CONSTRUCTION ENGINEERING MASTER’S

Equipping business leaders to transform the construction industry

2021 - 2023
PROSPECTUS

www.construction.cam.ac.uk/cem-programme

The CEM programme was launched in 2011 with industry partner Laing O’Rourke to fulfil a shared vision of transforming the construction industry through innovation, education and technology.
The Construction Engineering Master’s (CEM) is the leadership programme for the construction sector.

The CEM is a Master of Studies (MSt) course run by the Laing O’Rourke Centre for Construction Engineering and Technology in the University of Cambridge Department of Engineering, in partnership with Cambridge Judge Business School and academics from other departments and Universities.

**Aims**

The CEM aims to transform the construction industry by empowering agents of change to meet the future challenges of society.

This multidisciplinary leadership programme offers industry professionals the unique opportunity to step beyond their immediate context to explore the future of the industry alongside leading government, industry and academic experts.

The course covers the industry in its broadest sense: from policy and planning through to the physical construction and maintenance of infrastructure. The programme encourages students to challenge current practice and equips them to apply academic rigour to their existing sector expertise, thus uncovering innovative models for improving the performance, efficiency and sustainability of the construction industry.

This two-year, part-time research degree allows students to continue with their professional careers whilst studying, and is designed for candidates with at least five years’ professional experience who have either attained or been identified for leadership roles in their organisations.

The programme attracts participants from a range of professions within the wider construction sector representing, for example, clients, consultants, contractors and technology providers, as well as lawyers, architects and construction finance professionals.

**Structure**

The CEM is delivered by a combination of academics and industry experts.

Students attend a total of seven compulsory teaching weeks across the two years - four weeks in Cambridge and three weeks online. A typical teaching week includes:

- Lectures, seminars and workshops
- Group projects and presentations
- Individual meetings with supervisors and the Director of Studies

The CEM is primarily assessed through written work completed between teaching weeks. Assignments are as follows:

- one 5,000-word case study  
- two 3,000-word essays  
- one 15,000-word dissertation  

Topics may be based on an individual’s interests, experience and current employment, and are selected with guidance from the student’s Director of Studies, who will be one of the CEM academic team members.

Students become full members of Queens’ College. The College provides accommodation for the residential weeks in Cambridge and offers pastoral support as well as social and sports facilities.
Academic and industry involvement

Core academic team
- Prof. Campbell Middleton
- Dr Mohammed Elshafie
- Dr Ioannis Brilakis
- Dr Graham McShane

CEM Fellows (experts supporting the CEM core academic team)
- Dr Brendan Burchell: University of Cambridge
- Prof. Alistair Gibb: Loughborough University
- Prof. Peter Guthrie: University of Cambridge
- Dr Paul Heffernan: University of Cambridge
- Dr Julian Huppert: University of Cambridge; former MP
- Dr Benn Lawson: Cambridge Judge Business School
- Dr Kristen MacAskill: University of Cambridge
- Prof. Eve Mitleton-Kelly: formerly London School of Economics
- Prof. David Mosey: King's College London
- Dr William J. Nuttall: The Open University
- Dr Judith Plummer-Braekman: University of Cambridge; former World Bank Financial Analyst
- Prof. Phil Purnell: University of Leeds
- Prof. Rafael Sacks: Technion - Israel Institute of Technology
- Dr Sam Stanier: University of Cambridge
- Catherine Tilley: University of Cambridge

A selection of past contributors
- Dr Mark Bew: Chairman, PCSG; former Chairman, BIM Task Group
- Prof. Dame Carol Black: Expert Adviser on Health and Work to NHSI and PHE; Chair of the British Library
- Tim Chapman: Director, Arup
- Prof. Keith Clarke: former CEO, Atkins
- Steve Gooding: Director, RAC Foundation; former Director General, Department for Transport
- Prof. Peter Hansford: Honorary Professor at UCL; former UK Chief Construction Adviser
- Prof. Lord Robert Mair: University of Cambridge
- Dr Darryl Murphy: Head of Infrastructure Debt, Aviva Investors
- Liam O’Keefe: Project Finance Advisor and Consultant; former MD Crédit Agricolé CIB
- Nick Raynsford: Deputy Chairman of Crossrail; former Minister for Construction and Minister for Housing
- Dr Mark Raiss: Engineering Director, Civil Infrastructure, AECOM
- Brigadier Sara Sharkey: Ministry of Defence
- Hannah Vickers: Chief Executive, Association for Consultancy and Engineering (ACE)
- Paul Westbury: Senior Vice President - Development & Construction, Strategy & Operations at The Madison Square Garden Company

Themes

1. The built environment
This module explores the wider context of the built environment - providing a strategic overview of the current state of the industry, infrastructure in the UK and abroad, management of risk and uncertainty and the economic and political framework within which the industry operates.

2. Design for value
This module provides an overview of how the construction industry equips itself to achieve value and address the needs of clients in the public sector, private sector and society. Students are introduced to complexity theory and how it can be used to understand organisations and the value they deliver.

3. Research and innovation
This module covers the fundamental principles of developing, implementing and managing effective innovation techniques, processes and procedures - exploring examples of innovation emerging from current research.

4. Advances in construction technology and materials
This module provides an insight into the state-of-the-art for common materials, special novel materials, key areas of advanced construction technologies and how materials and technologies (such as robotics, artificial intelligence and the use of big data) might contribute towards advances in construction practice.

5. Advances in construction management
This module covers concepts and methods used to manage construction projects/businesses. Challenges of management and the methods for planning operations and improving productivity are explored as well as key aspects of leadership.

6. Finance, planning and procurement
This module familiarises students with different models of financing construction projects, including the necessary elements required to support project finance and procurement - contractual agreements, sources of capital, financial structuring and some elements of construction law.

7. The future of construction (through policy development)
This module creates greater links between construction engineering and policymaking. It will advance students’ skills in advocacy on relevant policy issues, applying all the skills developed throughout the two year programme.

It has been great to be challenged by the content and expectations of the CEM programme. I have certainly felt the benefit at work, and I am putting my new skills into practice in my new role leading public sector frameworks.

Andrew Ernest, CEM alumnus
Managing Director of public sector frameworks,
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**Dates and Fees**

### Teaching Weeks

Students receive teaching across a total of seven weeks - four weeks in Cambridge and three weeks online, as laid out below.

<table>
<thead>
<tr>
<th>Teaching Weeks 2021 - 2023</th>
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<tr>
<td><strong>2021</strong></td>
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<tr>
<td>12 - 18 September</td>
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<td>12 - 17 December</td>
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<tr>
<td><strong>2022</strong></td>
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<tr>
<td>03 - 08 April</td>
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<td>03 - 08 July</td>
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<td>11 - 16 December</td>
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<td><strong>2023</strong></td>
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<tr>
<td>26 - 31 March</td>
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<td>10 - 15 September</td>
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* Depending on the pandemic situation, teaching weeks may move online.

### Programme Fees

The fees for the entire two-year CEM programme are as follows:

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<th>Costs</th>
<th>Total</th>
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<tr>
<td>Combined University and College Fees</td>
<td>£25,698</td>
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<tr>
<td>Accommodation* and meals</td>
<td>£1,750</td>
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* (based on an average of £250 per residential week)

* Please note accommodation rates are set independently by Queens’ College.

Most of our students obtain full or partial funding from their employer. Where this is not possible, bursaries may be available for a proportion of the combined University and College fee. Please contact the Centre Manager for more information.

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**How to Apply**

To apply for this programme you will need to have:

- A first or upper second class UK honours degree or overseas equivalent in a discipline associated with infrastructure development.
- At least five years’ professional experience.

*If you have alternative experience or qualifications, you should contact the Centre Manager for advice. We are looking for people who are passionate about making a difference and are on a path to leadership.

You should consider carefully your capacity for balancing personal and professional commitments before submitting your application.

**Applications open on 01 September 2020 and close on 30 April 2021.**

Applications for the CEM programme are managed online by the Institute of Continuing Education at the University of Cambridge.

To apply online please go to: www.construction.cam.ac.uk/cem-programme and click the ‘apply now’ link.

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**Find out more**

Visit our website: www.construction.cam.ac.uk/cem-programme
Email: centre.manager@construction.cam.ac.uk
Telephone: +44 (0) 1223 332812

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*This course is flexible enough to allow me to enjoy the studies while not neglecting other responsibilities. As a full-time working mum, who had her second child during the programme, it was refreshing to see how naturally all my challenges were never viewed as a problem for this fantastic team of academics. The content of the programme and the way it is conducted makes you feel that you can achieve great things professionally, regardless of your circumstances or background. An incredibly empowering experience.*

**Maria Seco, current CEM student (2020)**

Engineering Maintenance Manager, Elizabeth Line, Transport for London
Benefits

The fundamental goal of the CEM is to further educate and inspire emerging leaders, equipping them with the knowledge, leadership and communication skills to effect change in the construction sector. The programme is designed to enhance students’ skills, confidence and sector-wide networks, benefitting their professional development and ultimately the performance of their companies and the industry.

**KNOWLEDGE**
Students broaden their knowledge base and perspective of the industry by exploring a range of construction activities and sectors and by conducting their own evidence-based research projects.

**DEVELOPMENT**
The programme supports the students’ career progression and professional development – their technical and analytical expertise as well as communication, leadership and managerial skills.

**NETWORKING**
Cohort sizes are approximately 25 – 35 people, creating a unique, close network of high-flying, like-minded thinkers, hand-picked by organisations to advance the transformation of the construction industry. There is also direct interaction with other current cohorts.

**MEMBERSHIP**
Students become full members of Queens’ College where they benefit from hospitality during residential weeks, a lifetime College membership and CEM alumni network.

This degree is accredited by the Joint Board of Moderators (JBM) as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired a partial CEng accredited undergraduate first degree. The JBM consists of the Institution of Civil Engineers, the Institution of Structural Engineers, the Chartered Institution of Highways and Transportation and the Institute of Highway Engineers.
With a career in design management at Costain spanning over 14 years it was time to plan the next stage in my career. I chose the Cambridge CEM due to its positioning as an advanced leadership programme.

The CEM programme proved to be transformational for my understanding of the subject matter covered and how I thought about delivering change. Near the end of the programme I moved from Head of Design Management to Head of Data Insight for Costain, something I could not have done without the education provided by the CEM programme. I now focus on how data can be used to improve people’s lives through delivery of data-driven decision making, something all large companies will need to do to be sustainable businesses in the age of the fourth industrial revolution.

Dan Rennison, CEM alumnus
Head of Data Insight,
Costain Ltd