BSc Environmental Chemistry **UCAS Code: F140**

Awarding Institution:	The University of Reading
Teaching Institution:	The University of Reading
Relevant QAA subject benchmarking group:	Chemistry
Faculty of Life Sciences	Programme Length: 3 years
For students entering Part 1 in 2007	Date of specification: Feb 2009
Programme Director:	Dr MJ Almond
Programme Adviser:	Dr EM Page
Board of Studies:	Chemistry
Recognition:	The Royal Society of Chemistry

Summary of programme aims and learning outcomes:
The programme is designed to provide a broad and rigorous study of modern Chemistry with particular attention to the environment. It is designed to receive recognition 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 BSc Environmental Chemistry degree programme is divided into three 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) (2007-2008)

Compulsory Modules (120 credits)		*Credits*	*Level*
CH1IN1	*Fundamentals of Atomic Structure and the Periodic Table*	20	C
CH1OR1	*Shape, Structure and Reactivity in Organic Chemistry*	20	C
CH1PH1	*Physical Processes and Molecular Organisation*	20	C
CH1PRA	*Laboratory Skills for Chemists*	20	C
GO1D1	*Earth Structure and Materials*	10	C
GO1D2	*Earth History*	10	C
ES1B2	*Environmental Science Field Class*	10	C
ES1B1	*Introduction to Environmental Systems*	10	C
	The following module is **compulsory** for students who do not have an A or AS level pass in Mathematics and must be taken in place of either GO1D1 and GO1D2 or ES1B1 and ES1B2.		
CH1M	*Chemistry M*	20	C

The following module is **compulsory** for those students with an A level pass at grade **C-E** and **optional** for those with a grade **A-B**. It will normally be taken in place of ES1B2.

CH1M2	*Mathematics for Chemistry2*	10	C

Part 2 (three terms) (2008-2009)

Compulsory Modules (110 credits)		*Credits*	*Level*
CH2I1	*Further Inorganic Chemistry 2*	20	I
CH2O1	*Further Organic Chemistry 2*	20	I
CH2P1	*Further Physical Chemistry 2*	20	I
CH2A1	*Analytical Chemistry & Professional Skills 1*	20	I
CH2E1	*Environmental Chemistry 1*	20	I
ES2E4	*Environmental Mineralogy*	10	I
and either			
ES2A5	*Environmental Systems*	10	I
or			
ES2X6	*Environmental Earth Science Field Class*	10	I

Part 3 (three terms) (2009-2010)

Compulsory modules (80 credits)		*Credits*	*Level*	*Term*
CH3A1	*Analytical Chemistry & Professional Skills*	20	H	*Su, Au, Sp*
CH3PR	*BSc Chemistry Project*	40	H	*Au, Sp, Su*
ES3A8	*Environmental Issues*	10	H	*Sp*
GO3B8	*Environmental and Global Geochemistry*	10	H	
Optional modules (40 credits)				
Students will take **40 credits** (4 modules) from the following six modules				
CH3I1	*d- and f- Block Chemistry*	10	H	*Sp*
CH3I2	*Clusters, Extended Arrays and Solid-State Chemistry*	10	H	*Au*
CH3O1	*Advanced Organic Chemistry- Synthesis of Complex Targets*	10	H	*Au*
CH3O2	*Advanced Organic Chemistry- Contemporary Synthetic Methodology*	10	H	*Sp*
CH3P1	*Advanced Topics in Physical Chemistry 1*	10	H	*Au*
CH3P2	*Advanced Topics In Physical Chemistry 2*	10	H	*Sp*

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 (CH1IN1, CH1OR1 and CH1PH1) averaged together **and**

not less than 40% in the module CH1PRA

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**

not less than 40% in the core modules (CH2I1, CH2O1, CH2P1 and CH2A1) averaged together **and**

not less than 40% in the practical chemistry components of the core chemistry modules averaged together**.**

A pass of at least 40% in module CH3PR 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 3 project, which will be assessed through laboratory work, the written report and an oral presentation. Geology and Soil Science modules are taught by staff in the School of Human and Environmental Sciences (SHES).

Part 2 contributes one third towards the Final Degree Classification, 27.55% from the Chemistry and 5.75% from the Geology or Soil Science.
Part 3 contributes two thirds towards the Final Degree classification, 38.9% from the Chemistry 5.6% from the Geology or Soil Science and 22.2% from the project.
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: 260 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 JM 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.

Careers prospects

A BSc degree in Environmental Chemistry from the University of Reading provides a strong platform from which to undertake a wide range of careers both within the chemical and environmental communities 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. Environmental Chemistry graduates from Reading have also found employment using their numerical and other skills in more general areas such as accounting and computing. In addition, some students with a BSc Environmental Chemistry degree pursue postgraduate work, either at Reading or elsewhere, by studying for a higher degree in specialised areas of Chemistry or Environmental Science.

Opportunities for study abroad

The Department of Chemistry participates in Socrates exchange programmes with a number of European Universities. Language tuition is available through the Institution Wide Language Programme (IWLP) in Part 1 and Part 2 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 normally spend their third year at the European University, returning to take Part 3 of the Environmental Chemistry programme, unless they have transferred to the MChem Chemistry with a Year in Europe programme (F104). The year abroad is only assessed when it is part of the MChem programme.

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. to introduce students to aspects of environmental chemistry including those particularly associated with geochemistry or soil chemistry
4. the main techniques involved in practical work
5. 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.

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

The latter part of 3 is covered by modules taught by the School of Human and Environmental Sciences.

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 4 is assessed by coursework. Dissertations and oral presentations also contribute to assessment, particularly in Part 3.

Skills and other attributes

B. Intellectual skills – be 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.

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 & 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 3 project report..

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 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 & 2 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 modules CH2A1 and CH3A1.

6 is assessed in the Part 3 project.

D. Transferable skills – be 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 modules CH1IN1and CH1PH1.

Team work and career planning are part of module CH2A1. Oral presentations are associated with modules CH3A1 and CH3PR.

Library resources are specifically addressed through a small project in module CH3A1, and within the third year project.

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

Assessment

1 - 5 contribute assessed coursework within the two compulsory modules on analytical and professional skills, CH2A1 and CH3A1.

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.