PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	MSci
4	**Programme Title**	Biochemistry Biochemistry with Professional Placement Year Biochemistry with Placement Year Biomedical Genetics Biomedical Genetics with Professional Placement Year Biomedical Genetics with Placement Year Biomedical Sciences Biomedical Sciences with Professional Placement Year Biomedical Sciences with Placement Year
5	**UCAS/Programme Code**	C701 / C704 / 1307U B903 / B904 / 1308U B900 / B944 / 1309U
6	**Programme Accreditation**	Royal Society of Biology Advanced Accreditation
7	**QAA Subject Benchmark(s)**	Biomedical Science; Bioscience
8	**FHEQ Level**	7
9	**Date written/revised**	May 2023

10 Programme Aims

The programme aims to recruit high quality students who are committed to a career in science. The degree will comprise the curriculum followed by current BSc students through years 1-3. The fourth year, which offers a choice of M level modules (40 credits) together with a substantial laboratory project (80 credits) will allow students to acquire higher level knowledge in selected disciplines aligned to the research strengths of the Faculty and to gain additional practical laboratory experience to prepare them for a research-based career. The option to take a professional placement year between stages 2 and 3 will enhance the employability of students.

The academic aims of the programme are as follows:

- To produce graduates who have a sound knowledge and understanding in Biochemistry, Biomedical Genetics or Biomedical Sciences as appropriate and specialised knowledge of specific areas, particularly that covered by their 4th year project, at a level at the forefront of the discipline.
- To produce graduates who have a core knowledge and understanding in the subject areas of physiology, biochemistry, molecular genetics, immunology, microbiology, human anatomy and pharmacology and who can apply this knowledge to the study of human health and disease with respect to their named degree**.**
- To produce graduates who have a knowledge of selected areas appropriate to their named degree at the forefront of the discipline.
- To produce graduates who have a multidisciplinary approach to understanding the functioning of the human body in health and disease and a knowledge of current

major advances in the scientific understanding of human health and disease.

- To develop students' intellectual and general transferable (key) skills including the ability to communicate effectively, to use digital and library resources appropriately, to prioritise work and to meet deadlines, to work alone and with others, to adopt a creative approach, use initiative and solve problems, to use critical and analytical skills to analyse biological questions of interest, propose solutions and to critically assess alternatives.
- To produce graduates who have well developed practical skills in relation to the biosciences, have an awareness of good practice in laboratory work and health and safety, and are able to apply quantitative and qualitative analysis to biological investigations and presentational skills including data analysis and statistics.
- To produce Masters level graduates who are capable of working independently in the laboratory to undertake an extended research project with a low level of supervision, who are able to design and conduct experiments to test a hypothesis.
- To produce graduates who have shown originality in the application of knowledge and understand how the boundaries of knowledge are advanced through research.
- To produce graduates who have an understanding of ethical reasoning and the ethical issues associated with current biomedical research.
- To provide a flexible programme which leads to a qualification which meets the criteria for a Masters degree laid down in the QAA's National Qualifications Framework and which fully meets the Quality Assurance Agency Benchmarking Statement in Biosciences and the Benchmarking Statement in Biomedical Sciences, except those elements of the Benchmark Statements for Biomedical Sciences which relate specifically to the provision of accredited status of the Institute of Biomedical Sciences.
- To produce graduates with the qualities needed for employment in circumstances requiring sound judgment, personal responsibility and initiative, in complex and unpredictable professional environments.
- To produce graduates capable of working in a wide variety of careers, including: 1) careers in biomedical and related sciences in research and development 2) careers in education 3) graduate careers in which there is greater emphasis on non-subject specific skills and 4) for further advanced study.

In addition, the optional professional placement year will:

- Provide students with the experience of seeking and securing a position with an employer.
- Facilitate independent self-management and proactive interaction in a workplace setting.
- Provide a period of practical work experience that will benefit current academic study and longer-term career plans.
- Enable students to ethically apply their knowledge and skills in the workplace, reflect upon their development and effectively evidence and articulate their learning and relevant future settings.

Aims in relation to the needs of stakeholders:

The programmes aim to ensure that our graduates are equipped at a Masters level with a current understanding and knowledge of their subject area and those specific practical skills that meet the needs of employers (including PhD Supervisors) of bioscientists with enhanced knowledge and skills. Whilst the degree is designed to support students wishing to pursue a research career, the development of both intellectual and transferable skills also ensures that our graduates are well equipped for the non-research job market. The inclusion of vocationally related components and emphasis on career development throughout the programme enhances the employability of our students. Successful completion of the year-long placement and the further enhanced employability this brings is immediately recognisable in the name of the degree.

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 and Biomedical Sciences.

Knowledge and Understanding

On successfully completing the programme students should have:

A1. Gained a core knowledge and understanding of the biomedical sciences and a variety of related disciplines.
A2. Gained a knowledge of the scope of the subject area.
A3. Gained an in-depth knowledge of selected areas of biomedical sciences up to current research level and developed an understanding of the experimental basis of this knowledge.
A4. Shown originality in the application of knowledge.

Students who have successfully completed a Professional Placement Year (BMS3030) will have:
A5. Developed an awareness of the context of a life science work environment including strategic imperatives and constraints.
A6. Applied their knowledge for life sciences in a professional context.

Students who have successfully completed the Placement Year (NCL3000/CMB3005) should be able to:
A7. Apply personal and professional development strategies to prioritise, plan, and manage their own skills, development and learning.
A8. Relate their placement-based learning to other areas of personal development, including academic performance.
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

The teaching and learning strategy is designed to encourage a progressive acquisition of knowledge and understanding. The first three semesters of the programme are concerned with providing a core knowledge and understanding of biomedical sciences and in semester 3 there is a focus on cell and molecular biosciences. Semesters 4-6 develop students' knowledge of the breadth and scope of biochemistry, biomedical sciences or biomedical genetics and an in-depth knowledge of selected areas and of the experimental basis of this knowledge up to the current research level (A2, A3). Semesters 7 and 8 (4th year) of study promotes students' ability to show originality in the application of knowledge (A4), through M level modules including both taught material and a major research project.

There is a gradual change of emphasis over the four taught years from strongly supported teaching, such as lectures which provide the core themes, the scope of the knowledge and understanding required, and explanation of concepts to a greater use of study groups and more independent self-directed learning from the scientific literature. The importance of a solid foundation of maths, biology and chemistry knowledge to successful studies is emphasised by the use of formative tests in each of these subject areas during the first few weeks of stage 1. Students use the tests to identify key areas that need support and are directed to remedial on-line and other forms of support material. Knowledge and understanding are further promoted by seminars and coursework (A1, A2, A3, A4), which allow students to explore material in more depth and to exchange ideas with staff and fellow students. Practical classes reinforce the taught curriculum (A1, A2). A3 and A4 are promoted through individual student projects and in-depth analysis of current research literature.

Students are provided with extensive, prioritised reading lists as well as digital resources and they are expected to use these to supplement the taught material, and to prepare for

seminars. Seminars allow for students to check their knowledge and understanding, and to develop their ability to apply this to novel situations. Study groups are used to reinforce the learning process and develop students as independent learners. Regular MCQ tests and feedback on laboratory reports and essays enable students to monitor the progress of their learning and understanding. In the final year capstone experience (research project) students are supported by one-on-one supervision to apply their knowledge and understanding to the development of hypotheses which can be critically analysed using independently sourced information.

A4 and A5 applicable to the programme with Professional Placement Year are acquired through a one-year professional placement which will also enhance their knowledge and understanding of academic material taught at the university.
A6-A7 are learning outcomes that are met by successfully completing the degree-focused placement year (BMS3030) or the more generic placement (NCL3000/CMB3005).

Assessment Strategy

Knowledge and understanding are primarily assessed via unseen written examinations. Understanding and the ability to apply knowledge is further assessed by coursework. The weighting of examination and coursework varies as appropriate to the module and most modules include some aspect of formative assessment.

The format of the unseen examination also varies as appropriate to the module and the level of study but can include multiple choice questions (MCQs) and Extended Matching Item (EMI)), structured short answer questions (SAQ), essays, problem solving, literature and data analysis.

The coursework element can include practical write ups/laboratory reports, study group tasks, oral presentations, posters, in course tests (normally EMI or MCQ), extended essays and timed essays.
Peer review may be employed in the assessment of study group tasks and presentations.

A4 to A5 are assessed by means of a report and oral presentation on the Professional Placement Year (BMS3030).
A6 to A7 are assessed by means of the report on the Placement Year (NCL3000/CMB3005).
These components must be passed for the degree 'with Placement Year' or 'with Professional Placement Year' to be awarded.

Practical Skills

On successfully completing the programme students should have:

B1. Mastered essentials of basic laboratory skills, safe working practices and the ability to carry out experiments accurately and responsibly.
B2. The ability to obtain, record, collate, analyse and interpret data from experiments.
B3. The ability to summarise and present such data according to scientific conventions.
B4. Developed the ability to use primary literature and bibliographic databases.
B5. Developed the ability to critically evaluate scientific information.
B6. Developed the ability to undertake independent, in-depth, research in a specific area of the biomedical sciences.
B7. Have shown originality in the application of knowledge and understand how the boundaries of knowledge are advanced through research.

Students who have successfully completed a professional placement year will also have:
B8. Further practiced and enhanced some or all of the above skills during a 1-year professional placement.

Teaching and Learning Methods

The core experimental skills of laboratory work and data handling (B1, B2 and B3) are progressively developed throughout the programme through a series of practical classes. Practical classes are supported by postgraduate demonstrators who undergo compulsory training offered by the School of Biomedical Sciences.

Students are introduced at Stage 1 to a Laboratory Code of Practice, where safety and responsibility in the laboratory are stressed.

Laboratory practical classes and seminars throughout the programme encourage students to evaluate critically scientific information in a range of forms (data from their own experiments, published papers and problem-solving tasks). Students are introduced at Stage 1 to a Laboratory Code of Practice, where safety and responsibility in the laboratory are outlined. Students are provided in their first and second year with training in the use of bibliographic databases including PubMed and Medline and referencing systems including Endnote. Laboratory practical classes and seminars throughout the programme encourage students to evaluate critically scientific information in a range of forms (data from their own experiments, published papers and problem-solving tasks). The ability to undertake research in relation to the subject specialism is developed progressively from group-based tasks early in the programme to individual in-depth research projects in the final year. Attendance at laboratory practical classes is compulsory and feedback on laboratory work and practical reports reinforces students' acquisition of basic experimental skills (B1-3). All submitted practical work must be presented according to scientific conventions. Feedback on assessed course work requiring the student to search bibliographic databases reinforces this skill (B4). Study Group tasks and seminars are used to encourage students to develop the confidence to evaluate critically scientific information and students are provided with feedback on these activities (B5). Feedback on study group-based and individual assignments enables students to improve their research skills and this is further reinforced at an advanced level by one-to-one supervision of research projects by experienced, research active academic staff (B6).

The professional placement year will provide a range of opportunities to attain higher level of competence and develop a wider range of practical skills (B8).

Assessment Strategy

At stage 1, students will be required to demonstrate a basic level of practical skills competence via a Practical Skills Test (B1). Practical reports require students to demonstrate the skills associated with experimental work (B1-B3), and these are further assessed at advanced level by the project supervisor's assessment of the student's competence, and the project reports, poster and oral presentation. Written assignments throughout the course will assess students' ability to undertake research and to use bibliographic databases (B4, B6) and this is further assessed in the project reports (B6, B7). The ability to critically evaluate scientific information (B5) is assessed by various written assignments and seminar presentations, by the project reports and by unseen examination.

At Stage 3 students are required to complete a project in a research active environment (B1-B6) which provides a strong base of experimental design upon which the major stage 4 based project can be based.

The ability to work independently in a research active environment (B6) is primarily assessed by the Stage 3 and Stage 4 project supervisors' assessment of competence and professionalism and the ability to show originality in the application of knowledge (B7) is assessed primarily through the project dissertations.

B8 is assessed by means of a report and oral presentation on the professional placement year, plus a satisfactory Placement Supervisor's report.

Intellectual Skills

On successfully completing the programme students will have:

C1. An ability to read and use scientific literature with a full and critical understanding, addressing content, context, aims, objectives, quality of information and its interpretation and application.
C2. An ability to critically evaluate information and data from a variety of sources, to interpret quantitatively and qualitatively scientific information, and to explain complex scientific ideas in written, visual, and oral form.
C3. An ability to assess the value and limitations of existing knowledge and experimental

techniques.
C4. An ability to use and integrate several lines of evidence to formulate key hypotheses, to test hypotheses using logical and consistent quantitative and qualitative arguments, and to identify key data in these processes in order to solve scientific problems.
C5. Developed skills of independent learning.
C6. An ability to deal with complex issues systematically and creatively, and to show originality in tackling and solving problems.

Students who have successfully completed a professional placement year will also have:
C7. An ability to solve problems in the work environment.

Teaching and Learning Methods

Intellectual skills (C1-C6) are progressively developed throughout the programme by practical work, study group tasks, seminar work, written work and the research projects.

At all stages students are encouraged to consider critically and evaluate information and experimental data from a wide variety of sources, including textbooks, the internet, and primary sources of scientific literature (C1-C5). In Stage 3 and Stage 4 students undertake research projects which support the development of all of the cognitive skills (C1-C6) and students are supported in this by one-to-one supervision. In seminar discussions students are supported in critically interpreting and discussing some of the latest scientific developments in relation to their subject with experts in the various fields of research and in developing skills of problem-solving in relation to complex material through the application of knowledge and understanding (C1-C6).

C7 is supported by the Placement Supervisor and monitored by the Academic Placement Officer during the Professional Placement.

Assessment Strategy

Intellectual skills are assessed via a range of coursework assignments including written exercises, seminar presentations and study group tasks. Unseen examinations further test the students' cognitive skills. The research projects have an important role in assessing all of the cognitive skills, including the ability to use scientific literature in a critical manner (C1), the ability to evaluate, interpret and explain complex information from a range of sources (C2), assessing the limitations of existing knowledge (C3), integrating several lines of evidence and testing hypotheses (C4) and the skills of independent learning (C5). Both Stage 3 and Stage 4 research projects assess the ability to deal with complex issues systematically and to show originality in approaches to problem-solving (C6)

C7 is assessed by means of a report and oral presentation on the placement year alongside a supervisor's report.

Transferable/Key Skills

On completing the programme students will have:

D1. Study skills of reading, noting, recall and essay/report writing.
D2. Gained competence in the use of digital skills including e-mail, word processing, spreadsheets, presentation and statistical software, use of the Internet and on-line library facilities.
D3. Developed the ability to work independently.
D4. Developed interpersonal skills, including team-working.
D5. Developed the ability to plan, organise and prioritise work activities.
D6. Developed skills of written, oral and visual presentation.
D7. Demonstrated the ability to develop and work towards targets for personal, academic and career development.
D8. Applied their knowledge and skills to solve scientific problems.
D9. Demonstrated the ability to use initiative and creativity, allied to critical thinking and analytical skills, to analyse biological questions of interest.

Students who have successfully completed the Professional Placement Year (BMS3030) or

Placement Year (NCL3000/CMB3005) will be able to:
D10. Reflect on and manage own learning and development in the placement.
D11. Use existing and new knowledge to enhance personal performance in a placement environment, evaluate the impact and communicate this process.
D12. Use graduate skills in a professional manner in a placement environment, evaluate the impact and communicate the personal development that has taken place.

Teaching and Learning Methods

Skills of reading, noting, recall and essay/report writing (D1) are developed through study skills support sessions, and tasks including directed reading and essays on which formative assessment is provided. Skills in the use of digital resources (D2) are developed through classes at various stages throughout the course and practised in a wide range of coursework. Skills of independent working (D3) are progressively developed by assignments throughout the programme. Students are initially encouraged to learn through group-based tasks and then through individual assignments culminating in the research projects. Planning, organising and prioritising (D5) are developed through study skills support sessions and the projects. The skills of written, oral and visual communication are developed in seminars and in the research project (D6). Students are challenged with increasingly complex scientific problems that they will resolve using their knowledge and skills (D8), initiative and creativity (D9).

Interpersonal skills (D4) are developed through study group work, team working exercises, seminars and the research projects. The ability to develop and work towards targets for personal, academic and career development (D7) is developed through a programme of career management sessions and the use of NU Reflect.

The Stage 4 research project supports the development of the ability to exercise sound judgment, personal responsibility and initiative in the complex professional environment of a research active(D9).

Students are encouraged to explore with their personal tutor the development of their study skills (D1). Students are provided with feedback on tasks requiring the use of digital skills (D2). Students are encouraged to reflect on their team-working skills and feedback on these are provided by peer-assessment of group tasks (D7). Skills of planning, organising and prioritising are developed by a progressively more complex series of assignments, culminating in the research project and greatly enhanced by a placement year. Students are encouraged to reflect of these skills and individual support is available from personal tutors and the Stage 3 and Stage 4 project supervisors. Students are enabled to monitor the development of their written, oral and visual presentational skills by feedback from peer and teachers on various assignments. Students are encouraged to discuss their personal goals with their tutors and record these meetings on the NU Reflect system (D7).

One-to-one supervision of the Stage 3 and Stage 4 projects encourages students to develop their ability to exercise sound judgement and to operate independently demonstrating responsibility and initiative in a working environment.

The placement year is an ideal vehicle to explore their career goals. Students will reflect on (D10) and discuss with the Placement supervisor and Academic Placement Officer their professional placement year with respect to the knowledge and skills they have developed and the implications for their career-planning and personal development (D11, D12).

Assessment Strategy

Transferable/key skills D1 to D9 are all assessed via coursework e.g., study group tasks, posters, oral presentations, and essays. An assessment schedule including deadlines is set for all modules and students are penalised for late submission of work (D5). The project and professional placement, where relevant, have key roles in assessment of all of these skills including problem solving (D8), report-writing (D1), oral presentation (D5) and digital skills including advanced word processing and the use of PowerPoint (D2). Both the project and placement supervisors are asked to assess students' inter-personal skills (D4) and skills of planning and organisation (D5), as well as the ability to exercise sound judgment and show

personal responsibility and initiative in a research active environment (D7). A students' NU Reflect record and, where relevant, placement portfolio are used to provide evidence of their ability to work towards targets for personal and professional development (D7).

D3-D12 are further assessed by means of a report and oral presentation at the end of the placement year alongside the Placement Supervisor's report.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

MSci Biomedical Sciences / Msci Biochemistry / Msci Biomedical Genetics

Duration of course: 4 years full time based on 30 weeks attendance per annum.
Number of stages: 4
Total credits: 480
Module credits: range from 10 to 80; with each 10 credits representing 100 hours notional student learning time.
Requirements for progression: passing all core modules and gaining appropriate overall number of credits with specific criteria defined in the programme regulations.

Msci Biomedical Sciences / with Professional Placement Year
Msci Biochemistry with Professional Placement Year
Msci Biomedical Genetics with Professional Placement Year

Duration of course: 5 years full time based on 30 weeks attendance per annum in campus based 'taught' years and with the year on professional placement (minimum 34 weeks) taken at either the 3rd or 4th year of the programme.
Number of stages: 4
Total credits: 480 for programme with placement year
Module credits: range from 10 to 80; with each 10 credits representing 100 hours notional student learning time.
Requirements for progression: passing all core modules and gaining appropriate overall number of credits with specific criteria defined in the programme regulations.

Msci Biomedical Sciences / with Placement Year
Msci Biochemistry with Placement Year
Msci Biomedical Genetics with Placement Year

Duration of course: 5 years full time based on 30 weeks attendance per annum in campus based 'taught' years and with the year on placement (minimum 34 weeks) taken at the 4th year of the programme.
Number of stages: 4
Total credits: 480 for programme with placement year
Module credits: range from 10 to 80; with each 10 credits representing 100 hours notional student learning time.
Requirements for progression: passing all core modules and gaining appropriate overall number of credits with specific criteria defined in the programme regulations.

Stage 1 provides a multi-disciplinary foundation covering a range of related biosciences, including biochemistry, cell biology, genetics, immunology, microbiology, physiology, and pharmacology and the analytical techniques used in each of these fields to test and confirm our knowledge base. At this stage students gain an appreciation of each of these areas and at the end of Stage 1 students may opt to transfer to another Bioscience programme if they so wish. At Stage 1 students are introduced to those practical skills essential for studying biomedical sciences and must pass a Practical Skills Test to evidence these skills. The students are also exposed to concepts of ethical reasoning and students also develop a number of generic skills including information literacy, writing skills, numeracy skills, oral presentation skills, bioinformatics and data handling skills. To allow students to evaluate their understanding and knowledge base of maths, biology and chemistry there are three separate formative tests that students are encouraged to use. Students identify areas needing improvement and are then directed at an early stage to on-line and other forms or support material to ensure they are appropriately prepared to study the content of stage 1 of the

degree. The chemistry test in particular will evaluate the student's understanding of basic atomic theory and structure, matter, bonding, thermodynamics, types of chemical reaction and reaction kinetics, acids, bases and buffers, gases, nomenclature and terminology used in chemistry and in particular organic chemistry.

Stage 2 semester 1 builds on Stage 1 and provides students with a deeper knowledge of cell and molecular biosciences with correlations to molecular medicine. The course focuses on the technologies that underpin our current understanding in these areas and provides students with hands-on experience of a range of molecular techniques. The course also explores how bioinformatics and statistics help make sense of the ever-increasing amount of biological data. Cell biology is studied in greater depth, particularly focusing on transcription, membrane transport, cell signalling and immunology with reference to the development and presentation of human disease.

Stage 2 semester 2 provides greater specialisation. The biomedical sciences cohort have option choices in a range of biomedical related modules that investigate the science of human health and disease. Both Biochemistry and Biomedical Genetics cohorts study some common theoretical material and up-to-date methodologies and techniques that allow extensive data collection, analysis and presentation ('omics' technologies, bioinformatics, data standards etc) alongside other degree specific subjects. Further emphasis is also given to developing the practical skills of students in those techniques considered important for graduates in the named degree. At Stage 2 students are also introduced to research skills, and other transferrable skills including data handling, presentation skills and team-working.

In year 3 students have the opportunity to undertake a professional placement year between Stages 2 and 3, providing experience of working in a life science company, research facility or similar relevant employment and affording the opportunity to acquire additional knowledge and skills in the workplace. The placement must be approved by the Degree Programme Director as appropriate to meet the learning outcomes of the 'with Professional Placement Year' programme. Students who undertake a placement year in a non-science related role are able to meet the learning outcomes for the 'with Placement Year' award.

At **Stage 3** students further develop their research skills as they undertake a research project supported by a research-active supervisor. They also study advanced topics in the following subject-specific areas:

Biochemistry students take taught modules covering advanced gene expression (with a focus on post-transcriptional events), protein structure and function (including nucleic acid-protection interactions). An emphasis is on understanding biochemistry in the context of human health and diseases and modules include information on biochemistry and molecular basis of chronic diseases and cancer. The impact of biochemistry is also emphasised in material that covers biotechnological applications.

Biomedical Sciences students are able to select options that consolidate a theme, or equally, select a diverse range of modules that give breadth of biomedical knowledge.

Biomedical Genetics students also take a range of taught modules that largely present information in the context of human health and diseases, including the molecular basis of cancer (common with Biochemistry), common and genetically complex diseases, development and diagnostic medical genetics. Understanding of the evolution of genomes is also stressed.

Alongside the degree specific modules above, there is a 10 credit optional 'vocational' module. The expectation is that most students on the MSci will pursue the research option, as the MSci is a research-orientated degree, but the other options are available should students wish to pursue them. Students also further develop their skills of experimental design and critical analysis of scientific data, as well as presentation and digital skills.

Students also have the option to study a supernumerary language module in their second and third year.

At **Stage 4** two modules will be selected from a wide range available at Masters level within the faculty provided by research active staff from across the research institutes. The defining feature of the final year and the MSci degree is a major research project undertaken within a research institute in the Faculty of Medical Sciences. Students will be individually guided in their choices to ensure that the modules that they take are appropriate to their named degree and the projects that they undertake have a core basis in the degree subject area.

Links between learning outcomes, curriculum and structure of the programme

The modules that comprise this degree programme are shown in the annex. Further detail can be seen in the module outline forms, which also show how the modules contribute to development of skills throughout the programme.

The curriculum is designed to allow systematic progression of students towards the programme's learning outcomes. Knowledge and understanding is progressively developed as students move from a broad overview of their subjects at Stage 1 to a much more specialised and detailed understanding at Stages 2, 3 and 4. Students who opt to take the placement year have the opportunity to put this knowledge into context. Practical techniques are also progressively developed throughout the course as students progress from competence in basic laboratory skills to the use of sophisticated laboratory techniques and equipment. For those who chose it, the placement year also provides unique opportunities not available in the university. Cognitive and intellectual skills are also developed throughout the programme from simple problem-solving exercises at Stage 1 to more complex data handling and experimental design and data analysis at Stages 2 and 3, culminating in the research project at Stage 4 that requires students to develop a highly critical approach to the scientific literature and to their own independently sourced experimental data/information. Students who have completed the professional placement year will be able to bring their experience and skills to Stages 3 and/or 4. Key skills are also progressively developed, being first introduced to the students (e.g., in formal lectures or seminars) and then practised and assessed in subsequent modules.

Thus, Stage 1 provides a firm grounding in the basic sciences underpinning the biomedical sciences. By the end of this stage the students will have:

- gained a basic knowledge and understanding of subject areas within Biomedical Sciences (A1) and started to use this knowledge to address simple scientific problems (D8)
- been introduced to basic laboratory skills, safe working practices and recording and interpretation of experimental results (B1-3)
- developed skills of independent learning (C5)
- developed study skills of reading, noting and recall (D1)
- gained competence in the use of digital skills (D2)
- have developed the ability to work independently (D3)

At Stage 2 the course gives a broad overview of subject material considered essential to the specific degree routes and starts to introduce the research basis of the acquired knowledge. By the end of this stage students will have:

- developed further, at the level presented in undergraduate textbooks, knowledge and understanding of the major areas that are the ‘core’ to the named degree (A2)
- experienced use of primary literature (B4)
- mastered essential elements of relevant laboratory techniques and safe laboratory practice and developed the ability to write laboratory reports (B1-B3)
- started to develop the ability to critically evaluate scientific information (B5) and to appreciate the relationship between research and knowledge gain in the discipline (B6)
- continued the development of transferable (key) skills, including the ability to use digital resources for information retrieval and data handling (D2, B4)

- further developed study skills of reading, noting and recall (D1) have developed the ability to work independently (D3)
- developed the ability to plan, organise and prioritise work activities (D5)
- been introduced to skills of scientific essay writing (D1) and oral and visual communication (D6)
- improved cognitive skills of reasoning, analysis of scientific literature, critical evaluation and the ability to apply their knowledge in problem-solving (C1-C4 and D8-9)
- developed further skills of independent learning (C5)
- developed inter-personal and team-working skills through collaborative work (D4, D9)

Through the Professional Placement year, students will:

- have the opportunity to apply, extend and enhance their knowledge (A5) in authentic problem solving (C6)
- appreciate how the biosciences sector use the knowledge and skills of its staff (A4)
- be able to demonstrate competence in a range of generic and placement specific skills (B7)
- produce a placement report (D1)
- further develop their interpersonal and tam working skills (D4, D9)

Alternatively, through the placement year, students will have the opportunity to:

- apply and further develop their knowledge beyond science (A9 and A10)
- utilise transferrable skills in a non-scientific role (A7 and A8)

At Stage 3 a higher level of specialisation is achieved with students being able to choose between different areas of interest in relation to some of their taught modules. By the end of this stage the students will have:

- extended their knowledge and understanding of biochemistry, biomedical sciences or biomedical genetics up to the current research level and developed an understanding of the experimental basis of this knowledge (A3)
- become fully competent in the use of primary literature and bibliographic databases, and have an improved ability to evaluate critically scientific information (B4-5)
- developed the ability to make oral and visual presentation of scientific data and knowledge (D3)
- developed skills of critical evaluation of scientific information (B3) and have acquired research and analysis skills (B6)
- produced project work that demonstrates a range of skills including subject-specific skills (B1-B6), report-writing (D1), digital skills (D2), independent working (D3), inter-personal skills (D4), planning, organising and prioritising (D5), creative problem solving, critical thinking and analytical skills (D8-9), presentation skills (D6), in-depth knowledge of selected areas (A3), and cognitive skills (C1-4)
- had further opportunities to practise a variety of transferable (key) skills that will be valuable for a range of employment opportunities.

- the ability to develop and work towards targets for person, academic and career development (D7), in-depth knowledge of selected areas (A3), originality in the application of knowledge (A4) and cognitive skills (C1-C6)

In **Stage 4** students study two modules of choice from a range of Masters level modules available. They also undertake a substantial (80credit) research project allowing them to develop to a higher level their subject-related, cognitive and key skills. By the end of this stage students will have:

- Further extended their knowledge and understanding of their chosen subject area up to the current research level, developed an understanding of the experimental basis of this knowledge, and shown originality in the application of knowledge (A3 and A4)
- Developed a sound appreciation of how the boundaries of knowledge, particularly scientific knowledge, are advanced through research (B7)

- Developed and demonstrated an ability to work independently in a research active environment (B6)
- Developed an ability to deal with complex problems systematically, creatively and with originality (C6)
- Developed the ability to develop and work towards targets for personal, academic and career development (D7)
- Developed the ability to exercise sound judgement, personal responsibility, and initiative in a complex and unpredictable professional environment (D8)
- Produced project work that demonstrates a range of skills including subject-specific skills (B1-B7), report-writing (D1), digital skills (D2), independent working (D3), inter-personal skills (D4), planning, organising and prioritising (D5), creative problem solving, critical thinking and analytical skills (D8-9), presentation skills (D6), in-depth knowledge of selected areas (A3), and intellectual skills (C1-C4)

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

A major strength of the programme is the close linkage between teaching and research. The majority of teaching staff are research active, and many are members of the Faculty Research Institutes and teach in areas relating to their particular expertise. This ensures that the curriculum content is kept up-to-date and the links between scholarship and research are explicit throughout the programme. Furthermore, the continued participation of teaching staff in professional development programmes (e.g., Advance HE / UKPSF) ensures that delivery of teaching is informed by up-to-date practice. The strong research base in the Faculty ensures that the most modern equipment is available to undergraduate students for their practical work. Involvement of teaching staff for the programme on committees of national professional bodies and learned societies helps to ensure that the programme continues to be informed by external developments.

A distinctive feature of the course is the extended final year research project which provides an important opportunity for students to develop their practical skills at the highest level. All modules are supported by staff affiliated to the research institutes within the Faculty (in particular the Masters level modules at Stage 4); this allows students to study in depth areas of particular interest that relate to Newcastle's research strengths.

The programme also places a strong emphasis on employability of its graduates, not only via the placement or professional placement year, but also via part time paid employment in one of the research laboratories during their second year of study. This may involve either laboratory work or other areas of interest (e.g., science communication). Students are also encouraged to take advantage of the international exchange opportunities offered by the School which include exchanges for the final year research project in a number of international institutions. Optional modules at stage 3 also allow students to specialise in a number of subject-related vocational topics such as business, science communication, and ethics.

The inclusion and recognition of the optional professional year placement gives students a clear distinctive employability advantage with many additional skills and experience gained over the year which will also aid the students with their academic studies. The science-focused professional placement also provides the potential to use industry standard equipment and techniques.

Programme regulations (link to on-line version)

RB900_1308U_vFinal.pdf

13 Support for Student Learning

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

learning
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15 Regulation of assessment
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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.