University of Plymouth

Plymouth Global
Peninsula Higher Education

Programme Specification

BTech (Hons) Robotics

Programme Code 7316

September 2025

1. BEng Robotics

Final award title	BTech Robotics
Intermediate award title(s)	Certificate of Higher Education
	Diploma of Higher Education

JACS code H671

2. Awarding Institution: University of Plymouth

Teaching institution(s): Peninsula Higher Education

3. Accrediting body: MBOT

4. Distinctive Features of the Programme and the Student Experience

The BTech Robotics programme provides a course of study at honours level which is accredited by the Malaysian Board of Technology.

The programme moves gradually from a taught-based approach in the first two years to a project-based approach in the final year, with the aim to encourage and support students to develop a self-motivated learning attitude and self-management skills, such as working effectively under time and resource constraints.

At the University of Plymouth we strongly believe that practical experience provides the best context for grounding and practising theoretical knowledge. Thus, through substantial hand-on sessions in the extensive lab facilities available at the University, the programme aims to provide students with an immersive learning-by-doing experience, which will develop fundamental practical and analytical skills in electronic, embedded and high-level programming, mechatronics, artificial intelligence, and the most modern findings in robotics research. This will be complemented by in-depth theoretical, analytical, and design abilities required for undertaking managerial engineering roles in their future career.

A fundamental role is played by robot design, analysis, building and programming. Robots are introduced to students in the first taught module and it will be through the design, analysis and programming of increasingly complex robots that knowledge and engineering practice will be integrated and contextualised. By moving from wheeled robots to humanoid robots, students will experience analogue and digital electronic, embedded and high-level programming, classical and modern control theory, as well as kinematics and the most relevant modelling techniques. Extensive robotics practice is complemented by theoretical lectures on principles and mathematics, which provide the essential background and analytical tools of a modern technologist and engineer.

The final year of BTech provides the opportunity for the students to engage on a challenging individual project, which is entirely led by the students, and for which they are responsible from early inception to conclusion. The final project is a milestone in the entire course and allows for experiences that will prove the technical and engineering skill of the students, but also will provide awareness of the business implications of engineering decisions and will test essential transferable skills, such as time-management and self-reliance.

The programmes are greatly enhanced by high-qualified staff that enjoy international recognition in fore-front robotics research in many areas of robot control, service robotics, cognitive robotics, artificial intelligence, and human-robot interaction. This creates a fertile research environment around the students and offers many occasions for deepening their knowledge through numerous workshops and seminars delivered by international researchers. The teaching also benefits from the positive research environment, as the lecturers will feed the latest findings and tools into their teaching, by exposing the students to new and exciting research.

The first two years of study develop a relatively common foundation of knowledge and skills to support final level specialisation. Final level modules are carefully tailored to optimise graduate ability to ‘hit the ground running’ in their chosen specialist field.

In line with our commitment to lifelong learning, students are encouraged to take an industrial placement following the Level 5 of the programme, and help is provided to secure suitable placements. Integrated Professional Development Planning is also encouraged and supported.

The course links theory through to practice, with a high commitment to project work. Students will design, analyse, construct and test analogue and digital circuits and integrated robotics systems. They will also write high and low level code and study good software engineering practice. This culminates with our final level project showcase where students compete for industrially sponsored prizes. As well as offering meaningful collaboration and publicity. The Level 6 project is an opportunity to showcase project work to colleagues and recruiters from industry, internal and external examiners and other students, often generating company interviews or immediate job offers.

Employment prospects from the course are very good, both in the UK and abroad. Our students are highly thought of by industry and Plymouth graduates are often found in senior positions (such as Senior Design Engineer). We benefit from enthusiastic industrial support via guest presentations, equipment and prize donations and course development.

Personal Development Planning (PDP)

Level 4 and 5 students will receive career related guidance via a variety of mechanisms that are directed to ensure that students obtain placement opportunities which will enable them to realise their true potential. These include project-based practicals (e.g. MAL2056), in which students are encouraged to develop their group work interaction, to produce a business plan, keep a log book and present their work in front of an audience.

Students on a professional training year will be able to develop their PDP further through the training reflective journal.

Level 6 students are expected to be able to self-manage their learning and career planning. However, support is available via project supervisor and personal tutor.

5. Relevant QAA Subject Benchmark Group(s)

QAA Subject benchmark: **Engineering.**

The programme learning outcomes are modelled from IET UK-SPEC learning outcomes and QAA Information and Guidance.

6. Programme Structure

The programme of study is comprised of the raft of modules outlined in this document with 120 module credits per level, with three levels of study. The aim is to develop skills consistent with those required in the Engineering Subject Benchmarks. This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably expect to achieve and demonstrate if he/she takes full advantage of the learning opportunities available. More detailed information can be found in individual module literature provided during the course.

Module delivery methods are diverse but are usually a mix of lectures, seminars, tutorials, laboratory sessions, research investigations and problem clinics. This delivery involves teams of academic, technical, support staff and students. To support learning, the University operates an electronic learning environment accessed via the student portal. All students have dedicated accounts linked to this which forms the primary mechanism to arrange meetings with staff outside of programmed sessions. The campus is well equipped with computers and there are additional dedicated computer labs running specialist software to support this programme. Lecture and support materials are available via web access using the portal to facilitate home study and preparation for sessions.

The weighting of examination and coursework performance is ramped-up from Level 4 to 6. For example, a Level 4 module in a particular theme may be weighted 50% examination, 50% coursework. In Level 5 this may be 60% examination, 40% coursework and by Level 6 it may be 70% examination, 30% coursework.

The integrated programme consists of Level 4 of the standard programme together with ILS1005: Interactive Learning Skills and Communications. Successful completion of both of these components allows students to proceed to Level 5 of the standard programme.

Students are expected to pass all modules in order to progress. Industrial placement is optional.

Pass requirement for each module: 40% (≥ 30% in each elements: Exam, Coursework and in-class Test).

Level 4 – 120 Credits

The overall mark from this level carries forward as 10% of the final BTech award.

Intermediate award on satisfactory completion of Level 4 but subsequent failure to progress leads to ***Certificate of Higher Education***

Semester	Module	Subject	Credit	E1 (%)	C1 (%)	T1 (%)	P1 (%)
1/2	MAL1054	Embedded System Design and Build	40		100		
1	MAL1055	Electrical Principles and Machines	20	60	40		
1	MAL1056	Engineering Mathematics	20	50	50		
2	MAL1057	Digital Electronics	20	60	40		
2	MAL1058	Analogue Electronics	20	60	40		P/F

Level 5 - 120 Credits

The overall mark from this level carries forward as 30% of the final BTech award. Intermediate award on satisfactory completion of Level 5 but subsequent failure to progress leads to ***Diploma of Higher Education***

Semester	Module	Subject	Credit	E1 (%)	C1 (%)	T1 (%)	P1 (%)

1	**MAL2055**	**Engineering Mathematics and Statistics**	**20**	**80**	**20**		
1/2	**MAL2056**	**Real Time Systems Project**	**40**		**60**		**40**
1	**MAL2060**	**Sensors and Actuators for Robotic Systems**	**20**	**40**	**60**		
2	**MAL2061**	**Introduction to Robotics**	**20**	**60**	**40**		
2	**MAL2059**	**Control Engineering**	**20**	**60**	**40**		

Level 6 – 120 Credits

Final mark for award classification is **60% Level 6 + 30% Level 5 + 10% Level 4**

Classification bands:

First class honours	70% and above.
Upper second class honours	60-69%
Lower second class honours	50-59%
Third class honours	40-49%
Pass degree	80 Level 6 credits.

Semester	Module	Subject	Credit	E1 (%)	C1 (%)	T1 (%)	P1 (%)
1	**MAL3070**	**Mobile and Humanoid Robots**	**20**	**70**	**30**		
1	**MAL3066**	**Advanced Embedded Programming**	**20**	**40**	**60**		
1	**MAL3067**	**Machine Learning for Robotics**	**20**	**50**	**50**		
2	**MAL3071**	**Computer Vision**	**20**		**100**		
2	**MAL3069**	**Individual Project**	**40**		**70**		**30**

7. Programme Aims

The general aims of the course are to:

- be inspirational and to support the students to unlock their potential with an innovative, experience-based, and self-motivated approach to robotics and to support their personal and professional development for a fulfilling post-graduate career in technology or engineering;
- provide a sustained programme of study at honours level that satisfies the requirements of accreditation by the Institution of Engineering and Technology and enables employment as a professional engineer;
- be highly informative and capable of stretching the intellectual skills of students to form an exceptional knowledge base suitable for a future career in Engineering based industry and research.
- encourage and support students during their professional development in applying technical and generic skills and to foster flexible and creative intellectual skills that will facilitate life-long learning and continuing professional development.
- establish an extensive and in-depth foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering

principles, mathematical modelling and advanced design methods to robotics and electronics problems;

- provide the opportunity to 'learn through design' via practical and project based work, particularly within the context of circuits and robot systems design.

8. Programme Intended Learning Outcomes

On completion graduates should have developed the following knowledge, understanding and skills:

Knowledge and Understanding

KU1. Understand the scientific principles and methodology necessary to enable appreciation of scientific and engineering context in robotics development, and to support the understanding of historical, current, and future developments in robotics;

KU2. Understand engineering principles applied to robotic contexts and to apply them to analyse key engineering processes;

KU3. Identify, classify and describe the performance of analogue and digital systems and components, as well as dynamic and kinematic systems, through the use of analytical methods and modelling techniques;

KU4. Apply quantitative methods and computer software relevant to solve robotics control problems, to model, and control, complex robotic systems;

KU5. Understand technical, social, and ethical aspects of modern robotics research and development.

Intellectual Skills

IS1. Apply and integrate knowledge and understanding of other engineering and scientific disciplines to support the creative design of innovative solutions to engineering problems;

IS2. Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues;

IS3. Understand legal requirements, professional and ethical conduct, and commercial and economic context of engineering processes and solutions;

Key and Transferable Skills

TS1. Understand and apply mathematical principles, methods, tools and notation proficiently in the analysis and solution of engineering problems;

TS2. Communicate effectively in written and oral form and proficiently use ICT technologies for effective communication purposes;

TS3. Reflect on their own learning, being autonomous in learning, being self-critical and demonstrate self-reliance to progress and plan for personal and professional development;

TS4. Work with, and relate effectively to others in the organization and management of robotics group projects.

Practical Skills

PS1. Apply knowledge of characteristics of particular materials, equipment, processes, or products in the design and build of integrated software and hardware components, such as mechanical parts and electronic circuits;

PS2. Assess and use the appropriate hardware and software tools for the design and build of robotics systems in modern workshop and laboratory settings;

PS3. Identify and use modern modelling software for the design and analysis of control engineering systems, electronic circuits, and kinematic models applied to robotics systems design;

PS4. Individually and autonomously manage a robotic project from its inception to the final realisation.

9. Admissions Criteria, including APCL, APEL and DAS arrangements

Entry into Level 4

- A pass in Matriculation or Foundation studies with minimum CGPA of 2.0 and a credit in Mathematics at SPM level or its equivalent; OR
- A pass in STPM (Malaysian pre-university programme. -Malaysian Higher School Certificate) with a minimum Grade C (GP 2.0) in any 2 subjects including Mathematics and Physical Science (Physics/ Chemistry/related subject) AND pass SPM or its equivalent with at least a pass in English. ; OR
- Unified Examination Certificate (UEC) with a minimum of Grade B in five (5) subjects including Mathematics and Physical Science (Physics/Chemistry/related subject)
- Pass A-Level (CGPA2.00) with at least a full pass in two (2) subjects including Mathematics and Physical Science (Physics/Chemistry/related subject)

Entry into Level 5

- Peninsula college are articulating diploma graduates from home grown Diploma in Electrical & Electronic Engineering Technology into Level 5.

- Any other Diploma in Engineering with a minimum CGPA of 2.0 may be admitted, subject to a rigorous internal assessment process and a credit in Mathematics at SPM level or its equivalent.

PLUS UoP English Requirement

I. MUET (Band 4) ,or
II. Cambridge English 1119 Grade 6 C, or

IELTS band 6.0 and above

APEL is considered on individual basis by admission tutors who will assess the suitability for the programme and will indicate the appropriate entry stage in accordance with the level of experience documented by the applicant.
We welcome applications from applicants with disabilities. Applicants will be subject to standard academic selection procedures. Some students may be invited to attend an information meeting to ensure that the University of Plymouth can provide the required support, and to indicate where any adjustments may need to be made. The University of Plymouth's Disability Assist Service is nationally recognised for its good practice in supporting learners with disabilities.

10. Exceptions to Regulations

The pass mark for a module is 40%.

Maximum compensation of 20 credits against the whole Degree programme (applied at Stage 1- level 4) and no compensation where there is direct entry into the final stage.

11. Transitional Arrangements

N/A

12. Mapping and Appendices:

12.1. ILO's against Modules Mapping

Knowledge and Understanding	
KU1	MAL1054, MAL2061, MAL1058, MAL1057
KU2	MAL1058, MAL1057, MAL1055
KU3	MAL1058, MAL1057, MAL1055, MAL2061
KU4	MAL1054, MAL2056, MAL3066, MAL2059, MAL3067
KU5	MAL1054, MAL2061, MAL3070, MAL2060
Intellectual Skills	

IS1	MAL1054, MAL3069, MAL3067, MAL3069
IS2	MAL3069
IS3	MAL3069
Key and Transferable Skills	
TS1	MAL1056, MAL2055, MAL2061, MAL3067
TS2	MAL2056, MAL3069
TS3	MAL3069
TS4	MAL2056,
Practical Skills	
PS1	MAL1054, , MAL2056
PS2	MAL1054, MAL1057, MAL1058, MAL2056,
PS3	MAL2059, MAL3066, MAL2060
PS4	MAL2056 MAL3069

12.2. Assessment against Modules Mapping

Already covered in structure

12.3. Skills against Modules Mapping

IET Skills mapping

IET Skills Mapping	ELEC1	ELEC1	ENGR	PROJ1	PROJ1	ELEC1	ELEC1	BPIE1	BPIE2	MATH	ROCO	ELEC2	ELEC2	ROCO	ROCO	ROCO	ELEC3	ELEC3	AINT3	PROJ3	ROCO
1. UNDERPINNING SCIENCE AND MATHEMATICS																					
1.1 Scientific Principles and Methodology																					
US1 Knowledge and understanding of scientific principles and methodology necessary to underpin their education in their engineering discipline, to enable appreciation of its scientific and engineering context, and to support their understanding of historical, current, and future developments and technologies.		x	x			x	x			x				x	x		x	x			x
1.2 Mathematics																					
US2 Knowledge and understanding of mathematical principles necessary to underpin their education in their engineering discipline and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems.			x				x			x				x	x			x			x
1.3 Integrated Engineering																					
US3 Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline.	x			x	x							x		x			x			x	
2. ENGINEERING ANALYSIS																					
2.1 Application of Engineering Principles																					

E1 Understanding of engineering principles and the ability to apply them to analyse key engineering processes.	x			x	x		x				x	x	x	x	x			x		x	x
2.2 Performance Classification and Modelling																					
E2 Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.	x		x			x	x			x	x	x		x	x	x		x			x
2.3 Quantitative Methods and Computer Based Problem Solving																					
E3 Ability to apply quantitative methods and computer software relevant to their engineering discipline, in order to solve engineering problems.	x					x	x					x	x	x		x	x	x			x
2.4 Systems																					
E4 Understanding of and ability to apply a systems approach to engineering problems.	x					x	x				x	x		x		x	x	x		x	
3. DESIGN																					
D1 Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues;				x	x	x	x					x		x				x		x	
D2 Understand customer and user needs and the importance of considerations such as aesthetics;				x	x									x		x				x	
D3 Identify and manage cost drivers;				x	x							x					x			x	
D4 Use creativity to establish innovative solution;				x	x	x	x					x								x	

D5 Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal;				x	x								x				x			x		
D6 Manage the design process and evaluate outcomes.				x	x						x	x								x		
4. ECONOMIC, SOCIAL, AND ENVIRONMENTAL CONTEXT																						
S1 Knowledge and understanding of commercial and economic context of engineering processes;												x	x									
S2 Knowledge of management techniques, which may be used to achieve engineering objectives within that context;								x	x													
S3 Understanding of the requirement for engineering activities to promote sustainable development;	x											x				x						
S4 Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues;						x		x	x			x										
S5 Understanding of the need for a high level of professional and ethical conduct in engineering.	x							x	x		x		x	x								
5. ENGINEERING PRACTICE																						
5.1 Materials and Components																						
P1 Knowledge of characteristics of particular materials, equipment, processes, or products.	x	x				x	x				x	x	x			x		x		x		
5.2 Workshop and Laboratory Skills																						

P2 Workshop and laboratory skills.	x					x	x				x	x	x		x	x		x				
5.3 Appropriate use of Engineering Knowledge																						
P3 Understanding of contexts in which engineering knowledge can be applied (e.g. Modified by the policy working party 2009 to include IEng UK-SPEC learning outcomes. 34 of 40 operations and management, technology development, etc).													x		x		x					
5.4 Technical Information																						
P4 Understanding use of technical literature and other information sources.	x	x				x	x				x	x						x		x		
5.5 Intellectual Property and Contracts																						
P5 Awareness of nature of intellectual property and contractual issues.													x	x						x		
5.6 Codes of Practice and Standards																						
P6 Understanding of appropriate codes of practice and industry standards.											x		x	x				x				
5.7 Quality																						
P7 Awareness of quality issues.						x	x						x	x						x		
5.8 Working with Uncertainty																						
P8 Ability to work with technical uncertainty.						x	x					x	x							x	x	

13 Appendices

Teaching and learning methods and assessment strategies

Module delivery methods are diverse but are usually a mix of lectures, seminars, tutorials, laboratory sessions, research investigations and problem clinics. This delivery involves teams of academic, technical, support staff and students.

To support learning, the University operates an electronic learning environment accessed via the student online learning environment. All students have dedicated accounts linked to this which forms the primary mechanism to arrange meetings with staff outside of programmed sessions. The campus is well equipped with computers and there are additional dedicated computer labs running specialist software to support this programme. Lecture and support materials are available via web access using the portal to facilitate home study and preparation for sessions.

Knowledge and understanding

Elements of teaching related to general and specific knowledge of engineering are mainly delivered by traditional in-class lectures. This traditional delivery method is always complemented by real and virtual laboratories, where students can experience and understand the theory through practice, as well as demonstrations and multimedia presentations. University of Plymouth has a strong focus on electronic resources as a means for providing equal accessibility to knowledge. Therefore, the electronic resources already available on the market are often integrated by tailored material produced and made available to the students by the teaching staff in various forms, such as, lecture slides, podcasts, multimedia products and video-recorded lectures.

Lectures and presentations from visiting industrialists, practising engineers and representatives of professional groups are included in the delivery of some modules and some are open to students as extramural activities for added value.

Knowledge related skills are usually assessed by a mix of practice-based elements and examination, which may take the form of formal exams or in-class tests.

Inclusive strategies in support of disabled students are put in place as a complement of other forms of assessment.

Intellectual skills

Intellectual skills are fostered by the application of learning methods based on self-discovery and learning-by-doing, in which the responsibility for taking the initiative, self-reliance and self -discipline is given to the student. Students are introduced to conception, development, design, analysis and review of real solutions to engineering challenges. These activities are usually stimulated during interactive sessions in labs and practical settings. Task-based and project-based teaching methods support the development of the necessary ability to apply theory and knowledge in practice and to widening the learning perspective of students in an integrative and comprehensive way, by favouring connections between specific engineering skills and other topics, such as market, legal, and ethical aspects.

These skills are assessed through the robust defence of design decisions by means of viva voce and reports. Tasks and case studies based on problem solving and forward planning to make provision for professional challenges such as lead times, secondary sourcing, critical functions and creative alternative solutions are presented to the students.

Key and transferable skills

A range of student-centred activities require students to work alone and in groups, focussing and researching topics, which are assessed through a variety of means including: viva voce, presentations, written reports, and an essay style dissertation. Sometimes the deliverables are in the form of design solutions underpinned by comprehensive mathematical analysis, or computer models of actual physical entities. Assessment not only includes the results obtained but also the methodology used and the means of presenting the results.

Projects in general, and particularly the Level 6 project, present opportunities for individuals to take a holistic view of a problem, set specific measurable and realistic goals within a strict timeframe.

As part of their personal and professional development, students are encouraged to take an optional placement year after the second year, during which they spend a full year in an industrial or research environment relevant to their study.

Practical skills

The teaching and learning strategy is based on a wide range of student centred activities involving hardware and software design and development which necessitate the full range of practical skills acquisition required by an engineer.

The modules link theory and practice, with a high commitment to project work.

From week 1 at the university, students select devices, construct, analyse and test analogue and digital circuits. This approach continues with increasing rigour as the programme progresses.

Students will use a wide range of devices to develop analogue and digital circuits and integrated embedded systems. Knowledge of what is available and how it may be applied is a fundamental part of the programme, together with the extensive use of a variety of circuits as teaching platforms for mathematics, electronics, mechatronics, and programming.

Students will write high- and low-level code and study good software engineering practice.

In level 4 general engineering skills are acquired through tasks with materials provided. In Level 5, 6 and 7 the range and complexity of tasks increases and enlarges its breadth, further enhancing students’ familiarity with a host of skills and numerous disciplines related to Electrical and Electronic Engineering domain, such as renewable energy, communications and interfacing. This culminates with our Level 6 project open day where students display innovative designs and compete for industrially sponsored prizes.