ACADEMIC EXCELLENCE AND INSPIRATIONAL TEACHING

Kent is one of the UK’s leading universities, ranked 23rd in The Guardian University Guide 2017. All of our academic schools produce world-class research, and Kent is ranked as internationally excellent, leading the way in many fields of study. In the Research Excellence Framework (REF) 2014, Kent is ranked 17th for research intensity, outperforming 11 of the 24 Russell Group universities.

Kent’s School of Physical Sciences offers a dynamic and diverse environment for your studies.

Chemistry is central to understanding the world around us and Kent has world-leading research expertise across the breadth of this subject. This enables the University to be a key player both in advancing chemical knowledge and in addressing key societal challenges in areas including human health, and meeting the world’s increasing energy demands.

World-leading research
Research within the School of Physical Sciences (SPS) was highly rated in the Research Excellence Framework (REF) 2014, in which 98% of Kent’s research in chemistry was judged to be of international quality, of which 78% was world-leading or internationally excellent. At Kent, we give you the opportunity to get involved in our cutting-edge research. In your final year of study, you join a research group and choose a project from the wide range of industrially relevant topics that are available. These may include:

• Computational and theoretical chemistry: nanomaterials for energy storage; nanomedicine; catalysis
• Inorganic chemistry: materials with magnetic, superconducting or insulating properties; inkjet-printable materials for solar cells
• Organic chemistry: porous materials for greenhouse gas capture or high-throughput drug synthesis; self-assembly of polymers for display devices and drug delivery
• Physical chemistry: synthesis of nanomaterials; heavy metal extraction from soil; radio-pharmaceuticals for site-specific imaging.

Inspirational teaching
Chemistry at Kent is distinctive; our modules are designed to give you a solid foundation of organic, inorganic and physical chemistry and are taught within contextual frameworks of important contemporary issues. These ‘chemistry in context’ modules enable you to develop an appreciation of the application of chemistry within areas such as: medicinal (drug) chemistry, computational chemistry, explosives, polymers and plastics, and smartphone screens (organic LED).

You are taught by some of the best teachers in the country, several of whom have won teaching awards, and have access to excellent student support and first-class learning resources. Our reputation for teaching excellence is reflected in the National Student Survey (NSS) results. For example, in 2015, Chemistry scored 93% for the quality of the course.

We also have strong collaborative links with a number of industrial partners who participate in our year in industry programme. In addition, the School is a key player in several international research networks. Our collaborative links span six continents (Europe, North America, Asia, South America, Africa, Australia).

Flexible entry levels
Our chemistry degree programmes typically require grades at A level ranging from ABB to BBB – see p19 for details. A foundation year is available for students who may not have the appropriate background for direct entry into the standard degree programmes, and successfully caters for students with a wide range of backgrounds and experience. Our foundation year equips you with all the chemical, mathematical and practical laboratory skills required to embark upon and successfully complete a degree in chemistry.

*of 122 universities, not including specialist institutions.
There is interaction at multiple levels between our students and staff, and one very popular facility is the student room, designed to give you a place to meet and to study.

A global outlook
Kent is known as the UK’s European university because of its strong links with top-ranking continental European institutions, our UK locations close to the European mainland and our postgraduate centres in Paris, Brussels, Athens and Rome.

Our student and staff community come from a diverse range of backgrounds and from all over the world, which helps to create a dynamic environment and gives your studies an international context. Our students represent 148 nationalities; 27% of students come from overseas and 37% of staff are from outside the UK.

A successful future
As well as providing a first-rate academic experience, we want you to be in a good position to face the demands of a tough economic environment. During your studies, you will develop key transferable skills considered essential for a successful career.

For more information on the careers help we provide at Kent, see p8 or visit our Employability web page at www.kent.ac.uk/employability
SUPERB STUDENT EXPERIENCE

Our campus at Canterbury provides a stunning location for your studies and offers first-class academic and leisure facilities.

First-class facilities
Throughout your studies, you are based at our scenic Canterbury campus, working with cutting-edge technology in the laboratories. The School of Physical Sciences is located in a completely renovated building, following investment of £10 million over the last few years. Here you have access to first-class research facilities with state-of-the-art equipment, including a full characterisation suite for materials containing three powder diffractometers, a crystal diffractometer, X-ray fluorescence, instruments to measure magnetic and transport properties at 4K and up to 7 T, a Raman spectrometer, two scanning electron microscopes, optical coherence tomography imaging equipment, optical spectrum analysers and a two-stage light gas gun for impact studies.

Excellent study resources
The Templeman Library has undergone a major expansion and refurbishment, providing over 500 study spaces, a new lecture theatre and an exhibition gallery. There are zoned study areas for silent, quiet or group working, PCs to use and laptops to borrow, plus a café for those much needed study breaks. The library has extensive print and electronic collections, including e-journals, e-books, databases, reference resources and newspaper archives, as well as being well connected to key online resources, such as scientific journals. We also provide tools and expert advice to help you navigate the wealth of online research that is available. The library has hundreds of study spaces and PCs, Wi-Fi throughout and printing, copying and scanning facilities. During exam periods, the library is open 24/7.

Kent’s Student Learning Advisory Service provides information and advice on all aspects of effective learning and study skills, and is available to all students from the time they arrive at the University. See www.kent.ac.uk/learning for more information.

Beautiful green campus
Our campus has plenty of green spaces with a view of the city and its Cathedral. The campus has its own cinema, theatre and nightclub.

Kent has a reputation for being a friendly university with a cosmopolitan environment. There are restaurants, cafés and bars on campus as well as a sports centre and gym. Everything you need on campus is within walking distance, including a general store, bookshop, banks, a medical centre and a pharmacy. From campus, it’s a 25-minute walk or bus-ride into the city.

Attractive location
Canterbury is a lovely city with medieval buildings, lively bars, pubs, and a modern shopping centre. The coastal town of Whitstable is close by, and there are sandy beaches further down the coast. London is just under an hour away by train.

International community
Kent has a diverse, cosmopolitan student community with 148 nationalities represented on campus.
Robert Nash is in his second year, studying for a Master’s [MChem].

Why did you choose Kent?
I came to an Open Day and spoke to the lecturers in the department and they were so enthusiastic, more so than at other universities I’d visited. The syllabus covered a lot of what I’m interested in, inorganic and materials, that you don’t get everywhere. I also liked the fact that it’s a campus university and that it’s not too far from the city centre.

How is the course going?
I’m really enjoying it. It’s very research oriented at Kent so you get to see what the lecturers are working on and it brings a more realistic application to the work, rather than just the theory. You also get to see how the work you are doing can be applied in the real world and a lot of it is cutting edge. We do a research project in the third year. You can do whatever you want. It’s proper, full on, nobody’s done it before research, so it’s very exciting. I’d like to do something on catalysis, which is a way of speeding up chemical reactions. A lot of the catalysis we use now is wasteful so, with a solid based one instead, you can reuse it after each reaction so it’s a more environmentally friendly method, I’d also like to see if there’s more you can do with them.

How would you describe your lecturers and what about the level of support?
All of them are enthusiastic about their subject. Some really like using new technology – we have software that the lecturers can record the drawing of reactions, alongside the lecture, so you can play it back, which really helps. They are very open to helping you and we get quite a lot of support. We have academic advisers and course reps; I am course rep for Stage 2.

Which modules have you enjoyed the most, and why?
I really enjoyed a module we did last year called Molecules, Matter and Energy, which covered a whole range of physical chemistry. You are taught by people who know the subject really well. I also enjoyed a computing module we did in our first year, which was more of a workshop-style seminar – we had help if we needed it and it involved a lot more independent working, which I quite liked.

What are the facilities like on campus?
We have a lot of facilities. I know a lot of people who go to the gym who say the membership fee is quite reasonable. There are a lot of places to eat on campus, the study rooms are good and once the library is fully open, that will be really handy. We have a study room in the department as well, which is good. The labs are a really good standard and the lab staff are friendly and helpful.

What is the accommodation like on campus?
I lived in Keynes College in my first year. I liked it, the accommodation is really nice, the rooms are about the right size for what you need, you share the kitchenettes with other students, but Keynes is also catered, so you don’t need as big a kitchen. It suited me well.

What kind of career do you hope to follow when you leave, and why?
I’d like to do a PhD because I am really enjoying the work at university. I did want to go into academia but I am now looking at research in a company – either computational or solid state chemistry – which they are quite strong on in the School. Our lecturers are experts in many areas, such as organic synthesis, polymers, plastics, crystallographers and so on – a lot of universities just home in on the one thing they are very good at but there’s more diversity at Kent.

Any advice to somebody thinking of coming to Kent?
The library has all the textbooks you need, don’t buy them – I spent so much money on textbooks when I didn’t need to! And learn your way around campus… I was late to lots of things at first! But, also, enjoy yourself, it’s not as intense in the first year to help you settle in, so take advantage of that.
Kent equips you with essential skills to give you a competitive advantage when it comes to getting a job; more than 95% of Kent students who graduated in 2015 were in work or further study within six months.

Good career prospects
Our graduates go into areas such as government agencies, consultancies, emergency services, local authorities, contract laboratories, research or further vocational training.

We plan regular employability events with input from local chemical and pharmaceutical industries. These events are designed to inform students of possible career options and to give guidance on CV writing and interview skills.

Gain transferable skills
The skills you gain through the degree also equip you for a range of jobs where the ability to analyse problems and combine disciplinary perspectives is required. Your degree will therefore open up a range of specialised opportunities, without closing off access to more general opportunities.

Careers advice
The University’s award-winning Careers and Employability Service can give you advice on how to choose your future career, how to apply for jobs, how to write a good CV and how to perform well in interviews and aptitude tests. It also provides up-to-date information on graduate opportunities before and after you graduate. For more information on how Kent helps you plan for your future career, see www.kent.ac.uk/employability
Not sure which programme to choose? Here's a quick guide to the chemistry degree programmes we offer.

Chemistry BSc (Hons)
Our distinctive three-year programme covers fundamental chemistry and develops your knowledge at the forefront of the field with our ‘chemistry in context’ modules. In your third year, you undertake a lab-based research project.

Chemistry with a Year in Industry BSc (Hons)
This programme covers the same content as the three-year BSc (above) with the benefit of an industrial placement year between your second and final years, to gain professional experience and enhance employability. For more information, see p14.

Chemistry MChem
This four-year programme builds an advanced knowledge of contemporary chemistry; year-four modules are focused on the diverse range of research interests of the academic staff. In your fourth year, you undertake an extended research project, which accounts for approximately 31% of the total marks for the MChem degree.

All three programmes prepare you for professional employment or further study.

Further information
For more information on our degree programmes, please contact: School of Physical Sciences, Ingram Building, University of Kent, Canterbury, CT2 7NH T: +44(0)1227 824392 F: +44(0)1227 827558 E: spsrecruit@kent.ac.uk www.kent.ac.uk/physical-sciences/prospective/undergraduate/chemistry

“The lecturers are enthusiastic about teaching, investing time and effort into everyone’s success and are always willing to offer additional help to students. The high level of support provided allows all students to achieve their full potential at Kent.”

Danielle Smith
Chemistry BSc
The Foundation Year is a popular option for students who, for example, might not have secured the grades required to enter the chemistry degree at Stage 1. We also welcome students who have taken a career break and feel the need for a refresher course to increase confidence prior to tackling the degree course.

A level material is refreshed and is extended beyond the level required at A level so students who take this option are fully equipped to tackle the degree course.

Modules you study during your foundation year are:
- Algebra and Arithmetic
- Chemical Reactivity
- Graphs, Geometry and Trigonometry
- Molecules and Analysis
- Properties of Matter.

Please note: that this module list is not fixed as new modules are always in development and choices are updated yearly. Please see www.kent.ac.uk/physical-sciences for the most up-to-date information.

All teaching and extensive practical laboratory classes are on campus, so you can take part in all student activities. The teaching is mainly conducted by academic staff from this University and consists of lectures, example classes and laboratory sessions.

Foundation modules

Algebra and Arithmetic
A degree in chemistry requires a significant competency in mathematics. Here, you are given all the mathematical tools required to embark upon a degree in chemistry. These include arithmetic calculations, significant figures and error analysis, which are required to present experimental data in a concise and scientific fashion. The module introduces algebra, including solving of equations and their manipulation such as quadratics, simultaneous equations, and binomial theorem.

Chemical Reactivity
You are introduced to a variety of topics that underpin chemical reactivity in this module. These include: the periodic table and periodicity, transition metals and basic reactions of organic compounds. It also covers reaction kinetics, chemical equilibrium and solubility. You also develop your problem-solving skills.

Graphs, Geometry and Trigonometry
All the underpinning mathematical graphing skills that are required to undertake a chemistry degree are introduced in this module. It includes, for example, constructing graphs using experimental data, co-ordinating geometry and vectors, and trigonometric functions and their manipulation.

Molecules and Analysis
This module explores chemical structure and analysis. We start with atoms and molecules and introduce chemical equations. You then explore the shapes of organic and inorganic molecules using atomic and molecular orbitals. Finally, you discover the energy levels of atoms and chemical compounds, such as the energy required to break bonds and form new bonds, and the energy released during a chemical reaction. There is a special focus on hydrogen bonding.

Properties of Matter
Central to chemistry are the states of matter: solids, liquids and gases are introduced, and we cover the science underpinning ideal and non-ideal gases, liquids and solutions, with a focus on the special properties of water. You are introduced to phase diagrams and how they can be used to determine the properties of a material at particular temperatures and pressures. The module is underpinned with main group inorganic chemistry.

DID YOU KNOW?
In the National Student Survey 2015, 93% of Chemistry students were satisfied with the overall quality of their course.
STUDYING AT STAGE 1

Stage 1 is the first year of your degree programme. It provides you with the broad base of knowledge on which chemistry is founded.

All students take the following modules:
• Chemical Reactions
• Chemical Skills
• Computing Skills
• Disasters
• Fundamental Organic Chemistry for Physical Scientists
• Introduction to Biochemistry and Drug Chemistry
• Molecules, Matter and Energy.

Please note: this module list is not fixed as new modules are always in development and choices are updated yearly. Please see our website for the most up-to-date information: www.kent.ac.uk/physical-sciences/

Modules: Stage 1

Chemical Reactions
This module introduces you to core scientific chemical concepts, terminology, theory and conventions. This includes: chemical equations and stoichiometry, chemical reactions in solution, reaction kinetics and activation energies, acid and base chemistry, and mathematical tools for chemists. Hands-on laboratory experimentation is a key component of this module. (Lab component.)

Chemical Skills
You explore the periodic table, focusing on the chemistry of the s- and p-block elements, in lectures and study sessions, and two lab components. To deepen your understanding of the fundamental concepts explored, you also study maths for scientists and computer modelling, to complement your practical skills. (Lab component.)

Computing Skills
Computing, including computer modelling and molecular graphics, is playing an ever increasing role in chemistry (Nobel Prize 2013). This module equips you with the skills you need in this growing area. It covers: programming languages, the modular design of programs and the Unix operating system. You spend part of your time working in a computer laboratory, where you write a variety of computer codes culminating in writing your own molecular dynamics program to simulate the interactions of atoms.

Disasters
Chemistry in context
Chemical disasters, whether natural (volcano) or man-made (Bhopal, Chernobyl, climate change) have devastating consequences. This module shows how chemical science is integral to the understanding and mitigation of such events. Moreover, chemistry occupies a central position in The Civil Contingencies Act 2004, which provides framework emergency disaster prevention and recovery. In this module, you choose a chemical disaster and, with academic guidance, use your understanding of chemical phenomenon to formulate a disaster management plan. Note: this module constitutes the writing component required by the Royal Society of Chemistry.

Fundamental Organic Chemistry for Physical Scientists
This module introduces you to the basic concepts of organic and bio-inorganic chemistry. You study functional group organic chemistry, reaction mechanisms and spectroscopy of organic molecules. (Lab component.)

Introduction to Biochemistry and Drug Chemistry
Chemistry in context
From an organic chemistry perspective, you cover the fundamentals of biochemistry including enzyme reactions, protein chemistry, DNA, lipids and carbohydrates. These areas are underpinned by chemical phenomena, such as thermodynamics and intermolecular interactions. You also explore the nature of drugs, how they work and are discovered, and their misuse.

Molecules, Matter and Energy
You deepen your understanding of the fundamental building blocks and processes in chemistry in this module. This includes atomic and molecular structure, properties of gases, liquids and solids, and thermodynamics.
STUDYING AT STAGE 2

Stage 2 is the second year of your degree.

You take the following modules:
- Chemical Identification Techniques
- Inorganic and Environmental Chemistry
- Materials and Solid State Chemistry
- Numerical, Statistical and Analytical Skills
- Organic Reaction Mechanisms
- Polymeric and Organic Materials
- Spectroscopy and Bonding
- Thermodynamics and Kinetics.

Please note: this module list is not fixed as new modules are always in development and choices are updated yearly. Please see our website for the most up-to-date information: www.kent.ac.uk/physical-sciences/

Inorganic and Environmental Chemistry
Here, you explore the chemistry of the d- and f-block elements, including their electronic and colour properties as well as their magnetic behaviour, both in lectures and workshops and practically through a lab component. Environmental chemistry is of growing importance. This module equips you to understand environmental concerns, such as toxicity, bioavailability and environmental mobility. (Lab component.)

Materials and Solid State Chemistry
The arrangement of atoms and defects in a solid governs its properties. Here, you cover the crystal structures and phase diagrams of solid materials.

Bonding in solids is discussed, including metallic, ionic and molecular crystals, band theory, defects and non-stoichiometry. You are introduced to the synthesis, properties and applications of a wide range of materials and their solid state reactions. Applications covered include catalysis, energy materials such as fuel-cells and Li-ion batteries, superconductivity and semiconductors, and nanomedicine. (Lab component.)

Numerical, Statistical and Analytical Skills
You are trained in quantitative chemical analysis including: trace analysis, quality control, accuracy and precision, probability, and statistics. This module is supported by hands-on analytical chemistry laboratory sessions.

Modules: Stage 2

Chemical Identification Techniques
You develop an understanding of the theory and application of techniques for chemical identification. You study symmetry, nuclear magnetic resonance (NMR), gas chromatography (GC), mass spectrometry (GCMS), infrared and Raman spectroscopy, spectrophotometry/fluorimetry, basic diffraction methods and electron spin resonance.
Organic Reaction Mechanisms
You study organic reactions and materials encountered in organic chemistry in depth. In particular, you study the organic chemistry of functional groups such as alcohols, ethers, carbonyl, amines and alkyl halides. You also look at carbon-carbon forming reactions and strategies for synthesising target molecules. (Lab component.)

Polymeric and Organic Materials
Chemistry in context
Plastics, liquid crystals and organic LEDs are ubiquitous in everyday life; your smartphone, tablet or television screen is likely to be an organic LED. Here, you explore the chemistry of these common materials, specifically, the structure and nomenclature of organic and inorganic macromolecules, as well as polymer syntheses. The physical, chemical and mechanical properties of polymers, liquid crystals and light-emitting materials are dissected and the device structure of organic LEDs is deconvoluted. (Lab component.)

Spectroscopy and Bonding
This module deepens your understanding of the fascinating world of quantum mechanics and symmetry. You explore how this gives rise to quantisation and selection rules, and go on to apply this to spectroscopic methods to understand structure and bonding including: rotational (microwave) spectroscopy, vibrational (IR and Raman) spectroscopy and electronic transitions (UV-vis, PES).

The lab course gives you hands-on experience of some of these quite abstract concepts, and allows you to apply your spectroscopic skills to real chemical problems. (Lab component.)

Thermodynamics and Kinetics
The speed (kinetics) and energetics (thermodynamics) of a reaction are of central importance in chemistry. Here, you use thermodynamics and kinetics to predict whether a particular reaction would take place and its likely product yield. You also cover equilibrium constants, electrochemical cells, colligative properties, including elevation and depression of melting and boiling points, zero, first, second and third order reaction kinetics, and statistical thermodynamics. Experiments are included to help to cement understanding. (Lab component.)

“We have a good relationship with the PhD students who are supervising us in our lab work – they are very clever and very helpful and it’s really reassuring that they are there. They’ve been through it and so we feel very comfortable asking them questions. We also help each other through group revision sessions.”

Nikki Uttamsingh
Chemistry BSc
YEAR IN INDUSTRY

If you choose to follow a programme with a year in industry, this placement year is taken between Stages 2 and 3.

Finding a placement
Work placements are usually advertised nationally and students apply by sending in a CV or application form. We guide you through the process, giving you valuable feedback on the placements that are likely to enhance your career prospects, how to write a winning CV and how to hone your interview skills.

Salary and benefits
You usually work on placement for an entire calendar year. Salary and holiday entitlements vary according to the employer. However, many students find that they earn enough to be able to save some of their income and this often helps them in their final year at Kent.

Study and career benefits
A work placement provides practical experience that can be put to good use in your final year of study. It gives you a sense of how the theory works in practice and improves your skills in many areas. It also allows you to evaluate a particular career path, and gain knowledge of the working environment.

In general, the year in industry is very popular with employers, because of the skills you gain. If your placement is a success, you may even be offered a job with the same employer after graduation.

Keeping in touch with Kent
To make sure you get the most out of the experience, you are assigned an academic supervisor who approves the company’s programme of work in consultation with your industrial supervisor. At the end, you write a report of the work you did during the placement and, on returning to Kent for your final year of study, present a lecture on your experiences. Your year in industry counts towards your final degree classification.
If you are studying on our BSc programmes, Stage 3 is the final year of your degree; for MChem students, Stage 3 is your penultimate year of study.

All students take the following modules:
- Analytical Chemistry
- Main Group and Organometallic Chemistry
- Topics in Functional Materials
- Topics in Inorganic Synthetic Chemistry
- Transformations and Chirality in Organic Chemistry.

Optional modules; students choose one of:
- DNA Analysis & Interpretation
- Fires and Explosions.

BSc (only)
- Research Project (Laboratory)

MChem (only)
- Advanced Project (Laboratory)

Please note: that this list of modules is not fixed as new modules are always in development and choices are updated yearly. Please see our website for the most up-to-date information: www.kent.ac.uk/physical-sciences/

Modules: Stage 3

Analytical Chemistry
Here, you are introduced to a variety of modern techniques used to understand the structure, properties and potential applications of materials. Analytical techniques include: atomic emission/absorption spectrometry, high-performance liquid chromatography (HPLC), capillary zone electrophoresis (CZE), ion chromatography, mass spectrometry and gas chromatography (GCMS), electro-analytical chemistry, optical microscopy and electron microscopy.

Main Group and Organometallic Chemistry

Chemistry in context
This module looks at the nature of chemical bonding and how it changes as you move across and down the periodic table. You study how and why this bonding changes and how we can use our knowledge of this to understand the structure and reactivity of many classes of compounds. This is coupled with advanced analytical techniques for probing these often complex and flexible structures. These concepts feed into the reactivities underpinning modern organometallic catalysis, moving from pure fundamentals to application and showing how we can understand the cutting edge of modern research and industrial syntheses.

Topics in Functional Materials

Chemistry in context
The chemistry of materials is widely exploited in technologically important areas, including catalysis, batteries, fuel cells and data storage. In this module, you learn about the fabrication and crystal growth of materials, the structure
of nanomaterials, glasses and molecular crystals, molecular motion in solids, defect chemistry and diffusion, and liquid crystals. Properties include: ferroelectricity, pyroelectricity, piezoelectricity and magnetic behaviour. Analytical techniques, including X-ray Absorption Spectroscopy (XAS) and experimental techniques for characterising solid surfaces and interfaces are also covered. You are introduced to atomistic simulation, used to design and understand material properties. (Lab component.)

**Topics in Inorganic Synthetic Chemistry**

‘Nanoscience will sculpt the scientific landscape of the 21st century.’

Here, you are exposed to the synthesis of nanomaterials spanning nanoparticles, nanorods and porous architectures. You learn how to control their shape, size, functionalisation and stabilisation. Solid-state reactions are introduced as well as high-pressure synthesis to prepare novel materials. The wealth of applications and potential applications of nanomaterials is covered, from catalysis and quantum dots to nanomedicine. You also synthesise nanomaterials in our chemistry laboratory. (Lab component.)

**Transformations and Chirality in Organic Chemistry**

A key component to chemical education is the exposure to more advanced aspects of chirality, and chemical transformations towards the synthesis of simple targets. Concepts relating to the synthesis of natural and unnatural target molecules through organic chemical transformations are essential to your chemical repertoire. In-depth exposure to chirality, asymmetric chemical transformations, carbon-carbon bond-forming reactions and their application in targeted small molecule synthesis is covered.

**Research Project (BSc Only)**

Here, you undertake a research project in one of three areas: computational chemistry, solid-state chemistry or synthetic (organic) chemistry. This module provides framework research training.

**Advanced Project (MChem only)**

You gain experience of a range of advanced laboratory methods to understand the structure and properties of materials. Techniques include, for example, atomic absorption spectroscopy, NMR spectroscopy, X-ray fluorescence, X-ray diffraction, Raman spectroscopy and UV-vis/fluorescence. You then undertake a short research project.

**Optional modules: Stage 3**

You choose one from:

**DNA Analysis & Interpretation**

*Chemistry in context*

Here, you are introduced to a variety of advanced chemical techniques within the contextual framework of DNA profiling. You therefore gain not only an understanding of advanced chemistries, but also how they impact upon important areas. Topics include, for example: DNA sequencing, genetic fingerprinting case studies, interpretation of DNA profiles and statistical evaluation of data. (Lab component.)

**Fires and Explosions**

*Chemistry in context*

This module is an excursion into the chemistry of fires and explosions. Explosives are some of the fastest chemical reactions known, with speeds of up to 10,000 metres per second. With fires, you look at combustion, flashpoints and ignition temperatures, while for explosions you study burning and detonation, primary and secondary explosives, analysis of explosive residues and the molecular design of explosives. Kinetics and thermodynamics are used to help you to understand fire and explosion phenomena.
STUDYING AT STAGE 4

Stage 4 is the final year of study for MChem students.

All students take the following modules:
- MChem Research Project
- Advanced Concepts in Physical and Inorganic Chemistry
- Computational Chemistry
- Modern Molecular Synthesis.

Please note: this module list is not fixed as new modules are always in development and choices are updated yearly. Please see our website for the most up-to-date information: www.kent.ac.uk/physical-sciences/

Modules: Stage 4

MChem Research Project
Here, you undertake an experimental or computational research project, which you choose from an available project list. You work under the guidance of an academic supervisor and become a member of their research team. Typical projects include, for example:
- Computational chemistry using high performance supercomputing
- Design of new polymers
- Fuels and accelerants
- ‘Green’ energy materials: lithium-ion batteries and fuel cells
- Latest TV and smart screen technologies: synthesising organic light-emitting diodes (OLEDs)
- Materials at ultra-low temperatures
- Molecules of abuse
- Superconductors and semi-conductors
- Synthesis, characterisation and properties of nanomaterials.

Advanced Concepts and Applications in Inorganic and Physical Chemistry

Chemistry in context
This module presents a variety of important cutting-edge areas of materials chemistry. In particular, each academic introduces their area of research, developing understanding of current advances in chemistry. Areas studied include:
- Designing novel materials for renewable energy sources; energy storage, solar cells and fuel cells
- Magnetic, multiferroic and superconducting materials
- Metal organic frameworks
- Nanomaterials – synthesis, characterisation and properties
- Porous inorganic, organic and polymeric materials
- Self-assembling organic and polymeric systems
- Sensor materials
- Stimuli-responsive materials.

Computational Chemistry

Chemistry in context
You perform a variety of simulations (virtual experiments) in our Computational Chemistry Studio. Computational experiments span organic, inorganic and physical chemistry and include, for example, the adsorption and reaction of molecules on surfaces (catalysis), organic and inorganic chemical reactions, diffusion of molecules in polymers and machine learning for the intelligent design of new materials. Computer modelling and simulation is pivotal to modern chemistry and is routinely performed in partnership with experiment. It is therefore vital for you to understand the capabilities and limitations of computational chemistry. Techniques include Molecular Dynamics (MD); Density Functional Theory (DFT); Hartree-Fock (HF) theory and perturbation theory. You are introduced to ‘big-data’ and how computational methods can be used to analyse vast datasets of chemical information to derive new insight.

Modern Molecular Synthesis

Chemistry in context
The ability to examine a molecule using retrosynthetic analysis and subsequent delineation of a feasible series of reactions to generate the target, is an essential tool in all areas of organic chemistry. The topic finds its fullest expression in the total synthesis of natural products. In this module, you make use of the full repertoire of organic reactions assimilated to date, but new reactions may also be delivered. You learn the development of synthetic schemes and study consideration of functional group compatibility, convergent and template-directed synthesis, protecting group strategies, and strategies devoid of protecting groups. In-depth exposure to chirality and carbon-carbon bond-forming reactions, and their application in small molecule synthesis is also covered.
VISIT THE UNIVERSITY

Come to an Open Day or an Applicant Day and see for yourself what it’s like to be a student at the University of Kent.

Open Days
Kent runs Open Days during the summer and autumn. These provide an excellent opportunity for you to discover what it is like to live and study at the University. You can meet academic staff and current students, find out about our courses and attend subject displays, workshops and informal lectures. We also offer tours around the campus to view our sports facilities, the library and University accommodation.

For further information and details of how to book your place, see www.kent.ac.uk/opendays

Applicant Days
If you apply to study at Kent and we offer you a place (or invite you to attend an interview), you will usually be sent an invitation to one of our Applicant Days. You can book to attend through your online Kent Applicant Portal. The Applicant Day includes presentations in your subject area, guided tours of the campus, including University accommodation, and the opportunity to speak with both academic staff and current students about your chosen subject. For further information, see www.kent.ac.uk/visit

Informal visits
You are also welcome to make an informal visit to our campuses at any time. The University runs tours of the Canterbury and Medway campuses throughout the year for anyone who is unable to attend an Open Day or Applicant Day. It may also be possible to arrange meetings with academic staff, although we cannot guarantee this. For more details and to book your place, see www.kent.ac.uk/informal

Alternatively, we can provide you with a self-guided tour leaflet, which includes the main points of interest. For more details and to download a self-guided tour, go to www.kent.ac.uk/informal
More information
If you would like more information on Kent’s courses, facilities or services, or would like to order another subject leaflet, please contact us on:
T: +44 (0)1227 827272
Freephone (UK only): 0800 975 3777
www.kent.ac.uk/ug

For the latest information on studying Chemistry at Kent, please see www.kent.ac.uk/physical-sciences/prospective/undergraduate/chemistry

Location
Canterbury

Award
BSc (Hons), MChem

Degree programmes
• Chemistry BSc (F107)
• Chemistry with a Foundation Year (F105)
• Chemistry with a Year in Industry (F108)
• Chemistry MChem (F109)

Typical offer levels
BSc programmes: BBB at A level; IB Diploma 34 points overall or 16 at Higher.
MChem programmes: ABB at A level; IB Diploma 34 points overall or 16 at Higher.
Foundation Year: individual consideration but evidence of prior scientific study needed.

Required subjects
A level Chemistry grade B with a pass grade in the practical, plus GCSE Mathematics grade C;
IB Chemistry 5 at HL and Mathematics 4 at HL or SL.

Year in Industry
See p14.

Professional recognition
All our chemistry degree programmes have been developed in consultation with the Royal Society of Chemistry (RSC).

Foundation year
Passing all modules in the foundation year programme guarantees you entry on to one of our chemistry degree programmes.

Offer levels and entry requirements are subject to change. For the latest information, see:
www.kent.ac.uk/ug

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For the University to operate efficiently, it needs to process information about you for administrative, academic and health and safety reasons. Any offer we make to you is subject to your consent to process such information and is a requirement in order for you to be registered as a student. All students must agree to abide by the University rules and regulations at: www.kent.ac.uk/regulations

More information
If you would like more information on Kent’s courses, facilities or services, or would like to order another subject leaflet, please contact us on:
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