

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

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 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 course 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 modules to the value of 120 national credits. The curriculum is based around a core set of mandatory modules 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 modules (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 modules 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 modules, as well as providing support with the skills necessary for the study of biological sciences. In **Stage two** you take 4 mandatory modules to the value of 60 credits and choose the remaining credits from a list of options. The mandatory modules build on the foundations laid in stage one and provide a basis for the study of the research led specialist modules in the 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. The optional modules allow you to either concentrate on molecular biology or to diversify into other areas depending on your interests. In **Stage three** you take 2 mandatory modules to the value of 30 credits, and choose 4 other modules from a list of options. The mandatory and optional modules available all have a strong molecular basis, but include topics as diverse as the Applications of Genetic Engineering, Circadian Biology, Seed Biology and Molecular and Medical Microbiology. You complete an individual research project, which provides training in a specialised research area and also in generic skills such as independent working, literature searching, report writing, use of word processing, graphics and statistics. The 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 course 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 Department 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 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 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 'course', these terms refer to the qualification you will be awarded upon successful completion of your studies.

Module – May also be referred to as 'course unit', 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 2022 | Location of study | Egham Campus |
| Course award and title | BSc Molecular Biology | Level of study | Undergraduate |
| Course code | 1309 | UCAS code | C701 |
| Year of entry | 2022/23 | | |
| 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 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 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 | Contact hours* | Self-study hours | Written exams** | Practical assessment** | Coursework** | Credits** | FHEQ level | Module status (see below) |
| 1 | BS1021 | Becoming a Bioscientist | 66 | 84 | 0 | 25% | 75% | 15 | 4 | MC |
| 1 | BS1031 | Chemistry of Life | 61 | 89 | 50% | 20% | 30% | 15 | 4 | MC |
| 1 | BS1032 | Fundamental Biochemistry | 59 | 91 | 50% | 10% | 40% | 15 | 4 | MC |
| 1 | BS1071 | Cell Biology and the Origin of Life | 39 | 111 | 50% | 20% | 30% | 15 | 4 | MC |
| 1 | BS1072 | Genetics | 35 | 115 | 50% | 0 | 50% | 15 | 4 | MC |
| 2 | BS2040 | Cell Dynamics: Division and Movement | 32 | 118 | 60% | 0 | 40% | 15 | 5 | MC |
| 2 | BS2150 | Applications of Molecular Genetics in Biology | 28 | 122 | 50% | 20% | 30% | 15 | 5 | MC |
| 2 | BS2520 | Protein Structure and Function | 34 | 116 | 50% | 5% | 45% | 15 | 5 | MC |
| 2 | BS2530 | Molecular Biology | 36 | 114 | 60% | 0 | 40% | 15 | 5 | MC |
| 3 | BS3010 | Individual Research Project | 183 | 117 | | 35% | 65% | 30 | 6 | MNC |
| 3 | BS3540 | Cell and Molecular Biology of Cancer | 23 | 127 | 60% | 15% | 25% | 15 | 6 | MC |
| 3 | BS3560 | Functional Genomics, Proteomics and Bioinformatics | 21 | 129 | 75% | 0 | 25% | 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.

*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. It is intended that these contact hours will face-to-face as far as possible, but in certain unavoidable situations, these may take place virtually.

**The way in which each module on your degree course 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 module, and potentially your degree classification, depending on your year of study. On successful completion of the module 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 module.

3.2 Optional modules

In addition to mandatory modules, there will be a number of optional modules available during the course of your degree. The following table lists a selection of optional modules 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 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, 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 II | BS3190: Climate Change: Plants and the Environment |
| BS1062: Introduction to Human Physiology in Health and Disease | BS2060: Developmental Biology | BS3230: Circadian Biology |

| | | |
|---|---|--|
| BS1091: Protein Biochemistry and Enzymology | BS2160: Evolution | BS3410: Biotechnology in a Changing World |
| | BS2510 Bioenergetics and Metabolism | BS3420: Nutrition and Medical Biochemistry |
| | BS2540: 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 Genetic Engineering in Health and Disease |
| | BS2580: Natural Product Biochemistry and Sustainability | BS3570: Human Embryology |
| | | BS3580: Cell and Molecular Neuroscience |
| | | BS3590: Molecular Basis of Inherited Disease |

3.3 Optional module requirements

During stage 1 you must choose options to the value of 45 credits from the list of stage one modules offered by the Department.
 During stage 2 you must choose options to the value of 60 credits from the list of stage two modules offered by the Department.
 During stage 3 you must choose options to the value of 60 credits from the list of stage three modules offered by the Department.

Section 4 - Progressing through each year of your degree course

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 a 15 credit option from the Stage one modules listed above.

Stage one (b):

BS1071 Cell Biology and the Origin of Life (15 credits; condonable)

BS1072 Genetics (15 credits; condonable)

and choose a 15 credit option from the Stage one modules 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 30 credits of options from the stage two modules listed above

Stage two (b)

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

BS2530 Molecular Biology (15 credits; condonable)

and choose 30 credits of options from the stage two modules 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 to the value of 60 credits from the stage three modules listed above

Progression and Award

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

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 [College's Undergraduate Regulations](#) (Section: Conditions for progression to the next stage) but fail to pass the Moodle-based Academic Integrity module will not be permitted to progress into their second year of academic study at the College.

Section 5 – Educational aims of the course

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

- provide a sound knowledge and critical understanding of molecular biology through a core of modules, and develop an insight into the current frontiers of knowledge, primarily through a series of specialised Stage 3 modules;
- 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 - Course learning outcomes

In general terms, the courses 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 some knowledge and understanding of standard safety protocols and Good Laboratory Practice (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. developing creativity by applying original ideas, being imaginative or using innovative approaches for tackling problems (S*); 23. written communication and verbal presentation (S*); 24. information technology (including spreadsheets, databases, word processing, email and WWW) (S*); 25. interpersonal skills, including team/group work and recognising and respecting the viewpoints of others (S*); 26. 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 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 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 modules can be obtained from the Department.

Section 8 – Additional costs

There are no additional costs associated with this 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 | |
|--|---|
| QAA Framework for Higher Education Qualifications (FHEQ) Level | 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. | |
| 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 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 – Further information

This specification provides a concise summary of the main features of the course 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 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, such as the Quality Assurance Agency (QAA).

Your course 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 course 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 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 |

Section 12 - Associated award(s)

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|------------------------------|--|
| BSc Molecular Biology (C701) | BSc Molecular Biology with a Year in Industry (C170) |
|------------------------------|--|