

PROGRAMME SPECIFICATION



1	Awarding Institution	Newcastle University
2	Teaching Institution	Newcastle University
3	Final Award	MChem
4	Programme Title	Chemistry
5	UCAS/Programme Code	F103
6	Programme Accreditation	Royal Society of Chemistry
7	QAA Subject Benchmark(s)	Chemistry
8	FHEQ Level	Level 7
9	Last updated	July 2013

10 Programme Aims

- 1 to enthuse students to chemistry by educating them with a thorough understanding of organic, inorganic and physical chemistry, including importance and sustainability of the chemical sciences in an industrial academic, economic environmental and social context
- 2 to demonstrate how chemical principles can be applied to processes and systems.
- 3 to equip students with the skills to do independent research at both experimental and theoretical levels through extended comprehension of key chemical concepts and in depth understanding of specialised areas
- 4 to provide training in problem solving, communication skills, numeracy and information technology; to apply methodology to the solution of unfamiliar problems
- 5 to equip students with skills that enable them to pursue careers in chemistry, chemistry-related disciplines or other professions, including critical awareness of recent advances in the chemical sciences.
- 6 to develop students' practical skills including assessing risks so they can work in the laboratory safely.

11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas. The programme outcomes have references to the benchmark statements for Chemistry.

Knowledge and Understanding

On completing the programme students should have a knowledge and understanding of:

- A1 The three main branches of chemistry (inorganic, physical and organic)
- A2 Practical laboratory chemistry
- A3 Data analysis and numeracy
- A4 Spectroscopy and chemical characterisation
- A5 Specialist aspects of chemistry
- A6 Research methods
- A7 Developed an awareness of issues in chemistry related to other disciplines.

Teaching and Learning Methods

Students acquire understanding and knowledge (the complexity of which increases as the course progresses) through lectures, tutorials and workshops (**A1, A5**). At Stage 1, students learn basic, and at Stage 2 more sophisticated, technical procedures by performing carefully designed and tested experiments. In the laboratory classes they also consolidate the learning started in lectures (**A1, A2, A4**) and improve on skill **A3**. At Stage 3 the students learn advanced practical methods and specialist theoretical material (**A1- A4**). They learn **A5** in Stage 4 lecture modules which describe sophisticated contemporary problems in Chemistry and **A6** through the training sessions as part of the Research Project. Throughout the period of the degree the student is expected to read around the taught material to supplement and strengthen the taught/learned work. Reading lists are provided to facilitate this. They develop **A7** in modules throughout this programme, particularly related to biology, medicine and materials. Specialist aspects are covered at Stages 3 and 4.

Assessment Strategy

Knowledge and understanding is assessed through unseen written examinations (including open-book exams) and in-course assessments (**A1, A3 – A5, A7**), answers to questions in practical reports (**A2**), and oral examinations eg in the Stage 4 project (**A2, A6, A7**).

Intellectual Skills

On completing the programme students should be able to:

- B1 Critically evaluate data, including using computer software and models.
- B2 Apply learnt knowledge to unseen problems
- B3 Analyse and interpret data objectively in terms of current underlying theory
- B4 Independently plan and undertake a practical and research project including accessing relevant literature and awareness of recent technical and theoretical advances which could be applied.

Teaching and Learning Methods

Intellectual skills are developed by means of the teaching and learning programme outlined above. Students apply the concepts learnt in lectures to problems in laboratory work, seminars and tutorials. **B2** and **B3** are progressively developed and enable the students to solve challenging problems (Stage 1 in Data Handling, Stage 2 in Group Assignment and Stage 3 Problem Solving modules) which cross the boundaries of the chemistry modules studied earlier. Tutorials facilitate individual and group participation in answering problems. Students develop skills **B1** and **B4** during their Stage 3 Advanced Practical Chemistry sessions and Stage 4 project work, they learn how to work in a team and apply advanced techniques to solving research problems.

Assessment Strategy

Problem solving based examinations and oral responses to either problems or tasks (tutorials) are used to test skills **B1 - B3**. Laboratory reports assess **B3**. Write up of independent components of Stage 3 Advanced Practical sessions within CHY3108, CHY3206 and CHY3306 and the Stage 4 project allows students to demonstrate, and be assessed in cognitive skills **B1 - B4**.

Practical Skills

On completing the programme students should be able to:

- C1 Work safely and independently in a chemistry laboratory.
- C2 Plan and undertake an advanced practical course
- C3 Plan and undertake a research project evaluate risks in experiments, understand the limits of accuracy of the data and how to improve it

Teaching and Learning Methods

Students receive close supervision from postgraduate demonstrators or members of staff in the laboratory when performing experiments to enable them to develop safe working practices and good techniques. Formative feedback is used to enable progressive development of these skills (**C1**). At Stages 1 and 2 detailed experimental procedures are presented in laboratory manuals. At Stage 3 the students learn aspects of planning and designing experiments for themselves (**C2**), they work with a greater level of independence and perform more technically demanding procedures. By Stage 4 they are able to work independently in a research laboratory and demonstrate competence in advanced laboratory techniques (**C3**).

Assessment Strategy

The skill **C1** is assessed by laboratory write-ups. **C2** is assessed within the laboratory sessions of the 3 major modules. **C3** is assessed in the Stage 4 Research Project module by oral presentation, poster and writing-up report.

Transferable/Key Skills

On completing the programme students should be able to:

- D1 Communicate and express clearly ideas both orally and in writing
- D2 Work in a group environment
- D3 Manage time and complete work to deadlines
- D4 Assess and form an opinion of other people's work, including numeracy and mathematical skills
- D5 Find information from a range of sources
- D6 Be self-reliant, exercise initiative and make decisions to solve complex problems
- D7 Critically evaluate data to solve chemical problems of an unfamiliar nature.

Teaching and Learning Methods

The laboratory courses requires the students to produce regular written work which is submitted to deadlines (**D1, D3**). Marked work is discussed with the students to develop their understanding as well as their powers of expression. A key skills module, 'Group Assignment' specifically addresses learning from, and working as part of, a group (**D2**). This module also includes information retrieval from a variety of sources and its evaluation, communication and presentation skills, assignments and reports (**D1, D3, D5**). Peer assessment is introduced in a practical course (Stage 2 Organic), Structural Chemistry and the Group Assignment (**D4**). Students further develop skills **D1, D3 – D5** and practise skills **D6** and **D7** during the Stage 3 Advanced Practical laboratory sessions delivered within the 3 major modules and Stage 4 projects. Solving challenging unseen problems at Stage 3 and the Research Project in Stage 4 develops skill **D7**. In Bioactive Natural Products students have to summarize their understanding of aspects of the literature in the form of a poster.

Assessment Strategy

Written work and oral examinations are used to assess skill **D1**. Many of the skills are assessed in written examinations by both the answers and the approach to question answering. Key skills **D1, D2, D5** are addressed in the 'Group Assignment' module by peer assessment of individual contributions to the group effort and of a group presentation. The Stage 4 project evaluates skills **D1 - D7**. In Bioactive Natural Products students have to summarize their understanding of aspects of the literature in the form of a poster.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The degree programme is offered full-time (4 years). Students have to take 120 credits at each stage for a total of 480 credits. All students take the compulsory modules outlined in each year.

Key features of the programme (including what makes the programme distinctive)

A special feature of this course is that students undertake research training and a research project in an area of chemistry of their choosing at Stage 4. More advanced chemistry topics are taught at Stage 4. Modules are designed to allow students to “self-learn” by reading of literature material and advanced problem solving. For example, in Functional Molecules a student is allowed the freedom to design a molecule for a specific purpose.

A number of modules at Stage 1 allow students to take subjects that they have not studied before at A-level (or equivalent). Specific modules are core to all the chemistry degrees and allow a student to transfer from one degree programme to another. For example, transfer to Chemistry with Medicinal Chemistry programme is possible at the end of Stage 1. Students may also transfer into the MChem with Industrial Training degree at the start of Stage 2. All transfers are subject to a student's academic performance.

The Group Assignment (Stage 2) module encourages the development of team-work and allows students the freedom to produce their own work on a chemistry-related topic. Peer-assessment is an integral part of the module. A major part of the Structural Chemistry module (Stage 2) is based on X-ray crystallography and the solving of actual structures. Problem solving is an integral part of many modules and at Stage 3 there is a dedicated module that uses learnt organic, inorganic and physical chemistry to solve unseen literature-based problems. The Advanced Practical Laboratory (Stage 3) contains open-ended experiments and introduces students to new chemistry practice. For example, the use of liquid ammonia as a solvent is introduced in the Inorganic Practical.

Programme regulations (link to on-line version)

<http://www.ncl.ac.uk/regulations/programme/>

13 Criteria for admission

Entry qualifications

AAB-ABB including Chemistry and preferably Mathematics or another science subject. GCSE Mathematics grade B required if not offered at a higher level.

AAABB-AABBB at Higher Grade including Chemistry and preferably Mathematics or another science subject. Mathematics required at grade 2 Standard Grade (or Intermediate 2 equivalent) if not offered at a higher level. Combinations of Highers and Advanced Highers accepted.

Applicants taking the International Baccalaureate are usually asked for 35 points including Higher Level Chemistry grade 6 or above. Standard Level Mathematics or Mathematical Studies required at grade 5 if not offered at Higher Level.

Admissions policy/selection tools

Upon receipt of a UCAS application form offers of places are made to suitably qualified candidates. UK - based applicants are invited to visit Chemistry on an Open Day. During the day they will have a tour of Chemistry. They also attend an informal interview with a member of academic staff. Applicants not based in the UK are not required to attend for interview.

Non-standard Entry Requirements

Applicants who hold non-standard qualifications will be considered on an individual basis.

Additional Requirements

Non applicable.

Level of English Language capability

For this degree you will need a minimum score of IELTS 6.5 or equivalent.

14 Support for Student Learning

The Student Services portal provides links to key services and other information and is available at: <http://my.ncl.ac.uk/students/>

Induction

During the first week of the first semester students attend an induction programme. New students will be given a general introduction to University life and the University's principle support services and general information about the School and their programme, as described in the Degree Programme Handbook. New and continuing students will be given detailed programme information and the timetable of lectures/practicals/labs/ tutorials/etc. The International Office offers an additional induction programme for overseas students.

Study skills support

Students will learn a range of Personal Transferable Skills, including Study Skills, as outlined in the Programme Specification. Some of this material, e.g. time management is covered in the appropriate Induction Programme. Students are explicitly tutored on their approach to both group and individual projects.

Numeracy support is available through Maths Aid and help with academic writing is available from the Writing Development Centre (further information is available from the Robinson Library).

Academic support

The initial point of contact for a student is with a lecturer or module leader, or their tutor (see below) for more generic issues. Thereafter the Degree Programme Director or Head of School may be consulted. Issues relating to the programme may be raised at the Staff-Student Committee, and/or at the Board of Studies.

Pastoral support

All students are assigned a personal tutor whose responsibility is to monitor the academic performance and overall well-being of their tutees. In addition the University offers a range of support services, including one-to-one counselling and guidance or group sessions / workshops on a range of topics, such as emotional issues e.g. Stress and anxiety, student finance and budgeting, disability matters etc. There is specialist support available for students with dyslexia and mental health issues. Furthermore, the Student Union operates a Student Advice Centre, which can provide advocacy and support to students on a range of topics including housing, debt, legal issues etc.

Support for students with disabilities

The University's Disability Support Service provides help and advice for disabled students at the University - and those thinking of coming to Newcastle. It provides individuals with: advice about the University's facilities, services and the accessibility of campus; details about the technical support available; guidance in study skills and advice on financial support arrangements; a resources room with equipment and software to assist students in their studies.

Learning resources

The University's main learning resources are provided by the Robinson and Walton Libraries (for books, journals, online resources), and Information Systems and Services, which supports campus-wide computing facilities.

All new students whose first language is not English are required to take an English Language Proficiency Test. This is administered by INTO Newcastle University Centre on behalf of Newcastle University. Where appropriate, in-session language training can be provided. The INTO Newcastle University Centre houses a range of resources which may be particularly appropriate for those interested in an Erasmus exchange.

15 Methods for evaluating and improving the quality and standards of teaching and learning

Module reviews

All modules are subject to review by questionnaires which are considered by the Board of Studies. Changes to, or the introduction of new, modules are considered at the Board of Studies and/or the School Learning, Teaching and Student Experience Committee. Student opinion is sought at the Staff-Student Committee and/or the Board of Studies. New modules and major changes to existing modules are subject to approval by the Faculty Learning, Teaching and Student Experience Committee.

Programme reviews

The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to Faculty Learning, Teaching and Student Experience Committee. The FLTSEC takes an overview of all programmes within the Faculty and reports any Faculty or institutional issues to the University Learning, Teaching and Student Experience Committee.

External Examiner reports

External Examiner reports are considered by the Board of Studies. The Board responds to these reports through Faculty Learning, Teaching and Student Experience Committee. External Examiner reports are shared with institutional student representatives, through the Staff-Student Committee.

Student evaluations

All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the Staff-Student Committee, and the Board of Studies. The National Student Survey is sent out every year to final-year undergraduate students, and consists of a set of questions seeking students' views on the quality of the learning and teaching. The results from student surveys are considered as part of the Annual Monitoring and Review of the programme and any arising actions are captured at programme and School / institutional level and reported to the appropriate body.

Mechanisms for gaining student feedback

Feedback is channelled via the Staff-Student Committee and the Board of Studies.

Faculty and University Review Mechanisms

The programme is subject to the University's Internal Subject Review process. Every six years degree programmes in each subject area are subject to periodic review. This involves both the detailed consideration of a range of documentation, and a one-day review visit by a review team which includes an external subject specialist in addition to University and Faculty representatives. Following the review a report is produced, which forms the basis for a decision by University Learning, Teaching and Student Experience Committee on whether the programmes reviewed should be re-approved for a further six year period.

Accreditation reports

Additional mechanisms

n/a

16 Regulation of assessment

Pass mark

The pass mark is 40 on Honours modules and 50 on Masters modules (Undergraduate programmes)

Course requirements

Progression is subject to the University's Undergraduate Progress Regulations and Undergraduate Examination Conventions. In summary, students must pass, or be deemed to have passed, 120 credits at each Stage. Limited compensation up to 40 credits and down to a mark of 35% is possible at each Stage and there are re-assessment opportunities, with certain restrictions.

Weighting of stages

Modules taken at Stages 2 and 3 are Honours modules and at Stage 4 are Masters modules and the three stages contribute to the award of the final degree in the ratio <1:2:2>

Common Marking Scheme

The University employs a common marking scheme, which is specified in the Undergraduate Examination Conventions, namely

	Modules used for degree classification (DC)	Modules not used for degree classification
<40	Fail	Failing
40-49	Third Class	Basic
50-59	Second Class, Second Division	Good
60-69	Second Class, First Division	Very Good
70+	First Class	Excellent

Role of the External Examiner

An External Examiner, a distinguished member of the subject community, is appointed by Faculty Teaching and Learning Committee, following recommendation from the Board of Studies. The External Examiner is expected to:

- i. See and approve assessment papers
- ii. Moderate examination and coursework marking
- iii. Attend the Board of Examiners
- iv. Report to the University on the standards of the programme

In addition, information relating to the programme is provided in:

The University Prospectus: <http://www.ncl.ac.uk/undergraduate/>

The School Brochure: <http://www.ncl.ac.uk/marketing/services/print/publications/ordering/>

Degree Programme and University Regulations: <http://www.ncl.ac.uk/regulations/docs/>

The Degree Programme Handbook <http://www.ncl.ac.uk/chemistry/undergrad/degrees/>

Please note. This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided. The accuracy of the information contained is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

Mapping of Intended Learning Outcomes onto Curriculum/Modules

Development of specific Intended Learning Outcomes occurs through the following modules (compulsory modules in bold text, optional modules in normal, italic text)

Intended Learning Outcome	Module codes (Compulsory in Bold)
A1 The three main branches of chemistry (inorganic, physical and organic)	CHY1101, CHY1201, CHY1205, CHY1204, CHY1301, CHY1402, CHY2001, CHY2003, CHY2101, CHY2102, CHY2201, CHY2301, CHY2401, CHY3108, CHY3206, CHY3306, CHY3401, CHY3402, CHY8420, CHY8421, CHY8422, CHY8423, CHY8424, CHY8425, CHY8426
A2 Practical laboratory chemistry	CHY1101, CHY1102, CHY1201, CHY1301, CHY2101, CHY2201, CHY2301, CHY2401, CHY3108, CHY3206, CHY3306
A3 Data analysis and numeracy	CHY1101, CHY1102, CHY1201, CHY1205, CHY1204, CHY1301, CHY1402, CHY2102, CHY2101, CHY2201, CHY2301, CHY2401, CHY2003, CHY3108, CHY3206, CHY3306, CHY3401, CHY8411, CHY8420, CHY8421, CHY8425, CHY8426
A4 Spectroscopy and chemical characterisation	CHY1201, CHY1205, CHY1204, CHY1301, CHY2001, CHY2003, CHY2101, CHY2201, CHY2301, CHY2401, CHY3206, CHY3306, CHY3401, CHY3402
A5 Specialist aspects of chemistry	CHY3009, CHY8420, CHY8421, CHY8422, CHY8424, CHY8425, CHY8426
A6 Research methods	CHY3009, CHY8411
A7 Developed an awareness of issues in chemistry related to other disciplines	CHY1101, CHY1102, CHY1201, CHY1301, CHY2003, CHY2101, CHY2102, CHY2201, CHY2301, CHY3108, CHY3206, CHY3306, CHY3401, CHY3402, CHY8421, CHY8424, CHY8425, CHY8426, CHY8430
B1 Critically evaluate data, including using computer software and models.	CHY3108, CHY3206, CHY3306, CHY8424
B2 Apply learnt knowledge to unseen problems	CHY1101, CHY1102, CHY1201, CHY1205, CHY1204, CHY1301, CHY1402, CHY2001, CHY2003, CHY2101, CHY2102, CHY2201, CHY2301, CHY2401, CHY3009, CHY3108, CHY3206, CHY3306, CHY3401, CHY3402, CHY8420, CHY8424, CHY8425, CHY8426, CHY8430
B3 Analyse and interpret data objectively in terms of current underlying theory	CHY1102, CHY1201, CHY1205, CHY1204, CHY1301, CHY1402, CHY2001, CHY2101, CHY2102, CHY2201, CHY2301, CHY2401, CHY3108, CHY3206, CHY3306, CHY3401, CHY3402, CHY8411, CHY8420, CHY8430
B4 Independently plan and undertake a practical and research project	CHY2001, CHY3009, CHY8411
C1 Work safely and independently in a chemistry laboratory	CHY1101, CHY1102, CHY1201, CHY1301, CHY2101, CHY2201, CHY2301, CHY3108, CHY3206, CHY3306, CHY8411
C2 Plan and undertake an advanced practical course	CHY3108, CHY3206, CHY3306
C3 Plan and undertake a research	CHY3009, CHY8411

	project	
D1	Communicate and express clearly ideas both orally and in writing	CHY1101, CHY1102, CHY1201, CHY1202, CHY1301, CHY1402, CHY2001, CHY2003, CHY2101, CHY2102, CHY2201, CHY2301, CHY2401, CHY3108, CHY3206, CHY3306, CHY3401, CHY3402, CHY8411
D2	Work in a group environment	CHY2001, CHY8430
D3	Manage time and complete work to deadlines	CHY1101, CHY1201, CHY1301, CHY1402, CHY2001, CHY2101, CHY2102, CHY2201, CHY2301, CHY2401, CHY3009, CHY3108, CHY3206, CHY3306, CHY3401, CHY3402, CHY8410, CHY8411, CHY8426
D4	Assess and form an opinion of other people's work	CHY2001, CHY2101, CHY3108, CHY3206, CHY3306
D5	Find information from a range of sources	CHY2102, CHY3009, CHY3108, CHY3206, CHY3306, CHY3401, CHY3402, CHY8425
D6	Be self-reliant, exercise initiative and make decisions to solve complex problems	CHY3108, CHY3206, CHY3306, CHY8411, CHY8425
D7	Critically evaluate data to solve chemical problems	CHY3108, CHY3206, CHY3306, CHY3401, CHY3402, CHY8410, CHY8411