

Programme Specification: Undergraduate

For students starting in Academic Year 2017/2018

1. Course Summary

Names of programme(s) and award title(s)	BSc (Hons) Applied Chemistry
Award type	Single Honours
Mode of study	Full time
Framework of Higher Education Qualification (FHEQ) level of final award	Level 6
Duration	1 year
Location of study	Keele University – main campus
Accreditation (if applicable)	Not applicable
Regulator	Higher Education Funding Council for England (HEFCE)
Tuition Fees	£15,250 for the year at Keele. NXU students are entitled to a £700 bursary which will be deducted from their tuition fee.
Additional Costs	Refer to section 18

How this information might change: Please read the important information at <http://www.keele.ac.uk/student-agreement/>. This explains how and why we may need to make changes to the information provided in this document and to help you understand how we will communicate with you if this happens.

2. What is a Single Honours programme?

The Single Honours programme described in this document allows you to focus more or less exclusively on Chemistry. In keeping with Keele's commitment to breadth in the curriculum, the programme also gives you the opportunity to take some modules outside Chemistry, in other disciplines and in modern foreign languages as part of a 360-credit Honours degree. Thus it enables you to gain, and be able to demonstrate, a distinctive range of graduate attributes.

3. Overview of the Programme

Chemistry is the central science, disciplined in experimental approach, highly creative in thinking, and life-enhancing in impact. The contribution of chemistry to our modern world ranges from advanced materials in gadgets, and high-tech materials used on the International Space Station, to life-saving drugs that are essential to modern medicine. The wide diversity of chemistry is reflected in teaching and research at Keele University.

In the final year of your BSc Applied Chemistry programme at Keele University, lectures and seminars cover research-focused material. Assessment includes exams and coursework designed to further develop information retrieval and critical thinking skills. Laboratory project work is assessed through a report, evaluation of the laboratory diary and an oral examination. You have access throughout your degree to excellent laboratory

facilities that are exceptionally well equipped with computational facilities and chemical instrumentation, much of which is research grade. The structure of the programme is designed to enable you to enhance your employability through the development of problem-solving, presentational and communication skills as well as developing your research skills and your capacity to learn independently. If you take advantage of the full range of opportunities the programme offers, you will have acquired the knowledge and skills to present yourself with confidence in pursuit of your chosen career in a competitive world.

4. Aims of the Programme

The broad aims of the programme are to enable you to:

- develop depth and breadth of chemistry knowledge,
- develop a wide range of laboratory and analytical skills,
- develop enhanced problem solving, research and communication skills.

5. What you will learn

The intended learning outcomes of the programme (what students should know, understand and be able to do at the end of the programme), can be described under the following headings:

- Subject knowledge and understanding
- Subject specific skills
- Intellectual skills
- Key or transferable skills (including employability skills)

Subject knowledge and understanding

Successful students will be able to demonstrate:

- Knowledge of the major aspects of chemical terminology and vocabulary
- Knowledge and understanding of fundamental physicochemical principles
- Knowledge of a range of inorganic and organic materials
- Understanding of general synthetic pathways, including related isolation, purification and characterisation techniques
- Awareness of issues within chemistry that overlap with other related disciplines
- Knowledge of selected aspects of chemistry at the forefront of the discipline
- Knowledge of aspects of chemical science research methods and peer-reviewed chemical science literature.

Subject specific skills

Successful students will be able to:

- Demonstrate skills in the safe-handling of chemical materials, taking into account their physical and chemical properties including any specific hazards associated with their use
- Conduct risk assessments
- Conduct documented laboratory procedures in synthetic and analytical work, in relation to both inorganic and organic systems
- Monitor, by observation and measurement, chemical properties, events or changes, with systematic and reliable recording and documentation thereof
- Operate standard chemical instrumentation
- Interpret and explain the limits of accuracy of their own experimental data in terms of significance and underlying theory.

Intellectual skills

Successful students will be able to:

- Demonstrate knowledge and understanding of essential chemistry-related facts, concepts, principles and theories
- Apply such knowledge and understanding to the solution of qualitative and quantitative problems, mostly of a familiar nature
- Recognise and analyse problems and plan strategies for their solution
- Evaluate, interpret and synthesise chemical information and data
- Carry out practical application of theory using computer software and models
- Communicate scientific material and arguments
- Use information technology (IT) to manipulate and present chemical information and data

Key or transferable skills (including employability skills)

Successful students will be able to:

- Communicate information, ideas, problems, and solutions to both specialist and non-specialist audiences orally and in writing
- Demonstrate problem-solving skills, relating to qualitative and quantitative information
- Demonstrate numeracy and mathematical skills, including such aspects as error analysis, order-of-magnitude estimations, correct use of units and modes of data presentation
- Retrieve and cite information, in relation to primary and secondary information sources, including retrieval of information through online computer searches
- Demonstrate skills in the use of information technology for presenting information and data.
- Interact with other people and engage in team-working, time management and organisational skills, as evidenced by the ability to plan and implement efficient and effective modes of working
- Show development of skills and awareness necessary to seek out opportunities to undertake appropriate further training of a professional nature.

Keele Graduate attributes

Engagement with this programme will enable you to develop your intellectual, personal and professional capabilities. At Keele, we call these our ten Graduate Attributes and they include independent thinking, synthesizing information, creative problem solving, communicating clearly, and appreciating the social, environmental and global implications of your studies and activities. Our educational programme and learning environment is designed to help you to become a well-rounded graduate who is capable of making a positive and valued contribution in a complex and rapidly changing world, whichever spheres of life you engage in after your studies are completed.

Further information about the Keele Graduate Attributes can be found here: <http://www.keele.ac.uk/journey/>

6. How is the Programme taught?

Learning and teaching methods used on the programme vary according to the subject matter and level of the module. Approaches to teaching, assessment and feedback make use of a variety of methods, including:

- Lectures, lecture breaks and self-tests
- Interactive personal response systems
- Screencasts
- Recorded lectures
- Tablet PCs
- Demonstrations
- Detailed personalised and generic written and face-to-face feedback
- Electronic submission and return of marked coursework (with feedback)
- Audio feedback
- Screencast feedback

- Pre-laboratory and post-laboratory exercises
- Laboratory classes
- Research projects
- Problem classes and workshops
- Problem-based and context-based activities
- IT instruction (spread sheets, word-processing, chemical structure drawing, databases, textbook resources, information retrieval and literature searching)
- Group work
- Self and peer-assessment for learning
- Information literacy activities
- Computer-aided learning (simulations and animations, online activities and exercises)
- Case studies
- Chemical Sciences Seminar Series
- Use of e-learning/the Keele Learning Environment (KLE)

Apart from these formal activities, students are also provided with regular opportunities to talk through particular areas of difficulty, and any special learning needs they may have, with their Personal Tutors or module lecturers on a one-to-one basis.

7. Teaching Staff

A dynamic group of staff with a broad range of expertise teach on the programme and bring a wealth of experience acquired through fundamental and applied research across a diverse range of areas. Some current staff members are internationally recognised leaders in their field and manage substantial research groups comprising postgraduate research students and postdoctoral researchers, some of whom contribute to the teaching on the programme. Reflecting the diverse range of research expertise, some staff members also contribute to the Forensic Science, and Applied Environmental Science programmes at Keele. Many current teaching staff hold, or are working towards an accredited Higher Education Teaching qualification and many are Fellows of the Higher Education Academy (FHEA), the professional body for teachers in Higher Education. A number of the teaching staff have established a national reputation for excellence in teaching and learning and have been recognised for their innovation in teaching through university and national teaching excellence awards, and the attraction of funding for teaching innovation projects.

The teaching and research profiles of the staff that currently deliver and support the Chemistry programme can be found at <http://www.keele.ac.uk/chemistry/staff/>.

The University will attempt to minimise changes to our core teaching teams, however, delivery of the programme depends on having a sufficient number of staff with the relevant expertise to ensure that the programme is taught to the appropriate academic standard.

Staff turnover, for example where key members of staff leave, fall ill or go on research leave, may result in changes to the programme's content. The University will endeavour to ensure that any impact on students is limited if such changes occur.

8. What is the Structure of the Programme?

The academic year runs from September to June and is divided into two semesters. The number of weeks of teaching will vary from course to course, but you can generally expect to attend scheduled teaching sessions between the end of September and mid-December, and from mid-January to the end of April.

Our degree courses are organised into modules. Each module is usually a self-contained unit of study and each is usually assessed separately with the award of credits on the basis of 1 credit = 10 hours of student effort. An outline of the structure of the programme is provided in the tables below.

Level 6:

Entry to level 6 of the BSc Applied Chemistry programme requires engagement with the eight bridging modules delivered by Keele teaching staff at Nanjing Xiaozhuang University (NXU) and passing seven out of eight of them. The pass mark is 40%. You must also obtain IELTS 6.0 to include a minimum of 6.0 in Reading and Writing, and a minimum of 5.5 in Listening and Speaking. You will take four compulsory modules in each semester at Keele and study an additional module throughout the academic year.

In Year 4, level 6, increasingly sophisticated theories and ideas are introduced which require you to draw upon, integrate and extend the fundamental chemical principles introduced during Years 1, 2 and 3 in both the bridging modules and modules studied at NXU. The breadth of material covered is diverse and encompasses research-informed topics at the forefront of the discipline in areas such as analytical chemistry, medicinal and biological chemistry, green chemistry and many others.

Module	Title	Indicative Format	Coursework	Credits	Semester
CHE-30039	Advanced Organic Chemistry	Lectures & Problem Classes	Synthesis Design Exercise (26%) Interview (9%) Exam (65%)	15	1
CHE-30038	Chemical Kinetics, Photochemistry & Inorganic reaction Mechanisms	Lectures & Problem Classes	Portfolio including analysis, simulation and interpretation of experimental data (35%) Exam (65%)	15	1
CHE-30042	Inorganic, Physical & Solid State Chemistry	Lectures & Problem Classes	Portfolio including analysis of data and scientific literature, and computational chemistry calculations (35%) Exam (65%)	15	1
CHE-30043	Materials Chemistry & Catalysis	Lectures & Problem Classes	Poster (35%) Exam (65%)	15	1
CHE-30032	Advanced Chemical Analysis	Lectures, Workshops, Laboratory Classes	Case Study (30%) Practical Assessment (30%) Exercises (40%)	15	2
CHE-30037	Topics in Chemistry	Lectures & Problem Classes	Poster (35%) Exam (65%)	15	2
CHE-30048	Applied Chemistry 1	Laboratory Classes, Workshops	Reflective Diary (65%) Laboratory Report (20%) Oral Presentation (15%)	15	1-2
CHE-30049	Applied Chemistry 2	Practical Work and Research	Scientific Report (50%) Laboratory Diary (30%) Oral Exam (20%)	15	2
ENL-90013*	Academic English for Science Students	Lectures, Workshops and Online and Practical Tasks	Class Participation (5%) Portfolio (55%)	15	1-2

			Oral Test (20%) Presentation (20%)		
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* - ENL – 90013 is excluded from calculation of the final degree classification

For further information on the content of modules currently offered please visit:

www.keele.ac.uk/recordsandexams/az

9. Final and intermediate awards

This programme of study leading to the award of a University BSc Honours Degree shall consist of FHEQ Level 6 modules to the value of 120 credits.

10. How is the Programme assessed?

The wide variety of assessment methods used within Chemistry at Keele reflects the broad range of knowledge and skills that are developed as you progress through the degree programme. Teaching staff pay particular attention to specifying clear assessment criteria and providing timely, regular and constructive feedback that helps to clarify things you did not understand and helps you to improve your performance. The following list is representative of the variety of assessment methods used within Chemistry:

- **Unseen written examinations** test students' knowledge and understanding of the subject. Examinations may consist of long or short answer questions.
- **Pre-laboratory exercises** - structured exercises designed to increase students understanding of the theory and techniques required by a specific laboratory practical and may require the student to read the lab script, watch short videos of techniques, perform calculations, answer short questions and look up information.
- **Laboratory reports** are structured proformas and full lab reports are formal summaries of work carried out in the laboratory and test students' understanding of the practical aspects of the programme and develop the skills necessary to enable students to present and analyse their results.
- **Laboratory diaries** are a hand-written record of work carried out in laboratory sessions, maintained regularly and kept in accordance with laboratory diary checklists and guidelines provided in the laboratory script. Typically a selection of experiments carried out in each module will be assessed at the end of the semester.
- **Oral examinations** – students answer questions posed by members of staff on a specific topic such as a laboratory experiment, item of coursework, or a research project.
- **IT assignments and computer-based exercises (e.g. spreadsheets exercises)** – various activities designed to assess students ability to use software to retrieve, analyse and present scientific data in a variety of formats.
- **Class tests** taken either conventionally or online via the Keele Learning Environment (KLE) assess students' subject knowledge and their ability to apply it in a more structured and focused way.
- **Information retrieval exercises** require students to locate and analyse information of different types from the internet, various databases, scientific publications and textbooks. The information is then presented in a prescribed written format.
- **Research projects and reports** test student's knowledge of different research methodologies and the limits and provisional nature of knowledge. They also enable students to demonstrate their ability to formulate research questions and to answer them using appropriate methods.
- **Research proposals** require students to develop an independent research project and think

through theoretical problems surrounding methodology and practical concerns relating to, for example, availability of sample, financial restrictions, and time limits. This form of assessment is key to the development of independent research skills and a portfolio of employability skills.

- **Oral and poster presentations and reports** assess individual students' subject knowledge and understanding. They also test their ability to work effectively as members of a team, to communicate what they know orally and visually, and to reflect on these processes as part of their own personal development.
- **Video/screencast presentations** require students to produce a short video or screencast on a given topic and assess students' knowledge and understanding, and ability to communicate what they know orally and visually, and to reflect on these processes as part of their own personal development.

Marks are awarded for summative assessments designed to assess your achievement of learning outcomes. You will also be assessed formatively to enable you to monitor your own progress and to assist staff in identifying and addressing any specific learning needs. Feedback, including guidance on how you can improve the quality of your work, is also provided on all summative assessments within three working weeks of submission, unless there are compelling circumstances that make this impossible, and more informally in the course of tutorial and seminar discussions.

11. Contact Time and Expected Workload

This contact time measure is intended to provide you with an indication of the type of activity you are likely to undertake during this programme. The data is compiled based on module choices and learning patterns of students on similar programmes in previous years. Every effort is made to ensure this data is a realistic representation of what you are likely to experience, but changes to programmes, teaching methods and assessment methods mean this data is representative and not specific.

Undergraduate courses at Keele contain an element of module choice; therefore, individual students will experience a different mix of contact time and assessment types dependent upon their own individual choice of modules. The figures below are an example of activities that a student may expect on your chosen course by year/stage of study. Contact time includes scheduled activities such as: lecture, seminar, tutorial, project supervision, demonstration, practical classes and labs, supervised time in labs/workshop, fieldwork and external visits. The figures are based on 1,200 hours of student effort each year for full-time students.

Activity	Year 3 (Level 6)
Scheduled learning and teaching activities	18%
Guided independent Study	82%
Placements	0%

12. Accreditation

This programme does not have accreditation from an external body.

13. Regulations

The University Regulations form the framework for learning, teaching and assessment and other aspects of the student experience. Further information about the University Regulations can be found at: <http://www.keele.ac.uk/student-agreement/>

Development of laboratory skills is an essential part of our programmes. Attendance at laboratory classes is compulsory and failure to attend a significant number of laboratory classes will result in failure of the module and no opportunity for reassessment. Students are asked to notify us of any absence from classes within 5 working days of the absence or submit an extenuating circumstances if the absence is for a longer duration. With valid extenuating circumstances, our regulations permit us to offer alternative reassessment or disregard small aspects of the laboratory assessment.

All students are provided with a copy of the laboratory rules and any students failing to follow the rules or other health and safety guidelines may be asked to leave the laboratory. In this case, no opportunity to make up the missed session will be offered.

14. What are the typical admission requirements for the programme?

Entry to level 6 of the BSc Applied Chemistry programme requires engagement with the eight bridging modules delivered by Keele teaching staff at Nanjing XiaoZhuang University or by Keele staff using distance learning, and passing seven out of eight of them. The pass mark is 40%.

The Bridging Modules are:

FHEQ Level 4 [Year 2 at NXU]
General Chemistry I – CHE-10053 Sustainable Chemistry – CHE-10054* General Chemistry II – CHE-10055 Physical Chemistry – CHE-10056
FHEQ Level 5 [Year 3 at NXU]
CHE-20038 Physical and Analytical Chemistry Organic Chemistry – CHE-20039 Analytical Chemistry I - CHE-20040 Inorganic Chemistry – CHE-20041*

*delivered via distance learning

You are also required to obtain IELTS 6.0 overall to include a minimum of 6.0 in Reading and Writing and 5.5 in Listening and Speaking.

Please note: All non-native English speaking students are required to undertake a diagnostic English language assessment on arrival at Keele, to determine whether English language support may help them succeed with their studies.

Accreditation of Prior Learning (APL) is considered on a case-by-case basis and those interested should contact the Programme Director. The University's guidelines on this can be found here:

<http://www.keele.ac.uk/qa/accreditationofpriorlearning/>

15. How are students supported on the programme? [excluded from CID]

Personal Tutors: You are allocated a Personal Tutor for the duration of your studies as part of the University's Personal Tutor system and in accordance with the University Code of Practice on Personal Tutoring. The role of the Personal Tutor is to meet formally with you periodically to discuss your progress and performance and to offer support and advice. You can make arrangements to see their Personal/Subject Tutor at any time.

Year Tutors: A year tutor is allocated to your class for every year of study and is responsible for monitoring attendance, discussing academic progress and assisting with extenuating circumstances and other issues that may be affecting your performance.

Use of e-learning/the Keele Learning Environment (KLE): All modules belonging to the Chemistry programmes are supported by learning resources that are accessible to students via the KLE.

Health and Safety: All students admitted to the programme receive detailed training on health and safety in the laboratory and are provided with a Safety Handbook, Safety Glasses and a Laboratory Coat. Other personal protective equipment will be provided if required.

Students with disabilities, medical conditions or dyslexia: Students admitted to the Chemistry degree programme with disabilities or medical problems are asked to disclose their condition to Student Support and Development Services. Year tutors and module leaders are responsible for ensuring reasonable adjustments are made.

16. Learning Resources

Chemistry at Keele is based in the Lennard-Jones building, which houses excellent, well-equipped teaching and research laboratory facilities. Each module has a site within the university's virtual learning environment (the Keele Learning Environment or KLE), which hosts teaching materials (lecture notes/slides, laboratory scripts, assessments, past examination papers, on-line quizzes, videos, screencasts and audio clips) and useful links. The KLE is accessible on or off campus and is also used for online submission and return of assessments. Each module has a module guide or specification which contains details of the specific intended learning outcomes, Graduate Attributes and assessments.

17. Other learning opportunities

You are encouraged to engage fully with campus life while at Keele and make the most of informal learning opportunities such as joining societies and participating in sports.

18. Additional costs

As to be expected there will be additional costs for inter-library loans and potential overdue library fines, print and graduation.

We do not anticipate any further additional costs for this undergraduate programme.

19. Quality management and enhancement

The quality and standards of learning in Chemistry are subject to a continuous process of monitoring, review and enhancement.

- The Learning and Teaching Committee of the School of Physical and Geographical Sciences is responsible for reviewing and monitoring quality management and enhancement procedures and activities across the School.
- Individual modules and the Chemistry Programme as a whole are reviewed and enhanced every year in the annual programme review which takes place at the end of the academic year and as part of the University's Curriculum Annual Review and Development (CARD) process.
- The programmes are run in accordance with the University's Quality Assurance procedures and are subject to periodic reviews under the Internal Quality Audit (IQA) process.

Student evaluation of, and feedback on, the quality of learning on every Chemistry module takes place every year using a variety of different methods:

- The results of student evaluations of all modules are reported to module leaders and reviewed by the Programme Committee as part of the Curriculum Annual Review and Development (CARD) process.

- Findings related to the Chemistry Programmes from the annual National Student Survey (NSS), and from regular surveys of the student experience conducted by the University, are subjected to careful analysis and a planned response at programme and School level.
- Feedback received from representatives of students in all three years of the Chemistry Programme is considered and acted on at regular meetings of the Programmes Staff/Student Liaison Committee.

The University appoints senior members of academic staff from other universities to act as external examiners on all programmes. They are responsible for:

- Approving examination questions
- Confirming all marks which contribute to a student's degree
- Reviewing and giving advice on the structure and content of the programme and assessment procedures

Information about current external examiner(s) can be found here:

<http://www.keele.ac.uk/qa/externalexaminers/currentexternalexaminers/>

20. The principles of programme design

The Chemistry Programme described in this document have been drawn up with reference to, and in accordance with the guidance set out in, the following documents:

- UK Quality Code for Higher Education, Quality Assurance Agency for Higher Education: <http://www.qaa.ac.uk/assuring-standards-and-quality/the-quality-code>
- QAA Subject Benchmark Statement: Chemistry (2014)
- Keele University Regulations and Guidance for Students and Staff: <http://www.keele.ac.uk/regulations>

21. Document Version History

Version history	Date	Notes
Date first created	October 2016	
Revision history		
Date approved		