PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	BSc Hons
4	**Programme Title**	Chemistry Chemistry with Industrial Training
5	**Programme Code**	F100, F102 F109
6	**Programme Accreditation**	RSC (Currently only applies to F100 and F102)
7	**QAA Subject Benchmark(s)**	Chemistry
8	**FHEQ Level**	Level 6
9	**Last updated**	August 2021

10 Programme Aims

1 to enthuse students to chemistry by educating them with a thorough understanding of organic, inorganic and physical chemistry, including the 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 provide training in problem solving, communication skills, numeracy and information technology;
4 to equip students with skills that enable them to pursue careers in chemistry, chemistry-related disciplines or other professions;
5 to develop students' practical skills including assessing risks so they can work in the laboratory safely.
6 to provide the opportunity for students to apply their skills in an industrial environment
7 to provide students with the opportunity to study chemistry in a prestigious university in another country and experience the culture of that country for a year
8 provide students with the experience of seeking and securing a position with an employer.
9 facilitate independent self-management and proactive interaction in a non-university setting
10 provide a period of practical work experience that will benefit current academic study and longer term career plans
11 enable students to ethically apply their knowledge and skills in the work place, reflect upon their development and effectively evidence and articulate their learning in relevant future settings

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, computational methods
A5 Chemistry related issues with an awareness of the relation with other disciplines

Industrial Training
A6 Some aspects of industrial chemistry

A7 Apply personal and professional development strategies to prioritise, plan and manage their own skills, development and learning.

A8 Research, select and apply relevant knowledge aimed at enhancing their own skills and effectiveness in specific duties at their placement

A9 Demonstrate an understanding of a work environment, how it functions and their contribution to it

A10 Relate their work based learning to other areas of personal development, including academic performance

Teaching and Learning Methods

Students acquire understanding and knowledge (the complexity of which increases as the course progresses) through lectures, tutorials and workshops (**A1**). 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 and on placement they also consolidate the learning started in lectures (**A1**, **A2**, **A4, A6**) and improve on skill **A3**. At Stage 3, the students learn advanced practical methods and more specialist theoretical material **(A1 - A4,)**. On placement the students learn **A6**. 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 **A5** in modules throughout the programme, particularly related to biology, medicinal and materials. Specialist aspects are covered at Stage 3.

Specialist aspects related to their placement are covered during their year in industry **(A6-A10) via interaction with industrial supervisors supported by the academic placement lead**.

Assessment Strategy

Knowledge and understanding is assessed through unseen written examinations and in-course assessments (**A1**, **A3**, **A4, A6**), answers to questions in practical reports (**A2**) and oral examinations e.g. in the advanced practical course housed in the relevant IOP modules (**A2**), and the working in Industry (**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 in terms of current underlying theory
B4 Independently plan and undertake a project

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 Professional Development and Employability Skills 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 practical sessions housed in the Advanced Chemistry modules and during their placement. Students develop skills **B1** and **B4** during their project work while in Industry or in a chemistry research laboratory abroad.

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**. Aspects of Stage 3 Advanced Practical Chemistry modules (housed in the relevant IOP modules) and the Research Literature Project allow 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 being able to conduct documented laboratory procedures including measurement of chemical properties.
C2 Plan and undertake an advanced practical course.
C3 Work on a project in an industrial environment or in a research laboratory abroad.

Teaching and Learning Methods

Students receive close supervision from postgraduate demonstrators and 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. On placement and in aspects of the Stage 3 Advanced Practical sessions (housed within the relevant IOP modules) the students learn to plan and design the experiments for themselves (**C2, C3**), 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 Stage 3 the student's practical competence is tested in the Advanced Practical laboratory sessions (**C1, C2**).

C3 is the placement in Industry or in a research laboratory abroad, but is not formally assessed as part of the degree programme.

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
D7 Critically evaluate data to solve chemical problems

D8 Reflect on and manage own learning and development within the workplace

D9 Use existing and new knowledge to enhance personal performance in a workplace environment, evaluate the impact and communicate this process

D10 Use graduate skills in a professional manner in a workplace environment, evaluate the impact and communicate the personal development that has taken place

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, 'Professional Development and Employability Skills' 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 stage 1 as part of the Organic Chemistry in the context of a series of problem sheets, a practical course (Stage 2 Organic), Structural Chemistry **(D3)** and the Professional Development and Employability Skills (**D4**). Students further develop skills **D1, D3 – D6** and practise skill **D7** during the Stage 3 Advanced Practical sessions. Solving challenging unseen problems at Stage 3 also develops skill **D7**.

Students further develop skills **D1 - D3** and **D5, D6 and D8-10** when on placement in Industry or in a research laboratory abroad.

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 'Professional Development and Employability Skills' module by peer assessment of individual contributions to the group effort and of a group presentation. The Stage 3 Advanced Chemistry modules evaluate skills **D1** - **D7**. In the Research Literature Project students have to summarize their

understanding of aspects of the literature in the form of a short oral presentation, a chemical communications exercise and a project plan (**D1, D3, D5 - D7**).

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The degree programme is offered full-time (3 years) and with Industrial Placement or Study Abroad (if chosen) (4 years). Students have to take 120 credits at each stage for a total of 360 credits. All students take the compulsory modules outlined in each year.

All placements will be undertaken in line with the University's placement policy http://www.ncl.ac.uk/ltds/assets/documents/qsh-workplacement-pol.pdf

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

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 programme up to the start of Stage 3. All transfers are subject to a student's academic performance. The Professional Development and Employability Skills (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 a major part of many modules and at Stage 3 there is a dedicated Stage 3 research literature project. 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.

The main special feature of this programme is that the students spend a year working in the chemical industry or at a prestigious University abroad between Stages 2 and 3. A student will find his/her own industrial placement on a competitive basis and obtain the position by interview with a company. The year in industry or abroad is not assessed.

Programme regulations (link to on-line version)

F100 F102 Regulations

F109 Regulations

13 Support for Student Learning

Generic information regarding University provision is available at the following link.

https://www.ncl.ac.uk/ltds/assets/documents/qsh_progspec_generic_info.pdf

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

Generic information regarding University provision is available at the following link.

https://www.ncl.ac.uk/ltds/assets/documents/qsh_progspec_generic_info.pdf

Accreditation reports

Royal Society of Chemistry

Additional mechanisms

n/a

15 Regulation of assessment

Generic information regarding University provision is available at the following link.

https://www.ncl.ac.uk/ltds/assets/documents/qsh_progspec_generic_info.pdf

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

The University Prospectus: http://www.ncl.ac.uk/undergraduate/degrees/#subject

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

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.