UNIVERSITY OF LIVERPOOL

Industrial Design MEng

COURSE DETAILS

- A level requirements: AAB
- UCAS code: 6G11
- Study mode: Full-time
- Length: 4 years

KEY DATES

- Apply by: 25 January 2023
- Starts: 25 September 2023

Course overview

This programme brings together product design creativity with the technical knowledge and skills of engineering. You will develop as a technically competent industrial designer, benefiting from the very latest in new product development techniques. The result is a modern engineering degree that will equip you with an excellent technical and creative grounding for a successful career in designing and developing new products.

INTRODUCTION

This four-year Industrial Design programme gives you a solid understanding of core engineering subjects providing you with a broad understanding of user-centered product design, key aspects of engineering, modern theory methodologies and best practices in new product development and visualisation.

With a good knowledge of the process and management of design, you will be well placed to play an important role in new product development, which is a top management priority in industry today.

WHAT YOU'LL LEARN

- The latest industrial and product design engineering techniques

- 3D designing, prototyping and production techniques
- Traditional discipline of engineering

ACCREDITATION

Our Industrial Design programmes are accredited, or pending accreditation, by our professional body, the Institution of Engineering Designers (IED), for the purpose of meeting the academic requirements for professional registration as Chartered Engineer (CEng) and Chartered Technological Product Designer (CTPD).

Course content

Discover what you'll learn, what you'll study, and how you'll be taught and assessed.

YEAR ONE

COMPULSORY MODULES

DESIGN COMMUNICATION (ENGG115)

Credits: 7.5 / Semester: semester 2

This module provides students with essential foundational skills in effective hand sketching, visualisation, and final presentation of design ideas. Students are instructed in principles, examples, and demonstrations regarding the use of a variety of design communication media and techniques, for the purposes of conceiving, developing and presenting product design ideas.

ELECTRICAL CIRCUITS FOR ENGINEERS (ELEC121)

Credits: 7.5 / Semester: semester 1

To provide students with a basic understanding of electronics from first principles covering analogue and electromechanical systems. Basic circuits and theory will be introduced including the use of semiconductor devices such as diodes and transistors. Electromechanics will be developed to provide the student with a fundamental knowledge of the principles of DC and AC machines, transformers and linear actuators

ELECTROMECHANICAL SYSTEMS (ENGG121)

Credits: 7.5 / Semester: semester 2

To provide students with a basic understanding of modelling and simulation techniques. Mathematical modelling and graph theory will be introduced to develop practical skills in the modelling and designing of different types of systems including electromechanical systems.

FLUID MECHANICS (ENGG113)

Credits: 7.5 / Semester: semester 1

This module introduces fluid mechanics to the First Year Undergradute students, describes the fundamental principles of fluid property, dimension analysis, hydrostatics and hydrodynamics. Students will be able to solve simple engineering problems involves steady fluid flow.

INTRODUCTION TO STATISTICS AND PROGRAMMING FOR ENGINEERS (ENGG185)

Credits: 7.5 / Semester: semester 1

This module introduces students to the basic concepts and principles of elementary statistics and programming. It explains the purposes and advantages of analysing data collected specifically to solve problems in engineering, reviews available software tools and programming languages used to formulate and answer basic engineering questions. It draws on examples from applications across the range of School of Engineering program areas.

INTRODUCTION TO STRUCTURAL MATERIALS (ENGG108)

Credits: 7.5 / Semester: semester 1

This module introduces students to important mechanical properties of metallic alloys, polymers, ceramics, construction materials and composites used in engineering industry. It also introduces the mechanical testing techniques used to measure such properties, the common mechanisms of materials and component failure in use, and some appreciation of materials processing. The laboratory sessions are designed to familiase students with engineering laboratory methods and procedures, as well as providing an experience of hands-on mechanical testing techniques.

ENGINEERING MATHEMATICS (MATH198)

Credits: 22.5 / Semester: whole session

MATH198 is a Year 1 mathematics module for students of programmes taught in the School of Engineering, e.g. Aerospace, Civil, Mechanical or Industrial Design Engineering. It is designed to reinforce and build upon A-level mathematics, providing you with the strong background required in your engineering studies and preparing you for the Year 2 mathematics module MATH299 (Mathematics engineering II). In the first semester, the foundations are laid: differential calculus, vector algebra, integration and applications. Semester two covers complex numbers, differential equations, Laplace transformations and functions of two variables

MECHANICAL ENGINEERING DESIGN A (MECH113)

Credits: 15 / Semester: semester 1

This module provides students with an introduction to mechanical design and the skills required by a professional engineer.

The module is configured around a group design project but is enhanced with lecture material and practical exercises to introduction to mechanical design and the skills required by a professional engineer.

The module is configured around a group design project but is enhanced with lecture material and practical exercises to introduce skills such as technical drawing, data analysis and technical writing.

The majority of these are brought together through their application to the design project that runs alongside them.

PRODUCT DEVELOPMENT 1 (ENGG114)

Credits: 15 / Semester: semester 2

This module provides students with a hands-on introduction to industrial design and new product development, and the skills required by a technical product designer. The module is configured around an industrial design studio-based project but is enhanced with lecture material and practical exercises to introduce skills such as report writing, oral presentation, computer-aided design, analysis of engineering mechanisms and components, and physical sketch modelling of design ideas. The majority of these are brought together through their application to the design project that runs alongside them.

SOLIDS AND STRUCTURES 1 (ENGG110)

Credits: 15 / Semester: whole session

This module aims to introduce students to the fundamental concepts and theory of how engineering structures work to sustain loads. It will also show how stress analysis leads to the design of safer structures. It will also provide students with the means to analyse and design basic structural elements as used in modern engineering structures.

THERMODYNAMICS I (ENGG112)

Credits: 7.5 / Semester: semester 2

The module provides an introduction to the laws of thermodynamics which are essential to understanding many branches of engineering. The module will be taught through reference to everyday examples and applications drawn from aerospace, civil and mechanical engineering.

Programme details and modules listed are illustrative only and subject to change.

YEAR TWO

COMPULSORY MODULES

CONSUMER ELECTRONICS (ENGG225)

Credits: 7.5 / Semester: semester 2

This module aims to introduce students to a range of common electrical technologies present in consumer products. Via dissection, students will gain an understanding and appreciation of the inner componentry found in modern devices. They will then be tasked with investigating their use with respect to usability, reliability, functionality and commercial viability. Learning will be assessed through project work.

ENGINEERING DESIGN (MECH212)

Credits: 15 / Semester: whole session

Professional Engineering can be defined as the application of science in the solution of problems and the development of new products, processes and systems. It is vital that all Engineering graduates have a solid design education; and this module is a core part of that.

In Year 1 students are introduced to the basic tools and techniques involved in engineering design.

In this module students are taught the basics of design theory in a lecture setting; but crucially they are required to apply this learning in a 24-week group project to design an innovative engineering product.

Students are given a design brief and are "coached" through product design specification; creative conceptual design; detailed design; 3D CAD modelling; design for manufacture, assembly and environment; and materials selection.

The module also enables students to develop and practice teamwork, communication, project management and problem solving skills.

HUMAN FACTORS IN PRODUCT DESIGN: PRACTICE (ENGG224)

Credits: 7.5 / Semester: semester 2

This module follows on from the prerequisite module, Human Factors: Theory, this module will continue to develop anthropometric and ergonomic concepts, and the capabilities and constraints of the physical, cognitive and cultural makeup of human beings. Successful candidates will have acquired knowledge and understanding of how human factors affect the design and development of new products.

HUMAN FACTORS IN PRODUCT DESIGN: THEORY (ENGG222)

Credits: 7.5 / Semester: semester 1

The module will introduce students to anthropometric and ergonomic concepts, and to the capabilities and constraints of the physical, cognitive and cultural makeup of human beings. Successful candidates will have acquired knowledge and understanding of how human factors affects the design and development of new products.

MANAGING PRODUCT DEVELOPMENT (MNGT205)

Credits: 7.5 / Semester: semester 1

The module teaches the management of new product development. It is taught in a traditional lecture style culminating in an exam.

Successful students will have acquired knowledge and understanding at a broad level of the process and how it is executed in a modern industrial environment.

MATERIALS PROCESSING AND SELECTION I (MATS214)

Credits: 7.5 / Semester: semester 1

This module introduces the main materials processing and manufacturing techniques used to shape metals. It also introduces technologies used to modify the surface properties of metal components, and heat-treatment procedures used to change materials' mechanical properties.

MATERIALS PROCESSING AND SELECTION II (MATS210)

Credits: 7.5 / Semester: semester 2

This module covers non-metallic materials and materials selection. The students will understand the processing, microstructure and properties of ceramic, polymer and composite materials. The students will also learn how to derive materials performance indices and select materials for mechanical design.

PRODUCT DEVELOPMENT 2 (ENGG220)

Credits: 15 / Semester: whole session

Following on from Y1, this module aims to further develop the student understanding of product development. In an open-ended studio setting, students will build on Y1 learning and further gain an understanding and appreciation of getting from an idea to a finished product. Successful students will be able to develop and articulate ideas in the form of sketch work and traditional model prototypes to an intermediate level. This will be assessed through project work.

PRODUCT FORM AND MATERIALS (ENGG226)

Credits: 7.5 / Semester: semester 2

This module aims to introduce students to materials and manufacturing issues at the core of industrial design practice. Students will develop an appreciation of how materials positively and negatively influence people's perception, appreciation and experiences of designed products. Students will also gain an understanding of the key considerations involved in turning ideas for product form into manufacturable components. An active learning approach will be taken, where students engage in practical exercises and projects to develop their knowledge and skills.

PRODUCT VISUALISATION AND SIMULATION 1 (ENGG221)

Credits: 15 / Semester: whole session

This module aims to introduce students to modern product visualisation and simulation techniques. Working in virtual space students will gain a good understanding of the fundamental principles and contemporary tools used in industry. They will learn and utilise specific functions to generate virtual models. Visualisation techniques will be explored and applied to aid the design and development process. At the end of the module, the students will be able to visualise and simulate products at an introductory level.

PROJECT MANAGEMENT (MNGT202)

Credits: 7.5 / Semester: semester 1

Project Management is a core skill for professional engineers of all types and a sound education in this subject area is required by the professional accrediting bodies. The knowledge and skills developed in this module will equip students for their future UG project work and for their careers ahead.
This module teaches students the theory of fundamental techniques in project management, risk management, and cost management.

In this modules student undertake a group "virtual project" in which they undertake all stages of project management involved n a major construction projects. The five virtual project tasks require students to apply their theoretical learning; and they provide an opportunity to develop key professional skills.

SOLIDS & STRUCTURES 2 (ENGG209)

Credits: 15 / Semester: whole session

This module aims to introduce students to techniques for load and displacement analysis of simple structures.

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YEAR THREE

COMPULSORY MODULES

ADVANCED MODERN MANAGEMENT (MNGT352)

Credits: 7.5 / Semester: semester 1

MECHANICAL ENGINEERING CAPSTONE 1 (MECH327)

Credits: 15 / Semester: whole session

The 2-year Capstone Projects are a hallmark of the Mechanical Engineering MEng programmes at Liverpool. They are group projects in which students apply their scientific knowledge, design training and management skills to design-build-test innovative engineering products or systems. These projects provide students an opportunity to develop and evidence a wide range of technical, personal and professional skills. The Capstone modules make the greatest contribution to graduate employability.

Students are given the choice of project from a portfolio of 6-8 options: some target international sporting competition (eg Velocipede or Formula Student); others are industry-led and address real world challenges (eg Nuclear Rover decommissioning robot with NNL or Paediatric Wheelchairs with Alder Hey Hospital). The range of available projects varies each year.

Each project team is assigned an academic project supervisor and a dedicated member of technical staff. You will work closely with these staff and a range of other technical experts from industry and/or the research community. It should be noted that the students "own" their project and it is their responsibility to specify, plan, manage and report on all project work.

Students will be timetabled for 4-hours per week but will be expected to spend a significant amount of additional time working on their project.

A variety of assessment methods are used that are as close as possible to professional engineering practice.

At four key points in the year the Careers and Employability Service will join the module to help students reflect on, record in CV, and communicate at interview the professional development.

INDIVIDUAL DESIGN PROJECT (INDD341)

Credits: 30 / Semester: whole session

The Year 3 Individual Design Project; 300 hours student work over 2 semesters; 3 assessment stages: (1) Project Plan and Literature Review (PPLR) – 10%; (2) Interim presentation and viva – 20%; (3) Final report, viva and artefact – 70% .

MANAGEMENT OF DESIGN (MNGT313)

Credits: 7.5 / Semester: semester 2

To enable students to develop a general understanding of a wide range of aspects of the design function in a manufacturing company and its management, and in particular a comprehensive understanding of the design process.

MANUFACTURING SYSTEMS (MNFG321)

Credits: 15 / Semester: semester 1

This module investigates how Manufacturing Systems function, considering the interaction of the Manufacturing Systems with external and internal constraints. The modules gives special emphasis to the use of Computer Integrated Manufacturing in Manufacturing Systems. A comprehensive overview is given starting with interactions with the Global economy before considering the effects at company and factory level. It then considers the function of Manufacturing Systems within the factory and company level and how this is driven by the function of the machines on the shop floor. It therefore gives a holistic view of how manufacturing systems function at all levels and how the levels interact.

MATERIALS DESIGN (MATS303)

Credits: 7.5 / Semester: semester 2

MECHATRONICS (MECH316)

Credits: 7.5 / Semester: semester 1

This module aims to provide students with an appreciation of the challenges related to the design of Mechatronics systems.

Both hardware and software integration issues will be studied within this module.

General design principles will be introduced first and learning will focus on the popular Arduino platform.

PRODUCT DEVELOPMENT 3 (ENGG320)

Credits: 15 / Semester: whole session

Following on from Y1 and Y2, this module aims to further develop the student understanding of product development. In an open-ended studio setting, students will build on Y1 and Y2 learning and further gain an understanding and appreciation of getting from an idea to a finished product. Successful students will be able to develop and articulate ideas in the form of sketch work and traditional model prototypes to an advanced level. This will be assessed through project work.

PRODUCT VISUALISATION & SIMULATION 2 (ENGG321)

Credits: 15 / Semester: whole session

Following on from Y2, this module aims to further develop the student understanding of modern product visualisation and simulation techniques. In an open-ended 3D environment setting, students will build on Y2 learning and further gain an understanding and appreciation of visualising products. Successful students will be able to develop and articulate product concepts in 3D virtual space at an intermediate level. This will be assessed through project work.

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YEAR FOUR

COMPULSORY MODULES

ADDITIVE MANUFACTURING (MNFG610)

Credits: 7.5 / Semester: semester 1

DESIGN FOR ENVIRONMENT, MANUFACTURE AND ASSEMBLY (MNFG413)

Credits: 7.5 / Semester: semester 2

ENTERPRISE STUDIES (MNGT414)

Credits: 7.5 / Semester: semester 2

The module teaches the concepts of Entrepreneurship, Intrapreneurship, Company Infrastructure and Investment Proposals. It is taught using lectures, class questions, case studie sand a comprehensive coursework assignment. Successful students will have acquired knowledge and understanding at mastery level of the process and how itis executed in a modern industrial environment.

FINITE ELEMENT ANALYSIS (MECH452)

Credits: 7.5 / Semester: semester 1

In this module the students will gain a basic understanding of the Finite Element method and learn to use Abaqus Finite Element software. This software will then be used to analyse a variety of different problems which are relevant to both mechanical and civil engineers

INTEGRATED SYSTEMS DESIGN (MNFG615)

Credits: 15 / Semester: semester 2

LASER MATERIALS PROCESSING (MECH605)

Credits: 15 / Semester: semester 1

The module will cover: how lasers work, what are the key beam properties of high power lasers, how the beam is deployed and delivered to the process/workpiece, safety in laser materials processing, and the working principles and industry practice for a range of laser processes.

MECHANICAL ENGINEERING CAPSTONE 2 (MECH431)

Credits: 30 / Semester: whole session

The 2-year Capstone Projects are a hallmark of the Mechanical Engineering MEng programmes at Liverpool. They are group projects in which students apply their scientific knowledge, design training and management skills to design-build-test innovative engineering products or systems. These projects provide students an opportunity to develop and evidence a wide range of technical, personal and professional skills. The Capstone modules make the greatest contribution to graduate employability.

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Students will be timetabled for 4-hours per week but will be expected to spend a significant amount of additional time working on their project.

A variety of assessment methods are used that are as close as possible to professional engineering practice.

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PRODUCT DEVELOPMENT 4 (ENGG420)

Credits: 15 / Semester: whole session

Following on from previous years, this module aims to further develop the student understanding of product development. In an open-ended studio setting, students will build on prior learning and further gain an understanding and appreciation of getting from an idea to a finished product. Successful students will be able to develop and articulate ideas in the form of sketchwork and traditional model prototypes to a fluent level. This will be assessed through project work.

VIRTUAL REALITY (MNFG421)

Credits: 15 / Semester: semester 2

This module aims to develop student understanding of modern product visualisation and simulation techniques. In an open-ended 3D environment setting, students will gain an understanding and appreciation of visualising environments and products. Successful students will be able to develop and articulate product concepts in 3D virtual space at an advanced level. This will be assessed through project work.

Programme details and modules listed are illustrative only and subject to change.

HOW YOU'LL LEARN

We are leading the UK's involvement in the international Conceive-Design-Implement-Operate (CDIO) initiative, an innovative educational framework for producing the next generation of engineers.

Our degree programmes encompass the development of a holistic, systems approach to engineering. Technical knowledge and skills are developed as part of the life-cycle processes involved in engineering and an awareness of the sustainability issue involved in practicing as a professional engineer.

LIVERPOOL HALLMARKS

We have a distinctive approach to education, the Liverpool Curriculum Framework, which focuses on research-connected teaching, active learning, and authentic assessment to ensure our students graduate as digitally fluent and confident global citizens.

Careers and employability

Our degrees provide pathways into rewarding careers and our graduates have found employment in a wide range of international industries and organisations. As well as achieving a degree qualification, you will graduate as an industry-ready engineer who has both practical experience and highly desirable skills in the engineering industry.

The Careers and Employability service maximises opportunities for career prospects, graduate opportunities, student summer placements and the annual engineering career fair with 30 blue-chip companies attending including Jaguar Land Rover, Nestle, Toyota, JCB and the British Army.

Our research-led teaching ensures that we incorporate the latest advances in cutting-edge engineering research. 95% of our research is deemed world-leading or internationally excellent and is highly regarded by engineering industries and partners.

4 IN 5 **OF OUR ENGINEERING STUDENTS FIND THEIR MAIN ACTIVITY AFTER GRADUATION MEANINGFUL.**

Graduate Outcomes, 2018-19.

RECENT EMPLOYERS

- ABB Ltd
- Airbus
- Arup
- Atkins
- BAE Systems
- Balfour Beatty
- Bentley
- BMI
- British Airways
- British Army
- Corus
- Costain
- Government organisations
- Halcrow
- Highways Agency
- Jaguar Land Rover
- Laing O'Rourke
- Metronet Rail
- Mott Macdonald
- Mouchel

- National Grid Transco
- National Nuclear Laboratory
- Network Rail
- Pilkington
- QinetiQ
- RAF
- Ramboll
- Rolls Royce
- Royal Haskoning
- Royal Navy
- Siemens
- Tarmac
- United Utilities

PREPARING YOU FOR FUTURE SUCCESS

At Liverpool, our goal is to support you to build your intellectual, social, and cultural capital so that you graduate as a socially-conscious global citizen who is prepared for future success. We achieve this by:

- Embedding employability within your curriculum, through the modules you take and the opportunities to gain real-world experience offered by many of our courses.
- Providing you with opportunities to gain experience and develop connections with people and organisations, including student and graduate employers as well as our global alumni.
- Providing you with the latest tools and skills to thrive in a competitive world, including access to Handshake, a platform which allows you to create your personalised job shortlist and apply with ease.
- Supporting you through our peer-to-peer led Careers Studio, where our career coaches provide you with tailored advice and support.

Fees and funding

Your tuition fees, funding your studies, and other costs to consider.

TUITION FEES

Tuition fees cover the cost of your teaching and assessment, operating facilities such as libraries, IT equipment, and access to academic and personal support. Learn more about tuition fees, funding and student finance.

UK fees	
Full-time place, per year	£9,250
Year in industry fee	£1,850
Year abroad fee	£1,385

International fees	
Full-time place, per year	£24,500

*Fees stated are for the **2022-23** academic year and may rise for 2023-24.*

ADDITIONAL COSTS

We understand that budgeting for your time at university is important, and we want to make sure you understand any course-related costs that are not covered by your tuition fee. This may include a laptop, books, or stationery. All safety equipment, other than boots, is provided free of charge by the department.

Find out more about the additional study costs that may apply to this course.

SCHOLARSHIPS AND BURSARIES

We offer a range of scholarships and bursaries to help cover tuition fees and help with living expenses while at university.

Scholarships and bursaries you can apply for from the United Kingdom

Select your country or region for more scholarships and bursaries.

Entry requirements

The qualifications and exam results you'll need to apply for this course.

Your qualification	**Requirements** About our typical entry requirements
A levels	AAB including Mathematics and a second science. Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is **ABB** with **A** in the EPQ. You may automatically qualify for reduced entry requirements through our contextual offers scheme. If you don't meet the entry requirements, you may be able to complete a foundation year which would allow you to progress to this course. Available foundation years: • Engineering Foundation BEng (Hons) (4 year route including a Foundation Year at Carmel College)
GCSE	4/C in English and 4/C in Mathematics

Your qualification	**Requirements** About our typical entry requirements
Subject requirements	Mathematics and a second science. Applicants following the modular Mathematics A Level must be studying A Level Physics or Further Mathematics as the second science (or must be studying at least one Mechanics module in their Mathematics A Level). Accepted Science subjects are Biology, Chemistry, Computing, Economics, Electronics, Environmental Science, Further Mathematics, Geography, Geology, Human Biology, Physics, Statistics and Design & Technology - Product Design. For applicants from England: Where a science has been taken at A Level (Chemistry, Biology or Physics), a pass in the Science practical of each subject will be required.
BTEC Level 3 Subsidiary Diploma	Acceptable at grade Distinction alongside AB in A Level Mathematics and a second science.
BTEC Level 3 Diploma	D*D in relevant BTEC considered alongside A Level Mathematics grade A. Accepted BTECs include Aeronautical, Aerospace, Mechanical, Mechatronics and Engineering.
BTEC Level 3 National Extended Diploma	Not accepted without grade A in A Level Mathematics
International Baccalaureate	35 overall, including 5 at Higher Level Mathematics and Physics
Irish Leaving Certificate	H1,H1,H2,H2,H2,H3, including H2 in Higher Maths and Higher Second Science. We also require a minimum of H6 in Higher English or O3 in Ordinary English.

Your qualification	**Requirements** About our typical entry requirements
Scottish Higher/Advanced Higher	Pass Scottish Advanced Highers with grades AAB including Mathematics and a second science.
Welsh Baccalaureate Advanced	Acceptable at grade B alongside AA in A Level Mathematics and a second science.
Cambridge Pre-U Diploma	D3 in Cambridge Pre U Principal Subject is accepted as equivalent to A-Level grade A M2 in Cambridge Pre U Principal Subject is accepted as equivalent to A-Level grade B Global Perspectives and Short Courses are not accepted.
Access	Not accepted
International qualifications	Select your country or region to view specific entry requirements. Many countries have a different education system to that of the UK, meaning your qualifications may not meet our entry requirements. Completing your Foundation Certificate, such as that offered by the University of Liverpool International College, means you're guaranteed a place on your chosen course.

ALTERNATIVE ENTRY REQUIREMENTS

- If your qualification isn't listed here, or you're taking a combination of qualifications, contact us for advice
- Applications from mature students are welcome.

THE ORIGINAL REDBRICK