

PROGRAMME SPECIFICATION

Bachelor of Engineering with Honours in Industrial Electronics and Control Engineering

Awarding institution	Liverpool John Moores University
Teaching institution	LJMU The Sino-British College
JACS Code	H100
Programme Duration	Full-Time: 2 Years
Language of Programme	All LJMU programmes are delivered and assessed in English
Subject benchmark statement	Engineering Council UK Specification
Programme accredited by	
Description of accreditation	
Validated target and alternative exit awards	Bachelor of Engineering with Honours in Industrial Electronics and Control Engineering Diploma of Higher Education in Industrial Electronics and Control Engineering
Link Tutor	Russell English

Educational aims of the programme

The B.Eng. programme in Industrial Electronics and Control Engineering (IECE) is designed to deliver the initial educational requirements for a professional engineer together with an appropriate range of transferable and engineering management skills. It will enable graduates to operate effectively in the early stages of their careers and provide a strong basis for future career development. The programme delivers a coherent and progressive course of study in engineering principles, mathematics, computing, engineering management and skills.

The programme aims to:

- Deliver the educational experience in which students can develop their knowledge of engineering science, core engineering principles and fundamental underpinning subjects such as mathematics and computation.
- Develop students confidence to analyse challenging technical problems and to further develop their core engineering knowledge and skills through the investigation and development of credible and robust solutions to control and automation problems.
- Provide students with appropriate support and encouragement to develop the necessary skills such that they can study independently and take responsibility for their own learning and subsequent professional development.
- Provide engineering graduates with a range of highly relevant transferable skills such as team working, communication, engineering management, problem solving, computing and technical computing.
- Provide a programme of study that fully meets the requirements of the Engineering Councils UK Standard for Professional Engineering Competence (UKSpec) and partially qualifies the successful graduate for the attainment of the Engineering Council Chartered Engineer status after completion of an appropriate period of industrial experience.
- Produce graduates with a depth, breadth of knowledge and understanding of electronics and control engineering, engineering management and teamwork to enable them to rapidly assume technical leadership and management roles.

Alternative Exit/ Interim Award Learning Outcomes - Diploma of Higher Education

A student who is eligible for this award will be able to:

To undertake advanced mathematical and computational studies of automated and controlled engineering systems and problems.

To 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 relevant to the Control and Automation industry

To demonstrate the intermediate engineering skills.

Demonstrate a competence in technical reporting and an ability to analyse and present engineering data.

Target award Learning Outcomes - Bachelor of Engineering with Honours

A student successfully completing the programme of study will have acquired subject knowledge and understanding as well as skills and other attributes.

Knowledge and understanding

A student who is eligible for this award will be able to:

- A1. Demonstrate their knowledge of essential facts, concepts, theories and principles of their engineering discipline, and its underpinning science and mathematics. They must have an appreciation of the wider multidisciplinary engineering context and its underlying principles. They must appreciate the social, environmental, ethical, economic and commercial considerations affecting the exercise of their engineering judgement.
- A2. Demonstrate a knowledge and understanding of scientific principles and methodology necessary to underpin their education in industrial electronics and control, to enable appreciation of its scientific and engineering context, and to support their understanding of historical, current, and future developments and technologies.
- A3. Illustrate a knowledge and understanding of mathematical principles necessary to underpin their education in industrial electronics and control and related engineering disciplines and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems.
- A4. Demonstrate an ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of industrial electronics and control and related engineering disciplines.
- A5. Understand engineering principles and the ability to apply them to analyse key engineering processes.
- A6. Illustrate an ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.
- A7. Demonstrate an ability to apply quantitative methods and computer software relevant to industrial electronics and control and related engineering disciplines to solve engineering problems.

Teaching, learning and assessment methods used to enable outcomes to be achieved and demonstrated

Acquisition of underpinning knowledge is achieved mainly through lectures and directed student-centred learning. Student-centred learning is used where appropriate resource material is available. Understanding is reinforced through case-studies.

Assessment

Testing of the knowledge base is through a combination of unseen written examinations, coursework in the form of case-study reports and coursework assignment submissions.

Skills and other attributes

Intellectual Skills

A student who is eligible for this award will be able to:

- B1. Apply appropriate quantitative science and engineering tools to the analysis of problems. They must be able to demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs. They must be able to comprehend the broad picture and thus work with an appropriate level of detail.
- B2. Demonstrate an understanding of and ability to apply a systems approach to engineering problems.
- B3. Demonstrate a knowledge and understanding of the commercial and economic context of engineering processes.
- B4. Illustrate a knowledge of management techniques which may be used to achieve engineering objectives within that context.
- B5. Understand the requirement for engineering activities to promote sustainable development.
- B6. Demonstrate an awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues.
- B7. Understand the need for a high level of professional and ethical conduct in engineering. The students must appreciate the social, environmental, ethical, economic and commercial considerations affecting the exercise of their engineering judgement.

Teaching, learning and assessment methods used to enable outcomes to be achieved and

demonstrated

Acquisition of these skills is achieved mainly through lectures and directed student-centred learning. Student-centred learning is used where appropriate resource material is available. Understanding is reinforced through case-studies.

Assessment

Testing of the skills and knowledge base is through a combination of unseen written examinations, coursework in the form of case-study reports and coursework assignment submissions.

Professional practical skills

A student who is eligible for this award will be able to:

- C1. Students must possess practical engineering skills acquired through, for example, work carried out in laboratories and workshops; in industry through supervised work experience; in individual and group project work; in design work; and in the development and use of computer software in design, analysis and control. Evidence of group working and of participation in a major project is expected.
- C2. Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues
- C3. Understand customer and user needs and the importance of considerations such as aesthetics.
- C4. Identify and manage cost drivers
- C5. Demonstrate creativity to establish innovative solutions
- C6. Illustrate creativity to establish innovative solutions
- C7. Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal
- C8. Manage the design process and evaluate outcomes
- C9. Demonstrate a knowledge of the characteristics of particular equipment, processes or products.
- C10. Develop engineering workshop and laboratory skills.
- C11. Demonstrate an understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology, development, etc).

Teaching, learning and assessment methods used to enable outcomes to be achieved and demonstrated

Engineering design, analysis and practical skills are taught almost exclusively by individual and group projectwork supported by a lecture programme appropriate to the demands of the project.

Assessment

Engineering design and practical skills are assessed by individual and group written design project reports, student presentations and presentations using computer graphics.

Transferable / key skills

A student who is eligible for this award will be able to:

- D1. The student must have developed transferable skills including problem solving, communication, and working with others, as well as the effective use of general IT facilities and information retrieval skills.
- D2. Understand the use of technical literature and other information sources.
- D3. Demonstrate an awareness of nature of intellectual property and contractual issues.
- D4. Demonstrate an understanding of appropriate codes of practice and industry standards.
- D5. Illustrate an awareness of quality issues.
- D6. Demonstrate an ability to work with technical uncertainty.

Teaching, learning and assessment methods used to enable outcomes to be achieved and demonstrated

The economic, social and environmental context of engineering operations is delivered by means of lectures and case studies. The use of appropriate case study material is an essential part of teaching in this area.

Assessment

Assessment is via a combination of unseen written examinations and coursework in the form of case-study reports.

Programme structure - programme rules and modules

Programme rules

Students will receive RP(E)L for Level 4 (based on successful completion of the NCUK International Diploma (Engineering)) and as such the Level 4 modules listed are not delivered at SBC.

Level 6	Potential Awards on completion	Bachelor of Engineering with Honours
Core	Option	Award Requirements
6104SBC Industrial Management (20 credits) 6300SBC Industrial Automation (10 credits) 6302SBC Embedded Systems (20 credits) 6305SBC Power Electronics, Drives and Systems (20 credits) 6312SBC Process Control (20 credits) 6355SBC Engineering Project (30 credits)		120 core credits at level 6 0 option credits at level 6

Level 5	Potential Awards on completion	
Core	Option	Award Requirements
5102SBC Engineering Mathematics 2 (10 credits) 5301SBC Digital and Embedded Systems (20 credits) 5302SBC Electric Machines (20 credits) 5304SBC Linear Electronics (10 credits) 5305SBC Control System Design and Analysis (20 credits) 5306SBC Electrical Engineering Practice 2 (20 credits) 5312SBC Applied Instrumentation (20 credits)		120 core credits at level 5 0 option credits at level 5

Level 4	Potential Awards on completion	
Core	Option	Award Requirements
4101SBC Engineering Mathematics 1a (10 credits) 4102SBC Engineering Mathematics 1b (10 credits) 4301SBC Engineering Principles (20 credits) 4302SBC Microprocessors and Software (20 credits) 4303SBC Electrical Circuit Principles (20 credits) 4304SBC Digital and Analogue Electronics (20 credits) 4305SBC Electrical Engineering Practice 1 (20 credits)		120 core credits at level 4 0 option credits at level 4

Information about assessment regulations

All programmes leading to LJMU awards operate within the University's Academic Framework.
<https://www.ljmu.ac.uk/about-us/public-information/academic-quality-and-regulations/academic-framework>

Opportunities for work-related learning (location and nature of activities)

Students are encouraged to undertake industrial placements throughout the duration of their studies (particularly between levels in the summer). There are also opportunities to complete industrially based projects via individual engineering projects at Level 6.

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.

Criteria for admission

Other

Students who have successfully passed 120 credits on the NCUK International Diploma (Electrical and Electronic Engineering) at SBC can progress into Level 5 of the BEng (Hons) Industrial Electronics and Control Engineering award. Students would be awarded 120 Level 4 credits for the BEng (Hons) award by virtue of their prior certificated studies on the International Diploma (RPL).

In addition, students must have at least a Grade 'C' for the NCUK 'English for Academic Purposes (EAP)' module, or demonstrate equivalence of this with an IELTS score of 6.

Non-standard: Applications considered through standard RPL processes at LJMU.

Overseas qualifications

Applicants offering other awards will be considered on an individual basis in line with the agreed entry criteria.

External Quality Benchmarks

All programmes leading to LJMU awards have been designed and approved in accordance with the UK Quality Code for Higher Education, including the Framework for Higher Education Qualifications in the UK (FHEQ) and subject benchmark statements where applicable.

The University is subject to periodic review of its quality and standards by the Quality Assurance Agency (QAA). Published review reports are available on the QAA website at www.qaa.ac.uk

Programmes which are professionally accredited are reviewed by professional, statutory and regulatory bodies (PSRBs) and such programmes must meet the competencies/standards of those PSRBs.

Support for students and their learning

The University aims to provide students with access to appropriate and timely information, support and guidance to ensure that they are able to benefit fully from their time at LJMU. All students are assigned a Personal Tutor to provide academic support and when necessary signpost students to the appropriate University support services.

Students are able to access a range of professional services including:

- Advice on practical aspects of study and how to use these opportunities to support and enhance their personal and academic development. This includes support for placements and careers guidance.
- Student Advice and Wellbeing Services provide students with advice, support and information, particularly in the areas of: student funding and financial matters, disability, advice and support to international students, study support, accommodation, health, wellbeing and counselling.
- Students studying for an LJMU award at a partner organisation will have access to local support services

Methods for evaluating and improving the quality and standards of teaching and learning

Student Feedback and Evaluation

The University uses the results of student feedback from internal and external student surveys (such as module evaluations, the NSS and PTES), module evaluation questionnaires and meetings with student representatives to improve the quality of programmes.

Staff development

The quality of teaching is assured through staff review and staff development in learning, teaching and assessment.

Internal Review

All programmes are reviewed annually and periodically, informed by a range of data and feedback, to ensure quality and standards of programmes and to make improvements to programmes.

External Examining

External examiners are appointed to programmes to assess whether:

- the University is maintaining the threshold academic standards set for awards in accordance with the FHEQ and applicable subject benchmark statements
- the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with University policies and regulations
- the academic standards are comparable with those in other UK higher education institutions of which external examiners have experience
- the achievement of students are comparable with those in other UK higher education institutions of which the external examiners have experience

and to provide informative comment and recommendations on:

- good practice and innovation relating to learning, teaching and assessment observed by external examiners
- opportunities to enhance the quality of the learning opportunities provided to students

Please note:

This specification provides a concise summary of the main features of the programme and the 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 learning outcomes, content, teaching, learning and assessment methods of each module can be found in module and programme guides.