



CITY
UNIVERSITY OF LONDON
EST 1894

Activities at City, University of London: School of Mathematics, Computer Science & Engineering

A guide for schools
and colleges

www.city.ac.uk/for-school-and-college-liaison



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Welcome

This leaflet details the types of activities that we offer to prospective students and details how colleagues from schools and colleges across the country can work with us to help inspire, inform and guide prospective undergraduate students to learn more about Mathematics, Computer Science and Engineering here at City, University of London and across UK higher education.

Should your school or college be interested in working with City in areas outside of Mathematics, Computer Science and Engineering, please be aware of the variety of ways in which you can work with the

University's Schools Liaison Team. The Schools Liaison Team (part of the Department of Marketing and Communications) helps students on their higher education decision making journey. The team offers a range of activities for year 12 and 13 students throughout the year to help them make the best informed decision about their future. We organise visits to campus, Open Days, Taster Days and campus tours, in addition to attending 200 events a year from higher education fairs and subject talks to workshops across a variety of topics in schools and colleges across the country.

About City, University of London

City is a unique place of study: we are located in the heart of one of the most exciting cities in the world; we combine a commitment to academic excellence with a longstanding tradition of preparing graduates for top-flight careers in business and the professions. Since our founding in 1894 we have cultivated strong links with business and the professions: many of our students undertake work placements and all our courses are designed with the needs of industry in mind.

City is a leading global university and the only university in London to be both committed to academic excellence and focused on business and the professions. We attract over 19,500 students from more than 150 countries and academic staff from over 50 countries.

We are in the top four per cent of universities in the world (*Times Higher Education World University Rankings 2016*); ranked first in London for student satisfaction, second in London for student experience and third in London for teaching quality (*The Times & Sunday Times University League Tables 2017*).

City is going through an exciting time. We have this year been announced in the top 20 universities in the UK (*Guardian University Guide 2017*) and we have recently joined the University of London. In addition, we are currently investing £120 million in our campus (including a new entrance area). We have strong links with the City, not least because the Lord Mayor of London is our Rector. We are pleased to be able to offer the Lord Mayor Scholarships for Academic Excellence and guaranteed accommodation for all our first year undergraduates.

About the School of Mathematics, Computer Science & Engineering

The School of Mathematics, Computer Science & Engineering at City is a dynamic community of scholars which has offered courses to meet the needs of the professions for over 100 years. In 2017 the School offers seven engineering courses designed to inspire undergraduate students and equip them to meet the challenges of the future. Our Electrical and Mechanical Engineering programmes ranked 2nd in London and 11th in the UK (*The Guardian University Guide 2017*).

The superb location of City's campus, surrounded by three prominent districts in central London, provides excellent work experience opportunities for all students. Students will have access to a large network of professionals who provide guest lectures, mentor students and contribute to shaping our degrees. Tech City is a flourishing community of IT professionals and digital businesses centred around Shoreditch. City students receive business startup education and can share working space within the University's Tech City hub for entrepreneurs, The Hangout. The City of London financial district is home to leading international banks, insurance houses, corporate finance, accounting consultancies and the Stock Exchange. Many Mathematics and Computer Science graduates start and develop their professional careers in The City. Clerkenwell is the creative centre of UK design and plays host to a thriving annual Design Week. The district is home to many leading architectural studios and structural engineering consultancies.

The School benefits tremendously from its close links with leading companies who employ high-calibre graduates in the fields

of mathematics, computer science and engineering. Our courses are designed in collaboration with industry, which is reflected in our emphasis on professional skills. Students can choose to undertake a 12-month work placement between the penultimate and final years of their degree. In the case of the Computer Science degrees, students may alternatively choose the innovative Professional Pathway scheme, gaining three years' work experience while studying. Students who consistently perform well in their studies will have the opportunity to apply for a six to eight week Summer Internship before embarking on the final year. The School has its own Professional Liaison Unit, with the primary purpose of supporting students in their placements and internships. The University's Careers Service offers professional guidance on graduate employment and opportunities for further study.

Research

Professor Roger Crouch
Dean, School of Mathematics,
Computer Science & Engineering



A Civil Engineering degree equips students with a strong technical background in the key subjects of structural, geotechnical and hydraulic engineering, management studies and design skills for the design, construction, management and sustainability required for a successful future in the construction industry.

Civil Engineering

What we offer

A session on Civil Engineering and a design challenge to create a removable ground anchor to support a retained excavation. Designs can be drawn, modelled and tested on site, drawn in CAD for 3D printing and tested at City on the geotechnical centrifuge.

Where it takes place

At your school with selected designs tested at City.

How it is delivered

A session on Civil Engineering and providing context on retained excavations and modelling using a geotechnical centrifuge. Creating a design brief, exploring precedents and possible forms for an anchor, sketching ideas, model making and testing feasible models.

The benefits for the student

An introduction to engineering and the opportunity to be creative and problem solve. For some, to visit and use a world leading research facility.

The benefits for the school or college

Provision of a realistic, open-ended design exercise on a manageable scale.



Computer Science

A Computer Science degree provides a systematic knowledge of the foundations of computing, the structure of programming languages and the skills to code creatively. It focuses on how programming can be used to solve real-world problems, equipping students with the skills for a range of careers, such as business computing, games development and research in the IT industry.

What we offer

A session on computer science with an introduction to programming and debugging using the context of puzzles. This can be a paper-based session or carried out in a school's computer laboratory. Students can later attempt further online challenges using Gidget: www.helpgidget.org. Students who complete all the challenges will be invited to a programming workshop at City, University of London.

Where it takes place

At your school with a workshop at City, University of London for students who continue to use Gidget after our visit.

How it is delivered

A session on programming and the important role it plays in everyday life with paper-based programming puzzles and an introduction to Gidget.

The benefits for the student

An interactive introduction to computer science with the opportunity to be creative and solve problems. For some, a programming workshop at City, University of London.

The benefits for the school or college

Provision of an engaging and fun introduction to programming and Gidget. Interested students can continue to use Gidget online after the visit and attempt increasingly complex challenges and create their own levels in the game.





Electrical and Electronic Engineering

What we offer

A session on the potential of electronic and biomedical engineering with a focus on digital motor speed control, robotics, virtual instrumentation and sensing. Students will be shown a range of electronic systems with different applications and will see how advances in electronic design have made control and instrumentation simple.

Where it takes place

At your school or City's electronics lab

How it is delivered

A session with demonstrations and activities to show some of the basic logic and design principles of modern robotics. The session will showcase the stories behind the design of some of the most successful electronic products.

The benefits for the student

To gain practical experience of simple electronic design problems and demystify the perceived complexity of electronic engineering. They will also gain an understanding of the potential of a degree in Electrical & Electronic or Biomedical Engineering.

The benefits for the school or college

Provision of examples of simple electronics projects with the demonstration of the social and economic benefit of engineering.

An Electrical & Electronic Engineering degree provides a solid foundation in the principles of engineering, applied physics, electronics, design and computing, for students wishing to pursue a career in electrical engineering, power systems, communications, control systems, robotics or sensor systems.

Engineering (multi-disciplinary)

What we offer

A session touching on the creative aspects of engineering design, including some of the following: F1 cars, Tour de France bikes, space probes and America Cup catamarans. The session will include videos of simulations of fluid flow and a discussion on how high performance computers are being used by leading engineers.

Where it takes place

At your school.

How it is delivered

A session followed by one or two applied maths and physics puzzles which may include a card overhang problem, the Venturi effect using molecular dynamics or a leaning stability problem and samples of 5-line Matlab code to solve these.

The benefits for the student

To recognise the dramatic impact of computational science on engineering. To gain an understanding of the benefits of cross-disciplinary studies, combining elements of mechanical, electrical and civil engineering (as followed in Oxbridge), with an emphasis on the value of learning to become code literate.

The benefits for the school or college

Provision of engaging team-based mental exercises to illustrate counter-intuitive solutions that can be verified by simple physics and numerical analysis. Students will gain an understanding that curiosity and thinking outside the box are highly valued personal characteristics within leading engineering practices.



An Engineering degree (multi-disciplinary) prepares engineers for an exciting career in computational design and analysis, with a cross-disciplinary approach to problem-solving using advanced engineering software. Potential careers include the design of space probes, aero-engines, F1 aerodynamics, oil and gas recovery or tether-free walking robots.

Mathematics

A Mathematics degree provides an introduction to a wide range of mathematical techniques. A central theme is the application of abstract and logical methods to a wide variety of problems, equipping students for a wide variety of careers in industry, commerce, education and research.

What we offer

A session on cryptography and number theory and the important role it plays for the secure transfer of sensitive information e.g. credit card information. Students will be introduced to the problem of secure communication and to different mathematical encryption algorithms and then explore different algorithms in small activities.

Where it takes place

At your school.

How it is delivered

A session on cryptography and number theory and activities to apply the learnt theory to concrete encryption problems.

The benefits for the student

An introduction to an area of pure mathematics not usually covered in the high school syllabus, gaining practical experience of how a real-world problem (the secure transfer of data) can be translated into a mathematical model and how mathematics can be instrumental to daily life.

The benefits for the school or college

Provision of an introduction to a, potentially, previously unknown area of mathematics, with small activities that allow students to immediately test the learnt theory.



Mechanical and Aeronautics

What we offer

A session on the science behind the efficient flight of an aircraft and mechanical system with design challenges to create a long flying paper aircraft and a paper tower.

Where it takes place

At your school.

How it is delivered

A session on Mechanical or Aeronautical Engineering, providing a context for aerodynamics, strength of material, structure and the science of motion and energy. The session will include model making of a paper aircraft and a paper tower.

The benefits for the student

Introduction to engineering, with the opportunity to be creative and gain an understanding of the science behind apparently simple, every-day challenges. The methods can be recreated, forming the good practice of any scientific experiment. The end product can be retained as a memento of the briefing and shared with peers and family.

The benefits for the school or college

Provision of realistic open-ended design exercises with a practical demonstration of scientific theory in action for the paper aircraft and paper tower exercises.

A Mechanical degree provides a broad foundation in engineering concepts with an emphasis on application to complex mechanical systems and is designed to train students to work in the fields of transport, energy, materials and manufacturing, including the aerospace and automotive industries. Students also go on to work in the aircraft and energy industries.



Structural Engineering

A Structural Engineering degree provides students with the skills to design and construct stable, durable and elegant structures, balancing efficient solutions where structures can withstand the stresses and displacements resulting from static and dynamic loads with elegant designs that link optimisation with a beauty of architectural form. Students may go on to work at structural engineering consultancies or architectural practices.

What we offer

A session on Structural Engineering, providing an illustration of the close and highly creative connection between structural engineering and architecture, with a focus on the design of the world's tallest buildings. The session emphasises career pathways to chartered status for Structural Engineers and the attractions of studying in the Clerkenwell district of London, with the availability of one year paid placement work experience and with 12 structural engineering practices and over 20 architectural firms within a 10 minute walk of City.

Where it takes place

At your school.

How it is delivered

A session with examples of structural solutions used in the Burj Khalifa and Kingdom Towers, with problems posed to students on beam theory (treating the towers as vertical cantilevers) to illustrate how maths and physics are essential to engineers. The session will include simple exercises on the forces generated by wind and earthquake loading and present examples of celebrated female structural engineers.

The benefits for the student

Learn how Structural Engineering differs from other branches of engineering and how Structural Engineering benefits from a greater understanding and empathy with the aesthetics and elegance of an engineered solution; gain an understanding of the benefits of working within a large design team to create something significant that is highly valued by the public; and gain an appreciation of the huge opportunities for women (with Maths and Physics skills combined with strong interests in creative design) studying Structural Engineering.

The benefits for the school or college

Provision of an introduction to Structural Engineering, explaining the connection between the highly energised and effective EC1 London design community and City, University of London. Provision of structural engineering career pathways and description of the country's only MEng Structural Engineering degree programme with a selective entry which intends to recruit equal numbers of women and men, emphasising opportunities to gain work experience between the 3rd and 4th years of an MEng degree.

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Find out more, visit

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City, University of London is an independent member institution of the University of London. Established by Royal Charter in 1836, the University of London consists of 18 independent member institutions with outstanding global reputations and several prestigious central academic bodies and activities.



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