PROGRAMME SPECIFICATION

Bachelor of Science with Honours in Product Design Engineering

Awarding institution	Liverpool John Moores University
Teaching institution	LJMU
UCAS Code	H772
JACS Code	H150
Programme Duration	Full-Time: 3 Years, Sandwich Thick: 4 Years
Language of Programme	All LJMU programmes are delivered and assessed in English
Subject benchmark statement	Engineering Council AHEP 4 (2020) QAA Subject Benchmark Statement – Engineering (2019) QAA Subject Benchmark Statement – Art and Design (2019)
Programme accredited by	Institution of Engineering Designers (iED)
Description of accreditation	Delivers all of the educational requirements for Incorporated Engineer status with the Institution of Engineering Designers. Details can be found at:- http://www.ied.org.uk/courses
Validated target and alternative exit awards	Bachelor of Science with Honours in Product Design Engineering Bachelor of Science with Honours (SW) in Product Design Engineering Diploma of Higher Education in Product Design Engineering Diploma in Higher Education (SW) in Product Design Engineering Certificate of Higher Education in Product Design Engineering
Programme Leader	Adam Papworth

Educational aims of the programme

The BSc. (Hons) Product Design Engineering (PDE) programme fulfils the educational requirements for Incorporated Engineer (IEng) status. It instils a high level of technical expertise and stimulates the development of an enquiring, analytical, critical and creative approach to prepare students for their future career in the design sector. It emphasises empathy, imagination and creativity to develop the students' intellect and their ability to communicate a rigour in process and thought. Combining this with the ability to design innovative, economically viable and ethically sound, sustainable solutions. It considers the complete life cycle of a product, from conception, through design and manufacture, to decommissioning, recycling and disposal, within the constraints imposed by economic, legal, social, cultural and environmental considerations. The resulting design graduates are able to work in a way that contributes to society, the economy and the environment, both in the present and for the future.

Additionally, the sandwich programme aims to give students first-hand knowledge and experience of the practice of design in the UK and European industry and the operation and internal structure of typical design based companies.

The programme aims to:

Develop core knowledge, and understanding of key design principles.

Cover the technical subjects appropriate for the needs of today's industrial and product designers working towards a sustainable future.

Enable students to develop knowledge, intellectual and practical skills that will enable them to take a leading role in the identification and solution of problems and the development of robust design solutions.

Investigate and explore idea creation mechanisms and techniques used to foster creativity within design teams and the typical commercial environment.

Allow students to gain knowledge about enterprise, innovation and the influence of standards and environmental legislation on innovation and the design process.

Develop student's study and personal skills so that they progressively take responsibility for their own learning, becoming independent learners, whilst 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.

Additionally, the sandwich programme aims 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. It will give students first-hand knowledge and experience of the practice of design in the UK and European industry and the operation and internal structure of typical design based companies.

Provide a degree programme that meets the accreditation requirements of the Engineering Council AHEP- 4, the QAA Subject Benchmark Statements for Engineering, Art and Design, and the needs of industry.

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

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

Apply creative and imaginative approaches in problem solving and the development of designs.

Develop a design concept using hand sketching and 2D sketching software techniques.

Use solid modelling techniques in the creation of 3D parts and assemblies.

Use knowledge of mathematics and electrical engineering theory in the selection and use of digital and analogue electronic components to solve a problem.

Create a program to operate embedded intelligent controllers within an electronic system.

Define the micro-structural characteristics of a range of engineering materials and identify the relationships between manufacturing processes and material behaviour.

Demonstrate a clear understanding of the physics of mechanical systems and mathematics by applying them in formulating solutions to common problems.

Identify and reflect upon the following aspects of personal development: strengths and weaknesses, motivations and values, ability to work with others.

Alternative Exit/ Interim Award Learning Outcomes - Diploma in Higher Education (SW)

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

A student who successfully completes the second year and a placement year will be eligible for the Sandwich award and will, in addition to the attributes detailed in the Diploma of Higher Education exit award, be able to demonstrate the professional and personal skills necessary for effective employment within a professional environment.

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

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

Understand how materials, colour and texture are applied in creating a persuasive 3D rendered graphic presentation of products.

Create professional quality display models. Design and build remote intelligent systems.

Ability to develop a branding strategy and promotional plan for a given product design.

Create 3D part models using surface modelling and other advanced modelling techniques.

Undertake finite element analysis of engineered components.

Generate an initial product design specification and select an optimal design from a range of design solutions.

Select appropriate standard items and select materials and their manufacturing processes to inform the final design.

Develop detail design documents.

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 Science with Honours

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. Apply creative and imaginative approaches in problem solving and the development of designs.

2. Develop a design concept using hand sketching and 2D sketching software techniques.

3. Use solid modelling techniques in the creation of 3D parts and assemblies.

4. Use knowledge of mathematics and electrical engineering theory in the selection and use of digital. and analogue electronic components to solve a problem.

5. Create a program to operate embedded intelligent controllers within an electronic system.

6. Define the micro-structural characteristics of a range of engineering materials and identify the relationships between manufacturing processes and material behaviour.

7. Demonstrate a clear understanding of the physics of mechanical systems and mathematics by applying them in formulating solutions to common problems.

8. Identify and reflect upon the following aspects of personal development: strengths and weaknesses, motivations and values, ability to work with others.

9. Understand how materials, colour and texture are applied in creating a persuasive 3D rendered graphic presentation of products.

10. Create professional quality display models.

11. Design and build remote intelligent systems.

12. Ability to develop a branding strategy and promotional plan for a given product design.

13. Create 3D part models using surface modelling and other advanced modelling techniques.

14. Undertake finite element analysis of engineered components.

15. Generate an initial product design specification and select an optimal design from a range of design solutions.

16. Select appropriate standard items and select materials and their manufacturing processes to inform the final design.

17. Develop detail design documents.

18. Maintain and extend a sound theoretical approach to the application of technology in engineering practice.

19. Use a sound evidence-based approach to problem solving and contribute to continuous improvement.

20. Identify, review and select techniques, procedures and methods to undertake engineering tasks.

21. Contribute to the design and development of engineering solutions.

22. Implement design solutions and contribute to their evaluation.

23. Plan for effective project implementation.

24. Manage tasks, people and resources to plan and budget.

25. Manage teams and develop staff to meet changing technical and managerial needs.

26. Manage continuous quality improvement.

27. Communicate in English with others at all levels.

28. Present and discuss proposals.

29. Demonstrate personal and social skills.

30. Comply with relevant codes of conduct.

31. Manage and apply safe systems of work.

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

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

34. Exercise responsibilities in an ethical manner.

Alternative target awards

A student who is eligible for the following awards will be able to:

Bachelor of Science with Honours (SW) in Product Design Engineering -

In addition to the Learning Outcomes for the BSc(Hons):

Provide evidence of their enhanced capabilities afforded through working in industry.

Demonstrate the professional and personal skills necessary for effective employment within a professional environment.

Teaching, Learning and Assessment

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

Acquisition of general and specialist engineering knowledge applied to existing and emerging technologies 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 and practical activities.

Testing of the knowledge base is through a combination of coursework and examinations.

Theoretical and practical methods are developed through lectures, case-studies and coursework assignments. Fundamental principles are delivered predominantly by lectures and laboratory classes. More advanced techniques such as computational techniques are delivered through examples, case studies and by project work supported by tutorials.

Theoretical and practical methods are assessed through a combination of exams, theoretical and practical coursework, laboratory work and project work.

Technical and commercial skills are taught through individual and group project work supported by a lecture and seminar programme appropriate to the demands of the coursework and projects.

Technical and commercial skills are assessed by individual and group written design project reports, student presentations with the aid of poster presentations, process books and display models and prototypes.

Interpersonal and professional skills are embedded into almost every activity within the programmes content and assessment.

Assessment of levels of interpersonal and professional skills is predominantly through individual and group academic and practical coursework and project work.

Programme structure - programme rules and modules

Students have the option to undertake a placement year. The placement year, module 5267PDE, will follow Level 5 and students will be enrolled on a 480 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 480 credit honours with study abroad programme. Of those 480 credits, 120 will be taken via a Level 5 study abroad module 5268PDE. 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.

This programme structure applies to students who join Level 4 of the programme from September 2022 onwards. Students who joined prior to this date follow the previously validated structure.

Level 6	Potential Awards on completion	Bachelor of Science with Honours
Core	Option	Award Requirements
6261PDE Design Project and Product Management (20 credits) 6262PDE Major Project Research Report (20 credits) 6263PDE Major Project (40 credits) 6264PDE Sustainable & Ethical Design (20 credits) 6265PDE User Centred Design (20		120 core credits at level 6 0 option credits at level 6

credits)		

Level 5	Potential Awards on completion	
Core	Option	Award Requirements
5261PDE Advanced Computer Aided Design (20 credits) 5262PDE Product Design And Presentation (20 credits) 5263PDE Applied Electronics And Control (20 credits) 5264PDE Embodiment Design (20 credits) 5265PDE Product Analysis (20 credits) 5266PDE Digital Marketing & Business Model Development (20 credits)		120 core credits at level 5 0 option credits at level 5

Level 4	Potential Awards on completion	
Core	Option	Award Requirements
4261PDE Computer Aided Design (20 credits) 4262PDE Design Visualisation (20 credits) 4263PDE Design Thinking Product Innovation (20 credits) 4264PDE Introduction to Electronics and Control (20 credits) 4265PDE Mechanics, Materials and Manufacture (20 credits) 4266PDE Prototyping and Modelmaking for Design (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 and supported to find and undertake a year's industrial placement between Level 5 and Level 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. Additionally, the programme team have a track record of liaising with outside and industrial partners to provide students with “live” projects that are considered stretch goals for their academic development and learning. The student must pass a single, 120 credit module during the sandwich year.

Criteria for admission

A/AS Level
Applicants should have or expect to obtain 112 UCAS points. At A2-level, applicants should expect to gain at least 64 UCAS points from Design Technology, Maths, Engineering, Chemistry, Physics or Electronics.

BTEC National Diploma
BTEC Extended Diploma.

Applicants should have or expect to obtain 112 UCAS points (DMM), in a relevant subject.

Applicants with an Advanced Diploma or Progression Diploma will be considered on an individual basis.

Access
Must be in relevant subject and a transcript must be seen before an offer can be made. GCSE English & Maths

should be passed if not included in the Access Diploma.

Other
Applicants should have five GCSE (or equivalent) passes of at least grade C including Mathematics and English (or IELTS 6.0).

Mature entry
Applicants offering other awards or combinations of unit awards will also be considered. All applications will be considered on an individual basis. We welcome applications from highly motivated applicants with relevant experience but without the necessary formal qualifications. All applications will be considered on an individual basis.

Overseas qualifications
The School actively supports the University Equal Opportunities policy and strategy in its underlying philosophy to value and respect individuals, and its commitment to maximize the potential of each student. The School is committed to complying with legislation, in particular the Race Relations Amendment Act 2000 and the Special Educational Needs and Disability Act 2001. Applications from students with disabilities are positively welcomed.

Applications are considered on the basis of academic criteria alone. Students are invited to contact the Equal Opportunities Unit for an information pack detailing the facilities, support available and physical access to the main University buildings. Students may also visit the University to discuss support strategies with the University Disability Welfare Advisor.

English Language Requirements

All applicants must provide evidence of competence in English. The level of English language required should be equivalent to 6.0 for IELTS within the previous 24 months. Equivalents to this score are:

1. UK GCSE English grade C or above

2. Test of English as a Foreign Language (TOEFL) score of 550 or above.

3. Cambridge Examination Board: Advanced Certificate of English, grade C or above.

Applicants who have studied and successfully achieved a UK Degree within the previous 24 months are exempt from the requirements to produce evidence of competence in English.

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.