UNIVERSITY OF LIVERPOOL

Civil and Structural Engineering MEng

COURSE DETAILS

- A level requirements: AAA
- UCAS code: H220
- Study mode: Full-time
- Length: 4 years

KEY DATES

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

Course overview

Whether you are interested in designing roads, airports, bridges, stadia, hospitals, power stations, harbours or water supply systems, a degree in Civil Engineering will teach you the latest construction technologies and design methods. There has never been a greater need for well qualified Civil Engineers: towns and coasts in need of flood defences; people and freight in need of safe and efficient transport systems; ever more urgent challenges in environmental conservation, sustainable design and infrastructure maintenance.

INTRODUCTION

We are committed to developing the modern professional engineers for the future by ensuring your learning environment reflects your future working environment.

Our emphasis is on active learning, supported by traditional lectures and tutorials, as well as the opportunities to be involved in research-led teaching, conducted in collaboration with industry, government, research laboratories and academics around the world.

The programme gives you the opportunity to undertake an individual research project in year three. Teaching staff offer projects based on their research expertise.

In years three and four, you can choose options modules based on particular areas of specialisation of the staff.

In year four, you will undertake a multidisciplinary group design project that brings together students specialising in various aspects of civil engineering, to work as a team to produce a

portfolio. Students on the Civil and Structural Engineering programme will be acting as structural engineers for the project. Recent projects have included a ferry terminal scheme and an Olympic-size swimming pool.

WHAT YOU'LL LEARN

- All bases underpinning the field of civil engineering
- Hands-on construction experience
- How to undertake research
- Adapting to a busy hands-on industry environment
- Critical thinking
- Teamwork
- How to present and communicate clearly

ACCREDITATION

This degree is accredited by the Joint Board of Moderators (JBM) comprising the Institution of Civil Engineers, Institution of Structural Engineers, Institute of Highway Engineers, the Chartered Institution of Highways and Transportation and the Permanent Way Institution on behalf of the Engineering Council for the purposes of fully meeting the academic requirement for registration as a Chartered Engineer (CEng).

See www.jbm.org.uk for further information.

Course content

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

YEAR ONE

COMPULSORY MODULES

GEOMECHANICS 1 (CIVE120)

Credits: 7.5 / Semester: semester 2

The Geotechnical Engineer is responsible for the safe design of how a building or infrastructure asset interacts with the ground. This module introduces students to the role of the Geotechnical Engineer and the fundamental principles and concepts that form the basis of soil mechanics

INTRODUCTION TO PROGRAMMING (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.

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

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.

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.

ENERGY SCIENCE (ENGG116)

Credits: 15 / Semester: whole session

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.

DIGITAL SKILLS AND SURVEYING (CIVE101)

Credits: 15 / Semester: whole session

The primary aim is to introduce students to the ways that digital technology is used for surveying and recording and for design and documentation.
The secondary aim is to introduce students to the concept of Building Information Modelling (BIM) using industry standard software

CIVIL AND ARCHITECTURAL ENGINEERING PROJECTS (CIVE162)

Credits: 30 / Semester: whole session

This module provides students with an introduction to projects within the built environment, the roles of professional engineers, the professions they will interact with, and the skills required by a professional engineer operating in the built environment

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

YEAR TWO

In the second semester students may have the option to take a week long residential course at the Constructionarium for which there will be a subsidised charge.

COMPULSORY MODULES

ENGINEERING MATHEMATICS II (MATH299)

Credits: 7.5 / Semester: semester 1

To introduce some advanced Mathematics required by Engineers, Aerospace Engineers, Civil Engineers and Mechanical Engineers. To assist students in acquiring the skills necessary to use the mathematics developed in the module.

FIELD THEORY, PARTIAL DIFFERENTIAL EQUATIONS & METHODS OF SOLUTION (MATH282)

Credits: 7.5 / Semester: semester 1

For XJTLU Students Only Maxwell's equations elegantly describe the physical laws governing such things as electrodynamics. Related problems may be posed in terms of vector calculus, or in terms of differential equations. In this module, we revise vector calculus and field theory in three dimensions, using Stokes' theorem and Gauss' theorem to solve explicit physical problems; we evaluate path, surface and volume integrals, and derive general electrodynamic laws. We also consider both the ordinary and partial differential equations arising from real world problems related to Maxwell's equations, and introduce some advanced methods for solving these (i.e. Fourier series, Fourier transforms, Laplace transforms), and further methods for approximating solutions (central difference methods in one and two dimensions).

GEOMECHANICS 2 (CIVE220)

Credits: 15 / Semester: semester 1

This module introduces students to the theoretical framework of geotechnical engineering. It emphasizes soil as a material and provides an introduction to the application of the theory to practical geotechnical engineering problems including bearing capacity of foundations, earth pressures on retaining walls and slope stability.

GROUP DESIGN PROJECT (CIVE263)

Credits: 15 / Semester: semester 2

The students are provided with a realistic design brief that needs to be met over the course of the semester. This is achieved via a defined set of realistic work stages which enables the students to produce an open-ended structural design within a group working environment, thus promoting teamwork and industrial awareness. The final deliverable will be the submission of structured design portfolio/sketchbook and oral presentation to academic members of staff and relevant industry partners.

HYDRAULICS (CIVE210)

Credits: 15 / Semester: semester 2

Hydraulics belongs to applied fluid mechanics and covers hydrostatics and hydrodynamics of liquid such as water. The module focuses on pipe flows and open channel flows, which occur in a wide range of science and engineering problems. It is delivered via lectures, laboratory class and tutorials.

STRUCTURAL ELEMENT DESIGN (CIVE241)

Credits: 15 / Semester: whole session

This module introduces students to the structural design concepts and applications of structural steelwork, reinforced concrete and other common building materials . The basic principles are covered and design examples (for design to the relevant sections of the Eurocodes) are given.

STRUCTURAL ENGINEERING IN THE BUILT ENVIRONMENT 2 (CIVE233)

Credits: 22.5 / Semester: whole session

This module builds on the first year with further exploration into topics introduced in "Structural Engineering in the Built Environment 1". Students are introduced to advanced and emerging materials used in Civil and Architectural Engineering, deeper theoretic and applied understanding of structural behaviour and systems and continue to develop their knowledge and understanding of industry standard structural design tools. All within the context of ensuring structures are constructed to ensure buildings and infrastructure assets are safe, resilient, sustainable, economical and buildable

ENVIRONMENTAL PLANNING AND INFRASTRUCTURE PROJECT (CIVE261)

Credits: 15 / Semester: semester 1

This module provides students with an introduction to thecontexts of transport and infrastructure, and the skills required by aprofessional engineer operating in this sector.

EXPERIMENTAL METHODS (ENGG201)

Credits: 7.5 / Semester: semester 1

The module focusses on the essentials of data analysis and interpretation, engineering experimentation, measurement techniques and principles of instrumentation.

PROGRAMMING FOR CIVIL ENGINEERS (CIVE286)

Credits: 7.5 / Semester: semester 2

Students will be introduced to the basic concepts of computer programming and Excel to solve engineering problems. Gain knowledge of basic procedural programming concepts. Become proficient in the use of Excel and Excel Macros. Enhance problem solving skills. Gain experience in solving engineering problems using a software tool.

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

YEAR THREE

The year three modules list is currently being reviewed and will be updated shortly.

COMPULSORY MODULES

INDIVIDUAL PROJECT (ENGG341)

Credits: 30 / Semester: whole session

The Year 3 individual research project; 300 hours student work over 2 semesters; 3 assessment stages (proposal 5%, interim 20%, final 75%).

GEOTECHNICAL ENGINEERING (CIVE320)

Credits: 15 / Semester: semester 2

This module introduces students to the theory and methods that underpin geotechnical engineering practice. It covers the design of shallow and deep foundations, retaining walls, slopes and other structures according to Eurocode 7. In addition, it provides a comprehensive introduction to modern finite element methods and their application to geotechnical engineering.

STRUCTURAL DYNAMICS (ENGG301)

Credits: 7.5 / Semester: semester 1

This module introduces essential principles necessary for the understanding of vibrations in Civil Engineering structures.

EARTHQUAKE ENGINEERING (CIVE342)

Credits: 7.5 / Semester: semester 1

This module aims at introducing students to earthquake engineering. It acquaints students with basic skills for analyzing the seismic response of structures subjected to earthquake excitations using structural dynamics principles. Background knowledge in engineering seismology will be covered to provide a comprehensive perspective to the topic. Seismic design principles are also introduced to provide a sound understanding of the rationale behind seismic codes.

SUSTAINABLE DESIGN AND CONSTRUCTION MANAGEMENT (CIVE350)

Credits: 15 / Semester: whole session

Sustainability and Management are areas of professionalism that are very important within the construction industry and wider built environment sector. Both areas are also emerging as new and exciting career paths for many graduate civil engineers plus architectural engineers. On completion of this module, students will understand a range of approaches to designing for climate change adaptation and net-zero carbon implementation, as well as appreciate diverse management practices associated with modern methods of construction plus industry innovation. In addition, skills will be gained by students in career evaluation, market analysis, design appraisal, options review and project judgements, all linked to enhanced graduate employment and responsible decision-making as a professional engineer.

OLD STRUCTURES OF STEEL, TIMBER AND MASONRY (CIVE334)

Credits: 15 / Semester: semester 2

It has been shown that the refurbishment of existing buildings is a more sustainable option than demolition and reconstruction as it leads to significant reductions in CO2 emissions. Additionally, the benefits of refurbishment (in comparison to new construction) extend beyond CO2 emissions and reduced energy expenditure: (i) less raw materials, (ii) less waste, (iii) heritage conservation and community retention and finally, (iv) well restored structures have a high economic value. This module gives students an insight into the structural appraisal and reuse of existing structures.

INTRODUCTION TO FINITE ELEMENTS (ENGG302)

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 some 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.

STRUCTURAL PLANNING (CIVE340)

Credits: 15 / Semester: semester 1

An essential skill of a structural engineer is structural planning. This involves applying a knowledge of structural analysis and design together with an understanding of structural behaviour and materials to real world structural engineering problems. This module gives students an insight into the creative design challenges addressed by a practising structural engineer.

UNCERTAINTY, RELIABILITY AND RISK 1 (ENGG304)

Credits: 7.5 / Semester: semester 1

This module covers broad aspects of uncertainty quantification methods, reliability analysis and risk assessment in engineering applications. It also provides understanding of statistical analysis of engineering data and computational methods for dealing with uncertainty in engineering problems.

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

YEAR FOUR

COMPULSORY MODULES

ADVANCED GEOMECHANICS (CIVE420)

Credits: 15 / Semester: semester 1

This module introduces students to advanced theories, concepts and methods of modern geomechanics, with emphasis on: – Advanced methods of simulation – Plasticity theory – Stability analysis – Groundwater flow analysis – Constitutive modelling.

CAPSTONE: MULTIDISCIPLINARY PROJECT (CIVE462)

Credits: 30 / Semester: semester 2

This module presents an opportunity to practise comprehensive, multidisciplinary design in civil engineering. The students work in teams to provide complete solutions to demanding civil engineering design problems with some significant reliance on self, guided learning.

MATERIALS FOR DURABLE AND SUSTAINABLE CONSTRUCTION (CIVE401)

Credits: 15 / Semester: semester 1

The aim of the module is to enhance students' knowledge and understanding of the advances made in conventional construction materials and alternative construction materials that have and are currently being developed for use in construction to achieve more innovative, and sustainable structures.

STRUCTURAL SYSTEMS (CIVE405)

Credits: 15 / Semester: semester 2

This module focuses on the conceptual design of civil engineering structures, and structural behaviour and assessment. It provides a review of the basics of structural engineering analysis and design including construction of bending moment and shear force diagrams, cross-sectional analysis, material properties and basic design code requirements.

ADVANCED CONSTRUCTION MANAGEMENT (CIVE450)

Credits: 15 / Semester: whole session

Management linked to industry innovation and employee practice is an area of professionalism that is very important
within the construction and wider built environment sector. It is also emerging as a distinctive and rewarding career path
for many graduate civil engineers plus architectural engineers. On completion of this module, students will understand a
range of approaches to project management implementation, diverse practices associated with modern methods of
construction, as well as effective judgement-making of challenging tasks in complex real-life situations. It will both prepare
graduates for professional development in civil engineering, as well as make them fully aware of multiple aspects of
strategic, operational and lifecycle management as applied to this specific industrial sector.

RISK AND UNCERTAINTY: PROBABILITY THEORY (ENGG404)

Credits: 7.5 / Semester: semester 1

This module develops understanding and appreciation of basic probability theory. It involves the quantification of uncertainties in input and models, their implementation, and the evaluation of the associated results in view of decision making. An introduction to numerical concepts will be provided. The methods shown in the module have a general applicability, which is demonstrated by examples and practical applications.

STRUCTURAL OPTIMISATION (ENGG414)

Credits: 7.5 / Semester: semester 2

This module is about classical optimisation and modern optimisation and their numerical methods. Structural optimisation and their numerical methods. Students will get an idea of how to optimise simple structure and get optimal solutions by analytical and numerical methods.

TECHNOLOGY 3.1: INTEGRATED TECHNICAL PROJECT DESIGN (ARCH361)

Credits: 15 / Semester: semester 1

The module covers the broad spectrum of construction technologies, materials and methods – from intermediate to current to emerging – by presenting the work of internationally respected architects operating in different geographical, cultural and economic contexts. Key aspects of architectural technology are discussed through precedents, with the aim to understand how material and technical choices are impacted by – and in turn able to impact – design, from concept to detailing.

The module reflects upon the multiplicity of ways in which technology can respond to site, programme, budget and users, act as a vehicle to articulate typological, spatial and haptic qualities in design, and address sustainability in the broadest sense.

The module consists of lectures, drop-ins and tutorials. The assessment is based on an individual exam, an individual peer assessment and a group coursework assignment.

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 complemented by a sound appreciation of the life-cycle processes involved in engineering and an awareness of the ethical, safety, 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, 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 particular 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

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.

Recent graduates have gone on to work for companies in the following industries:

- Engineering and Infrastructure: ABB Ltd, Arup, Atkins, Balfour Beatty, Bentley, Corus, Halcrow, Laing O'Rourke, Mott Macdonald, Mouchel, Ramboll, Royal Haskoning, Siemens, Tarmac.
- Aerospace and Aviation: Airbus, British Airways, Jaguar Land Rover, Rolls Royce.
- Construction and Project Management: Costain, Metronet Rail.
- Defence and Military: BAE Systems, British Army, RAF (Royal Air Force), Royal Navy.
- Energy and Utilities: BMI, National Grid Transco, National Nuclear Laboratory, United Utilities.
- Government organizations: Government organisations (not specifically listed), Highways Agency, Network Rail.
- Glass and Materials: Pilkington.
- Technology and Research: QinetiQ.

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

Graduate Outcomes, 2018-19

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
Year abroad fee	£13,600

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 includes a lab coat, safety boots, and a residential construction course.

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 provide tuition fee discounts and help with living expenses while at university.

Check out our Liverpool Bursary, worth up to £2,000 per year for eligible UK students. Or for international students, our Undergraduate Global Advancement Scholarship offers a tuition fee discount of up to £5,000 for eligible international students starting an undergraduate degree from September 2024.

Discover our full range of undergraduate 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	AAA including Mathematics 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.
GCSE	4/C in English and 4/C in Mathematics
Subject requirements	Mathematics For applicants from England: For science A levels that include the separately graded practical endorsement, a "Pass" is required.
BTEC Level 3 Subsidiary Diploma	Acceptable at grade Distinction* alongside AA at A level including A Level Mathematics.
BTEC Level 3 Diploma	Distinction* Distinction* in relevant BTEC considered alongside A Level Mathematics grade A. Accepted BTECs include Aeronautical, Aerospace, Construction, Mechanical, Mechatronics and Engineering.
BTEC Level 3 National Extended Diploma	BTEC Level 3 National Extended Diploma – Not accepted without grade A in A Level Mathematics.
International Baccalaureate	36 overall, including 5 at Higher Level Mathematics

Your qualification	Requirements About our typical entry requirements
Irish Leaving Certificate	H1,H1,H2,H2,H2,H2, including H2 in Higher Maths. We also require a minimum of H6 in Higher English or O3 in Ordinary English
Scottish Higher/Advanced Higher	Pass Scottish Advanced Highers with grades AAA including Mathematics
Welsh Baccalaureate Advanced	Acceptable at grade A alongside AA in A Level Mathematics.
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	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

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