

## Overview

<b>Programme Code</b>	36183-BGH
<b>Programme Title</b>	Mechatronics and Autonomous Systems
<b>Awarding Institution</b>	Liverpool John Moores University
<b>Programme Type</b>	Degree
<b>Language of Programme</b>	All LJMU programmes are delivered and assessed in English
<b>Programme Leader</b>	

## Awards

Award Type	Award Description	Award Learning Outcomes
Target Award	Bachelor of Engineering with Honours - BGH	See Learning Outcomes Below
Recruitable Target	Bachelor of Engineering Honours (SW) - SBGH	See Learning Outcomes Below
Alternative Exit	Certificate of Higher Education - CHE	Undertake basic mathematical analysis suitable to enable the study of engineering. Apply the basic principles of Electrical circuits, Electronics, Programming, Measurement and Control, Communications and microprocessors to simplified engineering problems. Design, simulate and construct, and test simple circuits. Demonstrate key skills appropriate to the professional engineer.
Alternative Exit	Diploma in Higher Education (SW) - SDHE	Undertake advanced mathematical and computational studies of engineering systems and problems. Demonstrate the application of basic principles of Electrical circuits, Electronics, Programming, Measurement and Control and microprocessors from level 4 to the solution of standard engineering problems. Demonstrate the intermediate engineering skills. Demonstrate a clear understanding of the business context of engineering development and activities and to demonstrate a range of business skills. A student who successfully completes a placement year will be eligible for the Sandwich award and will, in addition to the above, be able to demonstrate the professional and personal skills necessary for effective employment within a professional environment.
Alternative Exit	Diploma of Higher Education - DHE	Undertake advanced mathematical and computational studies of engineering systems and problems. Demonstrate the application of basic principles of Electrical circuits, Electronics, Programming, Measurement and Control and microprocessors from level 4 to the solution of standard engineering problems. Demonstrate the intermediate engineering skills. Demonstrate a clear understanding of the business context of engineering development and activities and to demonstrate a range of business skills

### Alternate Award Names

## External Benchmarks

### Subject Benchmark Statement

UG-Engineering (2019)

## Programme Offering(s)

Mode of Study, Mode of Delivery	Intake Month	Teaching Institution	Programme Length
Sandwich Year Out, Face to Face	September	LJMU Taught	4 Years
Full-Time, Face to Face	September	LJMU Taught	3 Years

## Aims and Outcomes

### Educational Aims of the Programme

The BEng. programme in Mechatronics and Autonomous Systems partially fulfils the educational requirements for Chartered Engineer status. It is designed to develop a high level of technical expertise together with the emotional intelligence to be able to practice successfully as a professional engineer in a modern interdisciplinary engineering environment. New graduate engineers are increasingly expected to take on important technical leadership and management responsibilities early in their careers and the knowledge and skills gained from this programme are designed to produce graduates who are able to make an immediate contribution to their employers' organisations. The programme aims to: Provide a programme of study that develops core knowledge and understanding of engineering principles, mathematics, and computation appropriate to the field of Mechatronics and Autonomous Systems. Enable students to develop specialist knowledge, intellectual and practical skills that will enable them to analyse, investigate and develop robust solutions to Mechatronics and Autonomous Systems problems. Develop relevant study and personal skills so that students progressively take responsibility for their learning, becoming, independent learners, while receiving appropriate tutoring and support. Equip students with a range of transferable skills and attributes in the use of computers, software packages, team working, communication, time management and problem solving methodology that will enable them to undertake responsible roles in industry and commerce. Provide a degree programme that meets the accreditation requirements of AHEP-4 UK Spec and the needs of industry. Develop students to work in and manage teams, and work independently at managerial level utilising project management and technical skills. To encourage students to engage with the development of employability skills by completing a self-awareness statement. For students undertaking a placement year, the aim is to provide students with an extended period of work experience at an approved partner that will complement their programme of study at LJMU. This will give the students the opportunity to develop professional skills relevant to their programme of study, as well as attitude and behaviours necessary for employment in a diverse and changing environment.

### Learning Outcomes

Code	Description
PLO1	Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology.
PLO2	Communicate in English about engineering topics.
PLO3	Present and discuss proposals.
PLO4	Demonstrate personal and social skills.
PLO5	Comply with relevant codes of conduct.
PLO6	Manage and apply safe systems of work.
PLO7	Undertake engineering activities in a way that contributes to sustainable development.

<b>Code</b>	<b>Description</b>
PLO8	Carry out and record CPD necessary to maintain and enhance competence in own area of practice
PLO9	Exercise responsibilities in an ethical manner, considering diversity and security of data.
PLO10	Engage in the creative and innovative development of engineering technology and continuous improvement systems.
PLO11	Identify potential projects and opportunities.
PLO12	Conduct appropriate research, and undertake design and development of engineering solutions.
PLO13	Manage implementation of design solutions, and evaluate their effectiveness.
PLO14	Plan for effective project implementation.
PLO15	Plan, budget, organise, direct and control tasks, people and resources.
PLO16	Lead teams and develop staff to meet changing technical and managerial needs.
PLO17	Bring about continuous improvement through quality management.

## Programme Structure

### Programme Structure Description

Students have the option to undertake a placement year. The placement year, module 5330ELE, will follow Level 5 and students will be enrolled on a 480 credit honours sandwich programme. The Level 5 mean for the final award mark will be calculated based upon the 240 credits at Level 5. Students successfully completing the assessment of the placement year are eligible for a Sandwich award. Students not undertaking a placement year are registered on the non-sandwich version of the programme and will have the opportunity of an additional study year abroad following Level 5. Students will be enrolled on a 480 credit honours with study abroad programme. Of those 480 credits, 120 will be taken via a Level 5 study abroad module 5331ELE. The modules to be studied in the host institution must be agreed in advance. The Level 5 mean for the final award mark will be calculated based upon the 240 credits at Level 5.

<b>Programme Structure - 360 credit points</b>	
<b>Level 4 - 120 credit points</b>	
<b>Level 4 Core - 120 credit points</b>	<b>CORE</b>
[MODULE] 4103MECH Applied Mechanics 1 Approved 2022.01 - 20 credit points	
[MODULE] 4301MECH Engineering Mathematics 1a Approved 2022.03 - 10 credit points	
[MODULE] 4302MECH Engineering Mathematics 1b Approved 2022.02 - 10 credit points	
[MODULE] 4402ELE Software Development for Embedded Systems Approved 2022.01 - 20 credit points	
[MODULE] 4403ELE Engineering Circuit Analysis Approved 2022.02 - 20 credit points	
[MODULE] 4404ELE Analogue Electronics Approved 2022.02 - 20 credit points	
[MODULE] 4405ELE Professional Practice and the Environment Approved 2022.02 - 20 credit points	
<b>Level 5 - 120 credit points</b>	
<b>Level 5 Core - 120 credit points</b>	<b>CORE</b>
[MODULE] 5304MECH Applied Mechanics 2 Approved 2022.01 - 20 credit points	
[MODULE] 5308MECH Mechatronics 2 Approved 2022.01 - 20 credit points	
[MODULE] 5404ELE Linear Electronics Design and the Environment Approved 2022.02 - 10 credit points	
[MODULE] 5405ELE Instrumentation and Control Engineering Approved 2022.01 - 20 credit points	
[MODULE] 5406ELE Professional Practice Integrative Project Approved 2022.02 - 20 credit points	
[MODULE] 5412ELE Local Communications Systems and Applications Approved 2022.02 - 20 credit points	
[MODULE] 5421ELE Advanced Mathematics Approved 2022.01 - 10 credit points	
<b>Optional placement - 120 credit points</b>	<b>OPTIONAL</b>
<b>Placement Year - 120 credit points</b>	<b>OPTIONAL</b>
[MODULE] 5330ELE Sandwich Year - Electrical and Electronic Engineering Approved 2022.01 - 120 credit points	
<b>OR Study Abroad - 120 credit points</b>	<b>OPTIONAL</b>
[MODULE] 5331ELE Study Year Abroad - Electrical and Electronic Engineering Approved 2022.01 - 120 credit points	
<b>Level 6 - 120 credit points</b>	
<b>Level 6 Core - 120 credit points</b>	<b>CORE</b>
[MODULE] 6313MECH Dynamics and Control Approved 2022.01 - 10 credit points	
[MODULE] 6400ELE Automation and IoT Approved 2022.03 - 20 credit points	
[MODULE] 6412ELE Process Control and Applications Approved 2022.02 - 20 credit points	

[MODULE] 6413ELE Autonomous Systems and Machine Learning Approved 2022.01 - 20 credit points
[MODULE] 6456ELE Mechatronics Engineering Project Approved 2022.02 - 40 credit points
[MODULE] 6465ELE Engineering Management Approved 2022.01 - 10 credit points

Module specifications may be accessed at <https://proformas.ljmu.ac.uk/Default.aspx>

## Approved variance from Academic Framework Regulations

### Variance

The following criteria will apply for students at Level 5, Level 6: Where a module comprises two or more assessment elements (e.g. examination and coursework), successful completion of the module should require a mark of greater than 10% less than the module pass mark in each element, as well as the overall module mark being above the normal pass mark (normally 40% or 50%). This requirement only applies to assessment elements that contribute more than 30% towards the final module mark. Variance approved on January 21st 2022.

## Teaching, Learning and Assessment

Teaching and learning: Lectures Tutorials Laboratory work Group projects Individual projects Individual and group presentations Poster presentation Design, build and test exercises Computer programming exercises On line formative quizzes Assessment: Written examinations On line summative quizzes Group design projects and reports Individual projects and reports Poster display Laboratory logbook

## Opportunities for work related learning

Students are encouraged to undertake a year long industrial placement between Level 5 and 6. There is a further opportunity to undertake summer placements between academic years to gain valuable industrial experience. This work experience will help develop understanding of the world of work environment suitable for the programme and increase a student's professional practical skills.

## Entry Requirements

Type	Description
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BTECs	<p>Applicants should have or expect to obtain a BTEC National Diploma with an overall grade of MMM in a subject (including optional units relevant to the intended degree) such as Engineering, ICT Systems Support or Laboratory and Industrial Science. Alternatively, applicants may achieve an overall grade of MMP supplemented with relevant qualifications to achieve a total of 112 UCAS points. The BTEC National Diploma should include a merit in the further mathematics unit or be supplemented with appropriate Free-Standing Mathematics Qualifications. BTEC National Certificate Applicants should have or expect to obtain a BTEC National Certificate with an overall grade of DD in a subject (including optional units relevant to the intended degree) such as Engineering, ICT Systems Support or Laboratory and Industrial Science. Alternatively, applicants may achieve an overall grade of MM supplemented with relevant qualifications to achieve a total of 112 UCAS points. The BTEC National Certificate should include a merit in a further mathematics unit or be supplemented with appropriate Free-Standing Mathematics Qualifications. BTEC National Award Applicants should have or expect to obtain a grade M in a BTEC National Award in a subject relevant to the intended degree, such as Engineering, ICT Systems Support or Applied Physics, including a Merit in a mathematics unit or relevant Free-Standing Mathematics Qualifications, together with other relevant qualifications to obtain a total of 112 UCAS points</p>
Alternative qualifications considered	<p>Applicants should have five GCSE (or equivalent) passes of at least grade C, or grade 4, including Mathematics and English (or IELTS 6.0). We welcome applications from highly motivated mature students with relevant experience but without the necessary formal qualifications. All applications will be considered on an individual basis.</p>
Other international requirements	<p>Other Applicants offering other awards (e.g. Welsh Baccalaureate, European Baccalaureate, pre-2002 BTEC National Certificate/Diploma, Advanced Extension Awards, pre-curriculum 2000 A-levels etc.) or combinations of unit awards may also be accepted.</p>
A levels	<p>Applicants should have or expect to obtain a total of 112 UCAS points. At A2-level, applicants should expect to obtain at least two awards and gain at least 64 points from A Level Mathematics and one of the following (Physics, Chemistry, Computing, Further Maths, Electronics or Engineering)</p>

## Extra Entry Requirements