

Royal Holloway, University of London
Programme specification for an undergraduate award
BSc Molecular Biology (C701)

Section 1 – Introduction to your programme

This programme specification is a formal document, which provides a summary of the main features of your programme 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 College prospectus, and in various handbooks, all of which you will be able to access online. Alternatively, further information on the College's academic regulations and policies can be found [here](#). Further information on the College's Admissions Policy can be found [here](#).

Your degree programme in Molecular Biology 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 course units to the value of 120 national credits. The curriculum is based around a core set of mandatory course units and there is a strong foundation in Stages one and two, which covers the requirements of the benchmarking statements in molecular aspects of the biosciences.

Stage one comprises a fixed selection of mandatory course units (totalling 75 credits) and seeks 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 also select from a set of optional course units which provide the option to include Physiology, Protein Biochemistry and Enzymology, Biology in a Changing World or a module on the Green World: Plant Evolution, Form and Function, depending on individual interests. Stage one also includes a strong element of laboratory training, with practical work in all course units, as well as providing support with the skills necessary for the study of biological sciences. In **Stage two** you take 4 mandatory course units to the value of 60 credits and choose the remaining credits from a list of options. The mandatory course units build on the foundations laid in stage one and provide a basis for the study of the research led specialist course units in the stage three. Again the course units all include a substantial element of laboratory training that prepares you for the selection and implementation of the individual research project in stage three. The optional course units allow you to either concentrate on molecular biology or to diversify into other areas depending on your interests. In **Stage three** you complete an individual research project, take 2 other mandatory course units to the value of 30 credits, and choose 4 other course units from a list of options. The mandatory and optional course units available all have a strong molecular basis, but include topics as diverse as Industrial Biotechnology, Circadian Biology, Seed Biology and Molecular and Medical Microbiology.

The programme emphasises the importance of molecular biology in the study of biology and biochemistry. It includes training in a range of practical techniques and skills relevant to research work in molecular bioscience. The system is also flexible and allows you 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 stage two. You 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 your Personal Tutor and the Director of Teaching.

While Royal Holloway keeps all the information made available under review, programmes and the availability of individual course units, especially optional course units 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 programme. In turn, Royal Holloway will inform you as soon as is practicable of any significant changes which might affect your studies.

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

Degree programme – Also referred to as 'degree course' or simply 'course', these terms refer to the qualification you will be awarded upon successful completion of your studies.

Course unit – Also referred to as 'module', this refers to the individual units you will study each year to complete your degree programme. Undergraduate degrees at Royal Holloway comprise a combination of 15 and 30 credit course units to the value of 120 credits per year. On some degree programmes a certain number of optional course units must be passed for a particular degree title.

Section 2 – Programme details			
Date of specification update	March 2019	Location of study	Egham Campus
Programme award and title	BSc Molecular Biology	Level of study	Undergraduate
Programme code	1309	UCAS code	C701
Year of entry	2019/20		
Awarding body	Royal Holloway, University of London		
Department or school	Biological Sciences	Other departments or schools involved in teaching the programme	N/A
Mode(s) of attendance	Full-time or Part-time	Duration of the programme	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 Molecular Biology; this is a requirement of the Royal Society of Biology for an accredited degree.		
Link to Coursefinder for further information:	https://www.royalholloway.ac.uk/studying-here/	For queries on admissions:	study@royalholloway.ac.uk

Section 3 – Degree programme structure										
3.1 Mandatory course unit information										
The following table summarises the mandatory modules which students must take in each year of study										
Year	Course code	Course title	Contact hours*	Self-study hours	Written exams**	Practical assessment**	Coursework**	Credits**	FHEQ level	Course status (see below)
1	BS1021	Becoming a Bioscientist	57	93		25%	75%	15	4	MC
1	BS1031	Chemistry of Life	61	89	60%	10%	30%	15	4	MC
1	BS1032	Fundamental Biochemistry	53	97	70%		30%	15	4	MC
1	BS1071	Cell Biology and Evolution	45	105	70%		30%	15	4	MC
1	BS1072	Genetics	35	115	70%		30%	15	4	MC
2	BS2040	Cell Dynamics: Division and Movement	34	116	70%	16%	14%	15	5	MC
2	BS2150	Applications of Molecular Genetics in Biology	30	120	70%		30%	15	5	MC
2	BS2520	Protein Structure and Function	34	116	70%	3%	27%	15	5	MC
2	BS2530	Molecular Biology	36	114	70%	0%	30%	15	5	MC
3	BS3010	Individual Research Project	183	117		25%	75%	30	6	MNC
3	BS3540	Cell and Molecular Biology of Cancer	23	127	80%	20%		15	6	MC
3	BS3560	Functional Genomics, Proteomics and Bioinformatics	21	129	80%		20%	15	6	MC

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

In the case of mandatory 'non-condonable' (MNC) courses, you must pass the course before you can proceed to the next year of your programme, or to successfully graduate with a particular degree title. In the case of mandatory 'condonable' (MC) courses, 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 programme 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 programme 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.

*Contact hours come in various different 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 course on your degree programme is assessed will also vary, however, the assessments listed above are all 'summative', which means you will receive a mark for it which will count towards your overall mark for the course, and potentially your degree classification, depending on your year of study. On successful completion of the course you will gain the credits listed. 'Coursework' might typically include a written assignment, like an essay. Coursework might also include a report, dissertation or portfolio. 'Practical assessments' might include an oral assessment or presentation, or a demonstration of practical skills required for the particular course.

3.2 Optional course units

In addition to mandatory course units, there will be a number of optional course units available during the course of your degree. The following table lists a selection of optional course units that are likely to be available. However, not all may be available every year. 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 programme 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, so it is important that this specification is read alongside your department's Student Handbook, which you can access via their [webpage](#).

Year 1	Year 2	Year 3
BS1041: Biology in a Changing World	BS2005: Microbiology	BS3020: Special Study: Dissertation
BS1043: Green World: Plant Evolution, Form and Function	BS2020: Plant Life: From Genes to Environment	BS3030: Biology of Parasitic Diseases
BS1061: Introductory Animal Physiology	BS2050: Human Physiology in Health and Disease	BS3190: Climate Change: Plants and the Environment
BS1062: Pathophysiology	BS2060: Developmental Biology	BS3230: Circadian Biology
BS1091: Protein Biochemistry and Enzymology	BS2160: Evolution	BS3410: Industrial Biotechnology in a Changing World
	BS2510 Bioenergetics and Metabolism	BS3420: Medical Biochemistry

	BS2540: Molecular and Cellular Immunology	BS3510: Molecular and Medical Microbiology
	BS2550: Neuronal and Cellular Signalling	BS3520: Seed Biology: From Molecular and Conservation Biology to Industrial Applications
	BS2560: Pharmacology and Toxicology	BS3530: Applications of Advanced Molecular Biology Methods
	BS2580: Plant Biochemistry and Biosynthesis	BS3570: Human Embryology and Endocrinology
		BS3580: Cell and Molecular Neuroscience
		BS3590: Molecular Basis of Inherited Disease

Section 4 - Progressing through each year of your degree programme

For Part-time study:

Stage one (a):

BS1021 Becoming a Bioscientist (15 credits; condonable)

BS1031 Chemistry of Life (15 credits; condonable)

BS1032 Fundamental Biochemistry (15 credits; condonable)

and choose options from the Stage one course units listed above.

Stage one (b):

BS1071 Cell Biology and Evolution (15 credits; condonable)

BS1072 Genetics (15 credits; condonable)

and choose options from the Stage one course units listed above.

Stage two (a)

BS2150 Applications of Molecular Genetics in Biology (15 credits; condonable)

BS2520 Protein Structure and Function (15 credits; condonable)

and choose options from the stage two course units listed above

Stage two (b)

BS2040 Cell Dynamics: Division and Movement (15 credits; condonable)

BS2530 Molecular Biology (15 credits; condonable)

and choose options from the stage two course units listed above

Stage three (a)

BS3010 Individual Research Project (30 credits) [Non-condonable fail – must be passed to qualify for specific field of study].

BS3540 Cell and Molecular Biology of Cancer (15 credits; condonable)

BS3560 Functional Genomics, Proteomics, and Bioinformatics (15 credits; condonable)

Stage three (b)

Options from the stage three course units listed above

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

Section 5 – Educational aims of the programme

The aims of the Honours Degree programme in Molecular Biology are to:

- provide a sound knowledge and critical understanding of molecular biology through a core of course units, and develop an insight into the current frontiers of knowledge, primarily through a series of specialised Stage 3 course units;
- provide an understanding of how the principles of molecular biology underlie much of the basis of modern research and have informed our biological and cellular understanding;
- provide knowledge of the essential biochemical principles that underlie molecular biology;
- 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 - Programme learning outcomes

In general terms, the programmes provide opportunities for students to develop and demonstrate the following learning outcomes. (*Categories – Knowledge and understanding (K), Skills and other attributes (S), and Transferable skills (*)*)

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. understanding of the essential molecular, cellular, physiological and chemical principles that underlie molecular biology (K); 2. a knowledge and critical understanding of the structure, arrangement, expression and regulation of genes, and techniques used to investigate and manipulate gene function (K); 3. a critical knowledge of the importance of molecular biology to the development and genetic manipulation of organisms, and to the understanding of disease (K); 4. an understanding of the principles that determine the three-dimensional structure of biological macromolecules and how this is related to their biological functions (K); 5. an understanding of the structure and function of various cell types in unicellular and multicellular organisms, and the structure and function of cell membranes, cell organelles and cell differentiation (K); 6. an understanding of the application of molecular biology in diverse areas of research, and how this has influenced our understanding of biological function or provided avenues to help ensure global sustainability (K); 7. understanding cutting edge developments in a range of areas specific to the subject (K); 8. knowledge and engagement with philosophical and ethical issues arising from some of the current developments in the biosciences (K); 9. well-developed strategies for updating, maintaining and enhancing their knowledge of the Biosciences (K); 10. a range of laboratory techniques of key importance in Molecular Biology (S); 11. working safely in a scientific laboratory, with awareness of standard safety protocols (S); 12. the ability to employ and evaluate suitable experimental methods for the investigation of relevant areas of molecular biology (S); | <ol style="list-style-type: none"> 13. the ability to apply relevant numerical skills, including statistics to biological and biochemical data (S); 14. the ability to access bioscience information from a variety of sources in order to maintain and enhance knowledge of the Biosciences and to communicate the principles clearly in oral and written forms (S); 15. assessing the merits of contrasting subject-specific theories, paradigms, concepts and principles (S); 16. applying subject-specific knowledge and understanding to address familiar and unfamiliar problems (S); 17. the ability to plan, design, execute and present an independent piece of research through a theoretical or practical project in molecular biology, including the production of the final report (S); 18. taking personal responsibility for learning, and developing habits of reflection on that learning (S*); 19. identifying, retrieving (including the use of online computer searches), sorting and exchanging information (S*); 20. abstracting and synthesising information, and developing a reasoned argument (S*); 21. critically interpreting and evaluating experimental data and relevant literature, analysing and solving problems, and decision-making (S*); 22. written communication and verbal presentation (S*); 23. information technology (including spreadsheets, databases, word processing, email and WWW) (S*); 24. interpersonal skills, including team/group work and recognising and respecting the viewpoints of others (S*); 25. CV and career preparation (S*). |
|---|--|

Section 7 - Teaching, learning and assessment

The overall strategy is to provide a progressive approach to molecular biology 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, 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 you the opportunity to design, execute and evaluate your 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 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. 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 programme and forms a strong element of the tutorial and study session programmes. 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 and laboratory reports, in addition to poster preparation, oral presentations and the individual research project. Full details of the assessments for individual course units can be obtained from the School.

Section 8 – Additional costs

Other essential costs - £396

These estimated costs relate to studying this particular degree programme 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	
QAA Framework for Higher Education Qualifications (FHEQ) Level	4-6
Your programme 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 programmes of study.	
QAA Subject benchmark statement(s)	http://www.qaa.ac.uk/quality-code/subject-benchmark-statements
Subject benchmark statements provide a means for the academic community to describe the nature and characteristics of programmes 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 – Further information

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate when taking full advantage of the learning opportunities that are available. More detailed information on course units, including teaching and learning methods, and methods of assessment, can be found via the online [Course 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, such as the Quality Assurance Agency (QAA).

Your programme will be reviewed regularly, both by the university as part of its cyclical quality enhancement processes, and/or by your department or school, who may wish to make improvements to the curriculum, or in response to resource planning. As such, your programme may be revised during the course of your study at Royal Holloway. However, your department or school will take reasonable steps to consult with students via appropriate channels when considering changes. All continuing students will be routinely informed of any significant changes.

Section 11 – Intermediate exit awards (where available)

You may be eligible for an intermediate exit award if you complete part of the programme as detailed in this document. Any additional criteria (e.g. mandatory course units, 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

Section 12 - Associated award(s)

None