PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	BSc (Hons)
4	**Programme Title**	Biology (Cellular and Molecular) and Biology (Cellular and Molecular with Placement).
5	**UCAS/Programme Code**	C1C7; CC17
6	**Programme Accreditation**	Not applicable
7	**QAA Subject Benchmark(s)**	Biosciences
8	**FHEQ Level**	Level 6
9	**Date written/revised**	August 2021

10 Programme Aims

1. Develop a thorough knowledge and understanding of organisms, including microbes, plants and animals, with an emphasis on the cellular and molecular basis of their biology.
2. Introduce the main disciplines underpinning a full understanding of biology, including molecular biology, biochemistry, cell biology, physiology, genetics, ecology, evolution and systematics.
3. Progressively develop the laboratory practical and analytical skills required for the study of cellular and molecular biology.
4. Provide a curriculum enhanced by an active research environment that engenders critical thinking.
5. Stimulate a wide interest in biological topics including an awareness of how current developments may affect the present and future well-being of society and the planet.
6. Provide graduate-level training in key skills including the ability to communicate in a variety of contexts, utilise IT and library resources efficiently, process and interpret quantitative data, manage time effectively, and work independently and in teams.
7. Provide a flexible programme covering all aspects of biology (with a cellular and molecular emphasis), incorporating the elements specified in the benchmark statement for Biosciences issued by the Quality Assurance Agency.
8. Provide a curriculum which meets the criteria for BSc. Honours Degree level in the Framework for Higher Education Qualifications issued by the Quality Assurance Agency.
9. Provide students with the experience of seeking and securing a position with an employer.
10. Facilitate independent self-management and proactive interaction in a non-university setting.
11. Provide a period of practical work experience that will benefit current academic study and longer term career plans.
12. 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 Biosciences.

Knowledge and Understanding

On completing the programme students should have:

A1 A knowledge of biology from the molecular to the organism level.
A2 An understanding of the functioning of plants, animals and micro-organisms, with particular reference to the cellular, biochemical, molecular genetic and genomic levels of organisation.

A3 A knowledge of the diversity of living organisms and the principles underlying classification, with an understanding of evolutionary processes.
A4 An appreciation of how basic knowledge of cellular and molecular biology can be used for practical applications, with an emphasis on biotechnology.
A5 An appreciation of the broader significance and impact of recent advances in biological science on contemporary society and the future.
A6 Apply personal and professional development strategies to prioritise, plan and manage their own skills development and learning.
A7 Research, select and apply relevant knowledge aimed at enhancing their own skills and effectiveness in specific duties at their placement.
A8 Demonstrate an understanding of a work environment, how it functions and their contribution to it.
A9 Relate their work based learning to other areas of personal development, including academic performance.

Teaching and Learning Methods

Teaching Strategy
A1-A5 are principally imparted through lectures, enhanced and supplemented with co-ordinated practical work or additional learning delivered by means of appropriate CAL tasks, written assignments and seminars. Many of the lecture courses at Stage 3 are crucial in delivering A5 as they provide knowledge and insights at the 'cutting edge'. These, together with the study skills module Academic and Professional Skills for the Biosciences, also address the social and ethical aspects involved in A5.

Learning Strategy
Throughout the taught component of the course, students are encouraged and expected to engage in independent study, and are supported in this by the provision of reading lists, handouts and direction to many library and web-based resources (including e-journals).

Assessment Strategy

Assessment Strategy
Assessment is partly by unseen written examinations (essays, short answers, data interpretation, missing words, multiple choice) but also via coursework. Most modules at Stages 1 and 2 include some coursework, thus ensuring that elements of formative, as well as summative, assessment and a variety of assessment methods are employed. At Stage 3, the distribution of exam- and assignment-assessed work is more polarised between modules, although, as at Stages 1 and 2, each forms a major part of the whole Stage 3 assessment.

The level of academic achievement required under these strategic objectives is consistent with the award of a B.Sc. Honours Degree according to the FHEQ guidelines.

Intellectual Skills

On completing the programme students should have acquired

B1 The ability to use the scientific method by formulating and testing hypotheses and to identify key data which allow such tests to be made.
B2 The ability to interpret and effectively summarise quantitative data to test hypotheses, including statistical analysis and interpretation.
B3 The ability to critically assess the value and limitations of existing information on a given subject and produce critical reviews of such information.

Teaching and Learning Methods

Teaching Strategy

Scientific (cognitive, numerical and analytical) skills (B1, B2) are introduced at Stage 1, and more specifically, via the study skills module Academic and Professional Skills for the Biosciences. These skills are further developed at Stage 2 through an experimental design and statistics module specifically for biologists and reinforced at Stage 2 via practical classes and the associated preparation of laboratory reports. B3 is also specifically addressed in the study skills and the experimental design and statistics modules. During Stage 3, B1-3 are all practised in an individual project based module.

Learning Strategy

Students are encouraged to acquire B1-2 skills early via the study skills module. They then have to rehearse these skills repeatedly in preparing a variety of laboratory and field practical reports at Stage 2. At Stage 2 Experimental Design and Statistics for Biologists offers repeated opportunities for practice of B3. The Stage 3 Biological Research Project requires students to design their own experiments (B1), analyse data yielded (B2), and appraise the quality of the data collected (B3). The Biological Literature Review and the Biological Information Project focus more on B3.

Assessment Strategy

All intellectual skills are assessed by means of coursework reports and/or small team outputs such as posters or talks in Stages 1 and 2. At Stage 3 some or all of B1-3 (depending on topic) are also examined by means of the dissertation.

The level of academic achievement required under these strategic objectives is consistent with the award of a B.Sc. Honours Degree according to the FHEQ guidelines.

Practical Skills

On completing the programme students should have acquired:

C1 Skills in quantitative techniques, including statistical analysis.
C2 Experimental skills including development of a hypothesis and the design, execution and evaluation of experiments using traditional and modern techniques and equipment.
C3 An ability to obtain record and interpret data from experiments and information in various forms from the literature, including electronic sources.
C4 Critical evaluation of data and information in terms of its quality.
C5 The ability to present data in written format according to accepted conventions for scientific communication.

Teaching and Learning Methods

Teaching Strategy

C1, C3 and C4 are introduced at Stage 1 with the study skills module. Practical classes associated with many modules during the first two years and also practical-intensive modules in Stage 2 progressively develop C1, C2 and C3 which are greatly enhanced by the individual research project in the final year. The project modules also make a major contribution to C3, C4 and C5, as too does a specific Stage 2 module focussing on experimental design and statistics for biologists. From the first year students are required, after appropriate guidance, to search the literature for information and submit all written work in an appropriate scientific format so that by the final year C5 and the literature searching skills of C3 are thoroughly integrated into all submitted work.

Learning Strategy

Students are encouraged to develop appropriate quantitative and practical skills (C1-C4) by monitored attendance at and practice of skills in formal classes during the first two years and at the start of Stage 3 through practice and discussion with their supervisor as part of their final year project. From the first year all written work must be submitted in an appropriate scientific format and feedback on such work enhances learning of the skill outlined in C5.

Assessment Strategy

Biochemical quantitative techniques, in C1, are partly assessed through unseen examinations in Stage 1. The whole of C1 together with C2, C3 and C5 are also assessed through coursework (laboratory reports, completion of quantitative and statistical calculation sheets, essays) during

the first two years.C1 to C5 form a major part of the assessment of the final year project, with the weighting depending on the type of project.

The level of academic achievement required under these strategic objectives is consistent with the award of a B.Sc. Honours Degree according to the FHEQ guidelines.

Transferable/Key Skills

On completing the programme students should be able to:

D1 Communicate technical information by means of clear written and spoken presentations, following the acceptable conventions for scientific interchange.
D2 Use library and IT sources efficiently and critically.
D3 Plan and prioritise work activities in order to meet deadlines.
D4 Work independently with initiative, and also synergistically in teams.

In addition, students opting to take modules covering employability skills at Stage 2 or creativity and marketing at Stage 3 have the opportunity to develop and demonstrate some or all of the following skills:

D5 The ability to submit effective applications for employment.
D6 Self-appraisal skills with regard to the development of workplace skills.
D7 The ability to produce a development plan to help overcome identified skills weaknesses.
D8 The ability to demonstrate personal achievement by preparation of a suitable portfolio of evidence.

For students on the Placement Year programme:
D9 Reflect on and manage own learning and development within the workplace.
D10 Use existing and new knowledge to enhance personal performance in a workplace environment, evaluate the impact and communicate this process
D11 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

Teaching Strategy

Management of workload in order to meet deadlines (D3) is promoted by means of a strict coursework timetable. All key skills (D1-4) are formally introduced in the Stage 1 study skills module. Key skills D1-4 are further developed at Stage 3 through the project. Team working skills (D4) are developed through supervised group exercises in the laboratory in Stage 2. For those students taking the Stage 2 module focused on employability skills, lectures and tutorials help to develop D5-D8, and D6-D8 are further developed in the workplace under guidance from the Placement Tutor and the workplace supervisors. In the Stage 3 optional module focusing on creativity and marketing, D6 and D8 are developed through group meetings. For those students taking a Placement year, preparation for the placement helps to develop D5 and D6-D11 are developed in the workplace with guidance from the Careers Service and the workplace supervisors.

Learning Strategy

The learning of these skills by practice with feedback, together with formative and summative assessment, is embedded in the curriculum at all Stages and in the great majority of modules. There are also specific modules at each Stage that give explicit opportunities in this area. Students frequently submit reports based on their own laboratory work, conducted in teams or alone (D1,D4). Individual verbal presentations are assessed in the Stage 2 Experimental Design and Statistics for Biologists module and formative feedback is given (D1, D2). The application of D1, D3 and D4 are particularly practised in a Stage 2 module focussing on biotechnological methods, their principles, theory and practice. Talks are required in addition to the dissertation as outputs from the Biological Literature Review and other media are routinely used to produce outputs for the Biological Information Project. The optional modules on employability skills and creativity and marketing help students to develop their understanding of business processes within a scientific framework.

Assessment Strategy

D1 and D2 are assessed repeatedly by means of coursework (laboratory reports) at all 3 Stages. The ability to critically assess and review existing information is specifically tested in the Stage 1

study skills module and in the project at Stage 3. Skills D5 to D11 are tested through work placement plans and reflective reports.

The level of academic achievement required under these strategic objectives is consistent with the award of a B.Sc. Honours Degree according to the FHEQ guidelines.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The following principles have been followed within this degree programme with respect to its overall structure:

- **Stage 1** modules are broad in scope and complementary in subject area. They are chosen so that all Stage 1 students receive the same solid grounding in all fundamental areas underpinning biology, regardless of entry qualifications. Study and reading patterns are quite strongly directed but students can choose optional modules to a value of 20 credits.

- **Stage 2** modules are more specialised, relating more closely to the specifics of the subject. As such, they are shared with fewer other degree programmes. In general, study is more self-driven than at Stage 1, and students are encouraged to develop a more individual and original approach to reading and report writing. Some modules are based around techniques, so that at the end of Stage 2, students should be competent to carry out basic cellular, biochemical and molecular biological analyses. Students will also have had some experience of critically reviewing research literature, experimental design and data analysis, and the presentation of written and spoken reports resulting from their own work.
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  - The placement year option occurs between Stages 2 and 3. The year allows students to experience first-hand the application of biology in industrial situations. It enhances the understanding of concepts and processes covered theoretically in Stages 1 and 2 and puts much of the students' previous knowledge into context.

Stage 3 modules are yet more specialised and research-informed. Much time is taken up with individual research work in the laboratory or library. Students are expected to apply the techniques and knowledge they have learnt in earlier Stages to specific tasks. Work should be highly self-directed, and revolve around the study of recent research-based literature. High quality work at this level should combine all the knowledge and skills objectives listed in the preceding sections.

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

The cellular and molecular strand, as well as giving a sound background in general biology, focuses on the molecular and physiological basis of biology from the sub-cellular to the whole-organism level. These provide the core of compulsory modules on the programme, with the option to select complementary modules on business, pollution, and human nutrition. In addition to providing a broad base of knowledge on cellular and molecular biology, the practical application of this knowledge is emphasised in areas such as genetic modification of microbes, animals and plants, and bioremediation. There is a high content of laboratory practical work, including a week-long laboratory workshop that gives students direct practical experience of key standard molecular biological techniques. During the course of the degree programme, students also develop skills in the critical analysis and communication of scientific information. As a whole, the degree programme allows students to undertake an academically coherent study of biology with a focus topics centred on cellular and molecular function. The option to undertake a Placement Year in industry is unique to this stand of our Biology degree programmes and provides students with real workplace experience and the opportunity to reflect on career development

Programme regulations (link to on-line version)

C1C7 Biology (Cellular and Molecular Biology)

CC17 Biology (Cellular and Molecular Biology) with Placement Year

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

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 Learning and Teaching 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.

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.