ROYAL HOLLOWAY
University of London

PROGRAMME SPECIFICATION

This document describes the **Honours Degree programme in Biomedical Sciences**. This specification is valid for new entrants from **September 2018.**

The aims of the Honours Degree programme in Biomedical Sciences are to:

- provide, through a core of course units, a sound knowledge and understanding of those areas of Bioscience necessary for understanding the biology of diseases and the scientific investigation of human health and disease. These include biochemistry, cell biology, genetics, molecular biology, physiology and anatomy, and pharmacology;
- provide a sound knowledge and understanding of those areas of the subject relevant to the diagnosis and development of therapies for a range of diseases;
- develop an insight into the current frontiers of knowledge in major aspects of the Biomedical Sciences, primarily through a series of specialised Stage 3 course units;
- 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:
- provide experience of independent research through a final year project;
- produce graduates who can work safely and responsibly with biological and chemical materials and laboratory equipment.

The programme is delivered in three stages, each of which comprises one year of full-time study, or two years of part-time study, during which the student must follow course units to the value of 120 national credits. The curriculum is based around a core set of mandatory course units and the programme offers a strong foundation in Stages one and two, which covers the requirements of the benchmarking statements in Biosciences and Biomedical Sciences 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 mandatory course units and seeks to provide the necessary grounding for the study of the subject at degree level with appropriate Biochemistry, Cell Biology, Chemistry, Genetics, and Physiology and including a strong element of laboratory training that forms the cornerstone of the subject. In **Stage two** students take 5 mandatory course units to the value of 75 credits in Physiology, Molecular Biology, as well as molecular studies of biomedical subjects such as Immunology, Neurology and Pharmacology and select the remaining 45 credits from a list of optional course units that include Microbiology, Developmental Biology, Cell Dynamics and Bioenergetics and Metabolism. Stage two builds on the foundations laid in Stage one and provides a basis for the study of the research-led specialist options in Stage three. All the course units include a substantial element of laboratory training that prepares the student for the selection and implementation of the individual research project in stage three. In **Stage three** there are 2 mandatory course units to the value of 45 credits, which are the Molecular Basis of Inherited Disease course units and the individual research project. The project is regarded as the culmination of their training in experimental design, research techniques, data analysis and presentation. Students select the remaining 5 course units from 15-credit options. Many of the course units specialise in medically oriented aspects of the subject, and have a strong element covering specific categories of disease, their underlying cause and treatment. The options include Clinical Physiology and Medicine, Clinical Diagnosis of Disease, Biology of Parasitic Diseases, Cell and Molecular Neuroscience, Human Embryology and others. Clinicians and other hospital experts contribute to several of the final year courses, providing teaching at the cutting-edge of clinical approaches and expertise.

The programme emphasises the importance and relevance of a wide range of subject areas for medicine and the understanding and scientific investigation of human disease. It also involves training in a variety of practical techniques and skills relevant to research work in Biomedical Sciences. The system is also flexible and allows the students to transfer to other degree streams within the School up to the start of the second term, or indeed to other Molecular Bioscience degrees up to the start of the second stage. Students can also take up to 30 credits from outside the School of Biological Sciences, but within the Faculty of Science, during stage two/three. Options are selected in consultation with the student's Personal Tutor and the Director of Teaching.

Further information

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 course units 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 subject and by the active research of staff, particularly in the areas of clinical biochemistry, molecular biology, molecular genetics, microbial genetics, neuroscience, cancer, parasitology, developmental biology, immunology, and gene therapy. In general terms the programme provides opportunities for students to develop and demonstrate these learning outcomes:

Knowledge and understanding

- a sound knowledge and understanding of those subjects essential for the scientific investigation and understanding of human disease, including biochemistry, cell biology, chemistry, genetics, molecular biology, physiology and anatomy, and pharmacology;
- a critical understanding of the molecular and cellular basis of human diseases, their diagnosis, treatment and the development of novel therapeutic strategies;
- a knowledge of the application of biochemistry, cell biology, molecular biology and molecular genetics to understanding the molecular basis and diagnosis of a range of diseases;
- understanding cutting edge developments in a range of areas specific to the subject;
- awareness of 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 Biomedical Sciences.

Skills and other attributes

- the ability to employ and evaluate suitable experimental methods for the investigation of relevant areas of biomedical science;

- a range of laboratory techniques of key importance in Biomedical Sciences;
- working safely in a scientific laboratory, with awareness of standard safety protocols;
- the ability to apply relevant numerical skills, including statistics, to biological data;
- the ability to access information from a wide range of sources in order to maintain and enhance knowledge of the Biosciences 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 the final year through a theoretical or practical project in biomedical sciences, including the production of the final report;
- 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 biological concepts and systems of increasing complexity that underpin Biomedical Sciences and that are directly relevant to the understanding and treatment of human disease. This strategy is realised through a range of teaching methods that aid learning and stimulate interest. Specific knowledge of the molecular, cellular and biochemical bases of diseases, their diagnosis and treatment are developed through a range of specialist final stage course units dealing with particular types of disease, e.g. the molecular basis of inherited disease, the biochemical diagnosis of disease, neurological disorders (cell and molecular neuroscience). Teaching is mostly by means of lectures, laboratory classes, computer exercises, seminars, tutorials, 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 course units 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..

Assessment is typically by formal unseen written examinations, practical exams, and a range of coursework assignments such as essays, laboratory reports, oral and poster presentations, and the individual research project. Full details of the assessments for individual course units can be obtained from the School.

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Details of the programme structure(s)
Please note that the list of available course units offered is subject to change and not all course units run each year. A full list of course units for the current academic year course units can be obtained from the School.

Stage one:
Full-time students must take the following mandatory course units:
BS1021 Becoming a Bioscientist (15 credits; condonable)
BS1031 Chemistry of Life (15 credits; condonable)
BS1032 Fundamental Biochemistry (15 credits; condonable)
BS1061 Introductory Animal Physiology (15 credits; condonable)
BS1062 Pathophysiology (15 credits; condonable)
BS1071 Cell Biology and Evolution (15 credits; condonable)
BS1072 Genetics (15 credits; condonable)
BS1091 Protein Biochemistry and Enzymology (15 credits; condonable)

Part-time students must take the following mandatory course units:
Stage one (a):
BS1021 Becoming a Bioscientist (15 credits; condonable)
BS1031 Chemistry of Life (15 credits; condonable)
BS1032 Fundamental Biochemistry (15 credits; condonable)
BS1061 Introductory Animal Physiology (15 credits; condonable)
Stage one (b):
BS1071 Cell Biology and Evolution (15 credits; condonable)
BS1072 Genetics (15 credits; condonable)
BS1062 Pathophysiology (15 credits; condonable)
BS1091 Protein Biochemistry and Enzymology (15 credits; condonable)

Stage two:
Full-time students must take the following mandatory course units:
BS2050 Human Physiology in Health and Disease (15 credits; condonable)
BS2530 Molecular Biology (15 credits; condonable)
BS2540 Molecular and Cellular Immunology (15 credits; condonable)
BS2550 Neuronal and Cellular Signalling (15 credits; condonable)
BS2560 Pharmacology and Toxicology (15 credits; condonable)

and choose three options (45 credits) from the following stage two course units:
BS2005 Microbiology (15 credits)
BS2040 Cell Dynamics: Division and Movement (15 credits)
BS2060 Developmental Biology (15 credits)
BS2510 Bioenergetics and Metabolism (15 credits)
BS2520 Protein Structure and Function (15 credits)

Part-time students must take:
Stage two (a)
BS2050 Human Physiology in Health and Disease (15 credits; condonable)
BS2530 Molecular Biology (15 credits; condonable)
and choose two options from the Stage two course units listed above.

Stage two (b)
BS2540 Molecular and Cellular Immunology (15 credits; condonable)
BS2550 Neuronal and Cellular Signalling (15 credits; condonable)
BS2560 Pharmacology and Toxicology (15 credits; condonable)
and choose one option from the Stage two course units listed above.

Stage three:
Full-time students must take the following mandatory course units:
BS3010 Individual Research Project (30 credits) [Non-condonable fail – must be passed to qualify for specific field of study].
BS3590 Molecular Basis of Inherited Disease (15 credits; condonable)

and two options (75 credits) from the following Stage three course units:
BS3020 Special Study: Dissertation (15 credits)
BS3030 Biology of Parasitic Diseases (15 credits)
BS3420 Medical Biochemistry (15 credits)
BS3510 Molecular and Medical Microbiology (15 credits)
BS3530 Applications of Advanced Molecular Biology Methods (15 credits)
BS3540 Cell and Molecular Biology of Cancer (15 credits)
BS3560 Functional Genomics, Proteomics and Bioinformatics (15 credits)
BS3570 Human Embryology and Endocrinology (15 credits)
BS3580 Cell and Molecular Neuroscience (15 credits)
BS3595 Clinical Physiology and Medicine (15 credits)
BS3600 Clinical Diagnosis of Disease (15 credits)

Part-time students must take:
Stage three (a)
BS3010 Individual Research Project (30 credits) [Non-condonable – must be passed to qualify for specific field of study].
BS3590 Molecular Bases of Inherited Disease (15 credits; condonable)
and choose options equal to the value of 15 credits from the stage three course units listed above
Stage three (b)
Options equal to the value of 60 credits from the stage three course units listed above.

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Progression and award requirements

Students are considered for the award and classified on the basis of a weighted average. This is calculated from marks gained in course units taken in stages two and three, and gives twice the weighting to marks gained in stage three. The College's Undergraduate Regulations include full details on progression and award requirements for all undergraduate programmes offered by the College.

In order to qualify for the award of Biomedical Sciences degree, students must gain a weighted average of at least 35%, pass at least 90 credits in the final year and take the mandatory course units specified above. The Individual Research Project (BS3010) is mandatory, non-condonable. Students must pass this course unit in order to qualify for an Honours Degree in Biomedical Sciences.

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Student support and guidance

- Personal Tutors: All students are allocated a Personal Tutor who meets with them regularly through the programme. The Personal Tutor'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 Tutor in tutorial groups of around 6 students, primarily throughout the teaching terms.
- The Director of Teaching and Academic Coordinators provide a back-up system of academic, pastoral and welfare advice.
- Provision of study skills sessions throughout the academic year focuses on enhancing generic study skills. The aim is to facilitate the transition of students to the University learning environment allowing them to perform to the best of their academic ability. Excellent associated online resources are also available through Moodle, the virtual learning environment, and on the Royal Holloway website.
- All staff are available and accessible through an open-door policy or by operating a defined office hours system, or by appointment.
- Student representation is included on the Student-Staff Committee and the School Teaching Committee.
- Detailed student handbook and module resources are provided.
- Extensive supporting materials and learning resources are available in the College libraries, the Computer Centre and via the School website and Moodle.
- Dedicated teaching laboratories are housed in the School of Biological Sciences (Bourne) Building.
- The School of Biological Sciences has a Disability and Dyslexia (DDS) network member.
- College Careers and Employability 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 Disability and Dyslexia services for students with disabilities and Specific Learning Difficulties.

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Admission requirements

Details of the Department's typical offer for each programme of study is available on the Course Finder web page. However, the Department also has 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. For further guidance it may also be helpful to contact the Recruitment and Partnership Office.

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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 many 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 Excellence Framework (REF 2014) conducted by the Higher Education Funding Council (HEFCE). The scoring system for the REF 2014 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 and 3* indicating research that is internationally excellent. 81% of the College's research profile was deemed to be within the 4* or 3* categories, an increase of over 20% since 2008. This result placed Royal Holloway 31st overall in the UK for 4* and 3* research and 33rd based on an overall Grade Point Average (GPA) score.

The School of Biological Sciences is ranked 34th in the UK for research of 4* standard and 32nd for 3* and 4* research.

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List of programmes offered by the School of Biological Sciences

Programmes are taught almost entirely by staff at Royal Holloway University of London, with some third year course units including contributions from external lecturers – particularly clinicians - who are experts in their subject area. All programmes lead to awards of the University of London. The QAA subject benchmark statement in Biomedical Sciences 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).

Single Honours Degree programmes in Biological Sciences taught wholly within the School of Biological Sciences

BSc Biomedical Sciences (B990)	Available Full Time or Part Time

Accreditation

The Honours Degree programme in Biomedical Sciences is accredited by the Royal Society of Biology.

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