**MChem Chemistry with a Year in Industry** **UCAS Code: F105**

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|---|---|
| Awarding Institution: | The University of Reading |
| Teaching Institution: | The University of Reading |
| Relevant QAA subject benchmarking group: | Chemistry |
| Faculty of Life Sciences | Programme Length: 4 years |
| For students entering Part 1 in 2006 | Date of specification: Feb 2009 |
| Programme Director: | Dr MJ Almond |
| Programme Adviser: | Dr EM Page* |
| Board of Studies: | Chemistry |
| Accreditation: | The Royal Society of Chemistry |

* Dr J E McKendrick will act as programme adviser during the Year in Industry

**Summary of programme aims and learning outcomes:**
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 experience in industry. It is accredited by the Royal Society of Chemistry. (For a fuller statement of the programme aims and learning outcomes see below.)

**Transferable skills**
The University's Strategy for Teaching and Learning has identified a number of generic transferable skills which all students are expected to have developed by the end of their degree programme. In following this programme, students will have had the opportunity to develop their skills relating to career management, communication (both written and oral), information handling, numeracy, problem-solving, team-working and use of information technology.

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 with a Year in Industry 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) (2006-2007)**

| *Compulsory Modules (70, 80 or 90 credits)* | | *Credits* | *Level* |
|---|---|---|---|
| CH1I1 | *Introduction to Inorganic Chemistry* | 20 | C |
| CH1O1 | *Introduction to Organic Chemistry* | 20 | C |
| CH1P1 | *Introduction to Physical Chemistry* | 20 | C |
| CH1SK1 | *Skills for Chemists* | 10 | C |

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

| | | | |
|---|---|---|---|
| CH1M | *Chemistry M* | 20 | C |

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**.

| | | | |
|---|---|---|---|
| CH1M2 | *Mathematics for Chemistry 2* | 10 | C |

*Optional modules*

Students will select modules amounting to 30 credits (if they take CH1M), 40 credits (if they take CH1M2) or 50 credits (if they take neither) from outside the School of Chemistry.

**Part 2 (three terms) (2007-2008)**

| *Compulsory Modules (100 credits)* | | *Credits* | *Level* |
|---|---|---|---|
| CH2I1 | *Further Inorganic Chemistry* | 20 | I |
| CH2O1 | *Further Organic Chemistry* | 20 | I |
| CH2P1 | *Further Physical Chemistry* | 20 | I |
| CH2AA1 | *Further Analytical Chemistry* | 20 | I |
| CH2A1 | *Analytical Chemistry & Professional Skills 1* | 20 | I |
| *Optional modules* (20 credits)* | | | |
| CH2E1 | *Environmental Chemistry* | 20 | I |
| CH2MMC | *Medicinal Chemistry* | 20 | I |

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

**Part 3 (three terms) (2008-2009)**

Part 3 of the programme takes place in a placement in the Chemical Industry. A distance-learning programme will also be provided for the core modules.

| *Compulsory modules (120 credits)* | | *Credits* | Levels |
|---|---|---|---|
| CH3IN | *Year in Industry* | 120 | H |

**Part 4 (three terms) (2009-2010)**

| *Compulsory modules (100 credits)* | | | *Credits* | *Level* |
|---|---|---|---|---|
| S | CH4SK | *Chemistry in Industry and Professional Skills* | 10 | M |
| A | CH4I1 | *Structure Determination* | 10 | M |
| A | CH4O1 | *Advanced Organic Chemistry-Synthetic Methodology* | 10 | M |
| A/S | CH4PR | *Research Project* | 60 | M |
| *And one module from the following 10 credit Physical Chemistry modules:* | | | | |
| S | CH4P1 | *Measurement Techniques in Physical Chemistry* | 10 | M |
| A | CH4P2 | *Biophysical and Bioinorganic Chemistry* | 10 | M |
| *Optional modules* (20 credits) to be chosen from the following modules not chosen at Part 3 or above:* | | | | |
| A/S | CH4CR | *Current Topics in Chemical Research* | 10 | M |
| A | CH4MM1 | *Medicinal Chemistry 1* | 10 | M |
| S | CH4MM2 | *Medicinal Chemistry 2(requires CH4MM1)* | 10 | M |
| S | CH4P1 | *Measurement Techniques in Physical Chemistry* | 10 | M |
| S | CH4P2 | *Biophysical and Bioinorganic Chemistry* | 10 | M |
| S | CH4O2 | *Advanced Organic Chemistry Heterocycles, Natural Products and Advanced Materials* | 10 | M |
| S | CH4PC | *Polymer Chemistry* | 10 | M |

**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**

not less than 40% in the compulsory core modules (CH1I1, CH1O1 and CH1P1) averaged together **and**
not less than 40% in the practical chemistry components of the core modules averaged together.

**Progression from Part 2 to Part 3**
To gain a threshold performance at Part 2 a student shall normally be required to achieve an overall average of 40% over 120 credits taken in Part 2, and a mark of at least 30% in individual modules amounting to not less than 100 credits. In order to progress from Part 2 to Part 3, a student shall normally be required to 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 I level or above), **and**

not less than 50% in the core modules (CH2I1, CH2O1, CH2P1, CH2A1) averaged together, **and**
not less than 40% in the practical chemistry components of the core chemistry modules averaged together**.**

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

A pass of at least 40% in module CH4PR is required to qualify for an honours degree.

**Summary of Teaching and Assessment**
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.

Part 2 contributes 20%, Part 3 contributes 30 %, and Part 4 contributes 50 % towards the Final Degree classification.

The University's honours classification is as follows:

| Mark | Interpretation |
|---|---|
| 70% - 100% | First class |
| 60% - 69% | Upper Second class |
| 50% - 59% | Lower Second class |
| 40% - 49% | Third class |
| 35% - 39% | Pass below Honours standard |
| 0% - 35% | Fail |

**Admission requirements**
Entrants to this programme are normally required to have obtained:
Grade C or better in Mathematics and English in GCSE; and to have achieved
UCAS tariff: 300 from 3 A levels including B in Chemistry (two AS grades are acceptable in place of one A-level), or
International Baccalaureate: 30 points including 6 in chemistry, or
Scottish Highers: BBBB including B in Chemistry, or
Irish Leaving Certificate: BBBBC including B in Chemistry.

Admissions Tutor: Dr J M Elliott email : j.m.elliott@rdg.ac.uk

**Support for students and their learning**
University support for students and their learning falls into two categories. Learning support includes IT Services, which has several hundred computers and the University Library, which across its three sites holds over a million volumes, subscribes to around 4000 current periodicals, has a range of electronic sources of information and houses the Learning Resource Centre with some 200 workstations. 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, the Careers Advisory Service, the University's Special Needs Advisers, Hall Wardens and the Students' Union.

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 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 in a wide range of situations 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, or sales and marketing personnel within the chemical industry. Chemistry graduates from Reading have also found employment using their numerical and other skills in more general areas such as accounting, computing and teaching.

**Opportunities for study abroad**
There may be limited opportunities for students to take their industrial placement in Europe, but this will depend on their having the necessary linguistic skills as well as finding a suitable placement.

**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 in which students develop their skills prior to applying them in their Parts 3 & 4 projects.

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 Parts 3 & 4.

## *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. construct a poster
8. the ability 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 4.

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

*Assessment*

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

6 & 7 are assessed in the Parts 3 & 4 project reports.

**C Practical Skills:- be 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 & 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 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 organic practical course in Part 2, although safe working procedures are emphasised at every stage.

3 is specifically but not exclusively assessed within core module CH2A1.

6 is assessed in the Part 4 project and during the placement in Industry.

**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 a core modules CH1SK1.

Team work and career planning are both part of module CH2A1. Oral presentations are associated with module CH4PR.

Library resources are specifically addressed through 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 on analytical and professional skills, CH2A1.

Career planning is assessed through the 5 credit CMS course embedded within module CH2A1.

*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 expect 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 module and programme handbooks.