PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	MChem
4	**Programme Title**	Chemistry with Industrial Training
5	**UCAS/Programme Code**	F106
6	**Programme Accreditation**	Royal Society of Chemistry
7	**QAA Subject Benchmark(s)**	Chemistry
8	**FHEQ Level**	Level 7
9	**Last updated**	June 2012

10	**Programme Aims**
1	to enthuse students to chemistry by educating them with a thorough understanding of organic, inorganic and physical chemistry, to an advanced level studied by distance learning during the placement, 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 the opportunity for students to apply their skills in an industrial environment
5	to provide training in problem solving, communication skills, numeracy and information technology; to apply methodology to the solution of unfamiliar problems
6	to equip students with skills that enable them to pursue careers in chemistry research, chemistry-related disciplines or other professions.
7	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:

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	Some aspects of industrial chemistry

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 lab classes they also consolidate the learning started in lectures (**A1**, **A2**, **A4**) and improve on skill **A3**. At Stage 3, they learn core chemistry by distance learning modules and **A6** through the training sessions as part of the Research Project in Industry. On placement the students learn **A7**. At Stage 4 the students learn further advanced practical methods through a project and specialist theoretical material

(**A1**- **A4**). Throughout the period of the degree the student is expected to read around the taught material to supplement and strengthen the taught/learnt 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 during their year in industry and in their Stage 4 project.

Assessment Strategy

Knowledge and understanding is assessed through unseen written examinations (including open-book exams) and in-course assessments (**A1**, **A3** – **A5, A7, A8**), answers to questions in practical reports (**A2, A7, A8**), and oral examinations.

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) 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 project work while in Industry and their Stage 4 academic project.

Assessment Strategy

Problem solving components of 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 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 a research project evaluate risks in experiments, understand the limits of accuracy of the data and how to improve it
C3 Work on a project in an industrial environment

Teaching and Learning Methods

Students receive close supervision from a demonstrator or member 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. While in Industry and at Stage 4 the students learn to plan and design the experiments for themselves (**C2, C3 and C4**). They work with a greater level of independence and perform more technically demanding procedures.

Assessment Strategy

The skill **C1** is assessed by laboratory write-ups at Stages 1 and 2. The student's practical competence is developed further by the research projects at Stages 3 and 4 (**C1, C2** and **C3). C2** and **C3** are assessed as part of the project in Industry.

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
D5 Find information from a range of sources
D6 Be self-reliant
D7 Critically evaluate data to solve chemical problems of an unfamiliar nature

Teaching and Learning Methods

The laboratory courses require 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 their research projects in industry (stage 3) and in Newcastle (stage 4). Solving challenging unseen problems at Stage 4 and the Research Project while in Industry develops skill **D7**.

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 Research Project and the Information Literacy module evaluate skills **D1** - **D7**. In Bioactive Natural Products students have to summarize their understanding of aspects of the literature in the form of an assignment. Distance learning modules are assessed by unseen examinations.

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. A number of option modules are open for each year of study and are chosen by the student in consultation with their personal tutor.

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

A special feature of this course is that students spend the third year of the degree at a placement in Industry. The year in Industry is accredited and is assessed on the basis of the research project, as well as by material delivered by distance learning. A student with help find his/her own placement on a competitive basis and obtain the position by interview with a company. 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 BSc 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. The degree is accredited by the Royal Society of Chemistry.

Programme regulations (link to on-line version)

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

13 Criteria for admission

Entry qualifications

The standard offer for this programme is AAB-ABB including Chemistry and preferably Mathematics or another science subject at A Level. GCSE Mathematics grade B required if

not offered at a higher level.

AAABB-AABBB at Higher Grade including Chemistry at grade A and preferably Mathematics or another science subject is asked for from applicants with Scottish qualifications. 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 with Higher Level Chemistry at grade 6 or above. Mathematics or Mathematical Studies at standard level 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 and the City. 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
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://www.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-sessional 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.

Annex 1

Mapping of Intended Learning Outcomes onto Curriculum/Modules

Either

	Intended Learning Outcome	Module codes (Compulsory in Bold)
A1	The three main branches of chemistry (inorganic, physical and organic)	**CHY1101, CHY1102. CHY1201, CHY1301, CHY2002, CHY2003, CHY2101, CHY2102, CHY2201, CHY2301, CHY3206, CHY3401, CHY3402,** *CHY8421, CHY8424, CHY8425, CHY8426*
A2	Practical laboratory chemistry	**CHY1101, CHY1102, CHY1201, CHY1301, CHY2101, CHY2201, CHY2301, CHY2401,**
A3	Data analysis and numeracy	**CHY1101, CHY1201**, **CHY1203, CHY1204, CHY1301, CHY1401**, **CHY2003, CHY2101, CHY2102, CHY2201, CHY2301, CHY2401**, **CHY3401, CHY3402, CHY3009,** *CHY8420, CHY8421***,** CHY8422, *CHY8423, CHY8424, CHY8425, CHY8426*
A4	Spectroscopy and chemical characterisation	*CHY8420, CHY8421, CHY8423, CHY8424, CHY8425, CHY8426*
A5	Specialist aspects of chemistry	*CHY8420, CHY8421, CHY8423, CHY8424, CHY8425*
A6	Research methods	**CHY3009, CHY8310, CHY8412**
A7	Some aspects of industrial chemistry	**CHY1101, CHY1102. CHY1201, CHY1301, CHY2002, CHY2003, CHY2101, CHY2102, CHY2201, CHY2301, CHY3206, CHY3401, CHY3402,** *CHY8421, CHY8424, CHY8425, CHY8426*
B1	Critically evaluate data, including using computer software and models.	**CHY3009, CHY3201**, *CHY8423, CHY8424*
B2	Apply learnt knowledge to unseen problems	**CHY1101, CHY1102, CHY1201, CHY1203, CHY1204, CHY1301, CHY1401, CHY2001**, **CHY2003, CHY2101, CHY2102, CHY2201, CHY2301, CHY2401, CHY3401, CHY3402,** *CHY8420, CHY8423, CHY8424, CHY8425*
B3	Analyse and interpret data objectively in terms of current underlying theory.	**CHY1102, CHY1201, CHY1203, CHY1204, CHY1301, CHY1401, CHY2001**, **CHY2101, CHY2102, CHY2201, CHY2301, CHY2401**, **CHY3009, CHY3401, CHY3402,** *CHY8420, CHY8423, CHY8424*
B4	Independently plan and undertake a practical and research project	**CHY2001, CHY3009, CHY8412**
C1	Work safely and independently in a chemistry laboratory.	**CHY1101, CHY1102, CHY1201, CHY1301, CHY2101, CHY2201, CHY2301, CHY8412**
C2	Plan and undertake a research project	**CHY3009, CHY8412**
C3	Work on a project in an industrial environment	**CHY8310**
D1	Communicate and express clearly ideas both orally and in writing	**CHY1101, CHY1102, CHY1201, CHY1202, CHY1301, CHY1401, CHY2001, CHY2003**, **CHY2101, CHY2102, CHY2201, CHY2301, CHY2401, CHY3401, CHY3402,** *CHY8420, CHY8422, CHY8424, CHY8425*
D2	Work in a group environment	**CHY2001, CHY3401, CHY3402**
D3	Manage time and complete work to	**CHY1101, CHY1201, CHY1301, CHY1401,**

	deadlines	**CHY2001**, **CHY2101, CHY2102, CHY2201, CHY2301, CHY2401, CHY3105, CHY3305, CHY3401, CHY3402,** *CHY8420, CHY8421, CHY8422, CHY8425, CHY8426*
D4	Assess and form an opinion of other people's work	**CHY2001, CHY2101, CHY3401, CHY3402**
D5	Find information from a range of sources	**CHY2102, CHY3105, CHY3305, CHY3009**
D6	Be self-reliant	**CHY3009**, *CHY8425*
D7	Critically evaluate data to solve chemical problems of an unfamiliar nature	**CHY3009,** *CHY8423, CHY8425*