PROGRAMME SPECIFICATION

Bachelor of Engineering with Honours (Fnd) in Mechanical Engineering

Awarding institution	LJMU
Teaching institution	Oryx Universal College WLL
JACS Code	
Programme Duration	Full-Time: 4 Years
Language of Programme	All LJMU programmes are delivered and assessed in English
Subject benchmark statement	Engineering Council UK Spec
Programme accredited by	
Description of accreditation	
Validated target and alternative exit awards	Bachelor of Engineering with Honours (Fnd) in Mechanical Engineering Diploma of Higher Education (Fnd) in Mechanical Engineering Certificate of Higher Education (Fnd) in Mechanical Engineering
Link Tutor	Russell English

Educational aims of the programme

The B.Eng. programme in Mechanical Engineering is designed to develop a high level of technical expertise together with the emotional intelligence to be able to practise successfully as a professional engineer in a modern interdisciplinary engineering environment. 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:

- 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.

- 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, management, problem solving, computing and technical computing.

- Produce graduates with a depth, breadth of knowledge and understanding of mechanical engineering, management and teamwork to enable them to rapidly assume technical leadership and management roles.

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

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

Undertake suitable basic mathematical analysis

Apply the basic principles of applied mechanics, thermodynamics and fluid mechanics, materials science and electrical engineering to simplified engineering problems.

Design and manufacture simple engineering components and assemblies.

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 intermediate level applied mechanics, thermodynamics and fluid mechanics, and electrical engineering from to the solution of standard engineering problems.

Demonstrate the intermediate engineering skills that will be required for further study.

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

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. Demonstrate their knowledge and understanding 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 judgment.

2. Demonstrate a knowledge and understanding of scientific principles and methodology necessary to underpin their education in mechanical engineering, to enable appreciation of its scientific and engineering context, and to support their understanding of historical, current, and future developments and technologies.

3. Illustrate a knowledge and understanding of mathematical principles necessary to underpin their education in mechanical engineering and related engineering disciplines and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems.

4. Apply and integrate knowledge and understanding of other engineering disciplines to support study of mechanical and related engineering disciplines.

5. Understand engineering principles and the ability to apply them to analyse key engineering processes.

6. Identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.

7. Apply quantitative methods and computer software relevant to mechanical and related engineering disciplines to solve engineering problems.

8. 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.

9. Demonstrate an understanding of and ability to apply a systems approach to engineering problems.

10. Demonstrate a knowledge and understanding of the commercial and economic context of engineering processes.

11. Illustrate a knowledge of management techniques which may be used to achieve engineering objectives within that context.

12. Understand the requirement for engineering activities to promote sustainable development.

13. Demonstrate an awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues.

14. Understand the need for a high level of professional and ethical conduct in engineering.

15. Apply 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.

16. Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues.

17. Understand customer and user needs and the importance of considerations such as aesthetics.

18. Identify and manage cost drivers.

19. Demonstrate creativity to establish innovative solutions.

20. Illustrate creativity to establish innovative solutions.

21. Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal.

22. Manage the design process and evaluate outcomes.

23. Demonstrate a knowledge of the characteristics of particular equipment, processes or products.

24. Develop engineering workshop and laboratory skills.

25. Demonstrate an Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology, development, etc).

26. Demonstrate transferable skills including problem solving, communication, and working with others, as well as the effective use of general IT facilities and information retrieval skills.

27. Understand the use of technical literature and other information sources.

28. Demonstrate an awareness of nature of intellectual property and contractual issues.

29. Demonstrate an understanding of appropriate codes of practice and industry standards.

30. Illustrate an awareness of quality issues.

31. Demonstrate an ability to work with technical uncertainty.

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. Understanding is reinforced through case-studies.

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.

The students must appreciate the social, environmental, ethical, economic and commercial considerations affecting the exercise of their engineering judgement.

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

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

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

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

Programme structure - programme rules and modules

The marks from Level 5 and 6 assessments contribute to the final degree classification i.e. 25% of Level 5 marks and 75% of Level 6.

Option Modules

Student are required to select two option modules at L6, one from each semester. The options are:-

Semester One

Fluid Dynamics and Heat Transfer

Materials Engineering

Manufacturing Processes and Industrial Automation

Semester Two

Thermodynamics

Structural Integrity

Dynamics and Control

Level 6	Potential Awards on completion	Bachelor of Engineering with Honours (Fnd)
Core	Option	Award Requirements
6000MEQR Engineering Project (40 credits) 6001MEQR Engineering Analysis (20 credits) 6002MEQR Mechanical Engineering Design 3 (20 credits) 6003MEQR Industrial Management (20 credits)	6004MEQR Fluid Dynamics and Heat Transfer (10 credits) 6005MEQR Thermodynamics (10 credits) 6006MEQR Materials Engineering (10 credits) 6007MEQR Structural Integrity (10 credits) 6008MEQR Manufacturing Processes and Industrial Automation (10 credits) 6009MEQR Dynamics and Control (10 credits)	100 core credits at level 6 20 option credits at level 6

Level 5	Potential Awards on completion	
Core	Option	Award Requirements
5000MEQR Engineering Mathematics 2 (10 credits) 5001MEQR Materials and Processes (10 credits) 5002MEQR Applied Mechanics 2 (20 credits) 5003MEQR Thermodynamics and Fluid Mechanics 2 (20 credits) 5004MEQR Mechanical Engineering Design 2 (20 credits) 5005MEQR Engineering Practice 2 (20 credits) 5006MEQR Mechatronics (20 credits)		120 core credits at level 5 0 option credits at level 5

Level 4	Potential Awards on completion	
Core	Option	Award Requirements
4000MEQR Engineering Mathematics 1a (10 credits) 4001MEQR Engineering Mathematics 1b (10 credits) 4002MEQR Applied Mechanics 1 (20 credits) 4003MEQR Thermodynamics and Fluid Mechanics 1 (20 credits) 4004MEQR Materials (20 credits) 4005MEQR Engineering Practice 1 (20 credits) 4006MEQR Electrical and Electronic Engineering (20 credits)		120 core credits at level 4 0 option credits at level 4

Level 3	Potential Awards on completion	
Core	Option	Award Requirements
3500FETQR Academic English Skills (AES) (40 credits) 3503FETQR Project Study (20 credits) 3504FETQR Foundation Mathematics for Engineering and Technology 1 (20 credits) 3505FETQR Foundation Mathematics for Engineering and Technology 2 (20 credits) 3506FETQR Introductory Foundation Physics (20 credits)		120 core credits at level 3 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

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

Students are encouraged to undertake industrial placements when possible during their studies (for example summer placements between academic years to gain valuable industrial experience).

Much assessment will be based on work related learning with the use of case studies and industry standard software where appropriate. This assessment 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

Mature entry
Mature applicants will be considered on a case-by-case basis.

Overseas qualifications
Entry of level-3:

Qualification: A score of 60% or above in Al Thanawiyya al Amma (Qatari curriculum High School exam conducted by the Ministry of Education and Higher Education in Qatar), or equivalent high school qualification approved by LJMU’s academic registry (e.g. passing 5-IGCSE & 2-AS subjects).

English: IELTS score 5.0 OR an equivalent English Language Proficiency Assessment approved by LJMU’s academic registry.

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.