

**PROGRAMME SPECIFICATION**

<b>1</b>	<b>Awarding Institution</b>	Newcastle University
<b>2</b>	<b>Teaching Institution</b>	Newcastle University
<b>3</b>	<b>Final Award</b>	MChem Hons
<b>4</b>	<b>Programme Title</b>	Chemistry with Medicinal Chemistry Chemistry with Medicinal Chemistry with Industrial Training
<b>5</b>	<b>Programme Code</b>	F123, F124
<b>6</b>	<b>Programme Accreditation</b>	RSC
<b>7</b>	<b>QAA Subject Benchmark(s)</b>	Chemistry
<b>8</b>	<b>FHEQ Level</b>	Level 7
<b>9</b>	<b>Last updated</b>	Sept 2014

**10 Programme Aims**

- 1 to enthuse students to chemistry by educating them with a thorough understanding of organic, inorganic, medicinal, core physical and essential biological chemistry, to an advanced level 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 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 research, chemistry-related disciplines or other professions, including critical awareness of recent advances in the chemical sciences. To develop students' practical skills including assessing risks so they can work in the laboratory safely;
- Industrial Training
- 6 to provide the opportunity for students to apply their skills in an industrial environment.

**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 Chemistry related issues with an awareness to other disciplines

A8 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 the students learn advanced practical methods and specialist theoretical material (**A1- A4**). Stage 3 students out on placement 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 research 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 with Chemical Toxicology, Chemotherapy and Enzymology at Stage 3.

Specialist aspects related to their placement are covered during their year in industry (**A6**).

### Assessment Strategy

Knowledge and understanding is assessed through unseen written examinations and in-course assessments (**A1, A3 – A5, A7**), answers to questions in practical reports (**A2**), the Stage 3 Research Literature project (**A6**) and oral examinations eg in the Stage 4 project (**A2, A6, A7**).

**A6 - A8** are also assessed through the Industry placement.

### 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 Analytical Methods and their Applications, Stage 2 in Group Assignment and Stage 3 Research Literature Project 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. Students develop skills **B1** and **B4** during their Stage 3 project work while in Industry.

### 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 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
C4	Work on a project in an industrial environment.

#### **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. While in Industry and in Stage 4 the students learn to plan and design the experiments for themselves (**C2**, **C3** and **C4**). At Stage 4 students work with a greater level of independence and perform more technically demanding procedures. 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 at Stages 1 and 2. At Stage 3 the students' practical competence is tested in the Advanced Practical laboratory (**C1 - C3**). At Stage 4 students are assessed in the Stage 4 Research Project module by oral presentation and examination, and writing-up of the project report (**C3**). **C3** and **C4** are assessed through the placement 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 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**.

Students further develop skills **D1 - D3** and **D5 - D7** when on placement in Industry.

#### **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 Literature Project at Stage 3 and the Research Project at Stage 4 evaluate skills **D1 - D7**. 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) and with Industrial Placement (if chosen). 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 the MChem Chemistry course is that students undertake research training and a research project in the area of medicinal chemistry at Stage 4. More advanced chemistry topics are taught at Stage 4 with modules including Advanced Methods in Drug Discovery, and Selectivity and Stereocontrol in Organic Synthesis.

A special feature of the MChem Chemistry with Industrial Training 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.

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 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*

ABB including Chemistry. No additional science required but Mathematics, Physics, Biology preferred. GCSE Mathematics grade B required if not offered at a higher level.

AABBB at Higher Grade including Chemistry. No additional science required but Mathematics, Physics, Biology preferred. 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 34 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 candidates will have a chance to meet staff and current students and will have a tour of the School.

*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 and Pastoral support*

Each undergraduate and taught postgraduate student will be assigned a personal tutor.\* A personal tutor is one part of a wider network of advice and guidance available to students to support their personal and general academic development. The module leader acts as the first point of contact for subject-specific academic advice. Thereafter the Degree Programme Director or Head of School may be consulted. Issues relating to the programme may be raised at the Student-Staff Committee, and/or at the Board of Studies. Within the academic unit, students may also receive additional academic and pastoral advice from a range of other student-facing staff including degree programme directors, dissertation/project supervisors, and administrative support staff.

\*Arrangements may vary for students taking special types of provision.

The University also offers a wide range of institutional services and support upon which students can call, such as the Writing Development Centre, Careers Service and Student Wellbeing Service. This includes 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 team 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 Teaching and Learning Committee. Student opinion is sought at the Student-Staff 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 Student-Staff Committee.

*Student evaluations*

All modules and stages\* are subject to review by student questionnaires. Informal student evaluation is also obtained at the Student-Staff 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.

\*With the exception of intercalating years and the final stages of undergraduate programmes.

*Mechanisms for gaining student feedback*

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

### *Faculty and University Review Mechanisms*

Every six years degree programmes in each subject area undergo periodic review. This involves both the detailed consideration of a range of documentation, and a review visit by a review team (normally one day in duration) which includes an external subject specialist and a student representative. 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*

## **16 Regulation of assessment**

### *Pass mark*

The pass mark is 50% at Stage 4 and 40% at Stages 1 to 3.

### *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*

The marks from **Stages 2, 3 and 4** will contribute to the final classification of the degree  
The weighting of marks contributing to the degree for **Stages 2, 3 and 4 is 1:2:2.**

### *Common Marking Scheme*

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

	<b>Modules used for degree classification (DC)</b>	<b>Modules not used for degree classification</b>
<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 the University 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/postgraduate/>

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

Module	Type	Intended Learning Outcomes			
		A	B	C	D
CHY1101	Compulsory	1, 2, 3, 7	1, 2, 3	1	1, 2, 3, 6
CHY1102	Compulsory	5	1, 2, 3		1, 3, 6
CHY1201	Compulsory	1, 2, 3, 7	1, 2, 3	1	1, 2, 3, 5, 6, 7
CHY1204	Compulsory	1, 2, 3, 7	1, 2, 3	1	1, 2, 3, 6, 7
CHY1205	Compulsory	1, 3, 5	1, 2, 3		1, 3, 6, 7
CHY1301	Compulsory	1, 2, 3, 4, 7	1, 2, 3	1	1, 2, 3, 6, 7
CHY1402	Compulsory	3, 4, 7	1, 2, 3		3, 6, 7
CHY2001	Compulsory	3, 4, 7	2, 3		1, 2, 3, 4, 5, 6, 7
CHY2003	Compulsory	5	2, 3		1, 3, 6, 7
CHY2101	Compulsory	1, 2, 3, 4, 7	1, 2, 3	1	1, 2, 3, 5, 6, 7
CHY2102	Compulsory	5	2, 3		1, 3, 5, 6, 7
CHY2103	Compulsory	5, 7	2, 3		1, 3, 5, 6, 7
CHY2201	Compulsory				
CHY2301	Compulsory				
CHY2401	Compulsory				
CHY3011	Compulsory				
CHY3108	Compulsory				
CHY3109	Compulsory	2, 3, 4, 5, 7	1, 2, 3	1, 2	1, 2, 3, 5, 6, 7
CHY3306	Compulsory				
CHY8411	Compulsory	1, 2, 3, 4, 6, 7	1, 2, 3, 4	1, 2	1, 2, 3, 5, 6, 7
CHY8421	Compulsory	1, 3, 4, 7	1, 2, 3		1, 6, 7
CHY8430	Compulsory	1, 6, 7	2, 3		1, 5, 6, 7
CHY8420	Optional	6, 7	2, 3		1, 5, 6, 7
CHY8422	Optional	1, 6, 7	2, 3		1, 5, 6, 7
CHY8423	Optional	1, 3, 6, 7	1, 2, 3		1, 3, 5, 6, 7
CHY8424	Optional	1, 6, 7	2, 3		1, 5, 6, 7
CHY8425	Optional	1, 6, 7	2, 3,		1, 5, 6, 7
CHY8428	Optional	1, 3, 6, 7	1, 2, 3		1, 3, 5, 6, 7
<b>Year Out</b>					
CHY3105	F106/F107	1, 2, 3, 4, 7	1, 2, 3		1, 2, 3, 5, 6, 7
CHY3305	F106/F107	1, 2, 3, 4, 7	1, 2, 3		1, 2, 3, 5, 6, 7
CHY8310	F106/F107	8	4	3, 4	1, 3, 5, 6