UNIVERSITY OF LIVERPOOL

Architectural Engineering MEng

COURSE DETAILS

- A level requirements: AAA
- UCAS code: HK28
- Study mode: Full-time
- Length: 4 years

KEY DATES

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

Course overview

Architectural Engineering is for students who wish to work at the intersection of architecture and structural engineering. At the end of your degree, you will be able to apply engineering principles to the planning, design and construction of the built environment.

INTRODUCTION

The Architectural Engineering degree is a multidisciplinary degree, encompassing civil engineering and architecture jointly delivered by the School of Engineering and the School of Architecture.

The MEng is a four year integrated Master's degree developed to fast-track our graduates to become Chartered Engineers with the Institution of Civil Engineers, Institution of Structural Engineers, Institution of Highways Engineers and the Chartered Institution of Highways & Transportation.

Architectural engineers are responsible for the design of different systems within a building or an aspect of critical infrastructure with a particular focus on key areas.

As a student, you will be provided with a multidisciplinary skill set to design building structures, bridges and critical infrastructure incorporating both the solid technical grounding that a typical civil/structural engineering degree provides; alongside a robust and wider appreciation of the architectural, societal, economic and environmental aspects associated to a particular design solution.

WHAT YOU'LL LEARN

- Create innovative design strategies
- Model and design heating, ventilation and air conditioning systems
- Acoustic performance and lighting design
- Hands-on construction experience
- Design building structures, bridges and critical infrastructures
- How to lead an individual research project

ACCREDITATION

The MEng programme is accredited by the Joint Board of Moderators, which represents the four 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 also recognised throughout the UK and satisfies the Engineering Council's academic requirements for registration as a Chartered Engineer.

Course content

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

YEAR ONE

COMPULSORY MODULES

CIVIL AND ARCHITECTURAL ENGINEERING PROJECT (CIVE161)

Credits: 22.5 / 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

CONTEXT 1.1: HISTORY OF ARCHITECTURE (ARCH171)

Credits: 15 / Semester: semester 1

History of architecture survey course.

ENVIRONMENTAL DESIGN 1 (ARCH111)

Credits: 15 / Semester: semester 2

The module is an introduction to the principles of net zero carbon design.
It aims to give students an understanding of the role of a building as a modifier of climate with reference to traditional climatically responsive architecture, and the role of buildings in the context of global energy usage, environmental impact, climate change and net zero carbon design.

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 THE DIGITAL BUILT ENVIRONMENT (CIVE170)

Credits: 15 / Semester: semester 1

The world is changing faster than at any time since the first industrial revolution. You will be introduced to the Built Environment as it exists now and how Digital processes and technology will affect the project lifecycle; feasibility, design, construction, operation and demolition/adaptation.

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

STRUCTURAL ENGINEERING IN THE BUILT ENVIRONMENT 1 (CIVE133)

Credits: 22.5 / Semester: whole session

Within the natural world, the skeleton of an animal and its form and function are intrensically linked. The structure of a building is its skeleton. The Structural Engineer is responsible for the design of the skeleton of a building or infrastructure asset, and so has the ability to directly impact its form, function, efficiency and effectiveness. This module provides students with an introduction to structural engineering, the typical materials a structural engineer will use to design with and the way structures are constructed to ensure buildings and infrastructure assets are safe, resiliant, sustainable, economical and buildable

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

YEAR TWO

During year two, you will have a week of real, hands-on construction experience at 'The Constructionarium'. The Constructionarium takes place at a six-hectare site, specifically designed and built to provide a range of challenging teaching and learning conditions for students.

COMPULSORY MODULES

CONTEXT 2.1: HISTORY AND THEORY OF ARCHITECTURE (ARCH271)

Credits: 15 / Semester: semester 1

Architectural History and Theory module on the Twentieth Century

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.

ENVIRONMENTAL DESIGN 2 (ARCH211)

Credits: 15 / Semester: semester 1

This module introduces students to energy and environmental issues, particularly those that must be faced by the discipline of architecture. The aim of this module is to provide an introduction to design of passive environmental systems for buildings, their integration into building fabric and structural systems, and selection of appropriate equipment and materials. Both the fundamentals and presentations of case studies (including lessons from the vernacular) will be used to enhance the understanding environmental simulation. The module will be delivered by weekly 2-hour lectures, and assessed by There are two mandatory components to the assessment: 1) Group Report on Vernacular Architecture (30% of total mark) 2) One-hour examination on all topics covered in the lecture series (70% of total mark).

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.

REINFORCED CONCRETE AND STEELWORK (CIVE241)

Credits: 15 / Semester: whole session

This module introduces students to the structural design concepts and applications of structural steelwork and reinforced concrete. 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

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YEAR THREE

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

COMPULSORY MODULES

CONSTRUCTION MANAGEMENT (CIVE345)

Credits: 7.5 / Semester: semester 2

This module will provide subject-specific content, by focusing on modern aspects of construction management, and on tools and approaches applied in built environment projects. New techniques, such as BIM, lean construction and sustainability will also be analysed from a 'business opportunity' perspective, and with direct applications to civil engineering practice.

CONTEXT 3.1: HISTORY AND THEORY OF ARCHITECTURE (ARCH321)

Credits: 15 / Semester: semester 1

The module uses lectures from staff to introduce specialised research themes and topics in architectural history and theory, and is supported by group and individual research. Students are able to choose topics for which they would like to attend further group tutorials / seminars. The module is assessed by an MCQ exam (50%) and a 2,000-word essay (50%).

ENVIRONMENTAL DESIGN 3 (ARCH311)

Credits: 15 / Semester: semester 2

The aim of the course is to develop from user requirements an introduction to design of environmental systems for large buildings, selection of appropriate equipment and materials, and their integration into building fabric and structural systems. The three topics are Artificial Lighting, Acoustics, and Thermal Environment and are delivered by a mixture of lectures and case studies.

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%).

STRUCTURAL DYNAMICS (ENGG301)

Credits: 7.5 / Semester: semester 1

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

(Y3) STRUCTURAL STEELWORK, TIMBER AND MASONRY (CIVE334)

Credits: 15 / Semester: semester 2

This module develops a student's ability with regard to structural engineering design in three typical construction materials; steelwork, timber and masonry. The students will learn the underlying theory and practical application of structural engineering design in these materials. The module will also introduce the relevant UK codes of practise in these materials (Eurocode 3,5 and 6)

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.

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

YEAR FOUR

During year four of your degree programme you will solidify your knowledge with a range of advanced modules.

COMPULSORY MODULES

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.

MATERIALS FOR DURABLE AND SUSTAINABLE CONSTRUCTION (CIVE401)

Credits: 15 / Semester: semester 1

STRUCTURAL STEELWORK, TIMBER AND MASONRY (CIVE444)

Credits: 15 / Semester: semester 1

This module is to cover design of steelwork, timber and masonry based on Eurocodes 3, 5 and 6. There will be 6 paralell lectures (2-hour slot) devlivered in those subject areas, respectively. In addition there will be three corresponding coursework items to help students undertake design practice. In completion of this module, students should be capable of analysing and designing structures in all three materials. Assessments will include a writen examination (85%) and three coursework items: Steelwork (5%), Timber (5%) and Masonry (5%).

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.

BIM THEORY, PRACTICE AND TOOLS (ARCH724)

Credits: 30 / Semester: semester 1

The module aims to provide students with a critical and systematic understanding of the theoretical, practical and technological aspects of Building Information Modelling as a tool, as a process, and as a managerial method. Through a combination of formal lectures, presentations and seminars managed by academic staff and leading practitioners from the AEC industry, students will be able to scrutinise the multi-faceted impact of BIM on the whole project life-cycle based on a thorough understanding of the limitations of traditional project delivery and the several challenges that may restrict full BIM adoption in practice. The module will introduce students to the various concepts and technologies that underpin BIM practice such as nD modelling and maturity levels, common data environment and clouds, data exchange and design coordination, clash detection and model checking, and interoperability and Industry Foundation Classes (IFCs). Students will also get familiar with the national and international BIM standards and will be able to observe the growth of BIM adoption in the UK and worldwide. Furthermore, the module will present BIM as enabling tool/method to support building sustainability and will introduce students to different concepts that are shaping the wider context of BIM and its future potentials such as parametric modelling, digital design, big data and smart cities. The module will be complemented with case studies to show examples of successful BIM implementation within real building projects. The module will introduce students to the case study research, allowing students to investigate the applications of BIM within a real-life project while enhancing their academic writing and research skills.

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

Careers and employability

As a student you will have maximum opportunities for career prospects, graduate opportunities, student summer placements specifically during the annual engineering careers fair with 30 blue chip companies attending (including Jaguar Land Rover, Nestle, Toyota, JCB, British Army, United Utilities, ABB Ltd, Network Rail, BAE Systems and many more).

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

Graduate Outcomes, 2018-19.

Our research-led teaching ensures that we incorporate the latest advances in cutting edge engineering research. As well as achieving a degree qualification, you will graduate as an industry-ready engineer who has both practical experience and highly desirable skills to the engineering industry.

Work experience opportunities
Many students undertake placements during the summer or for a full academic year in leading engineering companies.

Postgraduate opportunities
A number of our graduates go on to postgraduate study at MSc or PhD level, either remaining at Liverpool or going to another institution of their choice.

Qualifying you for life
Our teaching programmes are highly rated and this is underpinned by an extensive programme of research. All of our programmes are strongly linked with industry, both formally through our industrial advisory boards, and informally through industry contacts and alumni.

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 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 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	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: 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 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.

Your qualification	**Requirements** About our typical entry requirements
International Baccalaureate	36 overall, including 5 at Higher Level Mathematics
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.

Your qualification	Requirements About our typical entry requirements
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