

# PROGRAMME SPECIFICATION

## Bachelor of Engineering with Honours in Manufacturing Systems Engineering

<b>Awarding institution</b>	Liverpool John Moores University
<b>Teaching institution</b>	LJMU The Sino-British College
<b>JACS Code</b>	H700
<b>Programme Duration</b>	Full-Time: 2 Years
<b>Language of Programme</b>	All LJMU programmes are delivered and assessed in English
<b>Subject benchmark statement</b>	Engineering Council UK Specification
<b>Programme accredited by</b>	
<b>Description of accreditation</b>	
<b>Validated target and alternative exit awards</b>	Bachelor of Engineering with Honours in Manufacturing Systems Engineering  Diploma of Higher Education in Manufacturing Systems Engineering
<b>Link Tutor</b>	Russell English

## Educational aims of the programme

The B.Eng. programme in Manufacturing Systems Engineering 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 key 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.
- 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 manufacturing 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:*

- 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 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

*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 and understanding of essential facts, concepts, theories and principles of their manufacturing 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 manufacturing systems engineering, 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 manufacturing systems 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.

A4. Demonstrate an ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of manufacturing systems engineering 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 manufacturing systems engineering 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 project work 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.

Students are required to select one option module at Level 6, either 6102SBC Engineering Analysis, or 6312SBC Process Control.

Level 6	Potential Awards on completion	Bachelor of Engineering with Honours
Core	Option	Award Requirements
6101SBC Engineering Project (40 credits) 6104SBC Industrial Management (20 credits) 6107SBC Manufacturing Operations Management (20 credits) 6110SBC Materials Engineering (10 credits) 6300SBC Industrial Automation (10 credits)	6102SBC Engineering Analysis (20 credits) 6312SBC Process Control (20 credits)	100 core credits at level 6 20 option credits at level 6

Level 5	Potential Awards on completion	
Core	Option	Award Requirements
5102SBC Engineering Mathematics 2 (10 credits) 5103SBC Materials and Processes (10 credits) 5104SBC Mechanical and Thermal Systems 2 (20 credits) 5106SBC Design and Manufacture (20 credits) 5107SBC Engineering Practice 2 (20 credits) 5108SBC Mechatronics (20 credits) 5305SBC Control System Design and Analysis (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) 4103SBC Mechanical and Thermal Systems 1a (20 credits) 4104SBC Mechanical and Thermal Systems 1b (20 credits) 4105SBC Materials (20 credits) 4106SBC Engineering Practice 1 (20 credits) 4107SBC Electrical and Electronic Engineering (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 (Mechanical and Manufacturing) at SBC can progress into Level 5 of the BEng (Hons) Manufacturing Systems 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](http://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.*