Programme Specification: Post Graduate Taught

Academic Year 2021/22

1. Course Summary

Names of programme and award title(s)	MRes Chemistry
Award type	Taught Masters
Mode of study	Full-time Part-time
Framework of Higher Education Qualification (FHEQ) level of final award	Level 7
Normal length of the programme	1 year full-time or 2 years part-time
Maximum period of registration	The normal length as specified above plus 3 years
Location of study	Keele Campus
Accreditation (if applicable)	N/A
Regulator	Office for Students (OfS)
Tuition Fees	**UK students:** Full-time fee for 2021/22 is £9,000 Part-time fee for 2021/22 is £4,950 per annum* **International students:** Full-time fee for 2021/22 is £16,500

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.*

** We reserve the right to increase fees in subsequent years of study by an inflationary amount. Please refer to the accompanying Student Terms & Conditions for full details. Further information on fees can be found at http://www.keele.ac.uk/studentfunding/tuitionfees/*

2. What is an MRes programme?

An MRes programme is common in science, mathematics and engineering. It is a postgraduate qualification that offers the student undertaking it the experience of completing a research-led Masters degree. Students recruited to the course spend one year completing a predominantly research-based project in the laboratory/group of an academic supervisor (alongside a small taught component). This is important as it can offer a staged entry for BSc undergraduates into research and, importantly, facilitate a gateway into PhD level research.

3. Overview of the Programme

The focus of the MRes in Chemistry is learning through substantial "hands-on" research training along with completion of a final written thesis. Alongside this are modules of research-led teaching, to compliment the chosen chemistry research discipline.

4. Aims of the programme

The broad educational aims of the programme are given according to three categories:

Knowledge

Overall the programme aims to:

1. Engender and develop an enthusiasm for chemistry research and provide an intellectually stimulating and beneficial learning experience.
2. Provide an education to Masters level in core areas of chemistry, principally in organic, inorganic and physical chemistry and chemical biology.
3. Provide a thorough knowledge and experience of techniques relevant to the chosen chemistry discipline and their practical application in a research setting.
4. Provide a critical awareness of and engagement with current methods and techniques within chemistry research, some of which is at, or informed by, the forefront of the discipline.

Skills

The programme will provide all students with opportunities to:

1. Develop confidence in practical chemistry, problem-solving and quantitative skills within the context of chemistry.
2. Gain the abilities and skills necessary to research, devise, plan, execute and report on an original investigation or research project within the discipline.

Employment

The programme will enable all students completing it to:

1. Achieve a high level of scientific knowledge and skills, including transferable skills, in a UK-academic research setting.
2. Be able to deal with complex issues, both systematically and creatively, make sound judgements in the absence of complete data, and communicate outcomes clearly to specialist and non-specialist audiences.
3. Be independent and show originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level.
4. Develop the qualities and transferable skills necessary for employment requiring:

- the exercise of initiative and personal responsibility.
- confidence in decision-making in complex and open-ended situations
- the independent learning ability required for continuing professional development.
- productive collaborative working with others.

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:

- 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
- the ability to adapt and apply methodology to the solution of unfamiliar problems
- the ability to design and plan experiments through selection of appropriate techniques and procedures, and to evaluate critically the outcomes of those experiments

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
- demonstrate the ability to work independently, identify areas for further training and be self-critical in the evaluation of risks, experimental procedures and outcomes
- demonstrate the ability to assimilate, evaluate and present research results objectively
- demonstrate the skills required to undertake a research project reporting outcomes that are potentially publishable (in a peer-reviewed publication)
- use information technology (IT) to manipulate and present chemical information and data
- carry out practical application of theory using computer software and models

Intellectual skills

Successful students will be able to:

- demonstrate knowledge and understanding of essential chemistry-related facts, concepts, principles and theories
- 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
- demonstrate self-direction, initiative and originality when solving problems
- demonstrate the ability to make decisions in complex situations

Key or transferable skills (including employability skills)

Successful students will be able to:

- communicate scientific material and arguments
- 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
- demonstrate the ability to communicate and interact with professionals and work in multi-skilled teams
- show development of independent learning skills required for continued professional development

6. How is the programme taught?

Learning and teaching methods used on the programme vary and include the following:

- Lectures, lecture breaks and self-tests
- Screencasts
- Recorded lectures
- Demonstrations
- Detailed personalised and generic written and face-to-face feedback
- Electronic submission and return of marked coursework (with feedback)

- Audio feedback
- Screencast feedback
- Research projects
- Problem classes and workshops
- IT instruction (spread sheets, word-processing, chemical structure drawing, databases, textbook resources, information retrieval and literature searching)
- Information literacy activities
- Computer-aided learning (simulations and animations, online activities and exercises)
- 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 and Research Project Supervisors

A dynamic group of staff with a broad range of expertise teach on the programme and supervise research projects. They 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 research groups comprising postgraduate research students and postdoctoral researchers, some of whom contribute to the teaching on the programme.

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 programme runs from September to August and is divided into three 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. Research aspects of the course run throughout the year.

Credit Requirements

Our MRes in Chemistry degree course is 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 table below.

Year	Compulsory	Optional		Electives	
		Min	Max	Min	Max
Level 7	180	0	0	0	0

Module Lists

Level 7

Compulsory modules	Module Code	Credits	Period
Advanced Topics in Chemistry and Medicinal Chemistry	CHE-40048	30	Semester 1-2
MRes Chemistry Research Project	CHE-40052	120	Semester 1-3
Advanced Research Training for Chemists	CHE-40054	30	Semester 1-3

Learning Outcomes

The table below sets out what students learn in the programme and the modules in which that learning takes place. Details of how learning outcomes are assessed through these modules can be found in module specifications.

Level 7

Subject Knowledge and Understanding	
Learning Outcome	**Module in which this is delivered**
Awareness of issues within chemistry that overlap with other related disciplines	Advanced Research Training for Chemists - CHE-40054 Advanced Topics in Chemistry and Medicinal Chemistry - CHE-40048 MRes Chemistry Research Project - CHE-40052
Knowledge of selected aspects of chemistry at the forefront of the discipline	MRes Chemistry Research Project - CHE-40052 Advanced Research Training for Chemists - CHE-40054 Advanced Topics in Chemistry and Medicinal Chemistry - CHE-40048
Knowledge of aspects of chemical science research methods and peer-reviewed chemical science literature	Advanced Research Training for Chemists - CHE-40054 Advanced Topics in Chemistry and Medicinal Chemistry - CHE-40048 MRes Chemistry Research Project - CHE-40052
The ability to adapt and apply methodology to the solution of unfamiliar problems	Advanced Topics in Chemistry and Medicinal Chemistry - CHE-40048 MRes Chemistry Research Project - CHE-40052 Advanced Research Training for Chemists - CHE-40054
The ability to design and plan experiments through selection of appropriate techniques and procedures, and to evaluate critically the outcomes of those experiments	MRes Chemistry Research Project - CHE-40052

Subject Specific Skills	
Learning Outcome	**Module in which this is delivered**
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	MRes Chemistry Research Project - CHE-40052
Conduct risk assessments	MRes Chemistry Research Project - CHE-40052
Conduct documented laboratory procedures in synthetic and analytical work, in relation to both inorganic and organic systems	MRes Chemistry Research Project - CHE-40052
Monitor, by observation and measurement, chemical properties, events or changes, with systematic and reliable recording and documentation thereof	MRes Chemistry Research Project - CHE-40052
Operate standard chemical instrumentation	MRes Chemistry Research Project - CHE-40052
Interpret and explain the limits of accuracy of their own experimental data in terms of significance and underlying theory	MRes Chemistry Research Project - CHE-40052
Demonstrate the ability to work independently, identify areas for further training and be self- critical in the evaluation of risks, experimental procedures and outcomes	Advanced Research Training for Chemists - CHE-40054 MRes Chemistry Research Project - CHE-40052
Demonstrate the ability to assimilate, evaluate and present research results objectively	Advanced Research Training for Chemists - CHE-40054 MRes Chemistry Research Project - CHE-40052
Demonstrate the skills required to undertake a research project, reporting outcomes that are potentially publishable (in a peer- reviewed publication)	MRes Chemistry Research Project - CHE-40052 Advanced Research Training for Chemists - CHE-40054
Carry out practical application of theory using computer software and models	MRes Chemistry Research Project - CHE-40052
Use information technology (IT) to manipulate and present chemical information and data	MRes Chemistry Research Project - CHE-40052

Key or Transferable Skills (graduate attributes)	
Learning Outcome	**Module in which this is delivered**
Communicate scientific material and arguments	Advanced Research Training for Chemists - CHE-40054 MRes Chemistry Research Project - CHE-40052
Communicate information, ideas, problems, and solutions to both specialist and non-specialist audiences orally and in writing	MRes Chemistry Research Project - CHE-40052 Advanced Research Training for Chemists - CHE-40054
Demonstrate problem-solving skills, relating to qualitative and quantitative information	MRes Chemistry Research Project - CHE-40052
Demonstrate numeracy and mathematical skills, including such aspects as error analysis, order-of-magnitude estimations, correct use of units and modes of data presentation	MRes Chemistry Research Project - CHE-40052
Retrieve and cite information, in relation to primary and secondary information sources, including retrieval of information through online computer searches	MRes Chemistry Research Project - CHE-40052 Advanced Research Training for Chemists - CHE-40054
Demonstrate skills in the use of information technology for presenting information and data	Advanced Research Training for Chemists - CHE-40054 MRes Chemistry Research Project - CHE-40052
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	Advanced Research Training for Chemists - CHE-40054 MRes Chemistry Research Project - CHE-40052
Demonstrate the ability to make decisions in complex situations	Advanced Research Training for Chemists - CHE-40054 MRes Chemistry Research Project - CHE-40052
Show development of skills and awareness necessary to seek out opportunities to undertake appropriate further training of a professional nature	MRes Chemistry Research Project - CHE-40052 Advanced Research Training for Chemists - CHE-40054
Demonstrate self-direction, initiative and originality when solving problems	MRes Chemistry Research Project - CHE-40052

9. Final and intermediate awards

Credits required for level of academic award are as follows:

Master of Research (MRes) Chemistry	180 credits	You will require 180 credits at Level 7, including the 120 credit Research Project.
Postgraduate Certificate in Chemistry	60 credits	You will require 60 credits at Level 7

10. How is the Programme Assessed?

The following list is representative of the variety of assessment methods used on your programme:

- **Unseen problem solving** to test students' knowledge and understanding of the subject. This may consist of long or short answer questions
- **Project Notebooks** 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.

- **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
- **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

11. Accreditation

This programme is not currently accredited by a professional body. The programme team is exploring the options for Royal Society of Chemistry accreditation in the future, which if achieved will be backdated for existing or previous cohorts.

12. University 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/

If this programme has any exemptions, variations or additions to the University Regulations these will be detailed in an Annex at the end of this document titled 'Programme-specific regulations'.

13. What are the typical admission requirements for the Programme?

See the relevant course page on the website for the admission requirements relevant to this programme: https://www.keele.ac.uk/study/

Applicants for whom English is not a first language must provide evidence of a recognised qualification in English language. The minimum score for entry to the Programme is Academic IELTS 6.5, with a minimum of 6.0 in each component.

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. An English language module may be compulsory for some students during their first year at Keele.

Recognition of Prior Learning (RPL) 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/

14. How are students supported on the programme?

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.

Use of e-learning/the Keele Learning Environment (KLE): All modules belonging to 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 MRes Chemistry

degree programme with disabilities or medical problems are asked to disclose their condition to Student Services. The Programme Director and module leaders are responsible for ensuring reasonable adjustments are made.

15. Learning Resources

Chemistry at Keele is based in the Lennard-Jones building and Central Science Laboratories (CSL), which house excellent, modern, 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. This is also supported MS Teams. 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.

16. 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 costs for this programme.

17. Quality management and enhancement

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

- The School Education Committee is responsible for reviewing and monitoring quality management and enhancement procedures and activities across the School.
- Individual modules and the 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.
- 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 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 annual programme review.
- Findings related to the programme from the annual Postgraduate Taught Experience Survey (PTES), 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 on the programme is considered and acted on at regular meetings of the Student Staff Voice 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 assessments
- 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/

18. The principles of programme design

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

a. UK Quality Code for Higher Education, Quality Assurance Agency for Higher Education: http://www.qaa.ac.uk/quality-code
b. QAA Subject Benchmark Statement: Chemistry (2019) https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-chemistry.pdf
c. Keele University Regulations and Guidance for Students and Staff: http://www.keele.ac.uk/regulations
d. RSC accreditation framework https://www.rsc.org/globalassets/03-membership-community/degree-accreditation/accreditation-of-degree-booklet.pdf

Version History

This document

Date Approved: 30 July 2021

Previous documents

Version No	Year	Owner	Date Approved	Summary of and rationale for changes