

PROGRAMME SPECIFICATION

This document describes the **Combined Honours Degree programme in Biochemistry with Science Communication**. For Combined Honours Degree programmes, please also refer to the equivalent document(s) for the other subject(s). This specification is valid for new entrants from **September 2007**.

The aims of the Combined Honours Degree programme in Biochemistry with Science Communication are to:

- provide a sound knowledge and understanding of the molecular, cellular and biological principles of the subject through a core of courses, and develop an insight into the current frontiers of knowledge, primarily through a series of specialised level 3 courses;
- develop, through a flexible and progressive structure, a range of subject-specific and transferable skills, including practical laboratory skills, self-management, information retrieval, communication and presentation skills, working with others, decision making and meeting deadlines, that equip students for future employment;
- help the apprentice scientist develop the skill, the analyses and the confidence to debate scientific content and construct interpretations of science in terms of the needs, interest, language and conceptual abilities of the audience;
- provide experience of independent research through a final year science communication project;
- produce graduates who can work safely and responsibly with biological and chemical materials and laboratory equipment.

The programme is delivered full-time in three stages, each of which comprises one year of full-time study, during which the student must follow courses to the value of four units (one unit is equivalent to 30 national credits) during each stage. The curriculum is based around a core of mandatory units and there is a strong foundation in Stages one and two, which covers the requirements of the benchmarking statements in molecular biosciences and allows for specialisation in Stage three, while at the same time allowing some degree of diversification of interests.

Stage one comprises a fixed selection of core courses and seeks to provide the necessary grounding for the study of the subject at degree level, with appropriate Biology, Biochemistry and Molecular Biology subjects and including a strong element of laboratory training that forms the cornerstone of the subject together with an introduction to Science Communication. The courses seek to provide a broadly based introduction to the various subjects that are central to the study of Biochemistry. In **Stage two** students take 2 core course units and further optional courses to the value of 2 units. The core courses in Biochemistry and Science Communication build on the foundations laid in stage one and provide a basis for the study of the research led specialist options in stage three. The optional courses are a selection of Biochemistry and other related courses such as Molecular Genetics, Cell Biology and Physiology courses relevant to the degree programme. All the courses include a substantial element of laboratory training and the Science Communication training prepares the student for the selection and implementation of the media research project in stage three. In **Stage three** there is only 1 core course unit, the Advanced Media Project and the students select the remaining units from Biochemistry and other Molecular Bioscience options. The media project is regarded as the culmination of their training in the scientific presentations reinforced by the study of scientific topics to stage three level. There is no requirement for the students to carry out an additional biochemistry project.

The programme provides a comprehensive treatment of appropriate biological science including biochemistry, genetics and molecular biology. The programme involves training in a variety of practical techniques and skills relevant to research in molecular bioscience. The Science Communication part of the programme is designed to develop the skills necessary for the analysis, interpretation and communication of science to diverse audiences. The system is also flexible and allows the students to transfer to other degree streams within Molecular Biosciences, particularly up to the start of the stage two.

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This document provides a summary of the main features of the programme(s), and of the outcomes which a student might reasonably be expected to achieve if full advantage is taken of the learning opportunities provided. Further information is contained in the College prospectus, the College Regulations and in various handbooks issued to students upon arrival. Whilst Royal Holloway keeps all its information for prospective applicants and students under review, programmes and the availability of individual courses are necessarily subject to change at any time, and prospective applicants are therefore advised to seek confirmation of any factors which might affect their decision to follow a specific programme. In turn, Royal Holloway will inform applicants and students as soon as is practicable of any substantial changes which might affect their studies.

Learning outcomes

Teaching and learning in the programme are closely informed by current developments (including practical aspects) in the subjects and by the active research of staff, particularly in areas selected from neuroscience, plant cell and molecular biology, cell signalling, microbial genetics, cancer, parasitology, plant biotechnology, immunology, gene therapy and science communication. In general terms the programme provides opportunities for students to develop and demonstrate these learning outcomes:

Knowledge and understanding

- an understanding of biochemical reactions and techniques used to investigate them;
- a critical understanding of the molecular basis of genetics and the ability to explain how molecular biology underlies much of the basis of modern biosciences;
- an understanding of the structure and function of various cell types in unicellular and multicellular organisms, the structure and function of cell membranes, cell organelles and cell differentiation;
- a knowledge of cell metabolism, including its control, and topics such as energy and signal transduction, respiration and photosynthesis, with appropriate experimental techniques;
- an understanding of the chemical and thermodynamic principles underlying biological catalysis and the role of enzymes and other proteins in determining function and fate of cells and organisms;
- understanding the molecular, cellular and physiological principles that underlie the subject;
- knowledge and understanding of the various media available for science communication;
- a critical understanding of the differences between the various media and the ability to select the most appropriate to the given task;
- knowledge of the practical application of methods and the technical skills used to create finished presentations in all the various media;
- understanding cutting edge developments in a range of areas specific to the biochemistry and molecular bioscience;
- knowledge and engagement with philosophical and ethical issues arising from some of the current developments in the biosciences;
- well-developed strategies for updating, maintaining and enhancing their knowledge of the Biosciences and Science Communication.

Skills and other attributes

- a range of laboratory techniques of key importance in Biochemistry ;
- working safely in a scientific laboratory, with awareness of standard safety protocols;
- the ability to apply relevant numerical skills, including statistics to biochemical data;
- the ability to demonstrate and evaluate suitable experimental methods for the investigation of relevant areas of biochemistry and molecular biology;
- the ability to access information from a wide range of sources in order to maintain and enhance knowledge of the Biosciences and Science Communication, and to communicate that information clearly in oral and written forms;
- assessing the merits of contrasting subject-specific theories, paradigms, concepts and principles;
- applying subject-specific knowledge and understanding to address familiar and unfamiliar problems;

- the ability to plan, design, execute and present an independent piece of research in science communication in the final year, including the production of the final report;
- a range of methods and technical skills used to create finished presentations in all of the various media;
- taking personal responsibility for learning, and developing habits of reflection on that learning;*
- identifying, retrieving (including the use of online computer searches), sorting and exchanging information;*
- abstracting and synthesising information, and developing a reasoned argument;*
- critically interpreting and evaluating experimental data and relevant literature, analysing and solving problems, and decision-making;*
- written communication and verbal presentation;*
- information technology (including spreadsheets, databases, word processing, email and WWW);*
- interpersonal skills, including working in groups/teams and recognising and respecting the viewpoints of others;*
- CV and career preparation.*

* transferable skills

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Teaching, learning and assessment

The overall strategy is to provide a progressive approach to biochemical concepts and systems of increasing complexity through teaching methods that aid learning and stimulate interest. This is combined with training in communication skills for a variety of media. Teaching is mostly by means of lectures, laboratory classes, seminars, tutorials and study/revision sessions, with knowledge and understanding further developed by guided independent study. Learning and analytical ability are developed and reinforced through problem solving, essay writing, laboratory classes, critical evaluation and by giving students the opportunity to design, execute and evaluate their own experiments. Students are encouraged to acquire further knowledge beyond taught material, e.g. by reading topical reviews, original research literature and attending research seminars, especially in the final year.

The practical assignments associated with first year and second year courses provide training in a range of subject specific laboratory techniques, including safety assessment. The culmination of these skills is demonstrated in the final year research project, and for literature skills the preparation of a literature report. Students have to prepare their own risk assessment prior to commencing their final year project work.

Training in intellectual and key transferable skills is embodied throughout the programme and forms a strong element of the tutorial and study session programmes. All students are required to meet basic standards in information technology, for which training is provided by the College Computer Centre.

Assessment is typically by formal unseen written examinations and coursework such as essays and laboratory reports, in addition to poster preparation, oral presentations and dissertations on core courses. Full details of the assessments for individual courses can be obtained from the [School](#).

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Details of the programme structure(s)

Please note that not all courses run each year. A full list of courses including optional courses for the current academic year can be obtained from the [School](#).

Stage one:

Students must take:

BS1070 Genetics and Microbiology (1 unit)

BS1090 Biochemistry: the Molecular Basis of Life (1 unit)

SC1001 Media Communication (½ unit)

SC1002 The Genres of Science Communication (½ unit)

And

BS1030 Chemistry for Life Scientists (1unit) OR

BS1060 Living Systems: Cell Biology and Physiology (1 unit)

Stage two:

Students must take:

BS2520 Protein Structure and Function (½ unit)

BS2530 Molecular Biology (½ unit)

SC2001 Media Project (½ unit)

SC2002 Case Study (½ unit)

plus options totalling 2 whole units from the following:

BS2040 Cell Biology (½ unit)

BS2050 Essential Human Physiology in Health and Disease (½ unit)

BS2060 Developmental Biology (½ unit)

BS2150 Applications of Molecular Genetics (½ unit)

BS2510 Bioenergetics, Biosynthesis and Metabolic Regulation (½ unit)

BS2540 Molecular and Cellular Immunology (½ unit)

BS2550 Hormonal and Neuronal Signalling (½ unit)

BS2560 Pharmacology and Toxicology (½ unit)

BS2570 Physical Biochemistry for Life Scientists (½ unit)

Stage three:

Students must take:

SC3001 Advanced Media Project (1 unit)

plus options to the value of 3 full units from the following:

BS3020 Special Study: Dissertation (½ unit)

BS3510 Molecular and Medical Microbiology (½ unit)

BS3530 Advanced Molecular Biology (½ unit)

BS3540 Cell and Molecular Biology of Cancer (½ unit)

BS3560 Proteomics, Genomics and Bioinformatics (½ unit)

BS3570 Human Embryology and Endocrinology (½ unit)

BS3580 Cell and Molecular Neuroscience (½ unit)

BS3590 Molecular Bases of Inherited Disease (½ unit)

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Progression and award requirements

The progression and award requirements are essentially the same across all Honours Degree programmes at Royal Holloway. Students must pass units to the value of at least three units on each stage of the programme. On some programmes there may be a requirement to pass specific courses in order to progress to the next stage, or to qualify for a particular degree title (see programme structure above). Students are considered for the award and classified on the basis of a weighted average. This is calculated from marks gained in courses taken in stages two and three, and gives twice the weighting to marks gained in stage three. In order to qualify for the award of Biochemistry with Science Communication degree, students must gain a weighted average of at least 35% and complete the core units specified above.

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Student support and guidance

- Personal Advisers: All students are allocated a Personal Adviser who meets with them regularly through the programme. The Personal Adviser's role is to advise on academic, pastoral and welfare issues, but with referral of students for professional help, e.g. counselling, if required. Students work closely with their Personal Advisers in tutorial groups of around 7, primarily throughout the teaching terms.
- The Director of Teaching and Programme Directors provide a back-up system of academic, pastoral and welfare advice.

- Provision of study skills sessions both during the induction week and at appropriate times throughout the academic year for introduction to a range of specific study skills.
- All staff are available and accessible through an open-door policy or by operating a defined office hours system.
- Representation on the Student-Staff Committee.
- Staff-undergraduate ratio of 1:15 (2009/10).
- Detailed student handbook and course resources.
- A collection of articles and books supporting teaching and learning housed in the School Office.
- Extensive supporting materials and learning resources in College libraries, Computer Centre, School website and Moodle.
- Dedicated School teaching laboratories are housed in the School of Biological Sciences (Bourne) Building.
- The School of Biological Sciences has 2 Educational Support Office network members.
- College Careers Service and School Careers Liaison Officer, supplemented by a dedicated careers area.
- Access to all College and University support services, including Student Counselling Service, Health Centre and the Education Support Unit for students with special needs.

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Admission requirements

The Department's standard conditional offer is available on the [Course Catalogue](#) web page. However, the Department also has considerable flexibility in its admissions and offers policy and strongly encourages applications from non-standard applicants. Students whose first language is not English may also be asked for a qualification in English Language at an appropriate level. It may also be helpful to contact the [Admissions Office](#) for specific guidance on the entrance requirements for particular programmes.

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Further learning and career opportunities

Graduates from Biological Sciences degree programmes have successfully progressed into a wide range of professions, while some have continued onto Postgraduate studies. For further details please refer to the [Careers Service](#).

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Indicators of quality and standards

Royal Holloway's position as one of the UK's leading research-intensive institutions was confirmed by the results of the most recent Research Assessment Exercise (RAE 2008) conducted by the Higher Education Funding Council (HEFCE). The new scoring system for the RAE 2008 measures research quality in four categories, with the top score of 4* indicating quality that is world-leading and of the highest standards in terms of originality, significance and rigour. 60% of the College's research profile is rated as world-leading or internationally excellent outperforming the national average of 50%. The College is ranked 16th in the UK for research of 4* standard and 18th for 3* and 4* research. The School of Biological Sciences was ranked joint 3rd in the top 10 universities in the country in terms of proportion of 3* and 4* research, with 70% of its research profile being of 3* and 4* standard.

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List of programmes

All the programmes are taught entirely by staff at Royal Holloway, University of London, and lead to awards of the University of London. Programmes in Biological Sciences are not subject to accreditation by a professional body. The QAA subject benchmark statement in Biosciences describes the general features which one might expect from Honours Degree programmes in the subject, and can therefore be used as a point of reference when reading this document (see www.qaa.ac.uk). UCAS codes are given in parentheses (see www.ucas.ac.uk).

Combined Honours Degree programmes with Biological Sciences as a major component

BSc Biochemistry with Science Communication (C7P4)†

† Note: Indicates programmes to be withdrawn with effect from September 2009

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