Degrees in Chemistry

Further Studies in Chemistry and the Chemical Sciences

the essential guide

RSC | Advancing the Chemical Sciences

www.rsc.org/education

Why study chemistry?

A degree in chemistry opens the door to a wide range of career options – far more than you may have realised. Chemists are not just confined to the lab!

Chemists play a vital role in developing many of the everyday products we take for granted and help to sustain and improve our quality of life.

Lots of trained chemists end up in non-traditional chemistry careers because of all the transferable skills they gain from studying chemistry.

As a chemist you can…

… fight disease

Discover new medicines to prevent, treat and cure illness and find better ways of diagnosing disease.

… feed the world

Develop new ways of controlling plant and animal pests, or invent novel foods and flavours.

… inspire the next generation

Share your chemistry knowledge as a teacher and help others to pursue an interest in chemistry.

… protect our environment

Test the safety of products such as medicines and cosmetics and find greener ways of making them.

… solve crime

Use forensic techniques to analyse and investigate trace evidence from the scene of a crime.

… invent new products

Create new materials for the 21st century, which can be used in anything from solar panels to waterproof jackets.

Your skills

The skills you develop while studying for a chemistry qualification are highly desirable to employers in all sorts of sectors. Skills like:

- Logical thinking
- Communication
- Creativity
- Analysis
- Data handling
- Observation

Whether you know what you want to do after university or you're still unsure, a chemistry qualification stands you in good stead for the future.

Other careers

Studying chemistry is also great training for careers in:

- Sales and marketing
- Consultancy
- Central and local government
- Business and finance
- Law
- Publishing
- Journalism
- Information technology

And much more...

It pays to do chemistry

Independent research* shows that the average chemistry graduate earns substantially more over a lifetime than graduates of many other disciplines:

- £190,000 more than those with two or more A-levels (no degree)
- £60,000 more than most other graduates – including those with degrees in subjects like history, english and psychology

* The economic benefits of higher education qualifications. Price Waterhouse Coopers LLP January 2005

Different types of chemistry degrees

There is a wide variety of chemistry degree courses on offer in the UK. These vary in content, duration and the qualification you achieve, as well as the types of career they prepare you for.

BSc or MChem/MSci?

Most universities now offer both BSc (Bachelor of Science) and MChem/MSci (Master of Chemistry/Science) degree programmes. MChem and MSci degrees have exactly the same status as each other, these courses simply have different names at different universities.

BSc degrees

- Usually involve studying for three years (four in Scotland)
- Provide excellent training in the chemical sciences and can open doors to a huge range of careers
- May involve a year in industry or abroad

MChem/MSci degrees

- Usually involve studying for four years (five in Scotland)
- Provide a more in-depth study of chemistry than BSc degrees and usually involve a significant research project
- Offer more opportunities to develop skills such as presentation skills, problem solving and communication skills
- May involve a year in industry or abroad
- Provide a good basis for a PhD or a career in chemical science research

Still not sure?

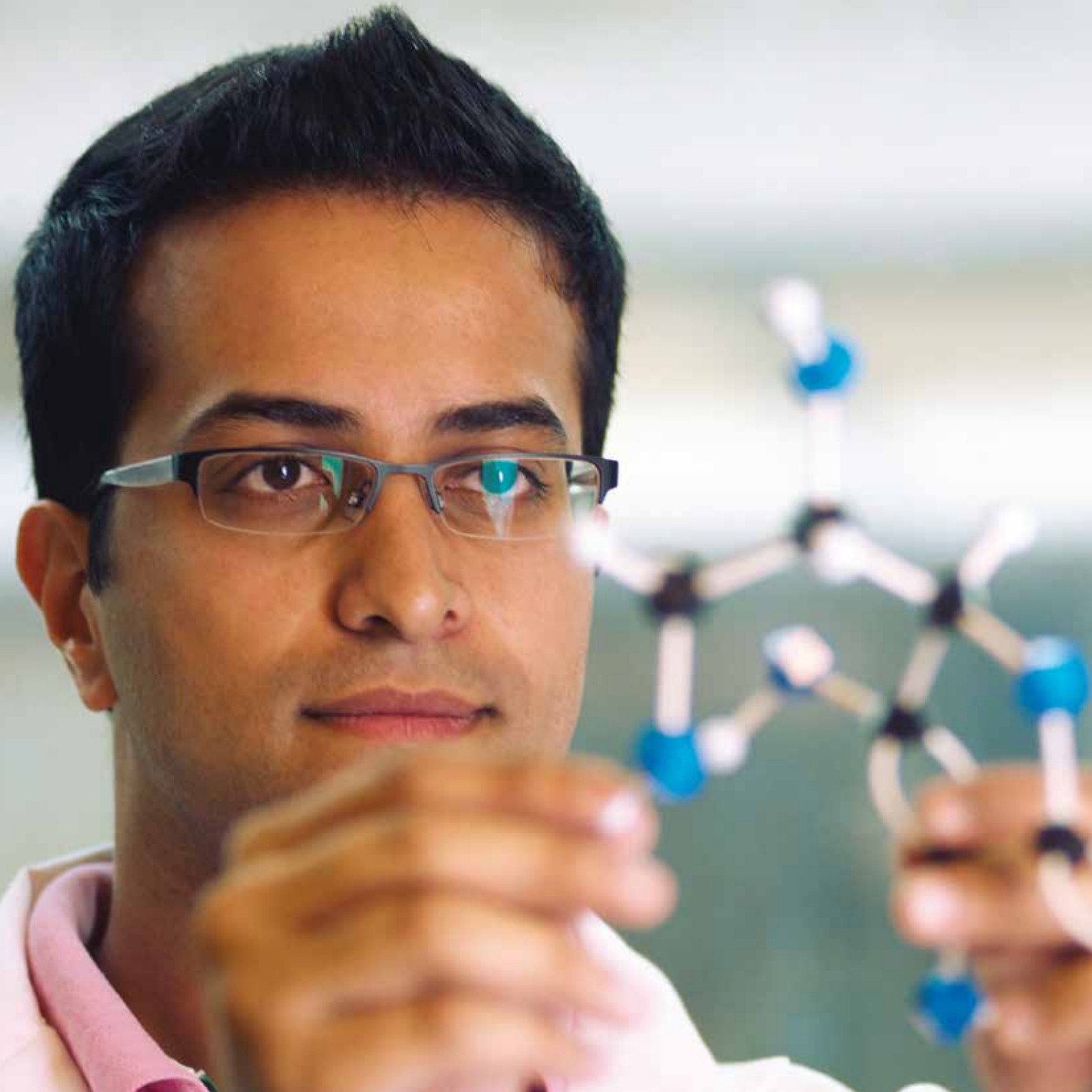
If you're not sure whether you want to do a BSc or an MChem/MSci many universities recommend that you apply for the longer course in the first instance. Transferring from an MChem/MSci to a BSc is usually relatively straightforward but it may be harder to transfer the other way.

MChem/MSci courses may help keep your options open if you're undecided about what to do after university (especially if you might want to do a PhD or go into research).

Check out

- http://rsc.li/employee-profiles
  for case studies of chemistry graduates working in a range of careers, with information including how they got there and what their job involves on a day-to-day basis
- www.futuremorph.org
  for information on careers in science
- www.ucas.com
  use the UCAS website to research your course and university choices





Chemistry with industrial experience

Many universities offer degree courses that involve a period of work in industry. The experience you gain is valuable if you are hoping to enter a career in industry (it may even lead directly to a job after you finish your degree). If you are undecided about what you want to do after university it may help you make up your mind about whether this type of career is for you.

Students are usually paid by industry during their placement year.

Industrial placements and internships are advertised on http://rsc.li/cw-jobs

Chemistry with a year abroad

There are lots of degree programmes in chemistry and related subjects that involve a year at a university abroad. You could spend the year in Europe, the US or even Asia or Australia.

The first two years of these courses are normally spent following the appropriate chemical science programme in a UK university and acquiring any language skills you might need while abroad. You will then spend the third year studying abroad. During this year you will follow the syllabus of the host university and will be assessed before returning to the UK for your final year.

Chemistry 'with' courses

These courses generally involve spending at least 60% of your time studying chemistry and the remainder studying another subject, e.g.

- Chemistry with Management
- Chemistry with Law
- Chemistry with Environmental Science

Chemistry 'and' courses

These courses generally involve spending 50% of your time studying chemistry, and 50% studying another subject, e.g.

- Chemistry and French
- Chemistry and Business
- Chemistry and Mathematics

If you're interested in studying a 'chemistry with…' or 'chemistry and…' course, it's important to consider how this might affect your future career options. Many jobs within the chemical and pharmaceutical industries will only be available to graduates who have spent a considerable amount of time in teaching laboratories developing their practical skills.



Other degrees involving chemistry

Many degree courses include a significant amount of chemistry. These are collectively referred to as chemical science courses. They include subjects like biochemistry, chemical engineering and pharmaceutical science. These degrees all require a good knowledge and understanding of the chemical principles that underpin them.

Specialised chemistry courses

Some courses allow you to specialise in a particular field of chemistry, e.g.

- Medicinal Chemistry
- Analytical Chemistry
- Nanotechnology
- Environmental Chemistry

If you are thinking about studying for a specialised chemistry degree, you need to be certain that you are interested in the area you choose. By choosing a more specialised chemistry degree you may be narrowing the options of what you can do after university. Research into the subject is vital, especially if you haven't studied it at school or college.

If you're not 100 per cent sure about what is involved and whether you'll like it, you may want to choose a more general chemistry degree that allows you to specialise in the final years of the course, when you have a better understanding of what is involved and which aspects you most enjoy.

Other things to consider

▶ Do your maths skills add up?

Mathematics is important in many aspects of chemistry and is a key part of most chemistry degree courses.

Not studying maths A-level/Higher will limit your university choices.

Although a maths A-level/Higher is not required for entry onto all chemistry degree courses, you should seriously consider studying the subject, at least to AS Level (or Higher in Scotland). If you are unable to do this, it may be worth considering some form of tutoring to help refresh and extend your maths knowledge.

If you haven't studied maths post-16, don't panic! Most universities provide extra maths support during your degree (especially in the first year).

▶ Are you interested in a chemistry degree but worried you don't have the necessary qualifications?

Some universities offer a foundation year (or access course) as part of their chemistry course. These one-year programmes are designed for students who have shown the ability, but do not possess the necessary qualifications (with respect to either grades or subjects) for direct entry onto BSc or MChem/MSci courses. After completing the foundation year you should be eligible to progress, as appropriate, onto the university's BSc or MChem/MSci course.

The foundation year may cover a range of topics, including laboratory work, a project, mathematics and elements of other science subjects. For information on different routes into university talk to university admissions tutors or visit the Access to HE website: www.accesstohe.ac.uk

Costs of studying

From September 2012, universities can charge up to £9,000 a year for their courses, so it is more important than ever to think about the costs of studying.

Things to remember are that there are no upfront costs. You can get a loan to cover the cost of your tuition, which you only start to pay back when you are earning over £21,000 a year.

There is also a loan available to help with your living costs such as food, accommodation and travel.

For more information on student finance visit www.gov.uk/student-finance

More information on courses

University admissions tutors should be able to give you more information on individual courses and on the employment destinations of previous graduates, so this is something you should ask about at university open days. You can access individual university websites through the UCAS website: www.ucas.com

▶ RSC recognised and accredited degree courses

The RSC recognises and accredits a wide range of chemical science degrees with academic content that meets specified standards. This helps you to choose a quality degree programme, which will give you an advantage when looking for a job in the future. A list of the chemical science courses accredited by the RSC is available at http://rsc.li/accreditation

Degree alternatives

▶ Do you want to continue studying chemistry when you leave school but don't think a degree is for you?

There are other options available for studying chemistry in higher education besides a traditional degree. These include Higher National Certificates (HNCs), Higher National Diplomas (HNDs) and foundation degrees.

▶ Higher National Certificates (HNCs) and Higher National Diplomas (HNDs)

HNCs and HNDs are vocational (work-related) qualifications that train you in a particular job sector. Many are designed with industry to ensure you gain the skills and knowledge employers are looking for.

▶ Foundation degrees

Foundation degrees are employment-based higher education qualifications which provide professional development in a broad range of vocational areas.

Foundation degrees take two years to complete full-time but some are available to study part-time or by flexible learning, often while at work, which usually takes three to four years. They are broadly equivalent to the first two years of a Bachelor's degree and can often be topped up to a degree with further study.

Apprenticeships

There are different levels of apprenticeships but all involve work-based learning and completing at least one nationally recognised qualification. As an apprentice, you will earn a wage and gain valuable professional experience in industry.

On average, an apprenticeship takes between one and four years to complete - depending on the level and the amount of time you have to study. You can find out more from the Apprenticeships website: www.apprenticeships.org.uk

Where do these qualifications lead?

Since HNCs, HNDs and foundation degrees are designed to equip you with the skills and knowledge for a particular field of work, they can lead straight into a career. They can also be used to develop skills and knowledge once you are in a job.

If you decide that you want to carry on studying then these qualifications can also be used to progress onto a higher level course, such as a degree.

Those with vocational qualifications and industrial experience (including apprentices) can now gain professional recognition by becoming a Registered Science Technician (RSciTech) or a Registered Scientist (RSci).

Study part-time

Most degree courses are full-time but you can also study part-time while you are working, for example with the Open University. www.open.ac.uk

The OpenPlus scheme from the Open University and its partner universities offers a great way to get started with a chemistry degree if you find your grades or financial situation prevent you from studying full time for a chemistry degree course. You can apply for the course irrespective of your qualifications and if you are successful over the first two years of study with the Open University you can transfer onto a full time degree course with a partner university. www.open.ac.uk/choose/openplus



Questions you should ask

There are a number of things you should think about before making a decision about exactly what and where you want to study. Some of these are listed below. There is no right or wrong answer to these questions – it's just a case of what's best for you.

Once you have a better idea about what you're looking for, ask the following questions about your preferred institution and course. The answers will help you make the right decision for you.

Degree course options

- What qualification do I get?
- What career options will I have when I've completed my degree?
- Should I choose chemistry or another chemical science degree?

Entry requirements

- What are the entry requirements for the course? Am I likely to meet them?
- Might a foundation year course be suitable for me if I don't expect to meet the requirements for the course I'd like to do?
- Can I switch course mid-degree?

Life at university

- Where will I feel most comfortable? (Near home? On a campus? In a city?)
- What is the background of other students on the course?
- Do I like the location of the university?
- What accommodation is available and for how long? Is the accomodation catered or self-catering?

Costs

- What expenses will I have? Books, lab coat, safety glasses, other costs?
- How much will it cost me in accommodation and tuition fees?
- When will I have to pay?
- Will I get financial support? Are any bursaries or scholarships available?

Practical work in the laboratory

- Will I work as an individual, in pairs or as part of a bigger group?
- What kind of experiments will I do in the first year?
- Will I work at my own pace or to a fixed schedule?
- How do the experiments fit into the lecture course?

Assessment

- How and when will I be assessed?
- Is there a practical exam?
- What happens if I fail an exam?

General teaching arrangements

- What is the student : lecturer/tutor ratio?
- Is the style of teaching different to that in schools and colleges? If so, how?
- Will the course take into account my study background and experience?
- Can I get help if I find the work difficult?

Course structure

- What is the chemistry curriculum in the first year?
- How many students will there be in a lecture, tutorial etc.?
- What will be my total contact time with lecturers/tutors per week?
- How much practical work will I do?
- What is a typical student week?

Non-contact time

- How many hours work will I be directed to do each week?
- How much other work will I be expected to do?
- What are the library and computer facilities like and can I access them remotely?



Career choices

You may not have decided on your future career yet - don't worry. A degree in chemistry or a related subject can really allow you to keep your options open. You may start to get an idea of what you want from your career as you make progress through your degree. If you have some career ideas then consider the following:

Consider this

- Is my choice relevant or acceptable as training for my future career?
- What do students typically do after this degree course?
- What percentage of graduates get a job on leaving university?
- Is the course designed to produce researchers, industrial chemists or something else?

Do your research

Once you've got an idea about what you'd like to do, talk to your parents, teachers and university admission tutors about any questions you have. Also…

- Check out the UCAS (www.ucas.com) and individual university websites.
- Go to university open days – these are a great way to get answers to lots of questions and to find out about the place where you'll be living and studying for the next few years.

See www.opendays.com for open day dates and more advice on how to get the most out of them.

You can also find useful information at www.rsc.org/education

The more information you can get the easier it will be to make the right decision for you.

Work experience

Getting some work experience can be a great way to gain new skills, collect ideas for your next move and help make your CV stand out from the crowd.

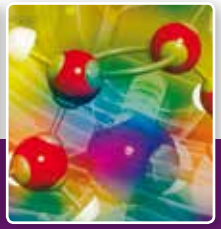
If you get some relevant work experience while you're still at school or college, you'll have something extra to add to your personal statement when applying to university.

Alternatively, you may want to apply for summer placements during your holidays before you go to university or while you are at university. This may be especially important if you know you want to work in research or industry when you graduate – it shows you're keen and already have knowledge and experience of working in this environment.

The Prospects website has useful advice on how to find a work experience placement: www.prospects.ac.uk

You may also want to look at the Year in Industry website www.yini.org.uk It offers young people paid, degree-relevant work placements in a year out before or during a university course.





To get your hands on more chemistry information, join RSC ChemNet, the membership network for young people run by the RSC. It is free to join for all 14 - 18 year old chemistry students.

Join RSC ChemNet

By joining RSC ChemNet you will have free online access to our student magazine, *The Mole*, expert advice and engaging interactive resources to support your study of chemistry. You will be able to seek guidance with university choices, and attend events to discover what a career in chemistry and university has to offer.

To find out more, visit http://rsc.li/chemnet

Meet the Universities

Meet the Universities takes place every summer and brings chemistry students together with representatives from institutions offering courses in chemical science.

If you are considering a degree in chemistry or the chemical sciences then this is a great opportunity for you to talk directly to staff and students from many of the UK's universities.

To find out more, visit http://rsc.li/mtu

Contact

For further information contact:
Royal Society of Chemistry
Education Department
Thomas Graham House, Science Park, Milton Road
Cambridge, CB4 0WF
Tel: +44 (0)1223 432221
Fax: +44 (0)1223 423623
E-mail: education@rsc.org
www.rsc.org/education

Royal Society of Chemistry
Email: www.rsc.org/education
Registered Charity Number: 207890

Thomas Graham House
Science Park, Milton Road
Cambridge, CB4 0WF, UK
Tel: +44 (0)1223 420066

Burlington House
Piccadilly, London
W1J 0BA, UK
Tel: +44 (0)20 7437 8656

RSC International Offices
São Paulo, Brazil
Beijing, China
Shanghai, China
Bangalore, India
Tokyo, Japan
Philadelphia, USA