UNIVERSITY OF LIVERPOOL

Civil Engineering with Year in Industry

MEng

COURSE DETAILS

- A level requirements: AAA
- UCAS code: H204
- Study mode: Full-time
- Length: 5 years

KEY DATES

- Apply by: 31 January 2024
- Starts: 23 September 2024

Course overview

Civil engineers are responsible for the design, project management and construction of the physical infrastructure of our society. Our broad-based, vocational programme covers all the required bases of a civil engineer's education, with an emphasis on applying your learning in context.

INTRODUCTION

You will be introduced to the essentials – everything from structural analysis and design, geomechanics and materials, to the digital built environment and its digitisation. You'll also study relevant subjects such as maths, computer-aided drawing, and analysis and design.

Site visits are integral to the programme, as are various individual and group design exercises, which provide an opportunity for industrial feedback. Our teaching staff offer projects based on their research expertise.

Students will gain relevant work experience to enhance their employability by applying for a year placement with an approved company/organisation.

Civil engineering graduates are in great demand and our programme aims to provide the educational base for graduates who demonstrate ingenuity whilst being practical, articulate, numerate, literate, imaginative, versatile, confident and inquisitive.

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

These programmes are accredited by the Joint Board of Moderators, which represents the five major civil engineering institutions and accredits civil engineering programmes on behalf of the Engineering Council, which sets and maintains the standards for the engineering profession in the UK. The MEng degree is accredited as fully satisfying the educational base for 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

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.

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.

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).

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

YEAR IN INDUSTRY

During this year you will undertake a year placement with an approved company/organisation. The aim is to develop an understanding of the practical application of theories and technical skills in a real-work environment. Industry-relevant activities will develop your transferrable skills and professional competence, leading to enhanced employability.

Whilst we will provide all necessary support and guidance, it is the responsibility of the student to secure an industrial placement. Applicants should note that these are highly sought after, and competition to be accepted into one can be significant. They therefore cannot be guaranteed. Students who fail to secure a suitable placement will transfer back to the standard version of the programme without a year in industry.

COMPULSORY MODULES

SCHOOL OF ENGINEERING YEAR IN INDUSTRY (ENGG299)

Credits: 120 / Semester: whole session

This module is associated with the placement year of the 'year in industry' programme. On accepting an approved offer, students spend a minimum of 40 weeks employed in a company/organisation. Placements will be approved and arranged at places accessible to the individual student. An academic mentor will be assigned to monitor and assess the student's progress during placement. This will involve at least one site visit and follow-up telephone call as well as checking that the student's placement log is being kept up to date. The placement year should be a mutually beneficial experience for both student and employer. Students will be given opportunities and gain confidence to apply theories and technical skills learned in Years 1 and 2 of their studies in a real-time work environment. Ideally (depending on the placement), these activities will be engineering/industry relevant and project (team) based extending over several months and will therefore provide opportunities to develop the student's transferable skills and professional competence leading to enhanced employability.

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

YEAR FOUR

The year four modules are currently being reviewed and will be updated shortly.

COMPULSORY MODULES

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.

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%).

SUSTAINABLE WATER ENGINEERING (CIVE316)

Credits: 15 / Semester: semester 2

In the face of growing populations, increasing demand from agriculture and industry, unsustainable use of water reserves and on going environmental change, water engineers face enormous challenges. This module will study the natural water systems, which underpin our use of water resource. Furthermore, it will apply fundamental hydraulic principles to predict flood risks, estimate water demand and supply, design and optimise water storage, transfer and supply infrastructure as well as set out the basic principles and practical measures to deal with these challenges.

STRUCTURES 3 (CIVE344)

Credits: 7.5 / Semester: semester 1

This module introduces students to plastic structural analysis. At the member level the principle and method for assessing the load carrying capacity of a section is discussed. Topics covered at the structural level include principle and method behind collapse mechanisms, determining collapse loads by incrementally increasing load magnitude (incremental load analysis), and by investigation of the final incipient collapse state (plastic limit state analysis). Implications on limit state design are also discussed.

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.

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.

OPTIONAL MODULES

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.

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.

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.

PRESTRESSED CONCRETE DESIGN (CIVE343)

Credits: 7.5 / Semester: semester 1

This module builds on the knowledge and skills gained in CIVE241 Reinforced Concrete and Steelwork and extends them to the design of prerstressed concrete. The modules gives a background to the history and principles of prestressed concrete design and construction. This is all illustrated will extensive practical examples. All the concepts required to design simple prestressed concrete elements are covered

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

YEAR FIVE

COMPULSORY MODULES

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.

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 the input and modelling, 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.

ADVANCED GEOMECHANICS (CIVE420)

Credits: 15 / Semester: semester 1

This module introduces students to advanced theories, concepts and methods of modern geomechanics. These include particle dynamics simulations, plasticity theory, limit analysis, constitutive modelling of soft and hard soils, and finite element analysis.

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.

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.

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.

OPTIONAL MODULES

COASTAL AND ESTUARY PROCESSES (CIVE487)

Credits: 15 / Semester: semester 1

This module aims to introduce student the basic theory of surface waves, understand the nearshore morphological process and estuary processes.

POLITICS OF THE ENVIRONMENT (ENVS525)

Credits: 15 / Semester: semester 1

Increasingly recognition of the environmental threats that we all face means that responding to this crisis affects the decisions we all make at a variety of different scales. This module explores the extent to which environmental concerns are taken into account in various decision-making processes involving the public (government), private and third sectors at a variety of different scales, global, European, national and local. The module is assessed by an essay and an open-book exam, which provides students with significant choice to explore those parts of the module they find most interesting.

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

We are committed to developing the modern professional engineers for the future, ensuring that learning environments reflect future working environments. The skills gained through studying a degree in Civil Engineering equip our graduates with the knowledge necessary to excel in an ever-changing industry.

Many graduates have moved on to have careers with employers such as:

- Airbus
- BMI
- British Airways
- Highways Agency
- Jaguar Land Rover
- National Nuclear Laboratory
- Network Rail
- Pilkington
- Rolls Royce
- Siemens.

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

Graduate Outcomes, 2018-19.

Fees and funding

Your tuition fees, how to pay, 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

International fees	
Full-time place, per year	£27,200

Fees are correct for the academic year 2024/25
Tuition fees cover the cost of your teaching, assessment, operating University facilities such as libraries, IT equipment, and access to academic and personal support.

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 Undergraduate Global Advancement Scholarship. This offers a tuition fee discount of up to £5,000 for eligible students starting an undergraduate degree from September 2024. There's also the Liverpool Bursary which is worth £2,000 per year for eligible students.

Discover our full range of undergraduate scholarships and bursaries

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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	Not accepted without grade A in A Level Mathematics.
International	36 overall, including 5 at Higher Level Mathematics

Your qualification	Requirements About our typical entry requirements
Baccalaureate	
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 direct entry requirements. Although there is no direct Foundation Certificate route to this course, completing a Foundation Certificate, such as that offered by the University of Liverpool International College, can guarantee you a place on a number of similar courses which may interest you.

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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