

## **MSc in Chemical Research**

### **For students entering MSc programme in 2007**

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Faculty of Life Sciences	Programme length: 12 or 24 months
Date of specification: January 2007	
Programme Director:	Dr. W. Hayes
Board of Studies:	Chemistry

#### **Summary of programme aims**

This programme aims to provide a flexible course that enables students to acquire specialist research techniques and expertise in their chosen area of Chemistry. The ultimate aim of the programme is to fully prepare students for a career in Research and Development, or for taking a higher degree by research. Students will be trained to undertake practical and theoretical research in their specialist area of chemistry with guidance from an experienced researcher. This necessitates that all students will be able to establish the extent of published knowledge in the chosen field, understand and summarise that knowledge and be able to report formally, both orally and in writing. In addition, all students will be provided with a solid theoretical grounding of important concepts associated with their chosen research area and training in relevant database searching skills will be provided.

#### **Transferable skills**

A number of generic transferable skills will be acquired during this programme and these will be taught via formal courses as well as day-to-day training. In following this programme, students will have the opportunity to develop their skills relating to organisation and time management, communication (both written and oral), information handling, numeracy, problem solving and team working. A major focus of the programme will be on practical methods and the development and perfection of research methods and skills, self-motivation skills and the ability to work independently or as a team member will be expected at the end of the programme.

#### **Programme content**

The MSc Chemistry degree combines taught modules with a research project module. All students follow the module on Research Methods and Skills. The lecture courses selected for the remaining taught modules must be relevant to the dissertation project and must be jointly selected by the student and supervisor in conjunction with the programme coordinator. In principle, all courses at the H or M level from the Chemistry School portfolio are available for selection. If appropriate, validated courses from other Schools may be selected, subject to agreement of all parties. A summary of the structure of the MSc programme is provided below.

Module Code	Module Title	Credits	Level
<i>Compulsory Modules</i>			
CHMRMS	Research Methods and Skills	10	M
CHMPRM	Research Project	150	M
	H or M Level Modules*	20	H or M
<i>*Note</i> Students will take relevant modules totalling 20 credits at H or M level from existing programmes within the Department of Chemistry or, where appropriate, from other Schools/Departments. The available modules include the following, which are provided specifically for the Diploma / MSc in Chemical Research:			
CHM121	Advanced Organic / BioOrganic Chemistry	10	M

#### **Part-time/modular arrangements**

The programme may be taken over 12 months full-time or 24 months part-time.

#### **Progression requirements**

None

#### **Summary of teaching and assessment**

Teaching is organised in modules that may involve a combination of lectures and tutorials. Most taught modules will be assessed by a mixture of examination and continual assessment, as defined in each module description. See each module description for the exact assessment requirements. In cases of failure there will be a resit examination or resubmission of coursework, within the course schedule.

The remainder of the course assessment will come from the written dissertation and *viva voce* exam, which will be based on the research project. Each candidate will be examined by an approved external examiner, selected for both his/her expertise in the subject and experience in examining. As with other (research) higher degrees a suitable internal examiner will also be appointed. A *viva voce* exam will be arranged which will examine the material of the dissertation. In the light of the *viva voce* exam and the marks gained from the taught modules the external examiner will recommend the award of an appropriate level in accordance with the following classification:-

Students must pass each module and obtain a mark of 50% or more for the research project.

The University's taught postgraduate marks classification is based on the following ranges:

**Distinction:** [A Weighted Average Mark of 70 or more over 180 credits  
**AND** a mark of 60 or more for the dissertation  
**AND** no mark below 40.]

**OR** [A Weighted Average Mark of 66 or more over 180 credits  
**AND** a mark of 70 or more in 90 credits  
**AND** a mark of 60 or more for the dissertation  
**AND** no mark below 40.]

**Merit:** [A Weighted Average Mark of 60 or more over 180 credits  
**AND** a mark of 50 or more for the dissertation  
**AND** no mark below 40.]

**OR** [A Weighted Average Mark of 58 or more over 180 credits  
**AND** a mark of 60 or more in 90 credits  
**AND** a mark of 50 or more for the dissertation  
**AND** no mark below 40.]

**Pass:** [A Weighted Average Mark of 50 or more over 180 credits  
**AND** a mark of 50 or more for the dissertation  
**AND** no Significant Weakness (i.e. no mark below 40 in modules agreed at validation to be of special significance to the programme)  
**AND** no Absolute Weakness (i.e. the total credit value summed for all modules marked below 40 does not exceed 30 credits and for all modules marked below 50 does not exceed 55 credits).]

**OR** [A Weighted Average Mark of 48 or more over 180 credits  
**AND** a mark of 50 or more in 90 credits  
**AND** a mark of 50 or more for the dissertation  
**AND** no Significant Weakness (i.e. no mark below 40 in modules agreed at validation to be of special significance to the programme)  
**AND** no Absolute Weakness (i.e. the total credit value summed for all modules marked below 40 does not exceed 30 credits and for all modules marked below 50 does not exceed 55 credits).]

**Fail:** A performance which fails to fulfil the criteria for the above classifications.

The precise University classification scheme will be applied.

### **Admission requirements**

Entrants to this programme are normally required to have obtained a degree at the equivalent of UK 2.2 (Hons) or better in Chemistry or a closely related programme. However, given the interdisciplinary nature of the subject area, motivated applicants with other degree backgrounds are also strongly encouraged to apply. Admissions tutor: Prof. D.J. Cardin - E-mail : d.j.cardin@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, the University Library, which across its three sites holds over a million volumes, subscribes to around 4,000 current periodicals, has a range of electronic sources of information and houses the Student Access to Independent Learning (S@IL) computer based teaching and

learning facilities and the training course in generic research methods provided by the Joint Faculties of Science and Life Sciences. 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 Programme Directors, the Careers Advisory Service, the University's Special Needs Advisor, Study Advisors, Hall Wardens and the Students' Union.

School support is provided through the project supervisor and an internal assessor, the course administrator, and the Director of Postgraduate Studies, all of whom are actively involved in the running of the course. Each student will be assigned a supervisor with expertise in the subject area of the student's dissertation project. It is the responsibility of this research supervisor to give guidance to the student through regular meetings. For full-time students these meetings should take place at least once every three weeks. It is the responsibility of the student to raise with the supervisor any difficulties or problems which occur in the course of the work and to submit coursework and progress reports as required by the course handbook. The choice of taught courses to be taken should be made by the student in consultation with the supervisor and must be validated by the Director of Postgraduate Studies. A detailed course handbook is also available and students are able to report back comments on the course via the Staff Student Committee.

### **Career prospects**

This programme is attractive to graduates who wish to obtain additional research experience before seeking employment. Graduates from this programme will be well qualified to obtain employment in research and development, as technical assistants and as sales and marketing personnel in the chemical industry. They are also eligible to continue research at the higher degree (PhD) level. Alternatively, graduates will have the necessary numerical and transferable skills to allow them to move into a range of more general career choices such as accounting or computing. The part time option is also suitable for graduates already working in industry who wish to undertake a research project relevant to their job. Teaching Company Associates will also find the programme of use for combining their Teaching Company project with an academic award.

### **Opportunities for study abroad or in industry**

The nature of the course does not provide scope for spending time abroad or in industry.

### **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 chosen research area of Chemistry
2. Scientific advances related to the research area
3. Specialist research techniques

##### **Teaching/learning methods and strategies**

- 1 and 2. Knowledge of the chosen research area and related areas will be acquired by attending formal lectures and problem classes from the agreed modular programme, as well as attending colloquia and conferences related to the subject area. Researching and reading primary journals during the programme will provide theoretical knowledge of the chosen area.
3. Hands on practical experience will be gained during the research project and training in specialist research techniques will be provided by the supervisor, technicians and senior members of the research group.

Feedback on the student's progress will be provided via formal meetings with the supervisor, and discussions on taught work during tutorials as well as by the Internal Assessor from the 6-month report.

##### ***Assessment***

The knowledge and understanding that has been acquired will be assessed via MSc exams, the written thesis and the *viva voce* exam on CHMPR.



**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 within the chosen research area
5. plan, conduct and write a report on the chosen research topic

**Teaching / learning methods and strategies**

1. Logic is an essential part of the MSc programmes and will be involved in the problem solving elements of the taught courses and the conduct of the research project in CHMPR.
2. The analysis of problems will be central to all parts of the course and students will gain experience in this area by solving theoretical problems in lectures, tutorials and problem classes, and overcoming experimental problems that may occur during the research project in CHMPR.
3. The efficient running of the research project in CHMPR will require the development of effective organisation and planning skills. Guidance in this area will be provided by the supervisor and via attendance of lectures covering time and resource management during CHMRMS.
4. The student will be required to review the current state of knowledge within their chosen research area as the first part of their 6 month report and thesis. Guidance in this area will be provided by the research supervisor.
5. The supervisor and senior members of the research group will provide guidance in planning, conducting and writing a report of the chosen research area. Guidance in writing reports will be provided by attending lectures on communication skills during CHMRMS.

**Assessment**

All points will be assessed through the assessments and exams relating to the taught modules as well as via the dissertation and viva voce exam relating to CHMPR.

**C. Practical Skills – be able to**

1. follow practical instructions safely and accurately
2. formulate safety protocols
3. carry out a variety of experimental procedures
4. measure and interpret various spectroscopic techniques
5. interpret quantitatively the results of their experiments
6. devise suitable experimental methods for tackling a particular problem

**Teaching / learning methods and strategies**

- 1, 2 and 3. Practical instruction in conducting experimental research and formulating safety protocols will be provided by the supervisor(s), senior research group members and technicians. Attendance of lectures within CHMRMS covering ethical and legal issues of research will also be of use.
- 4 and 5. All research projects selected in CHMPR will necessitate the measurement and interpretation of a range of spectroscopic data such as infra red, nuclear magnetic resonance and ultra violet spectra. All projects will produce data that must be analysed and interpreted in a qualitative and quantitative fashion before further experiments can be designed. In the first instance training in data analysis will be provided by the research supervisor and senior members of the research group.
6. As research progresses within CHMPR the student will have the opportunity to devise new experiments for obtaining novel data or preparing novel intermediates. At the onset of CHMPR experiments will be designed in collaboration with the research supervisor. Discussions held during the planning of such experiments will serve to train the student to think independently and devise new experiments that will provide meaningful results for the project

***Assessment***

Assessment will mainly be via the dissertation and viva voce exam relating to CHMPR.

**D. Transferable skills – be able to:**

1. perform research with efficient planning and time management
2. use IT (word-processing, spreadsheets and chemical databases)
3. prepare and deliver written and oral reports
4. ability to work in a team or as an individual
5. solve problems
6. make decisions

**Teaching/learning methods and strategies**

1. Module CHMRMS will provide training in time and resource management and day-to-day training will be provided by the supervisor during CHMPR.
2. Specific training in IT will be provided through training programmes organised by the library as well as lectures outlined in CHMRMS. Training on searching chemical databases such as Beilstein and the Web of Science will also be provided by the research supervisor and senior members of the research group during CHMPR. Training to familiarise students with specific chemical drawing packages such as ChemDraw will also be provided by the supervisor and senior members of the research group during CHMPR.
3. Attendance of the lectures on communication skills within CHMRMS as well as guidance from the research supervisor and senior members of the research group will assist with training in this area.
4. The ability to work in a team or as an individual will be covered both during the lectures on interpersonal skills, included in CHMRMS and via day-to-day experiences during CHMPR.
5. Training in problem solving will be provided through lectures and tutorials, as well as through discussions with the research supervisor of problems encountered in CHMPR.
6. During CHMPR the student will gradually be given the opportunity to work independently on the chosen research area. This will allow them to make decisions as to which experiments should be performed, and how experiments should be conducted.

**Assessment**

Assessment will mainly be via the dissertation and viva voce exam relating to CHMPR.

**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 processes or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.**