

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

Programme Code: ECRAI

Programme Specification

This programme specification is relevant to students entering:
01 September 2022

Associate Dean of School (Academic Quality Assurance):
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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

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) and Module Guides.

Section 1

Awarding Institution/Body	University of Hertfordshire
Teaching Institution	University of Hertfordshire
University/partner campuses	College Lane
Programme accredited by	See Section D
Final Qualification	MEng/ BEng Honours
All Final Award titles	Robotics and Artificial Intelligence
(Qualification and Subject)	Robotics and Artificial Intelligence (Sandwich) Robotics and Artificial Intelligence with Year Abroad Robotics and Artificial Intelligence with Study Abroad
	Robotics and Artificial Intelligence Technology (Direct entrant L6) Robotics and Artificial Intelligence Technology (Sandwich) Robotics and Artificial Intelligence Technology with Year Abroad Robotics and Artificial Intelligence Technology with Study Abroad
FHEQ level of award	6/ 7
UCAS code(s)	H671 BEng H672 MEng
Language of Delivery	English

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

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.

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. Additionally, the curriculum design has taken into account UH Graduate Attributes (please refer to: <https://www.herts.ac.uk/about-us/our-students/student-charter/graduate-attributes>).

	A. Knowledge & Understanding		Teaching/learning methods & strategies	Assessment strategy
MEng	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.	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.	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.	
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.	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.	
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		

A6		engineering & AI, and an appreciation of their limitations. 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.		
	B. Intellectual Skills for Analysis		Teaching/learning methods & strategies	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. Analysis, problem solving and modelling skills are further developed through tutorial work, laboratory work, in-course exercises and project work.	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.
B2	EA2p - Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.	EA2m - Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.		
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.		
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. Intellectual Skills for Design		Teaching/learning methods & strategies	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.	Intellectual 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.		
	D. Economic, Legal, Social, Ethical & Environmental Context		Teaching/learning methods & strategies	Assessment strategy
	BEng	MEng		
D1	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.	D1 to D6 are assessed by coursework, project reports, technical reports and presentations.
D2	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.		
D3	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.		
D4	EL4- Understanding of the requirement for engineering activities to promote sustainable development and ability to apply	EL4- Understanding of the requirement for engineering activities to promote sustainable development and ability to apply quantitative techniques where appropriate.		

D5	quantitative techniques where appropriate. 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.		
D6	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.		
D7		EL7m- Understanding of the key drivers for business success, including innovation, calculated commercial risks and customer satisfaction		
E. Engineering Practice			Teaching/learning methods & strategies	Assessment strategy
	BEng	MEng		
E1	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.)	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 E1, E2, E3, E4 and E11. Acquisition of skills for E5, E6 and E7 are through a combination of formal lectures and tutorials, as well as project based work.	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.
E2	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.		
E3				

E4	P3- Ability to apply relevant practical and laboratory skills. P4- Understanding use of technical literature and other information sources.	P3- Ability to apply relevant practical and laboratory skills. P4- Understanding use of technical literature and other information sources.	An increasingly self-directed and interactive approach will be adopted at higher levels, particularly for E6, E7 and E8.	
E5	P5- Knowledge of relevant legal and contractual issues.	P5- Knowledge of relevant legal and contractual issues.		
E6	P6- Understanding of appropriate codes of practice and industry standards.	P6- Understanding of appropriate codes of practice and industry standards.		
E7	P7- Awareness of quality issues and their application to continuous improvement.	P7- Awareness of quality issues and their application to continuous improvement.		
E8	P8- Ability to work with technical uncertainty.	P8- Ability to work with technical uncertainty.		
E9		P9m – A thorough understanding of current practice and its limitations, and some appreciation of likely new developments.		
E10		P10m – Ability to apply engineering techniques taking account of a range of commercial and industrial constraints.		
E11	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.		
F. Transferable Skills			Teaching/learning methods & strategies	Assessment strategy
	BEng	MEng		
F1	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:

F2	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.	F1 is developed through feedback on coursework reports, oral presentations and project reports.	F1, and F2 are assessed through coursework, individual project and technical reports and oral presentations.
F3	G3p- 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.	F2 is developed in a dedicated module that emphasises the role of such practice.	
F4	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.	F3 is developed through project work planning and throughout the programme. F4 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.	F3 and F4 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), sandwich (4 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 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 BEng level 4, 5 & 6: Full Time: 3 years; Sandwich: 4 years and Part time: 6 years
MEng level 4, 5, 6 & 7: Full Time: 4 years; Sandwich: 5 years and Part time: 8 years

Entry point Semester A

Level 4

Compulsory Modules Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semester	Full Time Mode	Part Time Mode
Introduction to Robotics	4ENT1177	15	English	0	100	0	A	1	1
Digital Electronics	4ENT1175	15	English	0	100	0	A	1	1
Math for Robotics and Artificial Intelligence	4ENT1176	15	English	50	50	0	A	1	2
Robot Design and Build Part A	4ENT1178	15	English	0	100	0	A	1	2
Programming	4ENT1179	15	English	0	100	0	B	1	1
Professional Engineering	4ENT1180	15	English	0	100	0	B	1	1
Digital Computing Principles	4ENT1181	15	English	0	100	0	B	1	2
Robot Design and Build Part B	4ENT1182	15	English	0	50	50	B	1	2

Level 4 (HIC)

Compulsory Modules Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semester	Full Time Mode	Part Time Mode
Introduction to Robotics	4ECS2015	15	English	0	100	0	A	1	1
Digital Electronics	4ECS2016	15	English	0	100	0	A	1	1
Math for Robotics and Artificial Intelligence	4ECS2017	15	English	0	100	0	A	1	2
Robot Design and Build Part A	4ECS2018	15	English	0	0	100	A	1	2
Programming	4ECS2019	15	English	0	100	0	B	1	1
Professional Engineering	4ECS2020	15	English	0	100	0	B	1	1
Digital Computing Principles	4ECS2021	15	English	0	100	0	B	1	2
Robot Design and Build Part B	4ECS2022	15	English	0	50	50	B	1	2

Progression to level 5 requires a minimum of 90 credits to remain on honours award.

Progression to non-honours level 5 with 75 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 4 in the first instance

Level 5

Compulsory Modules Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semester	Full Time Mode	Part Time Mode
Embedded Systems Design	5ENT1137	15	English	50	50	0	A	2	3
Behavioural Robotics	5ENT1139	15	English	0	50	50	A	2	3
Artificial Intelligence Principles	5ENT1140	15	English	50	50	0	A	2	4
Applied Robotics and AI project	5ENT1141	15	English	0	90	10	A	2	4
Operating Systems for Applications	5ENT1138	15	English	0	100	0	B	2	3
Robot Sensors and Signal Processing	5ENT1142	15	English	50	50	0	B	2	3
Mechatronics	5ENT1143	15	English	50	50	0	B	2	4
Team Project	5ENT1144	15	English	0	100	0	B	2	4

Progression to level 6 requires a minimum of 210 credit points to remain on Honours award.

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.

Level 6

Optional Modules Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semester	Full Time Mode	Part Time Mode
Placement Year	6AAD0015	0	English	0	P/F	0	ABC	3	-
Year Abroad	6ENT0001	0	English	-	-	-	AB	3	-
Semester Abroad	6ENT1051	0	English	-	-	-	A or B	3	-

Level 6

Compulsory Modules Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semester	Full Time Mode	Part Time Mode
Machine Learning	6ENT1176	15	English	50	50	0	A	3 or 4	5
Visual and Spoken interfaces	6ENT1183	15	English	0	100	0	A	3 or 4	5
3D Vision	6ENT1178	15	English	0	100	0	A	3 or 4	6
Industrial Robotics	6ENT1179	15	English	50	50	0	B	3 or 4	6
Robot Communication	6ENT1180	15	English	50	50	0	B	3 or 4	5
Mobile Robots and Drones	6ENT1181	15	English	0	100	0	B	3 or 4	5
BEng Individual Major Project	6ENT1186	30	English	0	100	0	AB	3 or 4	6
MEng Individual Major Project (Robotics & AI)	6ENT1185	30	English	0	100	0	AB	3 or 4	6

Level 7

Compulsory Modules Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semester	Full Time Mode	Part Time Mode
Human-Robot Interaction	7ENT1159	15	English	0	100	0	A	4 or 5	7
Robotic Systems Design	7ENT1160	15	English	60	40	0	A	4 or 5	7
Artificial Intelligence Theory and Applications	7ENT1162	15	English	60	40	0	A	4 or 5	8
Professional Practice	7ENT1163	15	English	60	40	0	B	4 or 5	7
Robotic Product Design	7ENT1161	15	English	0	100	0	B	4 or 5	7
MEng Team Project	7ENT1164	45	English	0	75	25	AB	4 or 5	8

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 Table 2)
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	7	All programme learning outcomes for the specified named award (see Table 2)

		Placement Year module.		
MEng (Hons) in the named award with Study Abroad		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 complete the Semester Abroad modules.	7	All programme learning outcomes for the specified named award (see Table 2)
MEng (Hons) in the named award with Year Abroad		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. Additionally, students must satisfactorily complete the Year Abroad modules.	7	All programme learning outcomes for the specified named award (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 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	A1, A2, A3, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6, E1, E2, E3, E4, E5, E6, E7, E8, E11, F1, F2, F3, F4
BEng in the named award		300 credit points including 180 at level 6/5 of which	6	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6, E1, E2, E3, E4, E5, E6, E7, F1, F2, F3

	Robotics and Artificial Intelligence	60 must be at level 6. (**)		
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	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6, E1, E2, E3, E4, E5, E6, E7, F1, F2, F3
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	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6, E1, E2, E3, E4, E5, E6, E7, F1, F2, F3
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	A1, A2, A3, A4, A5, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6, E1, E2, E3, E4, E5, E6, E7, F1, F2, F3
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 (see Table 2)

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 (see Table 2)
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 (see Table 2)
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	6	All programme learning outcomes (see Table 2)

		and the Year Abroad modules.		
MEng (Hons) in the named award	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 and the MEng Team Project. Compliant with UH compensation requirements	7	All programme learning outcomes for the named award (see Table 2)
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 named award (see Table 2)
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 Abroad modules. Compliant with UH compensation requirements.	7	All programme learning outcomes for the named award (see Table 2)
MEng (Hons) in the named award with Year 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	7	All programme learning outcomes for the named award (see Table 2)

	MEng Individual Project, the MEng Team Project and pass the Year Abroad modules. Compliant with UH compensation requirements	
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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 Bodie

Programme-specific assessment regulations

The programme complies with the University's academic regulations (in particular, [UPR AS11](#), [UPR AS12/UPR AS13](#) and [UPR AS14](#)) with the exception of those listed below, which have been approved by the University:

- **A compensated pass cannot be awarded for the BEng Individual Project, MEng Individual Project and MEng Team Project.**
- **The BEng and MEng individual projects and the MEng Team Project must be included in the calculation of degree classification.** Students who do not succeed on the individual project may be eligible to repeat and will be allocated an entirely different project.
- **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.
- **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; a maximum of 15 credit points can be compensated at level 7.**

MEng students exiting with a BEng Award (non-Honours) shall have their degree classification determined in accordance with UPR AS14 and include the Individual Project, if completed, in the calculation of degree.

Further programme-specific regulations (requiring School-level approval) are given below:

- BEng students achieving an award classification of 2:1 or above are eligible to progress to level 7 to accomplish a MEng qualification on their chosen pathway. BEng students at level 5 who would like to take up the option to progress to MEng at level 7, must apply to undertake MEng Undergraduate Individual Project at level 6 to satisfy the learning outcomes required for the MEng course. **Students will be able to indicate this preference by discussion with their Programme Leader and completing a Study Agreement form by the end of first teaching week at the start of level 6.** Eligible students will be permitted to transfer to the MEng programme on gaining an overall undergraduate classification of 2:1 or above.
- 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).
- Students exiting with a BEng Award (non Honours) 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?
ECRAIBENG	RAI3*, RAI4*, RAI6P	BEng (Hons) Robotics and Artificial Intelligence	6ENT1186 BEng Individual Major Project	yes
ECRAIMENG	RAIM3*, RAIM4*, RAIM6P	MEng (Hons) Robotics and Artificial Intelligence	6ENT1185 MEng Individual Major Project (Robotics & AI)	yes
ECRAIMENG	RAIM4*, RAIM7P, RAIM8P	MEng (Hons) Robotics and Artificial Intelligence	7ENT1164 MEng Team Project	yes

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;
- Student representatives on programme committees;
- Module Leaders who are responsible for individual modules.

Support

Students are supported by:

- An induction week at the beginning of each new academic session;
- Personal Tutors to provide academic and pastoral support;
- 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;
- StudyNet, a versatile on-line inter-active intranet and learning environment;
- Guided student-centred learning on StudyNet module sites;
- Access to extensive digital and print collections of information resources;
- Attractive modern study environments in 2 Learning Resources Centres;
- A Mathematics Drop-in Centre;
- Medical Centre;
- University Disability Advisors;
- An Equality Office;
- Careers Enterprise and Employment Services;
- The Students' Union.

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 Programme (or Student) Handbook;
- 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/>. Furthermore, the OfS has judged that the University of Hertfordshire delivers consistently outstanding teaching, learning and outcomes for its students. It is of the highest quality found in the UK. Consequently, the University received a Gold award in the 2018 Teaching Excellence and Student Outcomes (TEF) exercise. This award was made in June 2018 and is valid for up to 3 years. The TEF panel's report and conclusions can be accessed at: <https://www.officeforstudents.org.uk/advice-and-guidance/teaching/tef-outcomes/#/provider/10007147>

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: hadmin@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

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

This map identifies where the programme learning outcomes are 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.

The key to the learning outcomes are as listed in Section 1.C.

Programme learning outcome	Introduction to Robotics (4ENT1177)	Digital Electronics (4ENT1175)	Math for Robotics and Artificial Intelligence (4ENT1176)	Robot Design and Build Part A (4ENT1178)	Programming (4ENT1179)	Professional Engineering (4ENT1180)	Digital Computing Principles (4ENT1181)	Robot Design and Build Part B (4ENT1182)
<i>Knowledge & Understanding</i>								
A1	X							X
A2			X					X
A3				X				X
<i>Intellectual Skills for Analysis</i>								
B1		X					X	
B2		X		X			X	X
B3			X		X			
B4	X			X				X
<i>Intellectual Skills for Design</i>								
C1				X		X		X
C2				X				X
C3			X				X	
C4		X	X				X	X
C5		X	X			X	X	
C6				X				X
<i>Economic, Legal, Social, Ethical and Environmental Context</i>								
D1	X					X		
D2	X					X		
D3						X		X
D4		X				X	X	
D5	X					X		
D6				X				X
<i>Engineering Practice</i>								
E1	X					X		
E2		X			X			
E3				X				X
E4	X			X				X
E5	X					X		
E6	X					X	X	
E7			X			X		
E8			X					X

E11				X				X
<i>Transferable Skills</i>								
F1					X		X	
F2						X		X
F3				X		X		
F4				X				X

LEVEL 5

Programme learning outcome	Embedded Systems Design (5ENT1137)	Behavioural Robotics (5ENT1139)	Artificial Intelligence Principles (5ENT1140)	Applied Robotics and AI project (5ENT1141)	Operating Systems for Applications (5ENT1138)	Robot Sensors and Signal Processing (5ENT1142)	Mechatronics (5ENT1143)	Team Project (5ENT1144)
A1				X				X
A2						X	X	
A3		X	X		X	X		
B1				X			X	
B2	X						X	
B3			X			X	X	
B4	X	X		X				X
C1				X				X
C2		X						X
C3			X				X	
C4			X			X		
C5				X				X
C6				X				X
D1		X						X
D2				X				X
D3				X				X
D4				X				X
D5				X				X
D6				X				X
E1	X						X	
E2	X							
E3	X				X		X	
E4				X				X
E5				X				X
E6		X					X	
E7						X	X	
E8			X			X		
E11				X				X
F1				X				X
F2				X				X
F3				X				X
F4				X				X

LEVEL 6

Programme learning outcome	Machine Learning (6ENT1176)	Visual and Spoken Interfaces (6ENT1183)	3D Vision (6ENT1178)	Industrial Robotics (6ENT1179)	Robot Communication (6ENT1180)	Mobile Robots and Drones (6ENT1181)	BEng Individual Project (6ENT1186)	MEng Individual Project (6ENT1185)
A1		X		X				
A2	X		X	X				
A3		X			X	X	X	X
B1			X	X				
B2	X	X			X			
B3		X		X				
B4				X		X	X	X
C1				X			X	X
C2		X					X	X
C3	X				X			
C4		X	X				X	X
C5				X			X	X
C6					X		X	X
D1				X		X		
D2		X				X		
D3		X	X			X	X	X
D4	X						X	X
D5				X			X	X
D6				X		X		
E1		X	X					
E2				X		X		
E3						X		
E4		X	X				X	X
E5				X			X	X
E6				X		X		
E7	X					X		
E8	X					X		
E11			X				X	X
F1			X		X			
F2					X		X	X
F3		X					X	X
F4	X						X	X

LEVEL 7

Programme learning outcome	Human-Robot Interaction (7ENT1159)	Robotic System Design (7ENT1160)	Artificial Intelligence Theory and Applications (7ENT1162)	Professional Practice (7ENT1163)	Robotic Product Design (7ENT1161)	MEng Team Project (7ENT1164)
A4		X				X
A5					X	
A6	X				X	X
B5				X		X
B6		X			X	X
C7		X	X		X	X
C8			X		X	X
D6		X		X		X
D7	X				X	X
E9				X		X
E10					X	X

Section 2

Programme management

Relevant QAA subject benchmarking statements
Type of programme
Date of validation/last periodic review
Date of production/ last revision of PS
Relevant to level/cohort
Administrative School

Robotics and Artificial Intelligence

Undergraduate

November 19

March 2022

Level 4 entering September 2022

School of Physics, Engineering & Computer Science

Table 3 Course structure

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