LIBF

BEng (Hons) Robotics

Programme Specification

Contents

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General Information

UCAS Code	Award	Programme Title	Expected Duration	Study Mode
N/A	BEng (Hons)	Robotics **Programme Code** UK-LIBF-BAROE	3 years 4 years 6 years	Full-time Part-time 1 Part-time 2
	Exit Awards	• BEng (non-Hons) • Diploma of Higher Education • Certificate of Higher Education		

Credit Count	**360 FHEQ credits**
Awarding Institution	The London Institute of Banking & Finance
Teaching Institution	The London Institute of Banking & Finance
Delivery Modes	• On-campus • Online – Synchronous • Online – Asynchronous

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Record of modifications			

Programme Overview

Programme Summary

The BEng (Hons) Robotics programme is your gateway to a future where technology and innovation drive progress. The programme is designed to equip you with the essential skills in robotics, blending theory and experience to prepare you for an exciting career in this dynamic field. You'll gain a robust foundation in mathematics, physics, and computer science, supported by specialised robotics and engineering modules.

The programme begins with core subjects such as Introduction to Robotics, Mathematics (analysis and linear algebra), and Fundamentals of Physics. These foundational courses ensure you build the necessary analytical and problem-solving skills. As you progress, you will delve into Electrical Engineering, Signals and Systems, and Introduction to Programming with Python, providing you with practical knowledge and technical expertise.

Later you will focus on advanced topics like Sensor Technology, Mechatronic Systems, and Robot Kinematics. You'll engage in project reports from the modelling and simulation of robots, which will hone your ability to apply theoretical concepts to real-world scenarios. Modules on Control Systems Engineering, Safety of Industrial Plants, and the Robots and Society seminar ensure you understand both the technical and ethical dimensions of robotics.

Our flexible electives allow you to tailor your learning experience to your interests and career goals. Choose from exciting subjects such as Embedded Systems, Mobile Robotics, Artificial Intelligence, or Production Engineering Industry 4.0. Practical projects and internships provide practical experience, preparing you to tackle challenges in the modern world of work. Whether you're interested in Natural Language Processing, Computer Vision, or Human-Robot Interaction, there's something to suit every future robotics engineer.

The BEng (Hons) Robotics programme is dynamic and flexible, offering a range of learning opportunities to support your personal progress. It's crafted to meet the demands of the modern workforce, ensuring you're well-equipped to innovate and excel in the world of robotics.

Programme Aims

The BEng (Hons) Robotics programme aims to

- equip you with a comprehensive understanding of the concepts, principles, and technologies central to robotics engineering, preparing you to innovate and excel in the robotics and automation sectors effectively
- provide you with a strong ethical framework to navigate and address the ethical and societal implications of robotics, ensuring responsible and safe application of robotic technologies
- enable you to apply analytical and problem-solving skills to design, model, and implement robotic systems, utilising advanced programming, sensor technologies, and control systems
- develop your capability to manage projects effectively and communicate complex technical information clearly to diverse audiences;
- equip you with essential digital skills for the modern workplace through immersive use of a virtual learning environment, online learning resources, and access to Microsoft 365 and cutting-edge AI tools, thereby preparing you for the digital demands of contemporary business environments; and
- encourage a commitment to lifelong learning in robotics and related fields to keep pace with rapid technological advancements and industry trends.

Employability & Graduate Outcomes

Graduates of this programme are likely to pursue careers in a number of areas in the robotics sector and automation field, including industrial robotics, healthcare robotics, and autonomous systems. This programme of study supports graduates in developing the following employability skills:

- digital and technical literacy
- analytical skills
- organisational skills
- communication skills
- problem-solving skills

Intended Learning Outcomes of the Programme

This programme has been developed in accordance with the QAA Subject Benchmark Statement for Bachelor's Degrees in Engineering (2023).

Please note: The programme's intended learning outcomes below are described at the Bachelor with Honours level (Level 6).

On successful completion of this programme, you will be expected to:

L01 Demonstrate a systematic knowledge and understanding of the core principles of mathematics and physics in the analysis and design of robotic systems and their components, with particular emphasis on motion dynamics, system interactions, and geometric modelling.

L02 Systematically apply knowledge and understanding of the amalgamation of computer architectures, components, data processing, algorithms, hardware, software, and programming to solve engineering problems effectively.

L03 Critically apply principles of sensor technology and mechatronic systems measurement techniques to select and integrate appropriate features for robotic systems.

L04 Apply a thorough understanding of kinematics and dynamic properties of robotics to analyse and optimize the performance and behaviour of different robot configurations.

L05 Synthesize knowledge of the fundamental principles of electrical circuits, signals, and linear control systems in the design and analysis of mechatronic and robotic systems.

L06 Systematically apply virtual tools to simulate and address broadly-defined problems in robotics to design, test, and improve robotic systems.

L07 Critically analyse the impact of design choices on the performance and behaviour of robotic systems, applying a systems approach to optimize functionality and meet requirements.

L08 Critically evaluate the technical risks and benefits associated with robotic systems, considering design-driven risk reduction strategies, quality management systems, and adherence to international standards.

L09 Critically evaluate the ethical implications and broader societal, environmental, and economic impacts of deploying and using robotic technologies, promoting responsible and ethically sound engineering practices.

L010 Plan and execute relevant research projects which includes research and data analysis, encompassing the formulation of research questions, data collection methods and the review of literature in the field of engineering and communicate findings to both technical and non-technical audiences.

The Structure of the Programme

The BEng (Hons) Robotics programme is offered as a 3-year full-time programme or in part-time mode over a 4 or 6-year period.

The programme is divided into modules which include both compulsory and elective modules with a weighting of 15 credits each and a thesis with a weighting of 30 credits. All modules in the programme are assigned to one of three levels (Level 4/Level 5/Level 6) which reflect the depth of learning required in the relevant level and year of study.

To achieve a full-honours award, you need to complete modules with a combined weight of 360 credits, including the final thesis.

Table 1: Structure of the Programme

FT	PT 1	PT 2	Module Code	Module Name	Level	Credit	Compulsory / Elective
Semester 1	Semester 1	Semester 1	LIBFAWDLBROIR_E	Introduction to Robotics	4	15	C
			LIBFEXDLBDSMFC	Mathematics: Analysis	4	15	C
		Semester 2	LIBFEXDLBDSMFLA	Mathematics: Linear Algebra	4	15	C
	Semester 2		LIBFAWDLBWINGP-01_E	Fundamentals of Physics	4	15	C
Semester 2		Semester 3	LIBFEXDLBCSICS	Introduction to Computer Science	4	15	C
			LIBFAWDLBINGET-01_E	Electrical Engineering	4	15	C
	Semester 3	Semester 4	LIBFAWDLBROSS_E	Signals and Systems	5	15	C
			LIBFEXDLBDSIPWP	Introduction to Programming with Python	4	15	C
Semester 3		Semester 5	LIBFAWDLBIAWITT	Introduction to Academic Work for IT and Technology	5	15	C
	Semester 4		LIBFAWDLBROST_E	Sensor Technology	5	15	C
		Semester 6	LIBFPDLBWINWMKD1_E	Robot Kinematics	5	15	C
			LIBFAWDLBROMSY_E	Mechatronic Systems	5	15	C
Semester 4	Semester 5	Semester 7	LIBFPDLBWINWMKD2_E	Robot Dynamics	5	15	C
			LIBFAWDLBROCSE_E	Control Systems Engineering	5	15	C

		Semester 8	Elective from Group A			15	E
	Semester 6		Elective from Group A			15	E
		Semester 9	LIBFWAWADLBROSIPM_E	Safety of Industrial Plants and Machines	6	15	C
Semester 5			LIBFWAREDLBROSRS_E	Seminar: Robots and Society	6	15	C
	Semester 7	Semester 10	Elective from Group B			15	E
			Elective from Group B			15	E
		Semester 11	Elective from Group C			15	E
Semester 6	Semester 8		Elective from Group C			15	E
		Semester 12	LIBFBTDLBBT	Bachelor Thesis	6	30	C

Table 2: List of Electives

Module Code	Module Name	Level	Credit	Subject Area*
Electives A				
LIBFEXDLBDSEAR1	Production Engineering Industry 4.0	4	15	n/a
LIBFAWDLBENGFSS	Systems Simulation	5	15	n/a
LIBFAWDLBROES_E	Embedded Systems	5	15	n/a

LIBFPDLBROEPRS1_E	Programming with C/C++	5	15	n/a
LIBFWAWADLBLONQM1_E	Sustainability and Quality Management	6	15	n/a
LIBFPPDDT	Product Development and Design Thinking	6	15	n/a
LIBFAWDLBMETGWK_E	Materials Science for Engineers	6	15	n/a
LIBFPCADFE	Computer-Aided Design for Engineering	6	15	n/a
LIBFIRPFSINTER1	Internship I[1]	5	15	n/a
LIBFIRPFSINTER2	Internship II[1]	5	15	n/a
Electives B				
LIBFPDLBAETWEM1_E	Electrical Drive Technology	6	15	IR
LIBFWAPRDLBROPIRC_E	Project: Robot Control	6	15	IR / MSR
LIBFPDLBROESR1_E	Mobile Robotics	6	15	MSR
LIBFAWDLBAIINLP	Introduction to NLP	5	15	CR
LIBFAWDLBAIICV	Introduction to Computer Vision	5	15	CR
LIBFWAWADLBCSIDPITS	Introduction to Data Protection and Cyber Security	6	15	AID
LIBFWAWADLBDSEAIS1	Artificial Intelligence	6	15	AID
Electives C				
LIBFWACSDLBROEIRA2_E	Automation Technology	5	15	IR
LIBFWAPRDLBROPARRP_E	Project: Applied Robotics with Robotic Platforms	6	15	IR / MSR
LIBFWAWADLBROESR2_E	Soft Robotics	6	15	MSR

[1] Check eligibility before booking module.

LIBFWAREDLBROSHRI_E	Seminar: Human-Robot Interaction	6	15	CR
LIBFWAPRPDA	Project: Data Analysis	6	15	AID
LIBFPDLBDSEAIS2	Project: Artificial Intelligence	6	15	AID

*These subject areas represent recommended pathways through the electives.

IR = Industrial Robotics	MSR = Mobile and Service Robotics
CR = Cognitive Robotics	AID = Artificial Intelligence and Data

Teaching, Learning & Assessment

Information about teaching, learning and assessment can be found in the Learning, Teaching and Assessment Strategy.

Our programmes are designed to

- integrate theory with practice,
- develop your ability to critique and challenge models and theoretical frameworks,
- stimulate debate, discussion and research,
- foster a variety of academic skills,
- be accessible and inclusive, and
- develop global citizens.

You are expected to undertake a considerable amount of independent study, including reading, industry-related research and personal reflection.

Teaching Formats

The programme is designed to be offered in various teaching formats, for example online or via on-campus learning. The currently available delivery methods for this programme can be found on its dedicated page on the LIBF website.

You will have access to both asynchronous and synchronous teaching formats.

Via the Course Feed in the virtual learning environment, myCampus, you will be able to contact the module tutor in a flexible and accessible way.

This is also where Intensive Live Sessions are conducted synchronously with video-based elements. They serve to answer students' individual questions as well as to allow for group discussions.

Additionally, Learning Sprints[2] will offer a seven-week intense learning experience in which the lecturers guide students through the learning material in a very structured manner, with the goal of successfully preparing them to take the final assessment at the end. During this time, frequent synchronous online meetings are held, offering keynote speeches and interactive tasks.

Both the Intensive Live Sessions and Learning Sprints are recorded to further assist asynchronous learning.

In the on-campus format, teaching and learning combines online and in-person learning in a *flipped* classroom concept, where students are given control of their own learning and can decide which problem and learning activity they wish to engage in individually or collectively. Traditional classroom activities like lectures are conducted online via the learning platform, while in-class time is used for interactive work. On-campus elements like study groups and library study time complement this approach.

Learning Resources

You will have access to a wide range of resources, which may include the following:

- myCampus: This Moodle-based central information and digital learning platform is organised based on programmes and modules. On the respective module pages in myCampus, you can access all study materials (e.g., course books (i.e., text books), reading lists, practice exams and video galleries) as well as the links to all related resources and databases (e.g., MS Teams, links to the library for further reading, contact details of lecturers, links to the booking tool for online exams and the Turnitin submissions page). In the on-campus model you have access to the same learning platform, with slight adaptations made to accommodate, for example, differences in study sequence.

[2] Offered only when the minimum number of participants is reached.

- Learnhub App: You can access your learning materials in a digital app and have all your notes and highlights synchronised. The app supports different learning formats, such as reading and annotating course books, using different colour codes, assessing knowledge with interactive self-tests, or watching the latest videos of the current module.
- Our comprehensive online library is aligned with the study content and kept up to date. Compulsory and further reading is mentioned in the course and module descriptions available for the students and aims to provide them with unlimited access.

Assessment & Feedback

Regulations relating to progression and assessment, including information on late submissions, are as set out in LIBF's General and Academic Regulations for Students.

Assessment strategies follow LIBF's Higher Education Accessible and Inclusive Learning Policy.

Assessment consists of both formative and summative approaches, and feedback and feedforward are provided as outlined in LIBF's Higher Education Assessing Learning & Feedback Policy. The different types of assessment used by LIBF are described in the Higher Education Types of Summative Assessment Guidance.

Module assessment methods are included in Module Handbooks which are made available in myCampus.

Credit and Award

Credit Framework

The BEng (Hons) Robotics programme is made up of 360 FHEQ credits. One credit approximates to 10 student effort hours; therefore, the total course requires an average of 3,600 hours of effort. Typically, one ECTS credit is the equivalent to two UK credits, although this may vary depending on the individual European state's requirements.

Award

On successful completion of the full programme, you will be awarded the

Bachelor's Honours Degree	360 credits, of which at least 90 credits must be at Level 6 and 30 credits must be obtained through the Bachelor Thesis

Regulations

LIBF's General and Academic Regulations for Students detail

- regulations governing the award of credit,
- how grades for awards are granted,
- time limits for completion of programmes of study,
- capping of marks and regulations relating to the resitting of assessment components,
- academic misconduct (e.g., malpractice), and
- accreditation of prior learning (APL).

Exit Awards

In line with LIBF's General and Academic Regulations for Students, the following applies:

Bachelor's Degree (non-Honours)	minimum of 300 credits, of which at least 60 credits must be at Level 6
Diploma of Higher Education	minimum of 240 credits, of which at least 90 credits must be at Level 5
Certificate of Higher Education	minimum of 120 credits, of which at least 90 credits must be at Level 4

Note: LIBF does not award interim qualifications. For example, a student registered for the bachelor's degree will not automatically be awarded a Diploma or Certificate of Higher Education on completion of the required number of credits.

Professional Recognition

Credits gained via accreditation of prior learning (APL) into our awards may mean that students will not get certain exemptions from other institutions' higher education or professional awards that may recognise our programmes.

Criteria for Admission

All applications will be considered holistically and offers will be based on qualifications, subjects studied, any relevant work experience and personal statements demonstrating a desire to work in the relevant industry.

Students must be able to satisfy the general admissions criteria of LIBF. Entry requirements for the programme are

- 2 A Levels, and
- GCSE Maths 4 (C in old grading system) or above, and
- GCSE English 4 (C in old grading system) or above, and
- English language competence equivalent to IELTS 6.0 with no less than 5.5 in any element. An online English test is offered (SPEEX) if IELTS not available.

Overseas qualifications may be accepted and will be subject to evidence of equivalency normally verified through ECCTIS (UK ENIC).

If applicants do not satisfy these criteria, they can communicate with the LIBF Admissions Team and discuss entry requirements.

Suitable work experience may be accepted as an alternative on an individual basis.

Mature students who do not meet the entry criteria may be eligible to enrol under the LIBF mature student process. Applicants should contact a member of the Admissions Team if they do not meet the criteria.

Benchmarks

External

- QAA UK Quality Code, including:
    - Subject Benchmark Statement for Engineering (2023)
    - Level 6 descriptors in the Framework for Higher Education Qualifications in England, Wales and Northern Ireland
    - Higher Education Credit Framework for England

Internal

- LIBF Code of Practice
- LIBF General and Academic Regulations for Students

In addition, research with the relevant sector has been undertaken to ensure that the learning outcomes of the programme address identified skills and knowledge gaps.

Links

LIBF General and Academic Regulations for Students

LIBF Code of Practice

Subject Benchmark Statement for Engineering

Framework for Higher Education Qualifications in England, Wales and Northern Ireland

Higher Education Credit Framework for England

Curriculum Map of Modules Against Intended Learning Outcomes of the Programme

Module Code	Module Name	C / E*	Intended Learning Outcomes of the Programme									
			LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10
LIBFAWDLBROIR_E	Introduction to Robotics	C	X		X	X	X		X		X	
LIBFEXDLBDSMFC	Mathematics: Analysis	C	X			X						
LIBFEXDLBDSMFLA	Mathematics: Linear Algebra	C	X			X						
LIBFAWDLBWINGP-01_E	Fundamentals of Physics	C	X			X						
LIBFEXDLBCSICS	Introduction to Computer Science	C		X				X				
LIBFAWDLBINGET-01_E	Electrical Engineering	C	X				X			X		
LIBFAWDLBROSS_E	Signals and Systems	C	X		X	X	X					
LIBFEXDLBDSIPWP	Introduction to Programming with Python	C		X				X				
LIBFAWDLBIAWITT	Introduction to Academic Work for IT and Technology	C										X
LIBFAWDLBROST_E	Sensor Technology	C	X	X	X		X					
LIBFPDLBWINWMKD1_E	Robot Kinematics	C	X			X			X			
LIBFAWDLBROMSY_E	Mechatronic Systems	C	X	X	X	X	X		X			
LIBFPDLBWINWMKD2_E	Robot Dynamics	C	X			X		X	X			
LIBFAWDLBROCSE_E	Control Systems Engineering	C	X	X		X	X	X	X	X		
LIBFEXDLBDSEAR1	Production Engineering Industry 4.0	E		X				X	X	X		
LIBFAWDLBENGFSS	Systems Simulation	E		X		X	X	X	X			
LIBFAWDLBROES_E	Embedded Systems	E		X	X		X		X			
LIBFPDLBROEPRS1_E	Programming with C/C++	E		X				X				
LIBFWAWADLBLONQM1_E	Sustainability and Quality Management	E								X	X	
LIBFPPDDT	Product Development and Design Thinking	E		X				X	X	X	X	
LIBFAWDLBMETGWK_E	Materials Science for Engineers	E	X						X	X		
LIBFPCADFE	Computer-Aided Design for Engineering	E		X				X		X		

LIBFIRPFSINTER1	Internship I	E						X		X		
LIBFIRPFSINTER2	Internship II	E						X		X		
LIBFWAWADLBROSIPM_E	Safety of Industrial Plants and Machines	C			X		X		X	X	X	
LIBFWAREDLBROSRS_E	Seminar: Robots and Society	C							X	X	X	X
LIBFPDLBAETWEM1_E	Electrical Drive Technology	E	X		X		X	X	X	X		
LIBFWAPRDLBROPIRC_E	Project: Robot Control	E		X	X	X	X	X	X	X		X
LIBFPDLBROESR1_E	Mobile Robotics	E		X	X	X	X	X	X	X		
LIBFAWDLBAIINLP	Introduction to NLP	E		X								
LIBFAWDLBAIICV	Introduction to Computer Vision	E	X	X	X							
LIBFWAWADLBCSIDPITS	Introduction to Data Protection and Cyber Security	E		X						X	X	
LIBFWAWADLBDSEAIS1	Artificial Intelligence	E	X	X								
LIBFWACSDLBROEIRA2_E	Automation Technology	E	X	X	X		X					
LIBFWAPRDLBROPARRP_E	Project: Applied Robotics with Robotic Platforms	E		X	X	X	X	X	X	X		X
LIBFWAWADLBROESR2_E	Soft Robotics	E			X	X	X		X			
LIBFWAREDLBROSHRI_E	Seminar: Human-Robot Interaction	E							X	X	X	X
LIBFWAPRPDA	Project: Data Analysis	E		X							X	X
LIBFPDLBDSEAIS2	Project: Artificial Intelligence	E		X					X	X	X	
LIBFBTDLBBT	Bachelor Thesis	C	X	X	X	X	X	X	X	X	X	X

This table shows the distribution of the programme's intended learning outcomes (as specified in the programme specification) across the programme modules.
*Compulsory / Elective

Mapping of Teaching Formats and Types of Media Used in the Programme Modules

Module Code	Module Name	Type of Assessment[1]	Teaching Formats[2]			Types of Media[3]				
			CF	ILSE	LS[4]	CB	OT	RB	V	PE
LIBFAWDLBROIR_E	Introduction to Robotics	AW	X	X	X	X	X		X	
LIBFEXDLBDSMFC	Mathematics: Analysis	EX	X	X	X	X	X	X	X	X
LIBFEXDLBDSMFLA	Mathematics: Linear Algebra	EX	X	X	X	X	X	X	X	X
LIBFAWDLBWINGP-01_E	Fundamentals of Physics	AW	X	X	X	X	X	X	X	
LIBFEXDLBCSICS	Introduction to Computer Science	EX	X	X	X	X	X		X	X
LIBFAWDLBINGET-01_E	Electrical Engineering	AW	X	X	X	X	X	X	X	
LIBFAWDLBROSS_E	Signals and Systems	AW	X	X	X	X	X	X	X	
LIBFEXDLBDSIPWP	Introduction to Programming with Python	EX	X	X	X	X	X		X	X
LIBFAWDLBIAWITT	Introduction to Academic Work for IT and Technology	AW	X	X	X	X	X		X	
LIBFAWDLBROST_E	Sensor Technology	AW	X	X	X	X	X		X	
LIBFPDLBWINWMKD1_E	Robot Kinematics	P	X	X	X					
LIBFAWDLBROMSY_E	Mechatronic Systems	AW	X	X	X	X	X		X	
LIBFPDLBWINWMKD2_E	Robot Dynamics	P	X	X	X					
LIBFAWDLBROCSE_E	Control Systems Engineering	AW	X	X	X	X	X	X	X	
Elective from Group A										
Elective from Group A										
LIBFWAWADLBROSIPM_E	Safety of Industrial Plants and Machines	WAWA	X	X	X	X	X		X	
LIBFWAREDLBROSRS_E	Seminar: Robots and Society	WARE	X	X	X					
Elective from Group B										
Elective from Group B										
Elective from Group C										
Elective from Group C										
LIBFBTDLBBT	Bachelor Thesis	BT								
This table shows the distribution of teaching formats and types of media used in the programme modules.										

[1]EX = Exam, WAWA = Written assignment, WACS = Case study, WARE = Research essay, WAPR = Project report, P = Portfolio, AW = Advanced Workbook, OARP = Oral Assignment + Reflection Paper, OPRRP = Oral Project Report + Reflection Paper, IRP = Internship Reflection Paper, BT/MT = Bachelor / Master Thesis

[2]CF = Course Feed, ILSE = Intensive Live Sessions, LS = Learning Sprints

[3]CB = Course Book, OT = Online Tests, RB = Review Book, V = Videos, PE = Practice Exams

[4]Offered only when the minimum number of participants is reached.