



Chemical Engineering: undergraduate course brochure

2021-22

Chemical Engineering at Cambridge

This brochure is aimed at prospective undergraduate applicants for the Chemical Engineering course who are applying in October 2021 to start at Cambridge in October 2022. It is designed to supplement the material in the official University prospectus which can be found online at: <http://www.undergraduate.study.cam.ac.uk/>

New course from 2023

The course is being revised and will have a new structure from October 2023. This will affect anyone applying in October 2021 who wishes to defer entry until 2023. The new course will be titled “Chemical Engineering and Biotechnology”. Students will start studying the new course in their first year at Cambridge unlike the current structure where students spend the first year doing either Natural Sciences or (general) Engineering.

What chemical engineers do

Who makes new products such as biodegradable polymers, non-alcoholic beer and artificial hearts? Who invents methods for reducing emissions of carbon dioxide and toxic gases? Who designs the equipment used to produce ultra-low sulphur diesel? And who develops processes for obtaining large quantities of drugs from biological organisms?

Chemical engineers invent, design and operate industrial processes that convert raw materials into valuable products. Example products are food, pharmaceuticals, plastics, detergents, drinking water, fuel and electricity. These products are relevant to almost every aspect of our everyday lives.

The products are made by processes that change the chemical, biochemical or physical state of substances. Chemical engineers need to understand how such transformations happen at both the molecular scale and the industrial scale. They need to know how transformations can be achieved economically, safely, and in an environmentally friendly manner.

Chemical engineers are very much in demand in industry because consumers are demanding both more sophisticated products and more sustainable processes.

What we're offering

The Department of Chemical Engineering and Biotechnology at Cambridge enjoys a reputation for excellence in its teaching and research, regularly topping national league tables. The Department moved into a specially designed new building on the West Cambridge site in 2016-17 as part of a £60 million project backed by the University. The new building has been designed to house all the Department's teaching and research activities.

Our course provides a thorough grounding in chemical and biochemical engineering, while also providing training in personal and transferable skills. The aim is to produce graduates that meet the needs of today's process industries and who have the ability to cope with scientific advances when they occur.

The Department has excellent facilities that support the teaching and research activities of undergraduates. For instance, we have an extensive network of computers equipped with

modern applications used by practising engineers. These include CAD tools, process simulators and design packages.

We have strong links with industry and the course is supported by a consortium of ten industrial companies. These companies provide input on course content and assist with some of the teaching. Our industrial links also mean that there are opportunities for vacation placements with some of the world's top companies.

How we teach it

Chemical engineers spend their first year at Cambridge studying either Part IA Natural Sciences or Part IA Engineering. The Natural Sciences route enables students to study three science subjects and mathematics, and is ideal preparation for those who like pure science and want to understand how things work at a fundamental level. The Engineering route gives students a broad background in different engineering disciplines and is ideal preparation for those who like applying science to solve real-world problems.

From the second year, students are based within the Department of Chemical Engineering and Biotechnology. They are taught primarily through lectures supported by projects, laboratory classes, supervisions and coursework. Each week students typically attend 11 lectures and have two supervisions. They also undertake fortnightly projects.

Our course concentrates on the scientific principles behind modern chemical and biochemical engineering. These skills are complemented by a series of lectures and exercises that teach design. How to design individual items of process equipment, and how these may be integrated to make a chemical plant, are important aspects of industrial practice. Process design involves using scientific and engineering principles to make sensible decisions amidst uncertainty arising from limited technical information. Process design tuition culminates in a major Design Project at the end of the third year.

It is possible to graduate with a B.A. degree after three years. However, virtually all of our students who achieve a satisfactory standard stay on for a fourth year that leads to the B.A. and M.Eng. degrees. The aim of the fourth year is to develop a deeper understanding of the discipline and to study some specialist subjects. Students choose advanced topics from a range of options according to their interests, and undertake an original research project.

After Cambridge

The four-year course leading to the M.Eng. qualification is accredited by the Institution of Chemical Engineers. This means that graduates can apply for Chartered Engineer status once they have four years of relevant experience (e.g. in industry) without taking any further exams.

Within Chemical Engineering there are many well-paid career opportunities. Graduates might work as field engineers, be part of research teams, or occupy senior management positions. Those that work for multinational companies may have the opportunity to travel all over the world. Chemical engineers can also easily secure jobs outside the discipline because of their broad range of skills. About 50 per cent of our graduates go into the chemical, process and food industries, 20 per cent go into finance and management, and 15 per cent go into further education and research.

Applying to Cambridge

It is the Colleges, rather than the central University or Department, which handle undergraduate admissions at Cambridge. They aim to admit the applicants who will do best on the course. They therefore look for students who are bright and have an understanding of mathematics and the fundamentals of chemistry and physics. Applicants also need an enquiring mind and an interest in applying science practically to solve real-world problems.

All of the Colleges that admit undergraduates support chemical engineering. If you have a preference between them, you can choose to apply to a specific College. Alternatively, you can leave your application "open", and your form will be assigned to one of the Colleges.

Students choose which of the two entry routes, via Natural Sciences or via Engineering, they would prefer. The routes provide equally good preparation for the chemical engineering undertaken in subsequent years.

- **Chemical Engineering via Engineering (UCAS code H810)**

A typical offer for admission is A*A*A at A-Level (or equivalent qualification). Mathematics, Physics and Chemistry are essential. It is highly desirable to take Further Mathematics at AS or A-level. Some Colleges may require achievement in Further Mathematics.

- **Chemical Engineering via Natural Sciences (UCAS code H813)**

A typical offer for admission is A*A*A at A-Level (or equivalent qualification). Mathematics and Chemistry are essential. Further Mathematics and/or Physics is highly desirable at AS or A level. Biology may be helpful at AS or A-Level.

Applicants sit a pre-interview written assessment in November at an authorised centre (normally your school/college). Performance on this test is used by Colleges as part of their overall assessment of an applicant. The test is the same one as for engineering or for natural sciences applicants (depending on route chosen). Further information on the exact nature of this pre-interview assessment is available on the website <http://www.cam.ac.uk/assessment/>.

Each individual application is considered on its academic merits. In particular, offers may be lower than those specified above if there are special circumstances.

Application deadlines

Applicants need to submit the standard UCAS form that applies for applications to any UK University. The deadline for receipt of this form is 15 October for admission to the University the following October (or deferred entry in the October after that). The UCAS code used depends on which entry route is chosen. The code for Chemical Engineering via Engineering is H810 MEng/CEE, while that for Chemical Engineering via Natural Sciences is H813 MEng/CENS.

Applicants who are from overseas may have an earlier deadline for their application if they wish to be interviewed by members of the University's international team. Please see <https://www.undergraduate.study.cam.ac.uk/international-students/international-interviews>

After the UCAS form has been received, applicants are asked to fill in an on-line Supplementary Application Questionnaire (SAQ) that asks questions that are specific to Cambridge.

Open Days

Talks on Chemical Engineering and tours of the Department will be available to prospective applicants during the two University Open Days in early July – see the University website for details on these. Booking is not required to visit the Department of Chemical Engineering and Biotechnology, but the University prefers it if visitors do book a place in advance as it enables them to control numbers for some of the other events going on during the Open Days.

Flexibility

One great advantage of the Cambridge system is its flexibility. You are not absolutely committed to reading Chemical Engineering even if you specify it on your application form. For instance, it is usually possible to continue studying a pure science if you do first-year Natural Sciences, or another branch of engineering if you do first-year Engineering. Cambridge is thus an ideal choice for University applicants who aren't quite certain which course they eventually want to study.

It is often possible to change to Chemical Engineering, even if this isn't stated on the application form, if an appropriate first-year course is studied. However, if you are interested in Chemical Engineering, you are strongly encouraged to apply to read this subject. There are two reasons for this. The first is that the subject you apply for affects who is chosen to interview you during the admissions process. The second reason is that, in the event that the Chemical Engineering course becomes oversubscribed, preference is given to those who applied to read the subject.

Further information

More information on the Chemical Engineering course at Cambridge can be found at: University prospectus – <http://www.undergraduate.study.cam.ac.uk/>
Department website – <http://www.ceb.cam.ac.uk/>



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