The University Of Sheffield.

# Programme Specification

**A statement of the knowledge, understanding and skills that underpin a taught programme of study leading to an award from The University of Sheffield**

## Programme Details

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| 1. Programme title | Chemistry |
| 2. Programme code | MPST002 |
| 3. QAA FHEQ level | 7 (Masters) |
| 4. Faculty | Science |
| 5. Department | Chemistry |
| 6. Other departments providing credit bearing modules for the programme | None |
| 7. Accrediting Professional or Statutory Body | Not applicable |
| 8. Date of production/revision | Revised for 2022-23 Session, March 2026 |

| **Awards** | Type of award | Duration |
|---|---|---|
| 9. Final award | Master of Science (MSc) | 1 year |
| 10. Intermediate awards | PGDip (120 Credits) | 9 months |
| | PG Cert (60 Credits) | 9 months |

## Programme Codes

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| 11. JACS code(s)<br>*Select between one and three codes from the HESA website.* | F100 | | |
| 12. HECoS code(s)<br>*Select between one and three codes from the HECoS vocabulary.* | **(CAH07) physical sciences** | (CAH07-02) chemistry | (CAH07-02-01) chemistry |

**Programme Delivery**

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| 13. Mode of study | Full-time |
| 14. Mode of delivery | Blended |

**15. Background to the programme and subject area**

Chemistry occupies a central position in modern science. The behaviour of atoms and molecules underpins our understanding of the world around us, and in particular large parts of materials science, physics, and biology. The applications of Chemistry in modern technology include medicine, biotechnology, forensic science, bioscience, art restoration, archaeology, energy production, capture and storage, environmental control, sustainability, agriculture, novel materials and many others. It is not surprising that Chemistry graduates command a diverse range of professional career opportunities that exploit their skills and knowledge.

The MSc in Chemistry provides a route for BSc graduates in Chemistry or a related subject to deepen their knowledge of the subject, enhance their employability and to undertake a cutting-edge research project. This degree is suitable for candidates who wish to follow a career in research, as a subject-specialist in chemical education, or as a professional (scientist) in the chemical or related industry.

The Department of Chemistry in Sheffield has an international reputation in research and teaching and the expertise of the staff covers the full breadth of Chemistry including inorganic, organic, analytical and physical chemistry, as well as materials, biological, and computational chemistry. The MSc programme enables students to tailor their study to their individual needs and interests through a wide choice of optional components within the lectured modules, in their choice of topic for their substantial research project,  and in their research and professional skills training.

More information about the Department, the staff, and admissions is to be found on the Web at http://www.shef.ac.uk/chemistry/.

**16. Programme aims**

| MSc Chemistry aims to: | |
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| **A1** | Provide in depth knowledge and understanding in specialised areas of chemistry through exposure to advanced concepts in research-led teaching. |
| **A2** | Enhance competence in practical chemistry including specialist skills in experiment planning, chemical manipulation, data acquisition and analysis used in research at the forefront of the discipline through the medium of laboratory-based projects. |
| **A3** | Prepare students for a professional career in chemistry through the development of professional skills and attributes including knowledge of disciplinary norms of conduct such as ethical and moral implications of chemical research on society. |
| **A4** | Prepare students for a research career in chemistry through the completion of an advanced research project at the forefront of the discipline, following established research methodology to design and carry-out an extended project including use of the literature and communication of results in oral and written media. |

## 17. Programme learning outcomes

**Knowledge and understanding**

On successful completion of the programme, students will be able to demonstrate knowledge and understanding of:

1. Apply a detailed knowledge of chemistry concepts and demonstrate critical awareness of specialised area(s) at the forefront of contemporary chemistry to evaluate and interpret chemical phenomena.
2. Design, execute, evaluate, and report the results of a substantial original research project applying the appropriate knowledge within and up to the frontiers of the discipline.
3. Use chemical concepts and methods to interpret phenomena in society, technology, and the natural world. Articulate moral and ethical implications of chemical research for the researcher in and on society.
4. Solve a range of problem types by applying a range of specialised chemistry principles and knowledge, using logical methodology, and demonstrating creative and analytical thinking, and including situations with limited information. Demonstrate competence in decision making in a chemical context including critical evaluation of potential options applied within a complex environment.
5. Plan, conduct and accurately record the results of experiments using advanced practical laboratory techniques and following safe laboratory practice.
6. Analyse and represent chemical data using contemporary information technology packages appropriate to the research subdiscipline.
7. Find, communicate and critically evaluate information from the frontiers of chemistry, through a variety of written and oral media using discipline-specific conventions where appropriate.
8. Work independently and as part of a team deploying effective organisation, personal responsibility, and planning skills.
9. Describe skills, attributes and experience, and critically reflect on professional development to foster lifelong learning skills.

| | | **Links to Aim(s)** |
|---|---|---|
| **K1** | Chemistry at the frontiers of research, demonstrating critical awareness of selected areas in the discipline. | A1 |
| **K2** | And the ability to apply the basic methodology of research. | A1 A3-4 |
| **K3** | Advanced laboratory techniques used in collecting experimental data in a safe and responsible manner. | A2 |
| **K4** | Techniques and methods used in analysing and reporting of experimental data. | A2 |
| **K5** | Contemporary information technology packages and discipline specific conventions used in the communication of scientific information in written and oral media. | A2, A4 |
| **K6** | Scientific research ethics and integrity. | A3. A4 |
| **K7** | Platforms and mechanisms for communicating and advertising skills attributes and experience in a professional environment. | A3 |

| Skills and other attributes<br>On successful completion of the programme, students will be able to: | | |
|---|---|---|
| **S1** | Apply chemical principles to the solution of problems at the frontiers of knowledge. | A1-4 |
| **S2** | Demonstrate enhanced practical laboratory skills including risk and safety consideration. | A2, A4 |
| **S3** | Develop and plan research activities. | A3, A4 |
| **S4** | Demonstrate skills in the oral and written presentation of experimental results. | A2-4 |
| **S5** | Demonstrate competence in decision making in a chemical context including critical evaluation of potential options and in a complex environment. | A2-4 |
| **S6** | Demonstrate quantitative and qualitative problem solving, including situations with limited information. | A1-4 |
| **S7** | Show data literacy and skills in numeracy and computation, including error analysis and different formats of presenting data. | A1-4 |
| **S8** | Use scientific information sources, including information retrieval and critical analysis of the published literature. | A1-4 |
| **S9** | Apply IT skills to chemical data analysis and solving chemical problems. | A1-4 |
| **S10** | Work independently and as a member of a team. | A2-4 |
| **S11** | Work effectively, to plan work, and to manage their time. | A1-4 |
| **S12** | Reflect on own development, communicate own skills attributes and experiences to others and build skills and attributes for lifelong learning. | A3 |
| **S13** | Design experiments to test a hypothesis. | A4 |
| **S14** | Carry out science with the highest ethical and moral standards. | A3, A4 |

**18. Learning and teaching methods**

The MSc course comprises 180 credits of study and includes a 60 credit research project.

Optional modules (4 x 15 credits) will be chosen by students from a range of topics that cover the full breadth of chemistry. The lecture modules are designed to stretch students' knowledge and understanding to more advanced levels and into cutting-edge areas of research. Each module will be supported by class workshops, which develop students' abilities to apply their knowledge of the fundamental principles to solving problems and other subject/sub-discipline related skills.

The students will take part in 2 open-ended laboratory-based mini-projects giving an introduction to advanced experimental methods within the sub-disciplines of chemistry. The students perform the projects in groups under the direction of a staff project director, organising their own divisions of time and labour in order to achieve success. An important part of this module is to learn about and practice the communication of scientific results in preparation for their main 60-credit research project.

Additional preparation for the project and for graduation as a professional chemist will be undertaken in the “Research and Presentation and Professional Skills” module. This will develop essential skills for employability, research, the communication of research and the attributes of a professional scientist. This module is designed to also allow project and person specific training and development after a training needs analysis. The portfolio produced in the module will serve as a sound foundation for the project and progression after graduation. This module involves a variety of different learning and teaching methods including lectures, group and individual work and some self-directed learning.

The 60-credit research project is carried out during late spring and summer under the direction of a member, or a team, of academic staff from the Chemistry Department. These projects can lead to research publications in peer-reviewed journals.

**19. Assessment and feedback methods**

Lecture modules are assessed by coursework. The coursework’s are designed to test not only the students’ knowledge and understanding of the subject, but also their ability to apply that knowledge to solving problems. A variety of coursework formats allows students to develop and demonstrate various writing and presentation skills. The workshops are a formative assessment, where the students’ knowledge is reinforced, and essential problem solving skills are developed. In some cases workshops are also designed to equip students with specific sub-discipline skills.

The two mini-projects are assessed via a carefully structured scheme in which students submit written reports following standard conventions in the discipline. Peer assessment and a group mark are also awarded. Feedback on all marks will be given. Students will receive the marks and feedback for their first mini-project before completing their second.

During the skills module students undertake a written literature review and produce an oral presentation under the supervision of a member of academic staff. Interim feedback on both of these activities will be available. In addition, students will produce a portfolio of work for assessment evidencing compulsory and elected training and development for research, employability and professional activity. Full guidance and an interim feedback session on each students' portfolio will be available to students.

Research projects are assessed using a combination of panel interviews and research reports, as well as an assessment of practical ability and student intellectual input by the project supervisor. The assessment scheme is carefully structured and uses well-defined criteria agreed with external examiners. The project supervisor will provide feedback on a writing sample and will provide general project performance feedback half way through the project.

In addition to the formalised feedback points in modules, the Department runs a comprehensive personal tutor system for PGT students including guidance on the choice of modules and projects. Tutors are available to discuss study techniques and strategies and academic progress with students on request and students are asked to attend at least one tutor meeting per semester.

**20. Programme structure and student development**

The MSc Chemistry programme comprises 180 credits of study in total and includes a 60 credit research project.

The programme seeks to provide advanced chemical laboratory skills and the ability to communicate scientific results (30 credits) alongside developing the skills necessary to undertake research and act as a professional scientist (30 credits). Part of the skills modules allows students to tailor their development of training to prepare for their particular research project and to meet their personal needs through conducting a training needs analysis. These modules are undertaken during the autumn and spring semesters.

In addition, students will select 60 credits of study (four modules) from a range of optional modules that provide in-depth state of the art synopses of important areas in chemical research, with emphasis on problem solving and application of knowledge. This allows students to specialise in certain sub-

disciplines of chemistry. Similarly, these modules are undertaken during the autumn and spring semesters.

Finally, students will undertake the 60 credit research project under the supervision of a member, or a team of, academic staff. Students will be able to choose their preferences for research areas. The project takes place from late spring through the summer semester. These projects can lead to the creation of chemical knowledge and research publications in peer-reviewed journals.

Through their studies students will be guided by their personal tutor who will meet with them at least once per semester, but more frequently as required. The tutor will provide guidance on module and project choice as well as support with study skills and development.

Detailed information about the structure of programmes, regulations concerning assessment and progression and descriptions of individual modules are published in the University Calendar available online at http://www.sheffield.ac.uk/calendar/.

**21. Criteria for admission to the programme**

The entry requirements for MSc Chemistry are

BSc (Hons) 2:1 or equivalent in chemistry or a chemistry-related subject.

Entry requirements for international students

Overall IELTS score of 6.5 with a minimum of 6.0 in each component, or equivalent.

**22. Reference points**

**The learning outcomes have been developed to reflect the following points of reference:**

Subject Benchmark Statements
https://www.qaa.ac.uk/quality-code/subject-benchmark-statements

Framework for Higher Education Qualifications (2014)
https://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf

University Strategic Plan
http://www.sheffield.ac.uk/strategicplan

Learning and Teaching Strategy (2016-21)
https://www.sheffield.ac.uk/polopoly_fs/1.661828!/file/FinalStrategy.pdf

**23. Additional information**

None

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This specification represents a concise statement about the main features of the programme and should be considered alongside other sources of information provided by the teaching department(s) and the University. In addition to programme specific information, further information about studying at The University of Sheffield can be accessed via our Student Services web site at http://www.shef.ac.uk/ssid.