UCL

IEP Minors 2022-2023

The IEP Minor enables you to customise your chosen engineering degree programme

In 1827, UCL founded the first laboratory in the world devoted to engineering education.

Nearly 200 years later, we are still at the cutting edge of the discipline.

IEP Minors

As a student on the IEP you choose a specific degree programme. You also choose an IEP Minor.

What is the IEP Minor? The IEP Minor is unique in UK engineering education. A set of three modules grouped together, you take one module in your second year, and two modules in your third year.

Why does UCL Engineering offer an IEP Minor? Before the IEP Minor, timetable clashes meant picking electives was difficult for our students. By grouping elective modules together, we have allowed students to gain in-depth knowledge of certain subject areas over three modules, and also ensured timetable issues are lessened.

The IEP Minor is compulsory, and you must study all three modules in one grouping. Each module on an IEP Minor is worth 15 credits.

The IEP Minor does not change your degree title, but it does enable you to customise your chosen engineering degree programme, **follow your passions,** work and study with different students from different backgrounds, disciplines and perspectives, and **gain insight into specific engineering sectors.** Such experience really will **make you stand out in a competitive jobs market.**

Who takes the IEP Minor? BEng/MEng Biochemical, Biomedical, Chemical, Civil, Electronic & Electrical and Mechanical Engineering students, BSc/MEng Computer Science students, BSc/MSci Management Science students.

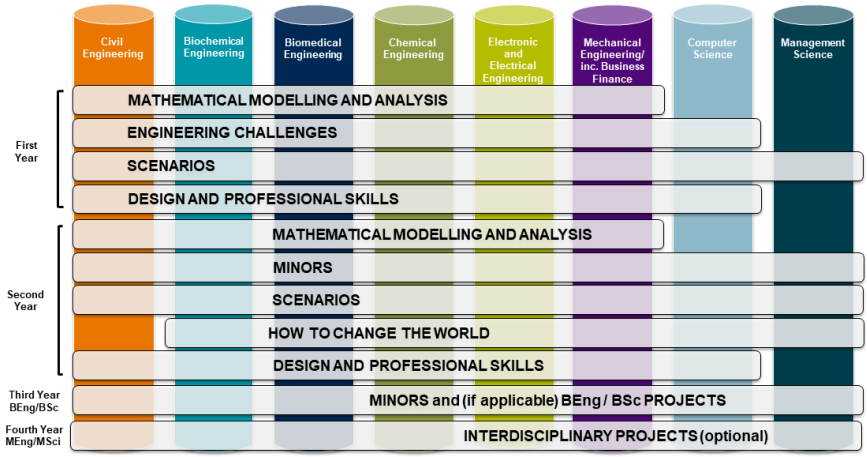
Please note that BEng/MEng Mechanical Engineering with Business Finance does not have an IEP Minor choice option. The 'with Business Finance', takes up the time in your schedule where the IEP Minor would otherwise sit.

We have tried to make every IEP Minor available to everyone, but there are some prerequisites, which are all included in IEP Minor descriptions. If your core degree programme already covers the subject area, you will not be able to take the corresponding IEP Minor. Additionally, some IEP Minors may require certain A-levels (or equivalent qualifications).

If you take an MEng, and choose to take your third year abroad, you may not be able to complete your third year IEP Minor modules, though provisions may be possible for you to take them in your fourth year.

What is the process to select an IEP Minor? During your 1st year you choose your IEP Minor. You start your IEP Minor in the 2nd term of your 2nd year.

Simplified IEP Structure



*Civil Engineering does not currently participate in How to Change the World

Notes

What do I want out of my IEP Minor?

What IEP Minors am I interested in?

Questions I have about the IEP Minors.

IEP Minors 2022-2023

2022-2023
Subject to changes

Table of content

This is the list of IEP Minors available to students entering their second year of study in Autumn 2023. Individual IEP Minors may be withdrawn or added in subsequent years.

IEP Minor Pathways

APPLICATION PROGRAMMING FOR DATA SCIENCE

As Albert Einstein noted, engineers think creatively to solve problems using the mental and physical tools at their disposal.

Programming is now an essential skill set that comes with its own extensive box of tools. It is hard to imagine embarking on any engineering project nowadays without using software to measure, analyse, control and provide feedback.

In this IEP Minor you will learn how to code in Python and use software engineering tools and techniques to design, develop and test applications with a data science focus.

Exceptions
Students not taking BSc/MEng Computer Science are eligible for this module.

IEP Minor Pathways

APPLIED CHEMISTRY AND MOLECULAR ENGINEERING

REVEAL THE LINKS BETWEEN MOLECULAR SCIENCE AND ENGINEERING PRACTICE OF A RAPIDLY CHANGING WORLD

This IEP Minor will widen and deepen existing knowledge of chemistry and enable you to apply advanced concepts of molecular engineering relevant to so many of the future global challenges.

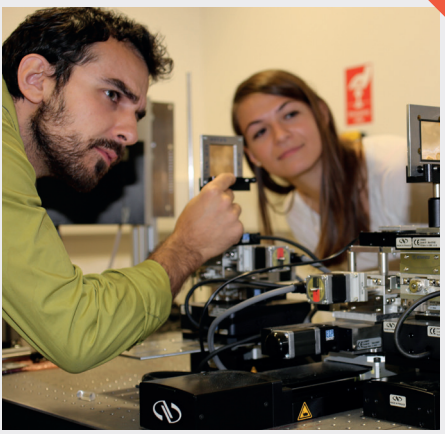
This IEP Minor will widen and deepen existing knowledge of A-level Chemistry or equivalent and provide a base to develop advanced chemistry concepts relevant to so many challenges of future engineering.

Prerequisites
Students wishing to take this IEP Minor must have A-level Chemistry or equivalent.

IEP Minor Pathways

BIOMEDICAL ENGINEERING

APPLYING ENGINEERING PRINCIPLES TO BIOMEDICAL PROBLEMS



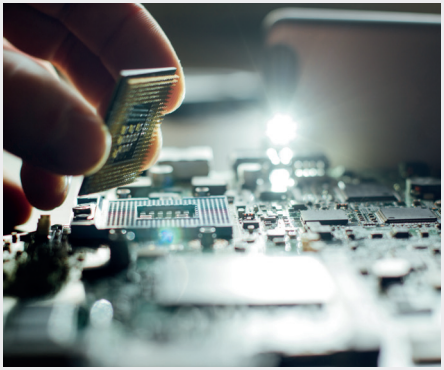
Biomedical engineering is the application of engineering principles to healthcare. In this IEP Minor, we will demonstrate how engineering can be used to understand how the human body works and how engineering can be used to diagnose, treat and manage a range of illnesses and conditions.

Exceptions *All students not studying BEng/MEng Biomedical Engineering are eligible to take this IEP Minor. Biomedical Engineering students already cover the course content in their core discipline modules.*

IEP Minor Pathways

CONNECTED SYSTEMS

DESIGN THE CONNECTED DEVICES OF THE INTERNET OF THINGS



Network technologies and the communications systems that underpin them have enabled the information revolution and driven advances from the way we do business, the way we deliver healthcare and most fundamentally, changed the way we interact as human beings.

This IEP Minor will provide students with a comprehensive coverage of connected systems and technologies that are driving the modern world. It covers the state-of-the-art sensing technologies that form the Internet of Things. It considers the devices that make up the 'things', the standards and protocols that allow them to be connected and the cloud services using the data produced to give insight into the world.

IEP Minor Pathways

CRIME AND SECURITY ENGINEERING

Security and crime are ongoing issues around the world. Terrorism, cybercrime, fraud and drug/human trafficking are just some of the many threats that are becoming more sophisticated in the technological age.

The IEP Minor in Crime & Security Engineering will provide students with knowledge on how science and technology can be used to tackle these problems, by focusing on the relationship between security threats and modern security technologies.

This IEP Minor provides a firm foundation for those wishing to pursue a career in the engineering side of industrial and government security.

"I chose this minor because I was really interested in the security part of engineering, everything regarding cybersecurity, hacking, security technologies, and I wanted to get more knowledge regarding that field."

Rim Khalife, Electronic and Electrical Engineering, 18/19

IEP Minor Pathways

ENGINEERING AND PUBLIC POLICY

HELP OUR SOCIETIES NAVIGATE THE CHALLENGES AND OPPORTUNITIES OF A RAPIDLY CHANGING WORLD

Engineering skills are in demand in policy professions around the world. From analysing challenges to guiding innovations and managing risks, engineers are central to the ability of governments, corporations and non-profits to understand and shape strategic responses to the rapidly evolving technological and social environments in which they operate.

This IEP Minor introduces you to how engineering can and does change the global world. You will discover how your engineering skills can help tackle major societal challenges and gain an insight into the world of politics and policy-making.

IEP Minor Pathways

ENGINEERING DESIGN FOR SOCIETY

LEARN TECHNIQUES TO ENCOURAGE ENGINEERING FOR A BETTER WORLD.

© Nathan John on Unsplash

This IEP Minor combines the principles of engineering design with the social science of responsible innovation.

It introduces techniques that are used to probe social worlds and integrates them with engineering design processes to address complex 21st century problems such as sustainability or the growing use of AI.

Students will develop the ability to take informed social perspectives on engineering projects and respond in ways that are technically sound and socially beneficial.

IEP Minor Pathways

ENTREPRENEURSHIP

Entrepreneurs see problems as opportunities. They create value by developing new ideas for the marketplace.

An entrepreneurial mindset is as valuable within an established organisation as it is within a start-up.

This IEP Minor will provide you with opportunities to build your entrepreneurial skills by introducing tools and methodologies that enable you to build new ventures to create and capture value.

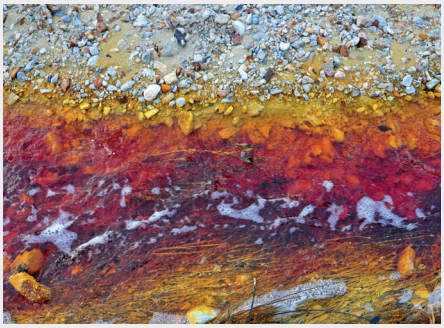
IEP Minor Pathways

ENVIRONMENTAL ENGINEERING

DESIGN AND IMPLEMENT APPROPRIATE TECHNOLOGY BASED SOLUTIONS FOR A HEALTHY ENVIRONMENT

The Environmental Engineering IEP Minor introduces the aspects of science and technology required to develop systems and technologies that protect and restore the environment.

It gives you opportunities to put these skills to use in a context of real-world problems and sustainable development.



IEP Minor Pathways

FINANCE AND ACCOUNTING

Central to this IEP Minor is the understanding of financial decision-making for business. It looks at the key issues – organisational, strategic and competitive – that affect such decision-making. At one level it offers conceptual and theoretical understanding, but it also teaches the applied methodologies and frameworks that are commonly used in the engineering business environment.

"I liked this minor because of how realistic it was. The knowledge that you get and the discussions that you have in lectures are very tangible, you see that in the news that week and the lecturer uses those examples in the lecture."

Shervin Sharifi Rad, Chemical Engineering, 4th year 18/19

Exceptions
Students on IEP programmes other than BSc/MSci Management Science are eligible to take this IEP Minor.

2022–2023
Subject to changes

IEP Minor Pathways

INTELLIGENT SYSTEMS

ENABLING MACHINES TO REASON ABOUT THE WORLD AROUND US

Intelligent systems are transforming the world.

From robotics to healthcare, from credit card fraud detection to news aggregation, they influence almost all aspects of our everyday lives and the world we live in. An intelligent system is a kind of reactive agent, observing the environment within which it operates, converting these observations into a representation of the world, making plans to maximise their goals, and undertaking actions to achieve these goals.

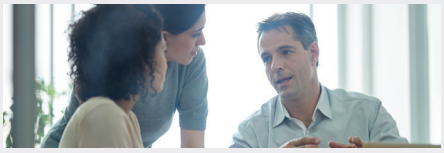
This IEP Minor will provide a foundational understanding of what intelligent systems are, the theories, mathematics and principles that underlie their operation, and provide students with experience to implement and test systems and algorithms which are available today.

Prerequisites *Students wishing to take this IEP Minor will be required to study both mathematical theory and write programmes at a high level. Successfully passing a pre-enrolment test is also required.*

IEP Minor Pathways

UNDERSTANDING MANAGEMENT

Management can be described as the efficient and effective allocation and use of scarce resources to achieve business goals. In practice, it means the tasks, roles and responsibilities that allow people to work together to achieve more than they would achieve working individually. Students explore management from practical and theoretical perspectives, including strategic thinking, analysing the business environment, marketing, leading and motivating others.



Exceptions
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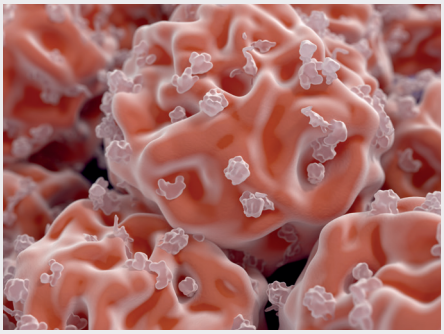
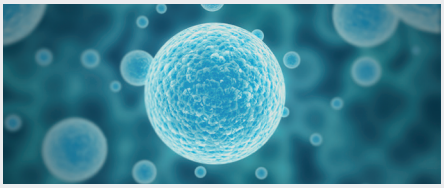
IEP Minor Pathways

MANUFACTURING THE FUTURE: REGENERATIVE MEDICINES



Regenerative medicine is an emerging field that aims to utilise the power of stem cells and tissue engineering to overcome today's most deadly diseases.

Students will learn about emerging medicines and focus their engineering skills to appraise existing devices, tools and technologies for processing and analytics that are used during manufacture. The outcome for students will be a strong grounding in the application of manufacturing tools for new medicines that will define 21st century healthcare.



IEP Minor Pathways

MODERN APPLICATIONS OF ENGINEERING MATHEMATICS

LEARN HOW TO USE THE SWISS ARMY KNIFE OF THE 21ST CENTURY

How do we as Engineers fit in the digital age and how does it affect our professional role?

This IEP Minor will provide you with a broad set of tools that will strengthen and diversify your engineering skills and enhance your employability across multiple business sectors.

Prerequisites
Students eligible for this IEP Minor must have successfully completed their Year 1 mathematics module.

IEP Minor Pathways

MODERN FOREIGN LANGUAGES

WHY LEARN A LANGUAGE?

Learning a language is empowering, it helps develop your cognitive skills, it gives an insight into different cultures/ language communities, and helps with your career, with travel, socialising and networking, and with arts and literature.

Levels available
Start at a complete beginner level and go up to near-fluent specialised courses (Professional Purposes, Academic Purposes, Translation Skills).

The aim of all our language courses is to enable you to improve both your ability to communicate and your linguistic competence in the chosen language. A balance of receptive (reading, listening) and productive (speaking, writing) skills are developed through communicative classes and self-study. All courses will give an insight into the country's culture and society in a European/global context. How to study a language, including autonomous learning, and how to approach authentic material plus various transferable skills are also part of the course. The language is always related back to your degree subject.

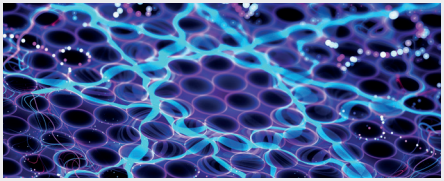
IEP Minor Pathways

NANOTECHNOLOGY

DEVICES AND MACHINES AT nm SCALE

Quantum computing, nano-robotics, targeted drug-delivery, nanosensors that detect heart attacks are all things to come, but nanotechnology is already here; in your mobile phone, anti-bacterial dressings and influencing climate-change. Nanotechnology even gives butterflies the appearance of colours on their wings.

Nanotechnology has fuelled the core innovations in electronics and energy, and is set to revolutionise healthcare. Join us on an exploration of the small.



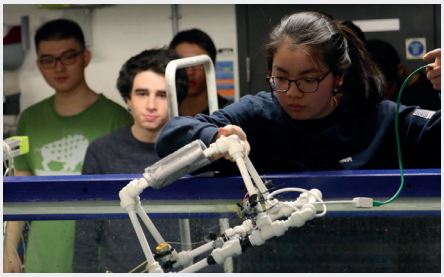
IEP Minor Pathways

OCEAN ENGINEERING

THE DESIGN, CONSTRUCTION AND OPERATION OF MARINE VEHICLES AND STRUCTURES

You will learn about the engineering challenges posed by the marine environment and gain the skills needed to design ships, boats, underwater vehicles, coastal management schemes and offshore structures.

This IEP Minor is taught through a collaboration between UCL Engineering Departments of Mechanical Engineering and Civil, Environmental and Geomatic Engineering.



IEP Minor Pathways

ROBOTICS

TOWARDS DESIGNING INTELLIGENT ROBOTIC SYSTEMS FOR IMPROVEMENT OF HUMAN WELL-BEING

Robotic technologies aim to improve human well-being by substituting humans in dangerous environments or in repetitive and dull manufacturing tasks, and by augmenting human capability by assisting in precision surgery, rehabilitation, and making smart decisions using artificial intelligence.

This IEP Minor will provide students with comprehensive coverage of the theory of robotics, state-of-the-art technologies in medical robots and intelligence, and the opportunity to work on industry-sponsored/inspired automation projects.

Prerequisites
Students eligible for this IEP Minor must have successfully completed their Year 1 mathematics module.

IEP Minor Pathways

STRATEGIC THINKING IN ENGINEERING AND TECHNOLOGY

SHAPE THE FUTURE THROUGH ANALYSIS AND COMMUNICATION

This IEP Minor is aimed at future technical consultants, investors, entrepreneurs, CTOs (chief technology officers), and thought leaders.

Through modules on horizon scanning and technical journalism, you will learn to analyse trends in today's science and engineering research and put them in the context of global changes in economics, demographics, politics, and the environment.

Specifically, by the end of the IEP Minor you will be able to compare new technologies with their competitors, think through problems they might cause (and how to mitigate them), identify the opportunities and threats that global changes will create for industry, and communicate your findings to different audiences.

Notes

UCL Engineering
Engineering Front Building
Room 2.09, Torrington Place, London WC1E 7JE
Tel: +44 (0)20 3108 4088
Email: fes-enquiry@ucl.ac.uk
www.ucl.ac.uk/engineering/how-we-teach

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