Programme Specification Document

Approved, 2022.02

Overview

Programme Code	46183
Programme Title	Mechatronics and Autonomous Systems
Awarding Institution	Liverpool John Moores University
Programme Type	Degree with Foundation
Language of Programme	All LJMU programmes are delivered and assessed in English
Programme Leader	Clifford Mayhew
Link Tutor(s)	

Awards

Award Type	Award Description	Award Learning Outcomes
Target Award	Bachelor of Engineering with Honours (Fnd) - BGHF	See Learning Outcomes Below
Recruitable Target	Bachelor of Engineering Honours (SW) (Fnd) - SBGHF	See Learning Outcomes Below
Alternative Exit	Certificate of Higher Education (Fnd) - CHEF	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) (Fnd) - SDHEF	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 (Fnd) - DHEF	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
Full-Time, Face to Face	September	LJMU Taught	4 Years
Sandwich Year Out, Face to Face	September	LJMU Taught	5 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 to the application of technology in engineering practice
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.

Code	Description
PLO8	Carry out and record CPD necessary to maintain and enhance competence in own area of practice.
PLO9	Exercise responsibilities in an ethical manner.
PLO10	Use a sound evidence-based approach to problem-solving and contribute to continuous improvement.
PLO11	Identify, review and select techniques, procedures and methods to undertake engineering tasks.
PLO12	Contribute to the design and development of engineering solutions.
PLO13	Implement design solutions and contribute to their evaluation.
PLO14	Plan for effective project implementation.
PLO15	Manage tasks, people and resources to plan and budget.
PLO16	Manage teams and develop staff to meet changing technical and managerial needs.
PLO17	Manage continuous quality improvement.

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 600 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 600 credit honours with study abroad programme. Of those 600 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.

Programme Structure - 480 credit points	
Level 3 - 120 credit points	
Level 3 Core - 120 credit points	CORE
[MODULE] 3100FNDET Algorithms and Computing Approved 2022.02 - 10 credit points	
[MODULE] 3101FNDET Engineering and Technology Practice Approved 2022.02 - 20 credit points	
[MODULE] 3102FNDET Foundation Mathematics for Engineering and Technology 1 Approved 2022.02 - 20 credit points	
[MODULE] 3103FNDET Foundation Mathematics for Engineering and Technology 2 Approved 2022.03 - 20 credit points	
[MODULE] 3107FNDET Introductory Foundation Physics Approved 2022.01 - 20 credit points	
[MODULE] 3108FNDET Additional Foundation Physics Approved 2022.01 - 20 credit points	
[MODULE] 3116FNDET Programming for Engineers Approved 2022.01 - 10 credit points	
Level 4 - 120 credit points	
Level 4 Core - 120 credit points	CORE
[MODULE] 4301MECH Engineering Mathematics 1a Approved 2022.03 - 10 credit points	
[MODULE] 4302MECH Engineering Mathematics 1b Approved 2022.02 - 10 credit points	
[MODULE] 4303MECH Applied Mechanics 1 Approved 2022.01 - 20 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	
Level 5 - 120 credit points	
Level 5 Core - 120 credit points	CORE
[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	
Optional placement - 120 credit points	OPTIONAL
Placement Year - 120 credit points	OPTIONAL
[MODULE] 5330ELE Sandwich Year - Electrical and Electronic Engineering Approved 2022.01 - 120 credit points	
OR Study Abroad - 120 credit points	OPTIONAL
[MODULE] 5331ELE Study Year Abroad - Electrical and Electronic Engineering Approved 2022.01 - 120 credit points	
Level 6 - 120 credit points	
Level 6 Core - 120 credit points	CORE
[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
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.

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

International Baccalaureate	Applicants should have or expect to obtain a total of 88 UCAS points overall.
Other international requirements	Applicants offering other awards will be considered on an individual basis in line with the agreed entry criteria
A levels	Applicants should have or expect to obtain a total of 88 UCAS points of which at least 20 should come from A2.
BTECs	BTEC Extended Diploma to the value of 88 UCAS points BTEC Diploma / 90 Credit Diploma / Subsidiary Diploma /Certificate to the value of 88 UCAS points when combined with other qualifications.
Alternative qualifications considered	Qualifications deemed equivalent to the above upon completion of appropriate assessment will be considered acceptable. Applicants should have five GCSE (or equivalent) passes of at least grade C, or Grade 4, including Mathematics and English (or IELTS 6.0).

Extra Entry Requirements