

MChem Chemistry (MChem)
For students entering Part 1 in 2015/6

UCAS code: F103

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	Chemistry
Faculty:	Life Sciences Faculty
Programme length:	4 years
Date of specification:	03/Jan/2018
Programme Director:	Dr John McKendrick
Programme Advisor:	Prof Elizabeth Page
Board of Studies:	Chemistry
Accreditation:	The Royal Society of Chemistry

Summary of programme aims

The programme is designed to provide a broad and rigorous study of modern Chemistry. It is accredited by the Royal Society of Chemistry.

Transferable skills

During the course of their studies at Reading, all students will be expected to enhance their academic and personal transferable skills. In following this programme, students will have had the opportunity to develop such skills, in particular relating to career management, communication (both written and oral), information handling, numeracy, problem solving, team-working and use of information technology and will have been encouraged to further develop and enhance the full set of skills through a variety of opportunities available outside their curriculum.

As part of this programme students are expected to have gained experience and show competence in the following skills: IT (word processing, use of spreadsheets and databases), scientific writing, oral presentation, team-working, problem-solving, use of library resources, time-management, and career planning and management

Programme content

The MChem Chemistry degree programme is divided into four Parts, each of 120 credits. The degree profile outlined below lists the compulsory modules and gives some indication of the optional modules from which the student must make a selection. Students choose such optional modules in consultation with the Programme Adviser or the Programme Director. The number of credits for each module is given after its title.

Part 1 (three terms)

Compulsory modules

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
CH1IN1	Fundamentals of Atomic Structure and the Periodic Table	20	4
CH1PH1	Physical Processes and Molecular Organisation	20	4
CH1OR1	Shape, Structure and Reactivity in Organic Chemistry	20	4
CH1PRA	Laboratory Skills for Chemists	20	4
CH1CC2	Chemical Concepts and Skills 1	20	4

The following module is **compulsory** for students who do not have an A-level pass in Mathematics

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
CH1M	Chemistry M	20	4

The following module is **compulsory** for students who have an A-level pass at grade **C-E** in Mathematics and **optional** for those with a grade **A-B**

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
CH1M2	Mathematics for Chemistry 2	10	4

Optional modules

Students who are required to take CH1M will not be able to select any other optional modules. Students who select module CH1M2 will have the option to select another module equalling 10 credits from outside the

department. Student who opt to take neither CH1M/CH1M2 will select other modules equalling 20 credits from outside the department.

Part 2 (three terms)

Compulsory modules

Code	Title	Credits	Level
CH2AN3	Analytical Chemistry	10	5
CH2CC2	Chemical Concepts and Skills 2	10	5
CH2IN1	Further Inorganic Chemistry	20	5
CH2OR1	Further Organic Chemistry	20	5
CH2PH1	Further Physical Chemistry	20	5
CH2PRAC	Extended Laboratory Skills for Chemists	30	5

Optional modules* (10 credits)

Code	Title	Credits	Level
CH2E2	Environmental Chemistry 2	10	5
CH2MC2	Medicinal Chemistry	10	5

*Students will normally select one chemistry module but this can be replaced by a suitably weighted module from other Schools, timetable permitting.

Part 3 (three terms)

Compulsory modules

Code	Title	Credits	Level
CH3I1	D and F Block Chemistry	10	6
CH3O1	Advanced Organic Chemistry - Synthesis of Complex Targets	10	6
CH3P1	Advanced Topics in Physical Chemistry 1	10	6
CH3PRAC	Advanced Chemistry Practical Training	30	6
CH3I2	Clusters, Extended Arrays and Solid-State Chemistry	10	6
CH3O2	Advanced Organic Chemistry - Contemporary Synthetic Methodology	10	6
CH3P2	Advanced Topics in Physical Chemistry 2	10	6
CH3AN1	X-ray Techniques and Databases in Analytical Chemistry	10	6
CH3AN2	Advanced Analytical Techniques for Inorganic Structure Determination	10	6
CH3CRP	Introduction to Chemistry Research and Practice	10	6

Part 4 (three terms)

Compulsory modules

Code	Title	Credits	Level
CH4O1	Advanced Organic Chemistry - Synthesis of Complex Targets (2)	10	7
CH4PR	MChem Chemistry Project	60	7
CH4SK	Chemistry in Industry and Professional Skills	10	7
CH4I2	Catalysis	10	7

Physical Chemistry: Students are required to select at least 10 credits from the following modules:

Code	Title	Credits	Level
CH4P3	Advanced Techniques in Physical Chemistry	10	7
CH4P4	Polymer and Biophysical Chemistry	10	7

Optional modules: Students should select a maximum of 20 credits from the following modules: *Optional modules will only run at Part 4 if 5 or more students enrol for that module. If a module enrolment is below 5, students will be notified and asked to make an alternate selection.*

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
CH4CR	Current Topics in Chemical Research	10	7
CH4AN1	Advanced Analytical Techniques for the Molecular Sciences	10	7
CH4PC	Polymer Chemistry	10	7
CH4O4	Advanced Organic Synthesis - Oligosaccharides and Natural Products	10	7
CH4I3	Functional Inorganic Materials	10	7
LA1XXX	Institution Wide Language Programme	20	4

Progression requirements

To gain a threshold performance at Part 1 a student shall normally be required to achieve an overall average of 40% over 120 credits taken in Part 1, and a mark of at least 30% in individual modules amounting to not less than 100 credits. In order to progress from Part 1 to Part 2, a student shall normally be required to achieve a threshold performance at Part 1 and achieve an overall average of 50% over 120 credits taken in Part 1 **and**

- not less than 50% in the practical module CH1PRA

[Marks of between 40%-49% will be sufficient to proceed to the BSc programme]

Those students who fail to achieve the progression criteria to Part 2 will leave with a CertHE.

To gain a threshold performance at Part 2, a student shall normally be required to achieve:

- (i) a weighted average of 40% over 120 credits taken at Part 2;
- (ii) marks of at least 40% in individual modules amounting to not less than 80 credits; and
- (iii) marks of at least 30% in individual modules amounting to not less than 120 credits.

MChem progression requirement - In order to progress from Part 2 to Part 3, a student must achieve a threshold performance at Part 2 and achieve an overall average of 50% over 120 credits taken in Part 2 (of which not less than 100 credits should normally be at 5 level or above), **and**

- not less than 50% in the practical module CH2PRAC.

Those students who achieve the threshold performance but do not meet the MChem progression requirement of an average of 50% over 120 credits will be eligible to transfer to a BSc Programme or leave with a DipHE.

Students who re-sit examinations at Part 2 and meet the MChem progression criteria will have their marks capped for classification purposes in accordance with the University regulations.

To gain a threshold performance at Part 3 a student shall normally be required to achieve an overall average of 40% over 120 credits taken in Part 3.

In order to progress from Part 3 to Part 4, a student shall normally be required to achieve a threshold performance at Part 3 and achieve marks of at least 30% in 100 credits.

Those students who fail to achieve the progression requirement to Part 4 but achieve an overall weighted average of between 35 - 39.9% may be eligible for the award of BSc Chemical Sciences in accordance with the University's Framework for Classification and Progression for First Degrees.

A pass of at least 50% in module CH4PR is required to qualify for an honours degree.

Part 2 contributes 20%, Part 3 contributes 40%, and Part 4 contributes 40% towards the Final MChem Degree classification.

Those students who fail to achieve the threshold performance of 50% weighted average across 120 credits at part 4 can only be awarded a pass degree.

Summary of Teaching and Assessment

The University's honours classification scheme is:

<i>Mark</i>	<i>Interpretation</i>
70% - 100%	First class
60% - 69%	Upper Second class
50% - 59%	Lower Second class
40% - 49%	Third class
35% - 39%	Below Honours Standard
0% - 34%	Fail

For the University-wide framework for classification, which includes details of the classification method, please see: www.reading.ac.uk/internal/exams/Policies/exa-class.aspx.

The weighting of the Parts/Years in the calculation of the degree classification is

Integrated Masters programmes (MEng, MMath, MChem, etc)

Part 2 20%

Part 3 40%

Part 4 40%

Teaching is organised in modules that involve a combination of lectures, tutorials, workshops and practical sessions. Modules are assessed by a mixture of coursework and formal examinations. At least 50% of the assessment will normally be by formal examination except for the Part 4 project, which will be assessed through laboratory work, the written report, a poster and an oral presentation.

Admission requirements

Entrants to this programme are normally required to have obtained:

A Level grades AAB/ABB one of which must be in Chemistry grade B or above and one other science subject; Grade B or better in Mathematics GCSE.

Admissions Tutor: Dr D. Nutt (d.nutt@reading.ac.uk)

Support for students and their learning

University support for students and their learning falls into two categories. Learning support is provided by a wide array of services across the University, including: the University Library, In-sessional English Support Programme, the Study Advice and Mathematics Support teams and IT Services. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is provided by Personal Tutors, School Senior Tutors, the Students' Union, the Medical Practice and the Support Centres. If a student has a general enquiry and is unsure where to seek help, they should visit their Support Centre. There are five Support Centres across the University, including one based at the London Road Campus. The Support Centre will be able to advise on matters such as extenuating circumstances, module selection, suspensions, withdrawals, timetable queries and transferring programme. The Support Centre will also be able to signpost students to Carrington building where other University services related to disability, financial support, counselling and wellbeing, accommodation and careers can be found. More information on what student services are available can be found here: <http://student.reading.ac.uk/essentials>.

Within the Department of Chemistry additional support is given through practical classes and tutorials in every Part of the degree programme. There are Course Advisers for every Part of the programme and the Director of Undergraduate Studies is also available for consultation and advice on academic and personal matters.

Career learning

Career prospects

Although most previous graduates from this degree programme have proceeded to further study for a higher degree at Reading or elsewhere, others have successfully found employment after graduation without further study. An MChem degree in Chemistry from the University of Reading provides a strong platform from which to undertake a wide range of careers both within the chemical community and outside. Chemists are highly valued for their numerical and problem solving skills as well as their technical knowledge. They can use their chemical knowledge as research workers, technical assistants, sales and marketing personnel within the chemical industry or as teachers in primary or secondary education. Alternatively, Chemistry graduates from Reading have found employment using their numerical and other skills in more general areas such as accounting, computing and teaching.

Opportunities for study abroad

As part of the degree programme students have the opportunity to study abroad at an institution with which the University has a valid agreement.

There are no formal arrangements within this programme. Students wishing to spend their third year abroad follow the alternative programme MChem Chemistry with a Year in Industry/Research, F105. The Department of Chemistry participates in ERASMUS exchange programmes with a number of European Universities. Language tuition is available through the Institution Wide Language Programme (IWLP) in Part 1 if the student

does not have adequate language skills. Such exchanges are only permitted if the student has the requisite degree of fluency in the language to benefit from such a European programme and gains a Grade C or above in the Part 2 assessments in Chemistry and overall. Students spend the third year of the MChem Chemistry with a Year in Industry/Research, at a European University, returning to take Part 4 of the programme at Reading.

Placement opportunities

There are no formal arrangements within this programme. Students wishing to spend their third year abroad/in industry follow the alternative programme MChem Chemistry with a Year in Industry/Research, F105.

The department has a well-established industrial placement programme supported by the industrial placements tutor (Dr Joanne Elliott).

The Department of Chemistry participates in ERASMUS exchange programmes with a number of European Universities. Language tuition is available through the Institution Wide Language Programme (IWLP) in Part 1 if the student does not have adequate language skills. Such exchanges are only permitted if the student has the requisite degree of fluency in the language to benefit from such a European programme and gains a Grade C or above in the Part 2 assessments in Chemistry and overall. Students spend the third year of the MChem Chemistry with a Year in Industry/Research, at a European University, returning to take Part 4 of the programme at Reading.

Programme Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

Knowledge and Understanding

A. Knowledge and understanding of:

1. The fundamental concepts and techniques chemistry
2. A selection of more specialist topics in the three main branches of the subject and in analytical chemistry
3. The main techniques involved in practical work
4. The spectroscopic methods used to identify molecules and to determine their structure and the basics of the underlying theory.

Teaching/learning methods and strategies

The knowledge required for the basic topics is provided in formal lectures supported by problem sets for students to tackle on their own and which are discussed formally in tutorial sessions with members of staff.

2 is addressed particularly during Part 4 of the course.

Practical classes are held throughout Parts 1, 2 and 3 in which students develop their skills prior to applying them in their Part 4 project.

Feedback on student work is provided by the discussion and return of work in tutorials and by regular workshop sessions during which students tackle unseen problems in the presence of academic staff who provide support.

All practical work is marked and returned to the student.

Assessment

Most knowledge is tested through a combination of coursework and unseen formal examinations, although 3 is assessed by coursework. Dissertations and oral presentations also contribute to assessment, particularly in Part 4.

Skills and other attributes

B. Intellectual skills - able to:

1. Think logically
2. Analyse and solve problems

Teaching/learning methods and strategies

Logic is an essential part of the understanding and construction of synthetic methods and mechanistic

3. Organise tasks into a structured form
4. Understand the evolving state of knowledge in a rapidly developing area
5. Transfer appropriate knowledge and methods from one topic within the subject to another
6. Plan, conduct and write a report on an independent project
7. Construct a poster.

C. Practical skills - *able to:*

1. Follow practical instructions safely and accurately
2. Carry out a variety of experimental procedures
3. Measure and interpret various spectroscopic techniques
4. Interpret quantitatively the results of their experiments
5. Formulate safety protocols
6. Devise suitable experimental methods for tackling a particular problem

D. Transferable skills - *able to:*

1. Use IT (word-processing, spreadsheets and chemical databases)
2. Communicate scientific ideas
3. Give oral presentations
4. Work as part of a team
5. Use library resources
6. Manage time
7. Plan their career.

pathways which form the framework for much organic and inorganic chemistry.

While not exclusively the preserve of physical chemistry, problem solving plays a major part in this section of the course.

Latest developments in the subject are introduced where appropriate, particularly in Part 4.

Practical reports in Part 1, 2 and 3 provide training for the Part 4 project report.

Assessment

1-4 are assessed directly and indirectly in most parts of this chemistry course, while 5 contributes to the most successful work.

6 and 7 are assessed in the Part 4 project report.

Teaching/learning methods and strategies

Detailed practical manuals are provided for all practical courses in Parts 1 and 2, together with sources of recommended further reading. Staff and post-graduate demonstrators are present during every practical session to guide and help students and to mark their reports.

Workshop sessions are held to assist students in interpreting spectroscopic information obtained on unknown compounds.

In Part 3 some open-ended experiments are undertaken by small teams of students

In Part 4 students work on individual projects under the supervision of one or more members of staff.

Assessment

1 to 4 are tested to different extents by the practical work associated with Parts 1 - 3 of the chemistry course.

3 is assessed through problems set in written examinations.

5 is specifically assessed during the practical course in Part 2 where safe working procedures are emphasised at every stage.

3 is specifically but not exclusively assessed within core modules CH2PRAC, CH3PRAC, CH2AN3, CH3AN1 and CH3AN2.

6 is assessed in the Part 4 project.

Teaching/learning methods and strategies

The use of IT is embedded throughout the programme but, is specifically addressed in the core modules CH1PRA.

Oral and written presentation skills, problem-solving, team working, time management and extracting and summarising information are specifically addressed in CH1CC2 and CH2CC2 and throughout the remainder of the programme.

Team work and career planning are both part of module CH2CC2 and the former in CH3PRAC.

Oral presentations are associated with module CH4PR, CH1CC2 and CH2CC2.

Library resources are specifically addressed through a small project in module CH4PR, and within the fourth year project.

Time management is essential for the timely and effective completion of the programme

Assessment

1 - 5 contribute assessed coursework within the compulsory module analytical and professional skills, CH1CC2 and CH2CC2.

2 - 6 are assessed in modules CH1CC2 and CH2CC2

Please note - This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the module description and in the programme handbook. The University reserves the right to modify this specification in unforeseen circumstances, or where the process of academic development and feedback from students, quality assurance process or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.