# PROGRAMME SPECIFICATION

Bachelor of Engineering with Honours (Fnd) in Electrical and Electronic Engineering

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| **Awarding institution** | Liverpool John Moores University |
| **Teaching institution** | LJMU |
| **UCAS Code** | 2K47 |
| **JACS Code** | H600 |
| **Programme Duration** | Full-Time: 4 Years, Sandwich Thick: 5 Years |
| **Language of Programme** | All LJMU programmes are delivered and assessed in English |
| **Subject benchmark statement** | Engineering council UK Spec and AHEP 4th Edition Engineering Subject Benchmark Statement (2019) |
| **Programme accredited by** | Institution of Engineering and Technology (IET) |
| **Description of accreditation** | Accredited by the Institution of Engineering and Technology (IET) on behalf of the Engineering Council for the purposes of fully meeting the academic requirement for registration as an Incorporated Engineer and partially meeting the academic requirement for registration as a Chartered Engineer. |
| **Validated target and alternative exit awards** | Bachelor of Engineering with Honours (Fnd) in Electrical and Electronic Engineering<br><br>Bachelor of Engineering Honours (SW) (Fnd) in Electrical and Electronic Engineering<br><br>Diploma of Higher Education (Fnd) in Electrical and Electronic Engineering<br><br>Diploma in Higher Education (SW) (Fnd) in Electrical and Electronic Engineering<br><br>Certificate of Higher Education (Fnd) in Electrical and Electronic Engineering |
| **Programme Leader** | Clifford Mayhew |

## Educational aims of the programme

The BEng. programme in Electrical Engineering partially fulfils all 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, which develops core knowledge, and understanding of engineering principles, mathematics, and computation, appropriate to the field of Electrical and Electronic engineering.

Enable students to develop specialist knowledge, intellectual and practical skills that will enable them to analyse, investigate and develop robust solutions to Electrical and Electronic engineering 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 which will enable them to undertake responsible roles in industry and commerce.

Provide a degree programme which meets the accreditation requirements of AHEP-4 UK Spec and the needs of industry.

Develop Students to work in and manage teams and also 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.

**Alternative Exit/ Interim Award Learning Outcomes - Certificate of Higher Education (Fnd)**

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

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/ Interim Award Learning Outcomes - Diploma of Higher Education (Fnd)**

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

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.

# Target award Learning Outcomes - Bachelor of Engineering with Honours (Fnd)

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

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

1. Maintain and extend a sound theoretical approach to the application of technology in engineering practice.
2. Use a sound evidence-based approach to problem-solving and contribute to continuous improvement.
3. Identify, review and select techniques, procedures and methods to undertake engineering tasks.
4. Contribute to the design and development of engineering solutions.
5. Implement design solutions and contribute to their evaluation.
6. Plan for effective project implementation.
7. Manage tasks, people and resources to plan and budget.
8. Manage teams and develop staff to meet changing technical and managerial needs.
9. Manage continuous quality improvement.
10. Communicate in English with others at all levels.
11. Present and discuss proposals.
12. Demonstrate personal and social skills.
13. Comply with relevant codes of conduct.

14. Manage and apply safe systems of work.

15. Undertake engineering activities in a way that contributes to sustainable development.

16. Carry out and record CPD necessary to maintain and enhance competence in own area of practice

17. Exercise responsibilities in an ethical manner.

## Teaching, Learning and Assessment

*The methods used to enable outcomes to be achieved and demonstrated are as follows:*

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. 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.

Testing of the knowledge base is through a combination of unseen written examinations, and coursework assignment submissions

Engineering Analysis is developed through lectures, case-studies and coursework assignments. Fundamental principles are delivered predominantly by lectures and laboratory classes. More advanced techniques are

delivered by project work and coursework supported by lectures.

Engineering Analysis and problem solving skills are assessed through a combination of unseen written examinations, assessed coursework and laboratory work, and project work

Design is taught by coursework, individual and group project work supported by an appropriate lecture programme

Design skills are assessed by coursework, individual and group written design project reports, and student presentations.

Engineering Practice permeates almost every activity within the programme content and assessment.

Assessment of Engineering Practice is varied throughout the programme but is mostly coursework based.

## Programme structure - programme rules and modules

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.

| Level 6 | Potential Awards on completion | Bachelor of Engineering with Honours (Fnd) |
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| Core | Option | Award Requirements |
| 6401ELE Signals and Systems with Real World Applications (10 credits)<br>6405ELE Power Electronics and Energy Efficient Drives (20 credits)<br>6455ELE Engineering Project (40 credits)<br>6465ELE Engineering Management (10 credits) | 6400ELE Automation and IoT (20 credits)<br>6406ELE Further Electronic Design (20 credits)<br>6412ELE Process Control and Applications (20 credits) | 80 core credits at level 6<br>40 option credits at level 6 |

| Level 5 | Potential Awards on completion | |
|---|---|---|
| Core | Option | Award Requirements |
| 5401ELE Embedded Systems Programming and Applications in the Environment (20 credits)<br>5402ELE Electric machines, power systems and clean energy (20 credits) | | 120 core credits at level 5<br>0 option credits at level 5 |

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| 5404ELE Linear Electronics Design and the Environment (10 credits)<br>5405ELE Instrumentation and Control Engineering (20 credits)<br>5406ELE Professional Practice Integrative Project (20 credits)<br>5412ELE Local Communications Systems and Applications (20 credits)<br>5421ELE Advanced Mathematics (10 credits) | | |

| Level 4 | Potential Awards on completion | |
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| Core | Option | Award Requirements |
| 4301MECH Engineering Mathematics 1a (10 credits)<br>4302MECH Engineering Mathematics 1b (10 credits)<br>4401ELE Digital Electronics (20 credits)<br>4402ELE Software Development for Embedded Systems (20 credits)<br>4403ELE Engineering Circuit Analysis (20 credits)<br>4404ELE Analogue Electronics (20 credits)<br>4405ELE Professional Practice and the Environment (20 credits) | | 120 core credits at level 4<br>0 option credits at level 4 |

| Level 3 | Potential Awards on completion | |
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| Core | Option | Award Requirements |
| 3100FNDET Algorithms and Computing (10 credits)<br>3101FNDET Engineering and Technology Practice (20 credits)<br>3102FNDET Foundation Mathematics for Engineering and Technology 1 (20 credits)<br>3103FNDET Foundation Mathematics for Engineering and Technology 2 (20 credits)<br>3107FNDET Introductory Foundation Physics (20 credits)<br>3108FNDET Additional Foundation Physics (20 credits)<br>3116FNDET Programming for Engineers (10 credits) | | 120 core credits at level 3<br>0 option credits at level 3 |

## 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

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.

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

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.

## Criteria for admission

**A/AS Level**
Applicants should have or expect to obtain a total of 88 UCAS points, of which at least 20 should come from A2.

**BTEC National Diploma**
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.

**Irish Leaving Certificate**
Applicants should have or expect to obtain a total of 88 UCAS points overall.

**Scottish Higher**
Applicants should have or expect to obtain a total of 88 UCAS points overall.

**International Baccalaureate**
Applicants should have or expect to obtain a total of 88 UCAS points overall.

**Other**
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).

**Mature entry**
Mature applicants will be considered on a case-by-case basis. The admissions team will be particularly concerned with the length of time since any relevant academic study and relevant background from work experience or 'Access' courses.

Admissions to the Foundation Year will follow the University Admissions policies on widening participation, equal opportunities, and students with disabilities.

**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.*