

BSc Chemistry with Year in Industry
For students entering Part 1 in 2014/5

UCAS code: F106

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:	16/Jun/2016
Programme Director:	Dr John McKendrick
Programme Advisor:	Dr Joanne Elliott
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 and to give students the experience of doing chemically related work in industry. This 480 credit BSc degree complements the 480 credit MChem with a Year in Industry but is designed for those who do not wish, or are not qualified to take credits at Level 7. It is designed to receive accreditation 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 BSc Chemistry with Year in Industry degree programme is divided into three Parts plus an industrial placement year, 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>
CH1CC2	Chemical Concepts and Skills	20	4
CH1IN1	Fundamentals of Atomic Structure and the Periodic Table	20	4
CH1OR1	Shape, Structure and Reactivity in Organic Chemistry	20	4
CH1PH1	Physical Processes and Molecular Organisation	20	4
CH1PRA	Laboratory Skills for Chemists	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

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
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)*

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
CH2E2	Environmental Chemistry 2	10	5
CH2MC2	Medicinal Chemistry 2 for Chemists	10	5

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

Year abroad/Year away/Additional year (three terms)

Compulsory modules

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
CH3PIN	Industrial Placement	120	6

Part 3 (three terms)

Compulsory modules

<i>Mod Code</i>	<i>Module Title</i>	<i>Credits</i>	<i>Level</i>
CH3I1	d and f block chemistry	10	6
CH3I2	Clusters, Extended Arrays and Solid-State Chemistry	10	6
CH3O1	Advanced Organic Chemistry - Synthesis of Complex Targets	10	6
CH3O2	Advanced Organic Chemistry - Contemporary Synthetic Methodology	10	6
CH3P1	Advanced Topics in Physical Chemistry 1	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

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
<i>And</i>			
CH3PR	BSc Chemistry Project	40	6
<i>or</i>			
CH3PRE	BSc Chemistry Education Project	40	6

Progression requirements

Progression from Part 1 to Part 2:

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 40% over 120 credits taken in Part 1 and a minimum criteria of 40% in CH1PRA for accreditation requirements.

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.

In order to progress from Part 2 to Part 3, a student must achieve a threshold performance at Part 2 and a pass of 40% in module CH2PRAC.

The module CH3PIN (Year in Industry) is assessed on a pass / fail basis.

Assessment and classification

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

Four-year programmes, including placement year: Normally:

Part 2 one-third

Placement Year not included in classification

Part 3 two-thirds

(where students fail a placement year which does not contribute to classification they transfer to the BSc Chemistry programme)

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.

Admission requirements

Entrants to this programme are normally required to have obtained:

A Level grades BBB/ABC one of which must be a B in Chemistry.

Grade B or better in Mathematics.

Admissions Tutor: Dr D. Nutt (email: 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, the Careers, Placement and Experience Centre (CPEC), In-session English Support Programme, the Study Advice and Mathematics Support Centre teams, IT Services and the Student Access to Independent Learning (S@il) computer-based teaching and learning facilities. 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 advisers in the Student Services Centre. The Student Services Centre is housed in the Carrington Building and offers advice on accommodation, careers, disability, finance, and wellbeing, academic issues (eg problems with module selection) and exam related queries. Students can get key information and guidance from the team of Helpdesk Advisers, or make an appointment with a specialist adviser; Student Services also offer drop-in sessions and runs workshops and seminars on a range of topics. For more information see www.reading.ac.uk/student

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

A BSc degree in Chemistry with a Year in Industry 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 and computing. In addition, some students with a BSc chemistry degree pursue postgraduate work, either at Reading or elsewhere, by studying for a higher degree in specialised areas of Chemistry.

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 an increasing number of industrial and research institutions in Europe that accept students on year-long placement programs. Many of these placement opportunities are in institutions, companies or universities that use English as the main language for communication. If the student wishes to undertake a placement abroad, the Department would advise that the individual have a working level ability in the native tongue of the country that the placement is based. The placement scheme is run by the Industrial placement tutor (Dr Joanne Elliott) who handles all placements in industrial and research facilities, both within the UK and abroad. Placements in Universities outside the UK are arranged and managed via the Study abroad tutor (Dr Christian Pfrang).

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

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. Practical classes are held throughout Parts 1 and 2 in

4. The spectroscopic methods used to identify molecules and to determine their structure and the basics of the underlying theory.

which students develop their skills prior to applying them in their Part 3 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 3.

Skills and other attributes

B. Intellectual skills - *able to*:

1. Think logically
2. Analyse and solve problems
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. Develop the ability to be able to work in an industrial environment

Teaching/learning methods and strategies

Logic is an essential part of the understanding and construction of synthetic methods and mechanistic 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 3.

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

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

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 postgraduate 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 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 and 2 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, CH2AN3, CH3AN1 and CH3AN2.

6 is assessed in the Part 3 project.

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

Teaching/learning methods and strategies

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

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

Team work and career planning are part of module CH2CC2. Oral presentations are associated with module CH3PR/E.

Library resources are specifically addressed through the third year project.

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

Assessment

2 - 6 are assessed in module CH1CC2.

1 - 5 contribute assessed coursework within the two compulsory modules on professional skills CH2CC2.

Career planning is assessed through the CMS course embedded within module 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.