UNIVERSITY OF LIVERPOOL

Chemical Engineering MEng

COURSE DETAILS

- A level requirements: AAA
- UCAS code: H811
- Study mode: Full-time
- Length: 4 years

KEY DATES

- Apply by: 29 January 2025
- Starts: 22 September 2025

Course overview

Chemical Engineers create innovative solutions to some of our world's greatest problems. They are involved in making medicines, safe water treatments, renewable energy and so much more. Our Chemical Engineering course focuses on sustainable solutions, hands-on learning, and industry experience. It will prepare you for a career in tackling global challenges.

This is a new programme and is subject to formal university approval.

INTRODUCTION

> If you want to make a real difference in addressing the world's major challenges including sustainability, climate change, food security, and ensuring good health for all, then chemical engineering is for you. It will equip you with skills and knowledge that are in high global demand and that can really change the world! Chemical engineers play a pivotal role in how we all live, working across societies and industries worldwide to achieve the UN's Sustainable Development Goals. Chemical engineering enables you to use a unique mix of your creativity, knowledge and problem-solving skills to make our planet a better place."

Yvonne Baker OBE, CENG, MICHEME – Chief Executive Officer of the Institution of Chemical Engineers (IChemE).

Our Chemical Engineering programme* offers an exciting blend of learning experiences, delivered by leaders in their field. Teaching the fundamentals of Chemical Engineering through a combination of lectures, laboratory sessions, tutorials and seminars equipping you with the skills, attitudes, and experience demanded by 21st century engineering and society.

You'll learn in a modern, well-equipped environment that fosters world-class digital innovation including our Active Learning Laboratories. You will also gain unique skills operating our pilot plant facility. You will join the UK professional chemical engineering community from day one because we will sign you up for student membership of the Institution of Chemical Engineers (IChemE) and cover the fees for the duration of your degree course.

Years One and Two are shaped to give you an understanding of the theory and skills needed to become a successful Chemical Engineer. As you progress into Year Three, you will focus on more advanced topics such as process safety alongside the all-important Design Project. We give you everything you need to walk out of the door to begin your professional journey towards chartered engineer. In Year Four, you can choose from optional advanced modules but your main task is the Research Project in which you will work, under supervision, to answer an important unsolved industrial problem using experiments or design software.

This programme is available from September 2025, subject to approval. The modules listed are an indication of what will be studied, though may be subject to change.

*pending approval and accreditation.

WHAT YOU'LL LEARN

- Underpinning science and mathematics of engineering systems
- Advanced information technology
- Collaborative engineering design
- Sustainable manufacturing
- Quantitative risk assessment and economic analysis
- Creative problem solving and critical thinking

ACCREDITATION

As a new programme, our Chemical Engineering courses are pending accreditation by the Institution of Chemical Engineers (IChemE). This degree has been designed in consultation with the IChemE and industry experts, and will be fully accredited (subject to approval) in 2029 as soon as students from the first cohort graduate. This is the first step in becoming a Chartered Engineer (CEng).

Course content

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

YEAR ONE

Year one gives students the scientific principles that underpin the practice of professional chemical engineering. You'll also get a fast-track, activity-based introduction to the key principles of engineering design requiring teamwork and communication.

COMPULSORY MODULES

PROFESSIONAL ENGINEERING: A SKILLS TOOLKIT (ENGG111)

Credits: 30 / Semester: semester 3

This module aims to provide students with an interesting and engaging project that will help them to immediately relate the material being taught,both within and without this module, to a practical problem that is identifiable to their engineering discipline, thus reinforcing its relevance to the topixc.

The module:
1) Seeks to provide students with an early understanding of the preliminary design processes
2) Will introduce students to formal engineering drawing and visualisation
3) Will expose the students to group work and the dynamics of working in a team
4) Will expose students to the complexity of an engineering design task
5) Will enable students to develop data analysis and plotting skills
6) Will embody an approach to learning that will engage the students for the remainder of their lives
7) Seeks to provide students with an early understanding of the detail design and manufacturing process
8. Will introduce students to industry standard computer aided engineering drawing tools and practice
9. Will enable students to develop report writing and oral presentation skills
10. Will provide students with a basic understanding of engineering components and mechanisms
11. Will embody an approach to learning that will engage the students for the remainder of their lives

ENGINEERING MATHEMATICS (ENGG198)

Credits: 22.5 / Semester: semester 2

ENGG198 is a Year 1 mathematics module for students of programmes taught in the School of Engineering, e.g. Aerospace, Civil, Architectural, Mechanical, Product Design and Industrial Design Engineering. It is designed to reinforce and build upon A-level (or equivalent) mathematics, providing you with the strong background required in your engineering studies and preparing you for Year 2 mathematics modules.

ENERGY SCIENCE (ENGG116)

Credits: 15 / Semester: semester 2

To develop an understanding of the basic principles of fluid mechanics, the laws of thermodynamics, and an appreciation of how to solve simple engineering problems. To develop skills in performing and reporting simple experiments.

CHEMICAL ENGINEERING DESIGN PRINCIPLES 1 (ENGG151)

Credits: 22.5 / Semester: semester 3

To develop an understanding of the basic principles of Chemical Engineering design, including dimensional analysis, batch/continuous processing, process flow diagrams, mass/energy balances and hazards analysis. To develop skills in performing essential engineering calculations.

CHEMISTRY AND BIOCHEMISTRY FOR ENGINEERS (ENGG152)

Credits: 15 / Semester: semester 3

To introduce students to the fundamental concepts of organic chemistry and physical chemistry for understanding reaction equilibrium/kinetics and mass transfer. To provide a basic understanding of biochemistry and bio-reactor design principles. To develop basic lab skills.

SOFT MATTER SCIENCE (ENGG153)

Credits: 15 / Semester: semester 3

To develop an understanding of the basic principles of rheology and solid-fluid interactions. To apply these principles to understand the chemistry and physics of complex/multiphase fluids such as polymeric suspensions, colloids and, also, mechanisms of crystallisation processes. To introduce engineering concepts for powder processing.

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

YEAR TWO

Year two extends core principles from year one and applies them to the flagship chemical engineering topics of separations, reaction engineering and process control. This learning is reinforced with the Year 2 Design Exercise. You are also given time to become proficient in industry standard process simulation software.

COMPULSORY MODULES

ENGINEERING MATHEMATICS AND COMPUTING (ENGG295)

Credits: 15 / Semester: semester 3

Engineering Mathematics and Computing will provide a fundamental understanding of mathematical techniques used to solve Engineering problems. Successful completion of this module will provide students with basic skills and solution methodologies (mathematical, and using MATLAB) for various engineering applications. The module will expose the essentials of numerical methods to solve systems of linear, non-linear, ordinary and partial differential equations. A series of classic engineering problems, such as trusses, mass-spring dampeners, 2D trajectory calculation, and 2D heat flow will place the acquired knowledge in an engineering context.

SEPARATION PROCESSES (ENGG253)

Credits: 15 / Semester: semester 3

To develop an understanding of the general concept of equilibrium stage processes as a key tool for the analysis and design of separation systems such as distillation, gas-liquid absorption, solvent extraction etc. To learn about principles of solid-liquid separation including filtration and working principles for alternative separation systems such as membranes, gas centrifuge etc. To develop skills in performing essential engineering calculations for the design of separation systems.

REACTION ENGINEERING (ENGG252)

Credits: 15 / Semester: semester 3

To understand the concept of residence time distribution for idealised reactor systems (Continuously Stirred Tank Reactor, CSTR) and Plug Flow Reactor, PFR) and how these can be combined to model real reaction systems. To be able to write down and solve equations to model the contribution of mass transfer limitations versus kinetic effects for determining overall reaction rate. To further refine skills in mathematical modelling and partial differential equations for the design of reactor systems.

CHEMICAL ENGINEERING DESIGN PRINCIPLES 2 (ENGG251)

Credits: 15 / Semester: semester 3

To build upon learning in Year 1 to solve mass and energy balances for complex flowsheets with material recycles etc. To perform heat integration using pinch analysis. To build a simple model in process simulation software.

PROCESS DYNAMICS AND CONTROL (ENGG254)

Credits: 15 / Semester: semester 3

To understand general principles of closed-loop feedback control and analysis of dynamic systems using block diagrams and Laplace Transforms. To design control strategies for the safe operation of process plant including an introduction to model based predictive control.

CHEMICAL ENGINEERING THERMODYNAMICS (ENGG255)

Credits: 15 / Semester: semester 3

To use established methods for modelling vapour-liquid equilibrium in multi-component systems. Methods for predicting bulk fluid properties from molecular descriptions such as group contribution methods. To have confidence using systematic methods for process systems calculations such as multi-component flash calculations.

YEAR 2 CHEMICAL ENGINEERING DESIGN EXERCISE (ENGG256)

Credits: 15 / Semester: semester 3

To work in groups to solve a well specified design exercise with reflection on team dynamics

PROJECT MANAGEMENT AND PROCESS OPERATIONS (ENGG257)

Credits: 15 / Semester: semester 3

To understand and use generic project management methodology and associated software. To understand operations management including continuous improvement and scheduling of multipurpose process plants.

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

YEAR THREE

The major module studied in year three is the Chemical Engineering Capstone Design Project in which you will work like a team in industry to do the preliminary design of an entire process complete with hazard assessment and economic analysis to calculate payback time. You'll also study advanced key modules for creating new sustainable processes, alongside process safety: techniques that are highly sought after in industry.

COMPULSORY MODULES

HEAT TRANSFER (MECH301)

Credits: 15 / Semester: semester 2

The aim of this module is to give the students a good understanding of the basic mechanisms of heat transfer and to equip them to solve significant engineering problems.

They will also learn about different designs of heat exchanger and how to carry out performance/design calculations.

ENGINEERING FLUID MECHANICS (MECH326)

Credits: 15 / Semester: semester 1

The module provides students with the fundamental concepts of Engineering Fluid Mechanics, and in particular: the role of viscosity in fluid mechanics, including the no-slip condition and the concept of vorticity; the basic principles of laminar and turbulent flow through pipes including definition and evaluation of the Fanning and Darcy friction factors; the concept of a boundary layer, including separation and transition, and basic equations for friction factor in laminar and turbulent flow with zero pressure gradient; the calculation methods of bluff-body drag using drag coefficients with qualitative explanations the potential-flow theory including the concept of irrationality and the principle of superposition; the analysis of compressible flow through constant-area ducts accounting for friction or heat transfer and to use the Fanno- and Rayleigh-flow tables; the analysis of external compressible flow including expansion and compression turns (Prandtl-Meyer expansions and oblique shock waves).

MENG CHEMICAL ENGINEERING DESIGN PROJECT (ENGG351)

Credits: 30 / Semester: semester 3

This is the major Chemical Engineering project to bring together key learning from the whole degree programme. Students will work in a team phase and then individually to create a full preliminary design of a major process plant with hazard assessment and economic costings.

PROCESS SAFETY AND LOSS PREVENTION (ENGG352)

Credits: 15 / Semester: semester 3

To instil in students the philosophy of safety first which is central to the Chemical Engineering discipline. Students will discover the ethical and economic motivation for preventing accidents, as well as the qualitative and quantitative techniques used to minimise risks to acceptable levels.

SUSTAINABLE PROCESSES (ENGG353)

Credits: 15 / Semester: semester 3

To allow students to apply established methodologies such as Life Cycle Analysis (LCA) as well as core engineering principles to assess and create low carbon process flowsheets. Wider issues of sustainability including social sustainability will also be briefly covered.

ENTERPRISE SKILLS AND PROJECT ECONOMICS (ENGG354)

Credits: 15 / Semester: semester 3

To introduce key concepts in developing a novel engineering system or solution idea; assessing the potential market; and identifying the capital and other resources required to exploit it. An exercise in formal economic analysis for a capital project will also be undertaken. Issues relating to project governance, ethics and security will be captured using groupwork and modern case studies.

ENVIRONMENTAL ENGINEERING (ENGG355)

Credits: 15 / Semester: semester 3

To introduce students to industry specific regulation and principle of design and operation of water and sewage treatment networks. Also, the process of environmental permitting for the control of liquid, gaseous effluents and wider community impacts.

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

YEAR FOUR

The major module in year four is the Chemical Engineering research project in which you will work independently to answer a question asked by industry that your teachers do not know the answer to (although they will guide you to the answer). Successful completion of this project will give you an extra level of maturity and resilience and it will be a sizeable chunk of text on your CV. This project is one of the reasons why MEng graduates are preferred over BEng graduates by many blue chip employers. The other work in this final year is a choice of two out of three specialised modules covering modern themes in Chemical Engineering.

COMPULSORY MODULES

CHEMICAL ENGINEERING RESEARCH PROJECT (ENGG451)

Credits: 60 / Semester: semester 3

To give students a large independent research exercise to answer to an important question posed by industry. Assessment is individual although students may do some common experimental work in a group. To give students the confidence, maturity and resilience to work on a challenging, open-ended problem in an independent manner, making them highly employable.

OPTIONAL MODULES

ADVANCED MATERIALS AND FORMULATION (ENGG452)

Credits: 30 / Semester: semester 3

To build on earlier topics and provide state-of-the-art techniques for formulation of complex soft materials in cosmetics, pharmaceuticals and other industries. An introduction to tissue engineering.

BIOLOGICAL PROCESS ENGINEERING (ENGG453)

Credits: 30 / Semester: semester 3

To tackle a comprehensive set of worked case studies applying core engineering principles to the bioprocessing industries and industrial biotechnology.

SYSTEMS ENGINEERING WITH AI (ENGG454)

Credits: 30 / Semester: semester 3

To build on previous mathematical and numerical solution techniques for systems modelling, digital twins and optimisation. To introduce data analytics and machine learning for engineering applications.

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

HOW YOU'LL LEARN

All engineering students at the University of Liverpool benefit from 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 complemented by a sound appreciation of the life-cycle processes involved in engineering and an awareness of the ethical, safety, security, environmental, economic and social considerations involved in practicing as a professional engineer.

You will be taught through a combination of face-to-face teaching in group lectures, laboratory sessions, hands-on operation of larger scale equipment, tutorials and seminars. Our programmes include a substantial practical component, with an increasing emphasis on project work as you progress through to the final year. You will be supported throughout by an individual academic adviser.

HOW YOU'RE ASSESSED

Assessment takes many forms, each appropriate to the learning outcomes of the module studied. The main modes of assessment are coursework and examination. Depending on the modules taken, you may encounter project work, presentations (individual and/or group), and specific tests or tasks focused on solidifying learning outcomes.

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

Chemical Engineering graduates have excellent employment prospects and attract some of the highest starting salaries of all the engineering disciplines. You will graduate with the technical and professional skills to pursue an exciting career in a wide range of industries, that can take you all over the world.

Liverpool are one of the most targeted universities by top employers, according to The Graduate Market 2024, High Fliers Research, meaning our graduates are in demand.

Qualifying with a Chemical Engineering degree from Liverpool will equip you with the knowledge and confidence to explore opportunities in many sectors. Modern Chemical Engineers work in a wide variety of industries including:

- Fine Chemicals and Pharmaceuticals
- Consumer Goods, Food and Drink
- Clean Energy, Hydrogen Economy, Nuclear and Sustainable Fuels
- Biotechnology, Water & Wastewater Treatment and Resource Recovery.

Our engineering graduates are also highly sought-after by other industries for their analytical, communications, management, business and IT skills. Some are thought leaders, policy makers and entrepreneurs delivering solutions in diverse areas, from treating diseases to tackling climate change.

Here, in the North West region, there are many world-leading employers of Chemical Engineering graduates including:

- Unilever
- Heinz
- United Utilities
- Sellafield Limited
- AstraZeneca.

Find out more about career opportunities on The Chemical Engineer website.

£78,500 **IS THE AVERAGE SALARY FOR A CHARTERED CHEMICAL ENGINEER.**

IChemE via prospects.ac.uk

Fees and funding

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

TUITION FEES

UK fees (applies to Channel Islands, Isle of Man and Republic of Ireland)	
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	£27,200

Fees shown are for the academic year 2024/25. Please note that the Year Abroad fee also applies to the Year in China.

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 paying for your studies.

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 could include buying a laptop, books, or stationery.

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 that could help pay your tuition and living expenses.

We've set the country or region your qualifications are from as United Kingdom. Change it here

- ## RIGBY ENTERPRISE AWARD

  - Home students

Are you a UK student with a household income of £25,000 or less? If you've participated in an eligible outreach programme, you could be eligible to apply for a Rigby Enterprise Award worth £5,000 per year for three years of your undergraduate degree.

- ## THE LIVERPOOL BURSARY

  - Home students

If you're a UK student joining an undergraduate degree and have a household income below £35,000, you could be eligible for a Liverpool Bursary worth up to £2,000 for each year of undergraduate study.

- ## ASYLUM SEEKERS SCHOLARSHIP

  - Home students

Apply for an Asylum Seekers Scholarship and you could have your tuition fees paid in full and receive help with study costs. You'll need to have applied for asylum in the UK, or be the dependant of an asylum seeker, and be joining an eligible undergraduate degree.

- ## CARE LEAVERS' OPPORTUNITY BURSARY

  - Home students

If you've spent 13 or more weeks in Local Authority care since age 14, you could be eligible for a bursary of £3,000 per year of study. You'll need to be a UK student joining an eligible undergraduate degree and be aged 28 or above on 1 September in the year you start.

- ## COWRIE FOUNDATION SCHOLARSHIP

  - Home students

Are you a UK student with a Black African or Caribbean heritage and a household income of £25,000 or less? You could be eligible to apply for a Cowrie Foundation Scholarship worth up to £8,000 for each year of undergraduate study.

- ## ESTRANGED STUDENTS BURSARY

  - Home students

If you're a UK student identified as estranged by Student Finance England (or the equivalent UK funding body), you could be eligible for a bursary of £1,000 for each year of undergraduate study.

- ## GENESYS LIFE SCIENCES SCHOLARSHIP

- Home students

Joining a School of Biosciences degree and have a household income of less than £25,000? If you're a UK student, you could apply to receive £4,500 per year for three years of your undergraduate course.

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GRADUATE ASSOCIATION HONG KONG & TUNG UNDERGRADUATE SCHOLARSHIPS

- International students
- Hong Kong

If you're an undergraduate student from Hong Kong who can demonstrate academic excellence, you may be eligible to apply for a scholarship worth £10,000 in partnership with the Tung Foundation.

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NOLAN SCHOLARSHIPS

- Home students

Do you live in the Liverpool City Region with a household income of £25,000 or less? Did neither of your parents attend University? You could be eligible to apply for a Nolan Scholarship worth £5,000 per year for three years of undergraduate study.

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ROLABOTIC SCHOLARSHIP

- Home students

Are you a UK student with a household income of £25,000 or less? Did neither of your parents attend University? You could be eligible to apply for a ROLABOTIC Scholarship worth £4,500 for each year of your undergraduate degree.

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SPORT LIVERPOOL PERFORMANCE PROGRAMME

- Home and international students

Apply to receive tailored training support to enhance your sporting performance. Our athlete support package includes a range of benefits, from bespoke strength and conditioning training to physiotherapy sessions and one-to-one nutritional advice.

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TECHNETIX BROADHURST ENGINEERING SCHOLARSHIP

- Home students

Joining a degree in the School of Electrical Engineering, Electronics and Computer Science? If you're a UK student with household income below £25,000, you could be eligible to apply for £5,000 a year for three years of study. Two awards will be available per academic year.

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UNDERGRADUATE GLOBAL ADVANCEMENT SCHOLARSHIP

- International students

If you're a high-achieving international student starting an undergraduate degree with us from September 2024, you could be eligible to receive a fee discount of up to £5,000. You'll

need to achieve grades equivalent to AAA in A levels and be joining a non-clinical degree.

- ## UNIVERSITY OF LIVERPOOL INTERNATIONAL COLLEGE EXCELLENCE SCHOLARSHIP

  - International students

Completed a Foundation Certificate at University of Liverpool International College (UoLIC)? We're offering a £5,000 fee discount off the first year of undergraduate study to some of the highest achieving students joining one of our non-clinical degrees from UoLIC.

- ## UNIVERSITY OF LIVERPOOL INTERNATIONAL COLLEGE FIRST CLASS SCHOLARSHIP

  - International students

We're offering a £1,000 fee discount for years 2 and 3 of undergraduate study to eligible students progressing from University of Liverpool International College. You'll need to be studying a non-clinical subject and get an average of 70% or above in year 1 of your degree.

- ## UNIVERSITY OF LIVERPOOL INTERNATIONAL COLLEGE IMPACT PROGRESSION SCHOLARSHIPS

  - International students

If you're a University of Liverpool International College student awarded a Kaplan Impact Scholarship, we'll also consider you for an Impact Progression Scholarship. If selected, you'll receive a £3,000 fee discount off the first year of your undergraduate degree.

- ## YOUNG ADULT CARER'S (YAC) BURSARY

  - Home students

If you're a young adult and a registered carer in the UK, you might be eligible for a £1,000 bursary for each year of study. You'll need to be aged 18-25 on 1 September in the year you start your undergraduate degree.

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	AAA We look for students who have completed A levels in Maths, Chemistry and one additional subject. Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is **AAB** 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 (4 year route including a Foundation Year at Carmel College) BEng (Hons)
GCSE	4/C in English and 4/C in Mathematics
Subject requirements	Maths, Chemistry and one additional subject
Irish Leaving Certificate	H1, H1, H2, H2, H2, H2 Including H1 in Mathematics and Chemistry
Scottish Higher/Advanced Higher	AAA in Maths, Chemistry and one additional subject
Access	Not accepted

Your qualification	Requirements About our typical entry requirements
International qualifications	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