

## Overview

<b>Programme Code</b>	35334
<b>Programme Title</b>	Product Design Engineering
<b>Awarding Institution</b>	Liverpool John Moores University
<b>Programme Type</b>	Degree
<b>Programme Leader</b>	Adam Papworth
<b>Link Tutor(s)</b>	

## Awards

Award Type	Award Description	Award Learning Outcomes
Alternative Exit	Diploma in Higher Education (SW) - SDHE	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	Bachelor of Science (SW) - SBS	Students who obtain this award will have achieved most but not all of the programme learning outcomes of the equivalent Bachelors award with honours.
Recruitable Target	Bachelor of Science with Honours (SW) - SBSH	See Learning Outcomes Below
Target Award	Bachelor of Science with Honours - BSH	See Learning Outcomes Below
Alternative Exit	Certificate of Higher Education - CHE	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	Diploma of Higher Education - DHE	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.

### Alternate Award Names

## External Benchmarks

### Subject Benchmark Statement

UG-Art and Design (2016), UG-Engineering (2019)

## Accreditation

### Programme Accredited by

PSRB Name	Type of Accreditation	Valid From Date	Valid To Date	Additional Notes
Institution of Engineering Designers (IED)	Accredited by the Institution of Engineering Designers (IED) on behalf of the Engineering Council for the purposes of fully meeting the academic requirement for registration as an Incorporated Engineer.			

### Programme Offering(s)

Mode of Study, Mode of Delivery	Intake Month	Teaching Institution	Programme Length
Sandwich Year Out, Face to Face	September	LJMU Taught	4 Years
Full-Time, Face to Face	September	LJMU Taught	3 Years

## Aims and Outcomes

### 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.

### Learning Outcomes

Code	Description
PLO1	Apply creative and imaginative approaches in problem solving and the development of designs.
PLO2	Develop a design concept using hand sketching and 2D sketching software techniques.
PLO3	Use solid modelling techniques in the creation of 3D parts and assemblies.
PLO4	Use knowledge of mathematics and electrical engineering theory in the selection and use of digital. and analogue electronic components to solve a problem.
PLO5	Create a program to operate embedded intelligent controllers within an electronic system.
PLO6	Define the micro-structural characteristics of a range of engineering materials and identify the relationships between manufacturing processes and material behaviour.
PLO7	Demonstrate a clear understanding of the physics of mechanical systems and mathematics by applying them in formulating solutions to common problems.

<b>Code</b>	<b>Description</b>
PLO8	Identify and reflect upon the following aspects of personal development: strengths and weaknesses, motivations and values, ability to work with others.
PLO9	Understand how materials, colour and texture are applied in creating a persuasive 3D rendered graphic presentation of products.
PLO10	Create professional quality display models.
PLO11	Design and build remote intelligent systems.
PLO12	Ability to develop a branding strategy and promotional plan for a given product design.
PLO13	Create 3D part models using surface modelling and other advanced modelling techniques.
PLO14	Undertake finite element analysis of engineered components.
PLO15	Generate an initial product design specification and select an optimal design from a range of design solutions.
PLO16	Select appropriate standard items and select materials and their manufacturing processes to inform the final design.
PLO17	Develop detail design documents.
PLO18	Maintain and extend a sound theoretical approach to the application of technology in engineering practice.
PLO19	Use a sound evidence-based approach to problem solving and contribute to continuous improvement.
PLO20	Identify, review and select techniques, procedures and methods to undertake engineering tasks.
PLO21	Contribute to the design and development of engineering solutions.
PLO22	Implement design solutions and contribute to their evaluation.
PLO23	Plan for effective project implementation.
PLO24	Manage tasks, people and resources to plan and budget.
PLO25	Manage teams and develop staff to meet changing technical and managerial needs.
PLO26	Manage continuous quality improvement.
PLO27	Communicate in English with others at all levels.
PLO28	Present and discuss proposals.
PLO29	Demonstrate personal and social skills.
PLO30	Comply with relevant codes of conduct.
PLO31	Manage and apply safe systems of work.
PLO32	Undertake engineering activities in a way that contributes to sustainable development.
PLO33	Carry out and record CPD necessary to maintain and enhance competence in own area of practice.

<b>Code</b>	<b>Description</b>
PLO34	Exercise responsibilities in an ethical manner.

## Programme Structure

### Programme Structure Description

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.

<b>Programme Structure - 360 credit points</b>	
<b>Level 4 - 120 credit points</b>	
<b>Level 4 Core - 120 credit points</b>	<b>CORE</b>
[MODULE] 4261PDE Computer Aided Design Approved 2022.01 - 20 credit points	
[MODULE] 4262PDE Design Visualisation Approved 2022.01 - 20 credit points	
[MODULE] 4263PDE Design Thinking Product Innovation Approved 2022.01 - 20 credit points	
[MODULE] 4264PDE Introduction to Electronics and Control Approved 2022.01 - 20 credit points	
[MODULE] 4265PDE Mechanics, Materials and Manufacture Approved 2022.01 - 20 credit points	
[MODULE] 4266PDE Prototyping and Modelmaking for Design Approved 2022.01 - 20 credit points	
<b>Level 5 - 120 credit points</b>	
<b>Level 5 Core - 120 credit points</b>	<b>CORE</b>
[MODULE] 5261PDE Advanced Computer Aided Design Approved 2022.01 - 20 credit points	
[MODULE] 5262PDE Product Design and Presentation Approved 2022.01 - 20 credit points	
[MODULE] 5263PDE Applied Electronics and Control Approved 2022.01 - 20 credit points	
[MODULE] 5264PDE Embodiment Design Approved 2022.01 - 20 credit points	
[MODULE] 5265PDE Product Analysis Approved 2022.01 - 20 credit points	
[MODULE] 5266PDE Digital Marketing and Business Model Development Approved 2022.01 - 20 credit points	
<b>Optional placement - 120 credit points</b>	<b>OPTIONAL</b>
<b>Placement Year - 120 credit points</b>	<b>OPTIONAL</b>
[MODULE] 5267PDE Sandwich Year - Product Design Engineering Approved 2022.01 - 120 credit points	
<b>OR Study Abroad - 120 credit points</b>	<b>OPTIONAL</b>
[MODULE] 5268PDE Study Year Abroad - Product Design Engineering Approved 2022.01 - 120 credit points	
<b>Level 6 - 120 credit points</b>	
<b>Level 6 Core - 120 credit points</b>	<b>CORE</b>
[MODULE] 6261PDE Design Project and Product Management Approved 2022.01 - 20 credit points	
[MODULE] 6262PDE Major Project Research Report Approved 2022.01 - 20 credit points	
[MODULE] 6263PDE Major Project Approved 2022.01 - 40 credit points	
[MODULE] 6264PDE Sustainable and Ethical Design Approved 2022.01 - 20 credit points	
[MODULE] 6265PDE User Centred Design Approved 2022.01 - 20 credit points	

## Teaching, Learning and Assessment

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.

## Opportunities for work related learning

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.

## Entry Requirements

Type	Description
BTECs	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.
A levels	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.



<p>Other international requirements</p>	<p>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.</p>
<p>Alternative qualifications considered</p>	<p>Applicants should have five GCSE (or equivalent) passes of at least grade C including Mathematics and English (or IELTS 6.0).</p>