PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	MSc
4	**Programme Title**	Drug Chemistry
5	**UCAS/Programme Code**	5099 F/P
6	**Programme Accreditation**	N/A
7	**QAA Subject Benchmark(s)**	Chemistry
8	**FHEQ Level**	Level 7
9	**Last updated**	May2023

10 Programme Aims

1. To provide advanced training in modern drug chemistry
2. To provide an appreciation of how new drugs are developed, from the therapeutic target selection and validation, the conceptualisation of the drug using molecular modelling techniques and the development in the laboratory, to their application, testing and subsequent industrial production
3. To provide an overview of the chemistry pertinent to modern drug design, as practiced in the pharmaceutical industry and in academia
4. To provide training in topics which constitute the “holy grail” of modern drug design and to introduce potential therapies not yet established commercially
5. To enable the student to achieve a high level of research competence and to gain experience through training in relevant aspects of laboratory work, including COSHH and safety
6. To provide the student with enhanced presentational skills

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 know:

A1 The three main branches of drug chemistry (organic, medicinal, computational)
A2 Practical laboratory: synthetic and computational
A3 Data analysis and numeracy
A4 Spectroscopy and chemical characterisation
A5 Specialist aspects of drug chemistry
A6 Research methods

Teaching and Learning Methods

Students acquire understanding and knowledge through lectures, seminars and workshops (**A1, A5**). In the laboratory classes they consolidate the learning started in lectures by performing carefully designed and tested experiments (**A1, A2, A4**) and apply data analysis skills (**A3)**. Modules cover some specialised areas of drug chemistry (**A5**), where the Research Project allows application and extension of taught material to the research environment (**A1–A6**). Throughout the period of the programme 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.

Assessment Strategy

Knowledge and understanding is assessed through unseen written examinations and in-course assessment (**A1, A3–A5**), practical reports (**A2**), the research dissertation and oral presentations on the Research Project (**A1–A6**).

Intellectual Skills

On completing the programme students should be able to:

B1 Critically evaluate data
B2 Apply learnt knowledge to unseen problems
B3 Analyse and interpret data
B4 Independently plan and undertake a research project

Teaching and Learning Methods

Intellectual skills are developed by means of the teaching and learning programme described above. Students apply the concepts learnt to problems in laboratory work, seminars and coursework assignments (**B1–B3**). Students develop skills **B1–B4** in the design and conduct of the Research Project.

Assessment Strategy

Problem solving components of taught modules present in examinations and course work assess skills **B1–B3**. The Research Project, assesses skills **B1–B4** through written reports, oral presentations and the research dissertation.

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

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**). Due to the diverse backgrounds of students on the programme initial experiments in a semester 1 module covering methods and techniques in drug chemistry have detailed procedures. Later experiments allow students to plan and design their experiments, work with a greater level of independence and perform more technically demanding procedures (**C2**). The research project allows the students to plan and undertake research requiring diverse practical techniques. Research teams require coordination of the effort to achieve the desired goal (**C3**).

Assessment Strategy

C1 and **C2** are assessed through practical reports. In addition to the final report, written and oral presentations are used to assess the planning and outcome of the Research Project (**C3**).

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 and use when required

Teaching and Learning Methods

Both lecture courses (through assignments) and practical courses require the students to produce regular written work which is submitted to deadlines (**D1, D3, D5, D6**). Assignments may also require critical evaluation and interpretation of data (**D7**). Both the methods and techniques for drug chemistry module and the Research Project provide the opportunity for students to plan work and solve problems as part of a team (**D2**). Peer assessment is introduced in a formative sense in the methods and techniques for drug chemistry module and through the planning of the Research Project (**D4**). All skills (**D1–D7**) are further developed through the Research Project.

Assessment Strategy

Written work and oral examinations are used to assess skill **D1**. Assignments as part of the taught modules assess **D1, D3, D5–D7**. The Research Project evaluates skills **D1–D7**. **D4** is addressed by peer assessment of individual contributions to the group effort and of team presentations on the Research Project. In addition skill **D2** is assessed in the methods and techniques for drug chemistry module and through research preparation and development.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The programme runs for 12-months from late September, across 3 Semesters. It comprises 180 credits, including 120 credits taught (Semesters 1 and 2) with 60 credits allocated to the consultancy project (mostly undertaken during Semester 3). 170 credits of modules are compulsory, with taught modules either 10- or 20-credit valency, taught in block weeks. The programme is offered in full time mode (1 year) or part time mode (2 years) and successful completion of the programme leads to the award of the MSc degree.

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

The taught programme highlights the key role of organic synthesis in drug discovery, including combinatorial synthesis, the use of radioisotopes, the concept of molecular recognition in the context of drug design and delivery.

The programme surveys the routes by which drugs are absorbed and metabolised in the human body and details mechanisms of toxicity, reviews the mechanisms of action of the major drug classes used to treat infectious disease and cancer and demonstrates how modern drug design is performed.

The programme equips students with solid foundations in structural biology, protein biochemistry, and proteins as drug targets – from principles governing protein structure and dynamics, drug-protein interactions, through pharmacology, to modern methods in protein structure prediction, protein molecular modelling, molecular simulations of drug-protein complexes, and structure-guided drug design.

The research project and dissertation will provide training in how to tackle and how to communicate the results of a significant research problem in drug chemistry.

The relevance of the programme to the pharmaceutical industry will be assured through the involvement of visiting scientists from leading pharmaceutical companies.

Programme regulations (link to on-line version)

5099FP: -R5099FP

13 Support for Student Learning

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

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. Generic Information *Accreditation reports* N/A *Additional mechanisms* N/A

15 Regulation of assessment
Generic information regarding University provision is available at the following link. Generic Information

In addition, information relating to the programme is provided in:
The University Prospectus: https://www.ncl.ac.uk/postgraduate/ 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.