modules							
Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Machine Learning	6ENT1176	15	0	50	50	0	A
Visual and Spoken interfaces	6ENT1183	15	0	0	100	0	A
3D Vision	6ENT1178	15	100	0	0	0	A
Industrial Robotics	6ENT1179	15	0	50	50	0	B
Robot Communication	6ENT1180	15	0	50	50	0	B
Mobile Robots and Drones	6ENT1181	15	50	0	50	0	B
BEng Individual Major Project (Robotics & AI)	6ENT2048	30	0	0	80	20	AB

Table 1a Outline Programme Structure

MEng (Hons) Robotics and Artificial Intelligence

Mode of study

MEng Full Time: 4 years; Part-time: 8 years

Entry point Semester A

Level 4

Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Introduction to Robotics	4ENT1177	15	40	0	60	0	A
Digital Electronics	4ENT1175	15	40	0	60	0	A
Math for Robotics and Artificial Intelligence	4ENT1176	15	25	50	25	0	A
Robot Design and Build Part A	4ENT1178	15	0	0	100	0	A
Programming	4ENT2053	15	100	0	0	0	B
Professional Engineering	4ENT2051	15	0	0	100	0	B
Digital Computing Principles	4ENT1181	15	100	0	0	0	B
Robot Design and Build Part B	4ENT1182	15	0	0	50	50	B

Level 5

Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Embedded Systems Design	5ENT1137	15	0	0	100	0	A
Behavioural Robotics	5ENT1139	15	25	0	75	0	A
Artificial Intelligence Principles	5ENT1140	15	25	50	25	0	A
Applied Robotics and AI project	5ENT1141	15	0	0	90	10	A
Electronics Practice for Robotics Applications	5ENT2057	15	0	0	60	40	B
Robot Sensors and Signal Processing	5ENT1142	15	0	50	50	0	B
Mechatronics	5ENT2052	15	0	50	50	0	B
Team Project	5ENT1144	15	0	0	100	0	B

Level 6

Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Machine Learning	6ENT1176	15	0	50	50	0	A
Visual and Spoken interfaces	6ENT1183	15	0	0	100	0	A
3D Vision	6ENT1178	15	100	0	0	0	A
Industrial Robotics	6ENT1179	15	0	50	50	0	B
Robot Communication	6ENT1180	15	0	50	50	0	B
Mobile Robots and Drones	6ENT1181	15	50	0	50	0	B
MEng Individual Major Project (Robotics & AI)	6ENT2055	30	0	0	80	20	AB

Level 7**Compulsory Modules**

Module Title	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Human-Robot Interaction and Interfaces	7ENT2046	15	0	0	100	0	A
Robotic Systems Design	7ENT1160	15	0	0	100	0	A
Deep Learning for Robotics Applications	7ENT2047	15	0	0	100	0	A
Professional Practice	7ENT1163	15	0	0	100	0	B
Robotic Product Design	7ENT1161	15	0	0	100	0	B
MEng Team Project	7ENT2044	45	0	0	80	20	AB

Table 1a Outline Programme Structure

MEng (Hons) Robotics and Artificial Intelligence (Sandwich)

Mode of study

MEng Sandwich: 5 years; Part-time: 8 years

Entry point Semester A

Level 4

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Introduction to Robotics	4ENT1177	15	40	0	60	0	A
Digital Electronics	4ENT1175	15	40	0	60	0	A
Math for Robotics and Artificial Intelligence	4ENT1176	15	25	50	25	0	A
Robot Design and Build Part A	4ENT1178	15	0	0	100	0	A
Programming	4ENT2053	15	100	0	0	0	B
Professional Engineering	4ENT2051	15	0	0	100	0	B
Digital Computing Principles	4ENT1181	15	100	0	0	0	B
Robot Design and Build Part B	4ENT1182	15	0	0	50	50	B

Level 5

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Embedded Systems Design	5ENT1137	15	0	0	100	0	A
Behavioural Robotics	5ENT1139	15	25	0	75	0	A
Artificial Intelligence Principles	5ENT1140	15	25	50	25	0	A
Applied Robotics and AI project	5ENT1141	15	0	0	90	10	A
Electronics Practice for Robotics Applications	5ENT2057	15	0	0	60	40	B
Robot Sensors and Signal Processing	5ENT1142	15	0	50	50	0	B
Mechatronics	5ENT2052	15	0	50	50	0	B
Team Project	5ENT1144	15	0	0	100	0	B

Level 6

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Module							
Module Title							
Industrial Placement	6AAD0015	0	0	0	P/F	0	AB

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Machine Learning	6ENT1176	15	0	50	50	0	A
Visual and Spoken interfaces	6ENT1183	15	0	0	100	0	A
3D Vision	6ENT1178	15	100	0	0	0	A
Industrial Robotics	6ENT1179	15	0	50	50	0	B
Robot Communication	6ENT1180	15	0	50	50	0	B
Mobile Robots and Drones	6ENT1181	15	50	0	50	0	B
MEng Individual Major Project (Robotics & AI)	6ENT2055	30	0	0	80	20	AB

Level 7

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Human-Robot Interaction and Interfaces	7ENT2046	15	0	0	100	0	A
Robotic Systems Design	7ENT1160	15	0	0	100	0	A
Deep Learning for Robotics Applications	7ENT2047	15	0	0	100	0	A
Professional Practice	7ENT1163	15	0	0	100	0	B
Robotic Product Design	7ENT1161	15	0	0	100	0	B
MEng Team Project	7ENT2044	45	0	0	80	20	AB

Table 1a Outline Programme Structure

MEng (Hons) Robotics and Artificial Intelligence with Year Abroad

Mode of study

MEng Full-time: 5 years; Part-time: 8 years

Entry point Semester A

Level 4

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Introduction to Robotics	4ENT1177	15	40	0	60	0	A
Digital Electronics	4ENT1175	15	40	0	60	0	A
Math for Robotics and Artificial Intelligence	4ENT1176	15	25	50	25	0	A
Robot Design and Build Part A	4ENT1178	15	0	0	100	0	A
Programming	4ENT2053	15	100	0	0	0	B
Professional Engineering	4ENT2051	15	0	0	100	0	B
Digital Computing Principles	4ENT1181	15	100	0	0	0	B
Robot Design and Build Part B	4ENT1182	15	0	0	50	50	B

Level 5

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Embedded Systems Design	5ENT1137	15	0	0	100	0	A
Behavioural Robotics	5ENT1139	15	25	0	75	0	A
Artificial Intelligence Principles	5ENT1140	15	25	50	25	0	A
Applied Robotics and AI project	5ENT1141	15	0	0	90	10	A
Electronics Practice for Robotics Applications	5ENT2057	15	0	0	60	40	B
Robot Sensors and Signal Processing	5ENT1142	15	0	50	50	0	B
Mechatronics	5ENT2052	15	0	50	50	0	B
Team Project	5ENT1144	15	0	0	100	0	B

Level 6

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Module							
Module Title							
Year Abroad	6ENT0001	0	0	0	P/F	0	AB

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Machine Learning	6ENT1176	15	0	50	50	0	A
Visual and Spoken interfaces	6ENT1183	15	0	0	100	0	A
3D Vision	6ENT1178	15	100	0	0	0	A
Industrial Robotics	6ENT1179	15	0	50	50	0	B
Robot Communication	6ENT1180	15	0	50	50	0	B
Mobile Robots and Drones	6ENT1181	15	50	0	50	0	B
MEng Individual Major Project (Robotics & AI)	6ENT2055	30	0	0	80	20	AB

Level 7

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Human-Robot Interaction and Interfaces	7ENT2046	15	0	0	100	0	A
Robotic Systems Design	7ENT1160	15	0	0	100	0	A
Deep Learning for Robotics Applications	7ENT2047	15	0	0	100	0	A
Professional Practice	7ENT1163	15	0	0	100	0	B
Robotic Product Design	7ENT1161	15	0	0	100	0	B
MEng Team Project	7ENT2044	45	0	0	80	20	AB

Table 1a Outline Programme Structure

MEng (Hons) Robotics and Artificial Intelligence with Study Abroad

Mode of study

MEng Full-time: 5 years; Part-time: 8 years

Entry point Semester A

Level 4

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Introduction to Robotics	4ENT1177	15	40	0	60	0	A
Digital Electronics	4ENT1175	15	40	0	60	0	A
Math for Robotics and Artificial Intelligence	4ENT1176	15	25	50	25	0	A
Robot Design and Build Part A	4ENT1178	15	0	0	100	0	A
Programming	4ENT2053	15	100	0	0	0	B
Professional Engineering	4ENT2051	15	0	0	100	0	B
Digital Computing Principles	4ENT1181	15	100	0	0	0	B
Robot Design and Build Part B	4ENT1182	15	0	0	50	50	B

Level 5

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Embedded Systems Design	5ENT1137	15	0	0	100	0	A
Behavioural Robotics	5ENT1139	15	25	0	75	0	A
Artificial Intelligence Principles	5ENT1140	15	25	50	25	0	A
Applied Robotics and AI project	5ENT1141	15	0	0	90	10	A
Electronics Practice for Robotics Applications	5ENT2057	15	0	0	60	40	B
Robot Sensors and Signal Processing	5ENT1142	15	0	50	50	0	B
Mechatronics	5ENT2052	15	0	50	50	0	B
Team Project	5ENT1144	15	0	0	100	0	B

Level 6

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Module							
Module Title							
Semester Abroad	6ENT1051	0	0	0	P/F	0	A or B

	Module Code	Credit Points	%Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Machine Learning	6ENT1176	15	0	50	50	0	A
Visual and Spoken interfaces	6ENT1183	15	0	0	100	0	A
3D Vision	6ENT1178	15	100	0	0	0	A
Industrial Robotics	6ENT1179	15	0	50	50	0	B
Robot Communication	6ENT1180	15	0	50	50	0	B
Mobile Robots and Drones	6ENT1181	15	50	0	50	0	B
MEng Individual Major Project (Robotics & AI)	6ENT2055	30	0	0	80	20	AB

Level 7

	Module Code	Credit Points	%Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Human-Robot Interaction and Interfaces	7ENT2046	15	0	0	100	0	A
Robotic Systems Design	7ENT1160	15	0	0	100	0	A
Deep Learning for Robotics Applications	7ENT2047	15	0	0	100	0	A
Professional Practice	7ENT1163	15	0	0	100	0	B
Robotic Product Design	7ENT1161	15	0	0	100	0	B
MEng Team Project	7ENT2044	45	0	0	80	20	AB

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 in Section 2.

Table 1b Final and interim awards available

The programme provides the following final and interim awards:

If any of the progression requirements stated above are not met, then the Board of Examiners is empowered to require the student to transfer to the BEng (non-Honours). The study pattern for students transferring onto the BEng (non-Honours) route shall be agreed on a case-by-case basis with the BEng Programme Tutor or Associate Dean of School.

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 in Section.

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)
MEng (Hons) in the named award	Robotics and Artificial Intelligence	480 credit points including 360 at levels 7/6/5 of which 120 must be at level 7. Additionally, students must satisfactorily complete an MEng individual project and the MEng Team Project	7	All programme learning outcomes for the specified named award (see Tables 2c and 2d).
MEng (Hons) in the named award (Sandwich)		480 credit points including 360 at levels 7/6/5 of which 120 must be at level 7. Additionally, students must satisfactorily complete an MEng individual project and the MEng Team Project and the Placement Year module.	7	All programme learning outcomes for the specified named award (see Tables 2c and 2d).
MEng (Hons) in the named award with Study Abroad		480 credit points including 360 at levels 7/6/5 of which 120 must	7	All programme learning outcomes for the specified named award (see Tables 2c and 2d).

		be at level 7. Additionally, students must satisfactorily complete an MEng individual project and the MEng Team Project and complete the Semester Abroad modules.		
MEng (Hons) in the named award		480 credit points including 360 at levels 7/6/5 of which 120 must be at level 7. Additionally, students must satisfactorily complete an MEng Individual Project and the MEng Team Project. Compliant with UH compensation requirements	7	All programme learning outcomes for the specified named award (see Tables 2c and 2d).
MEng (Hons) in the named award (Sandwich)	Robotics and Artificial Intelligence Technology **	480 credit points including 360 at levels 7/6/5 of which 120 must be at level 7. Additionally, students must satisfactorily complete an MEng Individual Project, the MEng Team Project and the Placement Year module. Compliant with UH compensation requirements	7	All programme learning outcomes for the specified named award (see Tables 2c and 2d).
MEng (Hons) in the named award with Study Abroad	Robotics and Artificial Intelligence Technology **	480 credit points including 360 at levels 7/6/5 of which 120 must be at level 7. Additionally, students must satisfactorily complete an MEng Individual Project, the MEng Team Project and pass the Semester	7	All programme learning outcomes for the specified named award (see Tables 2c and 2d).

		Abroad modules. Compliant with UH compensation requirements.		
BEng in the named award	Robotics and Artificial Intelligence Technology **	For students entering directly at level 6 only, 75 UH specified credits must be at level 6 excluding the individual major project (*).	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng in the named award	Robotics and Artificial Intelligence	300 credit points including 180 at level 6/5 of which 60 must be at level 6. (**)	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng in the named award (Sandwich)		300 credit points including 180 at level 6/5 of which 60 must be at level 6. Additionally, students must satisfactorily complete the Placement Year.(**)	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng in the named award with Study Abroad		300 credit points including 180 at level 6/5 of which 60 must be at level 6. Additionally, students must satisfactorily complete the Semester Abroad modules. (**)	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng in the named award with Year Abroad		300 credit points including 180 at level 6/5 of which 60 must be at level 6. Additionally, students must satisfactorily complete the Year Abroad modules. (**)	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng (Hons) in the named award	Robotics and Artificial Intelligence Technology **	360 credit points including 240 at level 6/5 of which 120 must be at level. 6 (Minimum Engineering	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).

		Council compensation requirements have not been achieved). Compliant with UH compensation requirements		
BEng(Hons) in the named award (Sandwich)	Robotics and Artificial Intelligence Technology **	360 credit points including 2S40 at level 6/5 of which 120 must be at level 6 (Minimum Engineering Council compensation requirements have not been achieved). Compliant with UH compensation requirements. Additionally, students must satisfactorily complete the individual project and the Placement Year module.	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng(Hons) in the named award with Study Abroad	Robotics and Artificial Intelligence Technology **	360 credit points including 240 at level 6/5 of which 120 must be at level 6 (Minimum Engineering Council compensation requirements have not been achieved). Compliant with UH compensation requirements. Additionally, students must satisfactorily complete the individual project and the Semester Abroad modules.	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng(Hons) in the named award with Year Abroad	Robotics and Artificial Intelligence	360 credit points including 240 at level 6/5 of which 120 must	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).

Technology **	<p>be at level 6 (minimum Engineering Council compensation requirements have not been achieved).</p> <p>Compliant with UH compensation requirements. Additionally, students must satisfactorily complete the individual project and the Year Abroad modules.</p>
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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 in the named award	Robotics and Artificial Intelligence Technology **	For students entering directly at level 6 only, 75 UH specified credits must be at level 6 excluding the individual major project (*).	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng in the named award	Robotics and Artificial Intelligence	300 credit points including 180 at level 6/5 of which 60 must be at level 6. (**)	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng in the named award (Sandwich)		300 credit points including 180 at level 6/5 of which 60 must be at level 6. Additionally, students must satisfactorily complete the Placement Year.(**)	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng in the named award with Study Abroad		300 credit points including 180 at level 6/5 of which 60 must be at level 6.	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).

		Additionally, students must satisfactorily complete the Semester Abroad modules. (**)		
BEng in the named award with Year Abroad		300 credit points including 180 at level 6/5 of which 60 must be at level 6. Additionally, students must satisfactorily complete the Year Abroad modules. (**)	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng (Hons) in the named award	Robotics and Artificial Intelligence Technology **	360 credit points including 240 at level 6/5 of which 120 must be at level 6 (Minimum Engineering Council compensation requirements have not been achieved). Compliant with UH compensation requirements	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng(Hons) in the named award (Sandwich)	Robotics and Artificial Intelligence Technology **	360 credit points including 2S40 at level 6/5 of which 120 must be at level 6 (Minimum Engineering Council compensation requirements have not been achieved). Compliant with UH compensation requirements. Additionally, students must satisfactorily complete the individual project and the Placement Year module.	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).
BEng(Hons) in the named award with Study Abroad	Robotics and Artificial Intelligence Technology **	360 credit points including 240 at level 6/5 of which 120 must be at level 6 (Minimum Engineering Council compensation requirements have	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).

		not been achieved). Compliant with UH compensation requirements. Additionally, students must satisfactorily complete the individual project and the Semester Abroad modules.		
BEng(Hons) in the named award with Year Abroad	Robotics and Artificial Intelligence Technology **	360 credit points including 240 at level 6/5 of which 120 must be at level 6 (minimum Engineering Council compensation requirements have not been achieved). Compliant with UH compensation requirements. Additionally, students must satisfactorily complete the individual project and the Year Abroad modules.	6	All programme learning outcomes for the specified named award (see Tables 2a and 2b).

Notes:

(*) in accordance with UPR AS11, the maximum APL permitted towards this interim award is 225 points at levels 4/5.

(**) this interim award is not accredited by the Professional Bodies.

Programme-specific assessment regulations

The programme complies with the University's academic regulations (in particular, [UPR AS11](#), [UPR AS12](#) and [UPR AS14](#)) with the exception of those listed below, which have been approved by the University:

Major projects (group and individual) i.e. BEng Individual Project, MEng Individual Project and MEng Team Project cannot be compensated. Students who are offered a re-enrolment opportunity on project modules in line with University regulations, will normally be allocated an entirely different project.

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

Course Code	Course Instance	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
ECRAIBEN G	RAI3F RAI4S, RAI6P	BEng (Hons) Robotics and Artificial Intelligence	BEng Individual Major Project (Robotics & AI) 6ENT2048	yes
ECRAIMEN G	RAIM3F, RAIM4S, RAIM6P	MEng (Hons) Robotics and Artificial Intelligence	MEng Individual Major Project (Robotics & AI) 6ENT2055	yes
ECRAIMEN G	RAIM4F, RAIM5S, RAIM7P, RAIM8P	MEng (Hons) Robotics and Artificial Intelligence	7ENT2044 MEng Team Project	yes

Professional Statutory Regulatory Bodies thresholds will apply for accredited awards as per the Engineering Council Compensation and Condonement notice November 2018.

BEng (Hons) accredited awards:

- To comply with professional body regulations students must achieve in all 15 credit point modules, after all available attempts under the University regulations, a minimum of 30% (in any allowable attempt) at levels 4, 5 and 6, before the board of examiners will be able to consider compensation for an accredited honours degree. A maximum of 30 credit points can be compensated across the programme, in line with University regulations and professional body accreditation requirements.

MEng (Hons) accredited awards:

- To comply with professional body regulations students must achieve in all 15 credit point modules, after all available attempts under the University regulations, a minimum of 30% (in any allowable attempt) at levels 4, 5 and 6, and 40% (in any allowable attempt) at level 7, before the board of examiners will be able to consider compensation for an accredited honours degree. A maximum of 30 credit points can be compensated across the programme, in line with University regulations and professional body accreditation requirements. **Compensation is limited to 15 credit points at Level 7.**

For non-honours awards, the standard University regulations on progression and compensation shall apply, and the Programme Board of Examiners shall have discretion to transfer a student onto a non-honours award where it is to the advantage of the student to do so (for example, where the criteria for progression on an accredited award have not been met).

E. Management of Programme & Support for student learning.

Management

The programme is managed and administered through:

- Dean of School;
- Associate Dean (Academic Quality Assurance);
- Associate Dean (Learning, Teaching and Student Experience);
- Programme Leader who has overall responsibility for the effective operationalization of the programme, and ensuring that academic standards are maintained and an effective student learning experience is provided;
- An Admissions Tutor with specific responsibility for open days and selection;

- Student representatives on programme committees;
- Module Leaders who are responsible for individual modules;
- 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;
- You will have a Personal Tutor who will be an important point of contact, able to help you gain a good understanding of the School and programme you are studying.
- A substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters, accommodation, and international student support;
- Office of Dean of Students, incorporating Chaplaincy, Counselling and nursery;
- Canvas, 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 environments in 2 Learning Resources Centres;
- Student Success Hubs, which include a Mathematics Drop-in Centre
- A Mathematics Drop-in Centre;
- Medical Centre;
- University Disability Advisors;
- An Equality Office;
- Careers and Employment Services;
- Hertfordshire Student's Union
- Dedicated programme site

F. Other sources of information

In addition to this Programme Specification, the University 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 [Ask Herts](#) website provides information on a wide range of resources and services available at the University of Hertfordshire including academic support, accommodation, fees, funding, visas, 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

For current entry tariff point requirements, please refer to the relevant page for the Course on the University website or on the online prospectus.

The programme is subject to the University's Principles, Policies and Regulations for the Admission of Students to Undergraduate and Taught Postgraduate Programmes (in [UPR SA03](#)), along with associated procedures. These will take account of University policy and guidelines for assessing accredited prior certificated learning (APCL) and accredited prior experiential learning (APEL).

If you would like this information in an alternative format please contact:
Hutton Hub Student Administration Service hhaq@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 Honours in Robotics and Artificial Intelligence

Table 2a: 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)																			
		Knowledge & Understanding														Intellectual Skills					
	Module Title	Module Code	SM1	SM2	SM3	SM4	SM5	SM6	EL1	EL2	EL3	EL4	EL5	EL6	EL7	EA1	EA2	EA3	EA4	EA5	EA6
Level 4	Introduction to Robotics	4ENT1177	X						X	X			X						X		
	Digital Electronics	4ENT1175										X				X	X				
	Math for Robotics and Artificial Intelligence	4ENT1176		X														X			
	Robot Design and Build Part A	4ENT1178			X									X			X		X		
	Programming	4ENT2053																X			
	Professional Engineering	4ENT2051							X	X	X	X	X								
	Digital Computing Principles	4ENT1181										X				X	X				
	Robot Design and Build Part B	4ENT1182	X	X	X						X				X		X		X		
Level 5	Embedded Systems Design	5ENT1137															X	X	X		
	Behavioural Robotics	5ENT1139			X				X										X		
	Artificial Intelligence Principles	5ENT1140			X													X			
	Applied Robotics and AI project	5ENT1141	X							X	X	X	X	X		X			X		
	Electronics Practice for Robotics Applications	5ENT2057			X																
	Robot Sensors and Signal Processing	5ENT1142		X	X													X			
	Mechatronics	5ENT2052		X												X	X	X			
	Team Project	5ENT1144	X						X	X	X	X	X	X					X		
Level 6	Placement Year	6AAD0015																			
	Machine Learning	6ENT1176																			
	Visual and Spoken interfaces	6ENT1183		X									X					X			
	3D Vision	6ENT1178	X		X						X	X						X	X		

		Programme Learning Outcomes (as identified in section 1)																		
		Knowledge & Understanding												Intellectual Skills						
Module Title	Module Code	SM1	SM2	SM3	SM4	SM5	SM6	EL1	EL2	EL3	EL4	EL5	EL6	EL7	EA1	EA2	EA3	EA4	EA5	EA6
Industrial Robotics	6ENT1179		X								X					X				
Robot Communication	6ENT1180	X	X						X				X	X		X		X	X	
Mobile Robots and Drones	6ENT1181			X													X			
BEng Individual Major Project	6ENT2057			X					X	X	X			X					X	

BEng Honours in Robotics and Artificial Intelligence

Table 2b: 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)																							
		Transferable Skills (Practical skills)																							
Module Title	Module Code	D1	D2	D3	D4	D5	D6	D7	D8	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	G1	G2	G3	G4	
Level 4	Introduction to Robotics	4ENT1177								X			X	X	X										
	Digital Electronics	4ENT1175				X	X				X														
	Math for Robotics and Artificial Intelligence	4ENT1176			X	X	X									X	X								
	Robot Design and Build Part A	4ENT1178	X	X				X				X	X								X			X	X
	Programming	4ENT2053										X										X			
	Professional Engineering	4ENT2051	X				X				X				X	X	X						X	X	
	Digital Computing Principles	4ENT1181			X	X	X									X						X			
	Robot Design and Build Part B	4ENT1182	X	X		X		X					X	X				X				X		X	X
Level 5	Embedded Systems Design	5ENT1137								X	X	X													
	Behavioural Robotics	5ENT1139		X											X										
	Artificial Intelligence Principles	5ENT1140			X	X											X								

		Programme Learning Outcomes (as identified in section 1)																							
		Transferable Skills (Practical skills)																							
Module Title	Module Code	D1	D2	D3	D4	D5	D6	D7	D8	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	G1	G2	G3	G4	
Applied Robotics and AI project	5ENT1141	X				X	X					X	X							X	X	X	X	X	
Electronics Practice for Robotics Applications	5ENT2057											X													
Robot Sensors and Signal Processing	5ENT1142				X											X	X								
Mechatronics	5ENT2052			X						X		X			X	X									
Team Project	5ENT1144	X	X			X	X					X	X							X	X	X	X	X	
Placement Year	6AAD0015	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Machine Learning	6ENT1176			X												X	X						X		
Visual and Spoken interfaces	6ENT1183		X		X					X		X											X		
3D Vision	6ENT1178			X						X		X									X				
Industrial Robotics	6ENT1179	X				X					X			X	X										
Robot Communication	6ENT1180			X			X														X	X			
Mobile Robots and Drones	6ENT1181										X	X			X	X	X								
BEng Individual Major Project (Robotics & AI)	6ENT2048	X	X		X	X	X						X	X						X		X	X	X	

MEng Honours in Robotics and Artificial Intelligence

Table 2c: 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)																		
		Knowledge & Understanding														Intellectual Skills				
Module Title	Module Code	SM1	SM2	SM3	SM4	SM5	SM6	EL1	EL2	EL3	EL4	EL5	EL6	EL7	EA1	EA2	EA3	EA4	EA5	EA6
Level 4	Introduction to Robotics	4ENT1177	X					X	X			X						X		
	Digital Electronics	4ENT1175									X				X	X				
	Math for Robotics and Artificial Intelligence	4ENT1176		X													X			
	Robot Design and Build Part A	4ENT1178			X								X			X		X		
	Programming	4ENT2053															X			
	Professional Engineering	4ENT2051						X	X	X	X	X								
	Digital Computing Principles	4ENT1181									X				X	X				
	Robot Design and Build Part B	4ENT1182	X	X	X						X			X		X		X		
Level 5	Embedded Systems Design	5ENT1137														X	X	X		
	Behavioural Robotics	5ENT1139			X			X										X		
	Artificial Intelligence Principles	5ENT1140			X												X			
	Applied Robotics and AI project	5ENT1141	X						X	X	X	X	X		X			X		
	Electronics Practice for Robotics Applications	5ENT2057			X															
	Robot Sensors and Signal Processing	5ENT1142		X	X													X		
	Mechatronics	5ENT2052		X											X	X	X			
	Team Project	5ENT1144	X						X	X	X	X	X	X				X		
Placement Year	6AAD0015																			
Level 6	Machine Learning	6ENT1176																		
	Visual and Spoken interfaces	6ENT1183		X							X					X				
	3D Vision	6ENT1178	X		X				X	X						X	X			

		Programme Learning Outcomes (as identified in section 1)																			
		Knowledge & Understanding											Intellectual Skills								
Module Title	Module Code	SM1	SM2	SM3	SM4	SM5	SM6	EL1	EL2	EL3	EL4	EL5	EL6	EL7	EA1	EA2	EA3	EA4	EA5	EA6	
Level 7	Industrial Robotics		X							X					X						
	Robot Communication	X	X					X				X	X		X		X	X			
	Mobile Robots and Drones			X												X					
	MEng Individual Major Project			X						X	X	X						X			
	Human-Robot Interaction						X							X							
	Robotic Systems Design				X									X						X	
	Artificial Intelligence Theory and Applications																				
	Professional Practice													X						X	
	Robotic Product Design					X	X								X						X
	MEng Team Project				X		X							X	X					X	X

MEng Honours in Robotics and Artificial Intelligence

Table 2d: 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)																						
		Transferable Skills (Practical skills)																						
Module Title	Module Code	D1	D2	D3	D4	D5	D6	D7	D8	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	G1	G2	G3	G4
Level 4	Introduction to Robotics									X			X	X	X									
	Digital Electronics				X	X					X													
	Math for Robotics and Artificial Intelligence			X	X	X										X	X							
	Robot Design and Build Part A	X	X				X					X	X								X		X	X
	Programming										X											X		
	Professional Engineering	X				X				X				X	X	X							X	X

		Programme Learning Outcomes (as identified in section 1)																							
		Transferable Skills (Practical skills)																							
Module Title	Module Code	D1	D2	D3	D4	D5	D6	D7	D8	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	G1	G2	G3	G4	
Digital Computing Principles	4ENT1181			X	X	X									X						X				
Robot Design and Build Part B	4ENT1182	X	X		X		X					X	X				X			X		X		X	
Embedded Systems Design	5ENT1137									X	X	X													
Behavioural Robotics	5ENT1139		X												X										
Artificial Intelligence Principles	5ENT1140			X	X												X								
Applied Robotics and AI project	5ENT1141	X				X	X					X	X							X	X	X	X	X	
Electronics Practice for Robotics Applications	5ENT2057											X													
Robot Sensors and Signal Processing	5ENT1142				X											X	X								
Mechatronics	5ENT2052			X						X		X			X	X									
Team Project	5ENT1144	X	X			X	X					X	X							X	X	X	X	X	
Placement Year	6AAD0015	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Machine Learning	6ENT1176			X												X	X							X	
Visual and Spoken interfaces	6ENT1183		X		X					X		X											X		
3D Vision	6ENT1178			X						X		X									X				
Industrial Robotics	6ENT1179	X				X					X			X	X										
Robot Communication	6ENT1180			X			X														X	X			
Mobile Robots and Drones	6ENT1181										X	X			X	X	X								
MEng Individual Major Project (Robotics & AI)	6ENT2055	X	X		X	X	X					X	X							X		X	X	X	
Human-Robot Interaction	7ENT1159																								
Robotic Systems Design	7ENT1160							X																	
Artificial Intelligence Theory and Applications	7ENT1162							X	X																
Professional Practice	7ENT1163																	X							
Robotic Product Design	7ENT1161							X	X										X						
MEng Team Project	7ENT2044							X	X									X	X						
MEng Team Project	7ENT2044		X		X					X		X												X	

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	4ENT1177	D			D		D
	Digital Electronics	4ENT1175	D			D		D
	Math for Robotics and Artificial Intelligence	4ENT1176	D			D		D
	Robot Design and Build Part A	4ENT1178	D			D		D
	Programming	4ENT2053	D			D		D
	Professional Engineering	4ENT2051	D	D	D	D	D	D
	Digital Computing Principles	4ENT1181	D			D	D	D
	Robot Design and Build Part B	4ENT1182	D			D		D
Level 5	Embedded Systems Design	5ENT1137	D			D		D
	Behavioural Robotics	5ENT1139	D			D		D
	Artificial Intelligence Principles	5ENT1140	D			D		D
	Applied Robotics and AI project	5ENT1141	D			D		D
	Electronics Practice for Robotics Applications	5ENT2057	D			D		D
	Robot Sensors and Signal Processing	5ENT1142	D			D		D
	Mechatronics	5ENT2052	D			D		D
	Team Project	5ENT1144	D			D	D	D
Placement Year	Placement Year	6AAD0015	D			D	D	D
	Year Abroad	6ENT0001		D		D		
	Semester Abroad	6ENT1051		D		D		

Level 6	Machine Learning	6ENT1176	D			D		D
	Visual and Spoken interfaces	6ENT1183	D			D		D
	3D Vision	6ENT1178	D			D		D
	Industrial Robotics	6ENT1179	D			D		D
	Robot Communication	6ENT1180	D			D		D
	Mobile Robots and Drones	6ENT1181	D	D		D		D
	BEng Individual Major Project (Robotics & AI)	6ENT2048	D			D		D
	MEng Individual Major Project (Robotics & AI)	6ENT2055	D			D		D
Level 7	Human-Robot Interaction	7ENT1159	D			D		D
	Robotic Systems Design	7ENT1160	D			D		D
	Artificial Intelligence Theory and Applications	7ENT1162	D	D		D		D
	Professional Practice	7ENT1163	D	D	D	D	D	D
	Robotic Product Design	7ENT1161	D			D		D
	MEng Team Project	7ENT2044	D			D	D	D

Section 2

Programme management

Relevant QAA subject benchmarking statements	Robotics and Artificial Intelligence
Type of programme	Undergraduate / Integrated Masters
Date of validation/last periodic review	November 19
Date of production/ last revision of PS	February 2023
Relevant to level/cohort	Level 4 entering September 2023
Administrative School	School of Physics, Engineering & Computer Science
Language of Delivery	English

Table 4 Course structure

Course details			
Course Code	Course Description	HECOS	UCAS
ECRAIMENG	MEng (Hons) Robotics and Artificial Intelligence	100170 - Mechatronics and robotics and 100359 - artificial intelligence with a 75/25 split.	H672 MEng
ECRAIBENG	BEng (Hons) Robotics and Artificial intelligence	100170 - Mechatronics and robotics and 100359 - artificial intelligence with a 75/25 split.	H671 BEng