

Engineering a sustainable world

Explore an exciting and impactful career in **Chemical and Process Engineering**



What is Chemical Engineering?

Chemical engineering is all around you and every minute of every day you are within reach of something that depends on chemical, biochemical or process engineering for its existence. Chemical and process engineers work in many industries; designing, improving and managing processes that turn raw materials into the things we need, from health and wellbeing to water and food to energy, and more. These processes are designed to be safe, sustainable and efficient.

Chemical engineering involves using maths and science and innovation to solve real-world problems and create useful products on a large scale.

We'll use 'chemical engineering' to cover a whole range of job roles across different industries. It's worth remembering that the courses students study often have 'chemical engineering' in their title, but the day-to-day job titles of qualified technicians and engineers could be 'process engineer', 'biochemical engineer', 'process safety engineer' or something similar. This is because of the wide range of different job roles, across different industries in countries across the world, making chemical engineering a global profession.

Why Choose Chemical Engineering?

Here are 5 reasons to choose a career in chemical engineering:

- **Do what you love**
Combine your passion for maths and sciences, as well as your creative side
- **Work with others**
Collaborate with people from other disciplines on different projects
- **Be the change**
Work towards net zero carbon emissions and the United Nations Sustainable Development Goals to solve the world's most pressing issues
- **Enhance your skill set**
Develop transferable skills to make you highly employable across many well-paid sectors
- **Work with anything, anywhere**
Get involved in a range of global industries for example making medicines, designing systems to store hydrogen energy, producing food or manufacturing fibres for the fashion industry and many more

What skills do I need?

Along with the knowledge that you'll learn during an apprenticeship or university course, there are key skills that chemical engineers need, and you'll continue to develop these throughout your career:

- **Problem-solving:** analyse and solve problems using a combination of mathematical and scientific principles and technical knowledge
- **Teamwork:** work with people from different disciplines to develop solutions
- **Communication:** effectively explain complex ideas to other engineers, technicians or non-experts
- **Creativity:** find innovative ways to solve problems
- **Attention to detail:** ensure that processes are efficient, safe, and sustainable



Where Do Chemical Engineers Work?

Chemical engineers work in diverse industries, including:

- **Energy:** oil, gas, nuclear, and renewable energy
- **Healthcare and wellbeing:** including making medicines, vitamins and supplements, as well as veterinary products, and personal care products like cosmetics, skin care, soap and shampoo
- **Food and drink:** designing and improving food production, storage and transportation processes
- **Water and wastewater treatment:** ensuring access to clean water and effective waste management for the global population
- **Mining and minerals:** sustainable minerals processing including extracting and refining minerals
- **Textiles and materials:** manufacturing fibres for fashion
- **Cybersecurity:** using digital technologies in the process industries

Routes into Chemical Engineering (UK)

- **Apprenticeship**
If you are 16 to 18 years old, look for Level 3 apprenticeships. When searching, use broad terms like 'engineering' and 'manufacturing' and then narrow your choices with more specific terms like 'chemical engineering' and 'process engineering'. You can also research different industries like 'food and drink' or 'energy' if you have an industry in mind. Apprenticeships at other levels are also available.
- **University degree**
Many chemical engineers start by completing a **BEng (Bachelor of Engineering)** or **MEng (Master of Engineering)** in chemical engineering.
- **Degree apprenticeship**
Degree apprenticeships allow you to study and work at the same time. This route typically takes **3 to 6 years** and provides practical experience while earning a salary and studying for a degree.



How much can I earn?

Chemical engineers are well paid and in demand. According to an annual salary survey of IChemE members, those aged 25 to 29 earn £42,000 a year on average in the UK (IChemE, 2024¹) and chartered chemical engineers can earn even more.

Chemical engineering is a global profession, offering opportunities to work abroad. Many large companies operate globally, providing you with a chance to travel and work on worldwide projects.

¹IChemE (2024). IChemE's new survey identifies Chartered status as key salary determinant.

What are my career prospects?

Earnings can grow significantly with experience, and senior roles can offer even higher salaries. As with many other job roles, being a life-long learner enables you to develop yourself and grow your career. The transferable skills developed in chemical engineering roles, especially in problem-solving, analysis and project management can make you highly sought after in many other sectors.

As part of their continual professional development, many people working in chemical engineering choose to become members of the Institution of Chemical Engineers (IChemE) and go on to achieve professional recognition and registration as an engineering technician or chartered engineer. The route to registration varies according to your previous education and experience and this is where membership of a professional body, like IChemE, can support personal and professional development throughout your career journey.

IChemE is the home for over 31,000 chemical, biochemical and process engineers across the Globe and you can apply for membership as soon as you start your engineering degree or apprenticeship.



I'm interested, what next?

Find your pathway into chemical and process engineering. For study at university, or through an apprenticeship, you will need to find out which subjects and grades are needed to help you make choices for the next stage in your education and career.

Of the subjects you study at school or college, maths underpins every aspect of chemical and process engineering. You'll need good practical skills, alongside a deep understanding of scientific principles,

In addition to your academic qualifications, other skills that chemical engineers need include being creative, problem-solving, working well as part of a team, being organised and having an eye for detail. Inside and outside school or college, through different activities and clubs, you can develop some of these skills.



**Become a Chemical Engineer
and help to engineer a
sustainable world!**



Where can I find out more?

■ Go to DiscoverChemEng www.icheme.org/discoverchemeng for a curated collection of resources to help you explore chemical engineering as a career

■ If you want to delve deeper, search for **IChemE VWEX** online to try your hand at IChemE's Engineering a sustainable world virtual work experience.



You'll find:

- 6 – 8 hours of interactive content
- different career routes explained
- skills you need to help employability
- find out where chemical and process engineers work
- quizzes and tasks
- downloadable certificate to record your achievement
- chat to working chemical and process engineers through the virtual work experience platform, when you complete 50% of the programme

■ Search for 'chemical engineering' at www.ucas.com for information on degree courses in the UK

■ Find apprenticeships at www.apprenticeships.gov.uk (UK only)

The Institution of Chemical Engineers, IChemE promotes sustainable systems as being at the heart of chemical and process engineering. Alongside other professions, chemical engineers will play a vital part in addressing the challenges ahead. In particular, contributing to United Nations Sustainable Development Goals around food, health and wellbeing, energy, water and sanitation.