

## Royal Holloway, University of London

### Course specification for an undergraduate award

### BSc Biochemistry (C700)

#### Section 1 – Introduction to your course

This course specification is a formal document, which provides a summary of the main features of your course and the learning outcomes that you might reasonably be expected to achieve and demonstrate if you take full advantage of the learning opportunities that are provided. Further information is contained in the University prospectus, and in various handbooks, all of which you will be able to access online. Alternatively, further information on the University's academic regulations and policies can be found [here](#). Further information on the University's Admissions Policy can be found [here](#).

Your degree course in Biochemistry is delivered in three stages, each of which comprises one year of full-time study, or two years of part-time study, during which you must follow modules to the value of 120 national credits. The curriculum is based around a core of mandatory modules and the course offers a strong foundation in Stages one and two, which cover the requirements of the benchmarking statements in molecular aspects of biology (including biochemistry).

**Stage one** provides a set of mandatory modules (totalling 90 credits) that seek to provide the necessary grounding for the study of the subject at degree level, with appropriate Chemistry and Biochemistry subjects in addition to an introduction to Genetics and Cell Biology. You will also select from a set of optional modules, to the value of 30 credits, which provides the option to include Introductory Animal Physiology and Introduction to Human Physiology or a module on the Green Planet: Plants and Our Future. Stage one includes a strong element of laboratory training, with practical work in all modules, as well as providing support with the skills necessary for the study of biological sciences. In **Stage two** you take 75 credits in more advanced Biochemistry and Molecular Biology modules building on the foundations laid in the first year and providing a basis for the study of the research led specialist options in Stage three. Again, the modules all include a substantial element of laboratory training that prepares you for the selection and implementation of the individual research project in Stage three. There are 45 credits of optional modules, allowing you to concentrate on biochemistry or to diversify into other areas depending on your interests. **Stage three** allows for increasing specialisation, with the major focus being on areas of the subject relevant to Biochemistry. In addition to the individual research project and two 15 credit mandatory modules, you will select your remaining modules (to the value of 60 credits) from a list of options, thus allowing you to select from modules that reflect the research interests of internal and external staff, who are specialists in their field. The final year project is regarded as your graduate capstone experience, as it is the culmination of your training in experimental design, research techniques, data analysis and presentation. The Biochemistry course has the flexibility to allow you to select between topics with relevance to medical research or the biochemistry within plants, or to include the more applied aspects of biochemistry such as biotechnology.

The course provides a comprehensive treatment of modern animal, plant and microbial biochemistry, molecular biology and chemistry pertinent to the Biosciences. The course involves training in a variety of practical techniques and skills relevant to research in biochemistry. The system is also flexible and allows you to transfer to other degree streams within the Department up to the start of the second term, or indeed to other Molecular Bioscience degrees up to the start of the second year. You can also take up to 30 credits from outside the Department of Biological Sciences, but within other Science Departments, during stage two/three. Options are selected in consultation with your Personal Tutor and the Director of Teaching/Department Lead in UG Education.

While Royal Holloway keeps all the information made available under review, courses and the availability of individual modules, especially optional modules are necessarily subject to change at any time, and you are therefore advised to seek confirmation of any factors which might affect your decision to follow a specific course. In turn, Royal Holloway will inform you as soon as is practicable of any significant changes which might affect your studies.

The following is a brief description for some of the most important terminology for understanding the content of this document:

*Degree course* – May also be referred to as ‘degree programme’ or simply ‘programme’, these terms refer to the qualification you will be awarded upon successful completion of your studies.

*Module* – May also be referred to as ‘course’, this refers to the individual units you will study each year to complete your degree course. Undergraduate degrees at Royal Holloway comprise a combination of modules in multiples of 15 credits to the value of 120 credits per year. On some degree courses a certain number of optional modules must be passed for a particular degree title.

Section 2 – Course details			
Date of specification update	March 2024	Location of study	Egham Campus
Course award and title	BSc Biochemistry	Level of study	Undergraduate
Course code	1016	UCAS code	C700
Year of entry	2024/25		
Awarding body	Royal Holloway, University of London		
Department or school	Department of Biological Sciences School of Life Sciences and the Environment	Other departments or schools involved in teaching the course	N/A
Mode(s) of attendance	Full-time or Part-time	Duration of the course	Three years or six years
Accrediting Professional, Statutory or Regulatory Body requirement(s)	You must pass the BS3010 Individual Research Project in order to qualify for an Honours Degree in Biochemistry; this is a requirement of the Royal Society of Biology for an accredited degree.		
Link to Coursefinder for further information:	<a href="https://www.royalholloway.ac.uk/studying-here/">https://www.royalholloway.ac.uk/studying-here/</a>	For queries on admissions:	<a href="https://royalholloway.ac.uk/applicationquery">https://royalholloway.ac.uk/applicationquery</a>

Section 3 – Degree course structure					
3.1 Mandatory module information					
The following table summarises the mandatory modules which students must take in each year of study					
Year	Module code	Module title	Credits	FHEQ level	Module status (Mandatory Condonable MC or Mandatory Non-Condonable MNC)
1	BS1021	Becoming a Bioscientist	15	4	MC
1	BS1031	Chemistry of Life	15	4	MC
1	BS1032	Fundamental Biochemistry	15	4	MC
1	BS1071	Cell Biology and the Origin of Life	15	4	MC
1	BS1072	Genetics	15	4	MC
1	BS1091	Protein Biochemistry and Enzymology	15	4	MC
2	BS2510	Bioenergetics and Metabolism	15	5	MC
2	BS2520	Protein Structure and Function	15	5	MC
2	BS2530	Molecular Biology	15	5	MC
2	BS2570	Physical Biochemistry for Life Scientists	15	5	MC
2	BS2580	Natural Product Biochemistry and Sustainability	15	5	MC
3	BS3010	Individual Research Project	30	6	MNC
3	BS3560	Functional Genomics, Proteomics and Bioinformatics	15	6	MC
3	BS3420	Nutrition and Medical Biochemistry	15	6	MC

This table sets out the most important information for the mandatory modules on your degree course. These modules are central to achieving your learning outcomes, so they are compulsory, and all students on your degree course will be required to take them. You will be automatically registered for these modules each year. Mandatory modules fall into two categories: 'condonable' or 'non-condonable'.

In the case of mandatory 'non-condonable' (MNC) modules, you must pass the module before you can proceed to the next year of your course, or to successfully graduate with a particular degree title. In the case of mandatory 'condonable' (MC) modules, these must be taken but you can still progress or graduate even if you do not pass them. Please note that although Royal Holloway will keep changes to a minimum, changes to your degree course may be made where reasonable and necessary due to unexpected events. For example: where requirements of relevant Professional, Statutory or Regulatory Bodies have changed and course requirements must change accordingly, or where changes are deemed necessary on the basis of student feedback and/or the advice of external advisors, to enhance academic provision.

### 3.2 Optional modules

In addition to mandatory modules, there will be a number of optional modules available during the course of your degree. Although Royal Holloway will keep changes to a minimum, new options may be offered or existing ones may be withdrawn. For example where reasonable and necessary due to unexpected events, where requirements of relevant Professional, Statutory or Regulatory Bodies (PSRBs) have changed and course requirements must change accordingly, or where changes are deemed necessary on the basis of student feedback and/or the advice of External Advisors, to enhance academic provision. There may be additional requirements around option selection; please contact the Department for further information.

During stage one, you must choose options equal to the value of 30 credits from a list of stage one modules offered by the Department.

During stage two, you must choose options equal to the value of 45 credits from a list of stage two modules offered by the Department.

During stage three, you must choose options equal to the value of 60 credits from a list of FHEQ level 6 modules offered by the Department.

## Section 4 - Progressing through each year of your degree course

For further information on the progression and award requirements for your degree, please refer to Royal Holloway's [Academic Regulations](#).

Progression throughout the year/s is monitored through performance in summative or formative coursework assignments. Please note that if you hold a Student Visa and you choose to leave (or are required to leave because of non-progression) or complete early (before the course end date stated on your CAS), then this will be reported to UKVI.

All first year undergraduate students are required to take and pass the non-credit bearing Moodle-based Academic Integrity module SS1001 in order to progress into the second year of study (unless their course includes the alternative mandatory SS1000 module). The pass mark for the module assessment is stated in the on-line Academic Integrity Moodle module. Students may attempt the assessment as often as they wish with no penalties or capping. Students who meet the requirements for progression as stipulated in the [Academic Taught Regulations](#) but fail to pass the Moodle-based Academic Integrity module will not be permitted to progress into their second year of academic study.

**Note for part-time study you will take:**

**Stage one (a):**

BS1021 Becoming a Bioscientist

BS1031 Chemistry of Life

BS1032 Fundamental Biochemistry)

BS1091 Protein Biochemistry and Enzymology

**Stage one (b):**

BS1071 Cell Biology and the Origin of Life

BS1072 Genetics

and choose options from the Stage one modules listed above.

**Stage two (a):**

BS2510 Bioenergetics and Metabolism

BS2520 Protein Structure and Function

BS2530 Molecular Biology

and choose options from the stage two modules listed above.

**Stage two (b):**

BS2570 Physical Biochemistry for Life Scientists

BS2580 Natural Product Biochemistry and Sustainability

and choose options from the Stage two modules listed above.

**Stage three (a):**

BS3010 Individual Research Project

BS3420 Nutrition and Medical Biochemistry

BS3560 Functional Genomics, Proteomics, and Bioinformatics

**Stage three (b):**

Optional modules from the Stage three modules listed above.

### Section 5 – Educational aims of the course

The aims of the Honours Degree course in Biochemistry are to:

- provide a sound knowledge and understanding of the molecular, cellular, and chemical principles of the subject through a core set of modules, and develop an insight into the current frontiers of knowledge, primarily through a series of second and more particularly specialised third year module options which focus on selected areas of topical importance in biochemistry;
- 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 you 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

Section 6 - Course learning outcomes				
In general terms, the courses provide opportunities for students to develop and demonstrate the following learning outcomes. ( <i>Categories – Knowledge and understanding (K), Skills and other attributes (S), and Transferable skills (*)</i> )				
	Course Learning outcome	Level 4	Level 5	Level 6
<b>1. Graduates from this course will demonstrate KNOWLEDGE and CURIOSITY</b>	<p>Describe and discuss the key biological concepts and phenomena relevant to Biochemistry, and to do so confidently, accurately and in detail, using appropriate terminology.</p> <p>Be aware of the historical context, ethical issues and societal impacts of advances in Biochemistry and appreciate the contribution of the field to the innovations that characterise the modern world and their potential future impact.</p>	<p>Recall basic knowledge of key biological concepts in the subjects that underpin the understanding of Biochemistry, including chemistry, cell biology, and genetics.</p> <p>Demonstrate an appreciation of the historical context of subjects in the field and the global reach of Biochemistry, the impact on human life and the environment and the ethical considerations implicit in their application.</p>	<p>Explain biochemical phenomena in the function of cells and organisms, including the structure and role of enzymes and other biological macromolecules, and describe tools for molecular analysis and manipulation.</p> <p>Recognise the relationships and interfaces between Biochemistry and other subjects, enabling efficient interactions in a multidisciplinary environment, and identify and discuss the application of Biosciences to solving current and future challenges in the world.</p>	<p>Apply a comprehensive knowledge of concepts and phenomena in Biochemistry including the complexity of biochemical function in living organisms and demonstrate evidence of enquiry beyond this.</p> <p>Critically assess the merits of contrasting subject-specific theories, paradigms, concepts, and principles, and develop a reasoned argument to support their position on a topic using evidence from a range of published articles.</p> <p>Engage with philosophical and ethical debates arising from current advances in the biosciences and their impact on society.</p> <p>Demonstrate awareness of the cutting-edge developments in the field and relevant interdisciplinary activity and the potential of Biochemistry graduates to develop solutions to current and future challenges.</p>
<b>2. Graduates from this course will demonstrate PRACTICAL SKILLS and RISK AWARENESS</b>	<p>Select and carry out appropriate quantitative and qualitative practical, laboratory and computational techniques to solve problems relevant to the course, including consideration of the theoretical basis and limitations of various techniques, and be able to</p>	<p>Demonstrate individual competency in a selection of appropriate practical techniques relevant to the course.</p> <p>Recognise Good Laboratory Practice and record data accurately.</p> <p>Follow instructions to work safely and demonstrate awareness of the</p>	<p>Demonstrate individual competency in a broad range of appropriate qualitative and quantitative practical laboratory techniques and discuss their theoretical basis and limitations.</p>	<p>Design an approach and use appropriate practical techniques and skills to address the aims of a research project or investigation, whilst discussing the limitations of the techniques and suggesting alternatives.</p> <p>Implement Good Laboratory Practice in the way experiments are planned, performed,</p>

	work safely with an awareness of the associated risks.	relevant risk factors involved in both biological and chemical laboratory activities.	<p>Follow Good Laboratory Practice in the planning, performance and recording of results.</p> <p>Follow standard operating procedures to enact safe working practices whilst understanding the relevant risks from biological and chemical factors and how to mitigate them.</p>	<p>monitored, recorded, reported, and retained.</p> <p>Independently produce and apply risk assessments for completing project work in a safe and reliable manner, including identification of relevant risks from biological, chemical, laboratory or field-based work.</p>
<b>3. Graduates from this course will be able to DESIGN EXPERIMENTS AND ANALYSE DATA</b>	<p>Apply knowledge and understanding of biological systems and methodologies to design experiments and to solve theoretical and practical problems, with awareness of appropriate controls, possible bias, ethics and sustainability.</p> <p>Collect qualitative and quantitative data from investigations relevant to the course and analyse and interpret these data to allow testing of hypotheses, contextualisation of findings, presentation of results, and suggestions for further lines of investigation.</p> <p>Deploy mathematical and statistical concepts, processes, and tools, such as the manipulation of equations and graphical and statistical analysis, to solve problems or evaluate data.</p>	<p>Design simple experiments and consider appropriate controls and sources of possible bias.</p> <p>Record data accurately and perform appropriate data analysis and presentation of results.</p> <p>Carry out numerical calculations and statistical analyses as appropriate in Biochemistry and interpret the outcomes.</p> <p>Reflect on practical outcomes in terms of the quality of results obtained.</p>	<p>Devise and evaluate solutions to solve both routine and unfamiliar problems using a range of methods, and demonstrate awareness of appropriate controls, possible bias, ethics, and sustainability.</p> <p>Record data accurately and apply appropriate methods for analysis using numerical calculations, Excel spreadsheets, bioinformatic analysis, and other computational techniques.</p> <p>Present results clearly using appropriate terminology and interpret data with relevant statistical analyses to test hypotheses.</p> <p>Critically assess the quality of evidence obtained and make suggestions for improvement.</p> <p>Place the work in context by integrating relevant information from the scientific literature and</p>	<p>Discuss the application of techniques relevant to biochemistry for understanding normal function of living organisms and to investigate the causes and solutions for disease or global challenges.</p> <p>Demonstrate independent and accurate data collection in the project, including selection of appropriate numerical, statistical, bioinformatic and computational methods for analysis.</p> <p>Present and evaluate data effectively, interpret findings, make and test hypotheses, make decisions, and consider further lines of investigation with a thorough understanding of the context within the field.</p> <p>Evaluate the evidence base for scientific claims in the primary literature by commenting on the adequacy of the methods, data and interpretation.</p>



			suggest further lines of investigation.	
<p><b>4. Graduates from this course will demonstrate RESEARCH SKILLS and the ability to EVALUATE LITERATURE</b></p>	<p>Complete independent open-ended investigative work through a project/research-based assignment relevant to the course and demonstrate the ability to think independently, work autonomously and solve problems.</p> <p>Engage with literature from Biochemistry to develop insight into the subject and to stay up to date with advances in the field, including aspects of sustainability, while appreciating the fluid nature of knowledge that evolves as new findings emerge.</p> <p>Use appropriate databases, computational techniques, and tools to aid further understanding and insight of Biochemical processes, and to innovate and solve problems creatively in a digital world.</p>	<p>Generate a solution to a task by following instructions or using ideas borrowed from elsewhere.</p> <p>Use search strategies to identify published scientific articles relevant to a topic.</p> <p>Apply a variety of methods of study in investigating, recording and analysing material.</p> <p>Demonstrate the ability to appropriately cite and reference source materials.</p>	<p>Assemble and apply information from different sources to address a problem and formulate a solution through independent effort or teamwork.</p> <p>Access and evaluate information from a wide range of sources such as texts, published journal articles, reports and clinical data and demonstrate the ability to put that information into context.</p> <p>Demonstrate critical and analytical skills, including a recognition that statements and hypotheses should be tested, and that evidence is subject to assessment and critical evaluation.</p> <p>Sort, filter, abstract, evaluate and synthesise information from a range of sources to produce a written body of work with complete and accurate citations and references.</p>	<p>Plan, execute and present an independent piece of work which includes analysis or evaluation of data within a supported framework, and demonstrate evidence of time management, problem-solving, and independence.</p> <p>Create solutions to problems using imaginative, creative, or innovative approaches, either independently or with teamwork, and employ appropriate databases, computational techniques, and tools.</p> <p>Demonstrate well-developed strategies for updating, maintaining, and enhancing their knowledge of the biosciences, synthesise information from different sources, and generate hypotheses based on current data while acknowledging that our understanding continues to evolve as new findings emerge.</p> <p>Assess the quality of evidence from different sources by evaluating the context, aims, objectives, experimental design, methodology, data interpretation and application of the study.</p>
<p><b>5. Graduates from this course will demonstrate PROFESSIONAL</b></p>	<p>Act professionally, with due regard for legal, ethical and societal responsibilities, modelling good practice that promotes positive perceptions of Biochemistry and Biochemists including working successfully in a group environment,</p>	<p>Interact with others in groups and understand the importance of inclusive working practices.</p> <p>Recognise the importance of effective communication within a</p>	<p>Work with others in groups and demonstrate inclusive working practices.</p> <p>Communicate effectively with all members of a team and demonstrate consideration of the</p>	<p>Collaborate with others to work in an effective team by coordinating to exchange information and tackle problems.</p> <p>Demonstrate leadership to help drive a project forwards, inspiring, and motivating others.</p>

<p><b>SKILLS AND BEHAVIOURS</b></p>	<p>contributing positively and flexibly to team outputs.</p>	<p>team and demonstrate consideration of the views of others.</p> <p>Recognise and apply the principles and codes of practice that underpin personal and professional integrity and standards.</p> <p>Reflect on their progress from feedback provided.</p>	<p>views of others and social intelligence.</p> <p>Demonstrate personal integrity and self-awareness of the ethical approach to their work.</p> <p>Reflect on their progress from feedback provided and apply comments on areas of improvement to further pieces of work.</p>	<p>Demonstrate an understanding of how to identify, protect and exploit intellectual property (IP) as part of the scientific innovation process.</p> <p>Evaluate their development of intellectual and transferable skills, for demonstration to employers.</p> <p>Demonstrate resilience and initiative to overcome problems or respond to changes in circumstance.</p>
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## Section 7 - 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. 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. You 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 modules 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. You have to prepare your own risk assessment prior to commencing your final year project work.

Training in intellectual and key transferable skills is embodied throughout the course and forms a strong element of the tutorial and study session courses. You 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, poster preparation, oral presentations and the individual research project. Full details of the assessments for individual modules can be obtained from the School.

Contact hours come in various forms and may take the form of time spent with a member of staff in a lecture or seminar with other students. Contact hours may also be laboratory or, studio-based sessions, project supervision with a member of staff, or discussion through a virtual learning environment (VLE). These contact hours may be with a lecturer or teaching assistant, but they may also be with a technician, or specialist support staff.

The way in which each module on your degree course is assessed will also vary. Assessments designated as 'summative' will receive a mark which will count towards your overall mark for the module, and potentially your degree classification, depending on your year of study. On successful completion of the module you will gain the credits listed.

More detailed information on modules, including teaching and learning methods, and methods of assessment, can be found via the online [Module Catalogue](#). The accuracy of the information contained in this document is reviewed regularly by the university, and may also be checked routinely by external agencies.

## Section 8 – Additional costs

There are no single associated costs greater than £50 per item on this degree course.

**These estimated costs relate to studying this particular degree course at Royal Holloway. General costs such as accommodation, food, books and other learning materials and printing etc., have not been included, but further information is available on our website.**

Section 9 – Indicators of quality and standards	
<b>QAA Framework for Higher Education Qualifications (FHEQ) Level</b>	4-6
Your course is designed in accordance with the FHEQ to ensure your qualification is awarded on the basis of nationally established standards of achievement, for both outcomes and attainment. The qualification descriptors within the FHEQ set out the generic outcomes and attributes expected for the award of individual qualifications. The qualification descriptors contained in the FHEQ exemplify the outcomes and attributes expected of learning that results in the award of higher education qualifications. These outcomes represent the integration of various learning experiences resulting from designated and coherent courses of study.	
<b>QAA Subject benchmark statement(s)</b>	<a href="http://www.qaa.ac.uk/quality-code/subject-benchmark-statements">http://www.qaa.ac.uk/quality-code/subject-benchmark-statements</a>
Subject benchmark statements provide a means for the academic community to describe the nature and characteristics of courses in a specific subject or subject area. They also represent general expectations about standards for the award of qualifications at a given level in terms of the attributes and capabilities that those possessing qualifications should have demonstrated.	

Section 10– Intermediate exit awards (where available)		
You may be eligible for an intermediate exit award if you complete part of the course as detailed in this document. Any additional criteria (e.g. mandatory modules, credit requirements) for intermediate awards is outlined in the sections below.		
Award	Criteria	Awarding body
Diploma in Higher Education (DipHE)	Pass in 210 credits of which at least 90 must be at or above FHEQ Level 4 and at least 120 of which must be at or above FHEQ Level 5	Royal Holloway and Bedford New College
Certificate in Higher Education (CertHE)	Pass in 120 credits of which at least 90 must be at or above FHEQ Level 4	Royal Holloway and Bedford New College