
Programme Specification

BSc Biological Sciences with Industrial Experience

UCAS code: C101

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|---|---------------------------|
| Awarding Institution: | University of Reading |
| Teaching Institution: | University of Reading |
| Relevant QAA subject benchmarking group(s): | Biosciences |
| Faculty of Life Sciences | Programme length: 3 years |
| For students entering Part 3 in: | October 2009 |
| Date of specification: | April 2009 |
| Programme Director: | Dr Gail Hutchinson |
| Programme Adviser: | Professor Phil Knight |
| Board of Studies: | Biological Sciences |
| Accreditation: | None |

Summary of programme aims

Biological Sciences with Industrial Experience is a 4 year degree programme aims to provide students with the opportunity to study biology at scales ranging from biomolecular processes to global ecological systems. It aims to allow students to choose either to specialise on a particular stream or to choose a broad-based programme, taking modules from a variety of streams. Students follow the full three-year degree programme in Biological Sciences but between years 2 and 3 will spend one year in an industrial, or institute, research or similar environment.

Students are expected to gain a broad understanding of the concepts underpinning biological sciences and to demonstrate the ability to complete a detailed study during Part 4.

The programme is concerned especially with the diversity of living organisms and includes study of the biology of all types of organisms, from microorganisms to flowering plants and mammals, at levels ranging from the molecular, biochemical and cellular to the physiological, environmental and ecological. The subject matter of Part 1 is broadly based but allows increasing specialisation in Parts 2 and 3 to provide a coherent, in-depth area of study that the student may select.

Transferable skills

The University's Strategy for Teaching and Learning has identified a number of generic transferable skills which all students are expected to have developed by the end of their degree programme. In following this programme, students will have had the opportunity to enhance their skills relating to career management, communication (both written and oral), information handling, numeracy, problem solving, team working and use of information technology.

As part of this programme all students are also expected to have gained experience and show competence in the following transferable skills:

1. The ability to assess, evaluate and present scientific data.
2. The ability to design and undertake a programme of scientific investigation and to effectively communicate the aims and results of this investigation.
3. A range of laboratory-based practical skills and, in the Environmental stream, laboratory and field-based practical skills.

Programme content

The profile that follows states which modules must be taken (the ‘compulsory’ modules), together with one or more lists of modules from which the student must make a selection (the ‘optional’ modules). Students choose such additional modules as they wish, in consultation with their programme adviser, to make 120 credits in each Part. The number of module credits for each module is shown in brackets after its title. Students may take up to 70 credits in any one term.

Part 1 (three terms, 120 credits)

| Compulsory core modules (50 credits) – All students | | <i>Credits</i> | <i>Level</i> |
|---|--|----------------|--------------|
| BI1BA1 | The Living Cell | 10 | C |
| BI1BC2 | Genes and Chromosomes | 10 | C |
| BI1EC12 | Exploiters and Exploited | 20 | C |
| BI1EG2 | Plant Diversity, Structure and Utilisation | 10 | C |
| Also, students without AS or A2 level Chemistry or an equivalent qualification must take: | | | |
| CH1FC1 | Fundamental Chemistry 1 | 10 | C |
| To achieve a total of 120 credits, students are asked to choose additional modules from one of the two groups of modules listed below . <i>Other module combinations may be possible subject to the approval of your programme adviser and to timetabling constraints.</i> | | | |
| Biomolecular Group of Modules (60 or 70 credits) | | | |
| Compulsory (20 credits) | | | |
| AM1P11 | Introductory Microbiology | 10 | C |
| BI1BG3 | Practical Biochemistry | 10 | C |
| Optional (40 or 50 credits) | | | |
| AP1A18 | Digestion and Nutrition | 10 | C |
| BI1BB2 | Biochemistry and Metabolism | 10 | C |
| BI1BE2 | Pathology: Introduction to Human Disease | 10 | C |
| BI1EF2 | Ecology: Species and their Interactions ^b | 10 | C |
| BI1EF23 | Ecology: Species and their Interactions ^b | 20 | C |
| BI1EI1 | Soil: Principles and Management | 10 | C |
| CH1FC2 | Fundamental Chemistry 2 | 10 | C |
| CH1IN2 | Descriptive Inorganic Chemistry* | 10 | C |
| CH1OR2 | Fundamentals of Organic Chemistry* | 10 | C |
| CH1PH2 | Physical Processes for Biologists* | 10 | C |
| LA1XX | Institution-Wide Language Programme | 20 | C/I |
| PM1PB2 | Human Physiology ^a | 20 | C |
| PM1PB2A | Human Physiology ^a | 10 | C |
| Bio-environmental Group of Modules (60 or 70 credits) | | | |
| Compulsory (30 credits) | | | |
| BI1EF23 | Ecology: Species and their Interactions | 20 | C |
| BI1EI1 | Soil: Principles and Management | 10 | C |
| Optional (30 or 40 credits) | | | |
| AM1P11 | Introductory Microbiology | 10 | C |
| BI1EA1 | Introduction to Enterprise and Marketing | 10 | C |
| BI1EB2 | Humans and the Changing World | 10 | C |
| BI1ED2 | Mammals: Diversity, Behaviour and Conservation | 10 | C |
| BI1EH1 | Principles of Horticulture | 10 | C |
| LA1XX | Institution-Wide Language Programme | 20 | C/I |

^a you can choose either module, not both ^b you can choose either module, not both

* requires A level Chemistry

Part 2 (three terms, 120 credits)

| Compulsory modules (60 credits) | | <i>Credits</i> | <i>Level</i> |
|---|---|----------------|--------------|
| AS2A1 | Statistics for Life Sciences | 10 | I |
| BI2BG5 | Animal Plant and Microbial Development | 10 | I |
| BI2BK5 | Molecular Biology of Gene Expression | 10 | I |
| BI2BM5 | Science Communication | 10 | I |
| BI2EE4 | Evolutionary Biology | 10 | I |
| Compulsory modules Biomolecular Option only | | | |
| BI2BP6 | Practical Skills: Recombinant DNA Exercise | 10 | I |
| Compulsory modules Bio-environmental Option only | | | |
| BI2EWEV | Biodiversity Field Course | 10 | I |
| <p>Optional modules (60 credits) To achieve a total of 120 credits, students choose additional modules, subject to the agreement of the Programme Adviser. Students are encouraged to focus in on a particular area of study. Those wishing to follow the Biomolecular Option should choose <u>at least</u> 40* credits from modules from the <i>Biomolecular</i> strand. Students wishing to follow the Bio-environmental Option should choose <u>at least</u> 40* credits from modules from <i>Bio-environmental</i> strand. Remaining credits may include any of the range of Bioscience modules, plus modules from other areas of the University. Students may take a maximum of 70 credits (including compulsory modules) in any one term [* excluding Institution-Wide Language Programme]</p> | | | |
| Biomolecular Modules | | | |
| AS2H1 | Genetic Data Analysis | 10 | I |
| BI2BB4 | Endocrinology | 10 | I |
| BI2BC4 | Human Development, Organogenesis and Anatomy | 10 | I |
| BI2BD4 | Life and Death of a Cell | 10 | I |
| BI2BE4 | Pharmacology and Toxicology | 10 | I |
| BI2BF4 | Physiology and Genetics of the Bacterial Cell | 10 | I |
| BI2BI5 | Immunology | 10 | I |
| BI2BJ5 | Microbiology: a Medical Perspective | 10 | I |
| BI2BL5 | Protein Structure and Function | 10 | I |
| BI2BO5 | Virology | 10 | I |
| BI2EH4 | Introduction to History and Philosophy of Science | 10 | I |
| LA1XX | Institution-Wide Language Programme | 20 | C/I |
| Bio-environmental Modules | | | |
| BI2BN5 | Vertebrate Zoology | 10 | I |
| BI2EA4 | Weed Biology and Control | 10 | I |
| BI2EB4 | Arboriculture and Ornamental Crops | 10 | I |
| BI2ED4 | Evolution and Classification of Plant Diversity | 10 | I |
| BI2EF6 | Habitat Management | 10 | I |
| BI2EG5 | Horticultural Crop Production | 10 | I |
| BI2EH4 | Introduction to History and Philosophy of Science | 10 | I |
| BI2EI4 | Invertebrate Zoology | 10 | I |
| BI2EM5 | Landscapes for Amenity and Sport | 10 | I |
| BI2EN5 | Animal Behaviour | 10 | I |
| BI2EO5 | Applied Ecology | 10 | I |
| BI2EP5 | Crop Pests and Integrated Crop Protection | 10 | I |
| BI2ET3P | Flora of the British Isles | 10 | I |
| LA1XX | Institution-Wide Language Programme | 20 | C/I |

Part 2Y (three terms)

Compulsory year out in an industrial placement or institute

BI2IND Industrial Placement

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Students will spend one year in an industrial, or institute research, or similar placement. Satisfactory attendance and performance during this year is an integral and compulsory part of this course.

Part 3

| Compulsory modules | | Credits | Level |
|--|---|----------------|--------------|
| BI3PRO | Research Project | 40 | H |
| Optional modules: (80 credits): Students will choose additional modules up to a total of 120 credits, subject to timetabling constraints and the agreement of the Programme Adviser. Details can be found at www.info.rdg.ac.uk/Module/ . In this final year students will be encouraged to focus their studies by specialisation within either the <u>Biomolecular strand</u> (including Biochemistry, Microbiology, Biomedical Science) or <u>Bio-environmental strand</u> (including Ecology, Conservation, Environmental Biology, Zoology, Botany). No more than 70 credits should be taken in any one term. | | | |
| Biomolecular Options | | | |
| BI2BA7 | Medical Genetics | 10 | H |
| BI3BB7 | Selected Topics in Endocrinology and Endocrine Disease | 10 | H |
| BI3BC7 | Bacterial Pathogens | 10 | H |
| BI3BD8 | Cancer | 10 | H |
| BI3BE8 | Cardiovascular Disease | 10 | H |
| BI3BF7 | Cell Communication and Disease | 10 | H |
| BI3BG8 | Mechanisms for Microbial Function | 10 | H |
| BI3BH8 | Mammalian Reproduction | 10 | H |
| BI3BI8 | Neurobiology | 10 | H |
| BI3BJ8 | Viral Pathogens | 10 | H |
| BI3BM7 | Immunology of Bacterial, Viral and Parasitic Diseases | 10 | H |
| BI3BN8 | Use and Abuse of the Microbial World | 10 | H |
| BI3SA1 | Epidemiology | 10 | H |
| BI3SA2 | Clinical Trials | 10 | H |
| FB3N2A | Diet and Disease | 10 | H |
| FB3N2B | Genes Lifestyle and Nutrition | 10 | H |
| Bio-environmental Options | | | |
| AP3A67 | Animal Welfare | 10 | H |
| AP3A68 | Wildlife in the Farming Environment | 10 | H |
| AP3A76 | Principles and Practice in Biological Control | 10 | H |
| AP3A84 | Dogs and Cats | 10 | H |
| BI3EA7 | Environmental and Ecological Weed Management | 10 | H |
| BI3ED6P | Marine Biology Field Course <i>(Takes place during summer after Part 2 Examinations. Enrolment procedures and availability take place in Spring Term Part 2)</i> | 10 | H |
| BI3EE8 | Biodiversity Assessment and the Sustainable Use of Plant Resources | 10 | H |
| BI3EF8 | Biodiversity Informatics | 10 | H |
| BI3EG7 | Evolutionary Genetics and Phylogeny | 10 | H |
| BI3EH8 | Plant Biotechnology for Postharvest Quality | 10 | H |

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| BI3EI8 | Research Topics in Ecology | 10 | H |
| BI3EJ8 | Conservation Biology | 10 | H |
| BI3EK7 | Behavioural Ecology and Life History Theory | 10 | H |
| BI3EL7 | Plants and Climate | 10 | H |
| BI3EO7 | Physiological Ecology | 10 | H |
| BI3EV8 | Biotechnology for Plant Breeding | 10 | H |

Progression requirements

To gain a threshold performance at Part 1 a student shall normally be required to achieve an overall average of 40% over 120 credits taken at Part 1 and a mark of at least 30% in individual modules amounting to not less than 100 credits. **In order to progress from Part 1 to Part 2** a student shall normally be required to achieve a threshold performance at Part 1.

To gain a threshold performance at Part 2 a student shall normally be required to achieve an overall average of 40% over the 120 credits of taught modules taken at Part 2, a mark of at least 30% in individual modules amounting to not less than 100 credits, *and* to have passed the Industrial Placement.

The Industrial Placement is assessed on a Pass/Fail basis. The assessment will be based on the following: a report on attendance and performance from the industrial supervisor; submission of a report on the work carried out during the placement; and, presentation of a seminar on the work carried out. Each of these areas must be judged satisfactory; a satisfactory mark will be not lower than 40%.

In order to progress to Part 3 a student shall normally be required to achieve a threshold performance at Part 2.

Students who at any stage fail to meet the progression requirements for this 4-year programme but who meet the progression requirements for the 3-year programme for BSc (Honours) in Biological Sciences will automatically be offered the opportunity to change to the 3-year programme.

Summary of teaching and assessment

Teaching is organised in modules. Teaching in Part 1 consists of lectures and practical classes with small group work being largely restricted to the Experiments: Design and Interpretation module. Modules can be assessed by 100% coursework but more usually are assessed by a combination of coursework (30%) and formal examination (70%).

In Parts 2 and 4, lectures and practical classes continue to be major modes of teaching but they are increasingly supplemented by seminars and other group work. Modules can be 100% in-course assessed but are more usually assessed by a combination of coursework (30%) and formal examination (70%).

Part 2 contributes one third of the overall assessment and Part 4 the remaining two thirds. In order to be eligible for Honours, students must gain an overall weighted average mark of 40% and must gain a mark of at least 40% in the Research Project module.

The assessment is carried out within the University's degree classification scheme, details of which are in the programme handbooks.

Admission requirements

Entrants to this programme are normally required to have obtained:

UCAS Tariff: 300 points from no more than 4 subjects at A level, including grade B in A level Biology and one other Science A level at grade C. Total points exclude Key Skills and General Studies. **GCSEs:** grade C required in Mathematics, English and Science.

International Baccalaureate: Pass Diploma and achieve 6,6,5 in 3 higher level subjects, including Biology and another Science.

Applicants with other types of qualifications and mature students are also encouraged to apply.

Admissions Tutor: Dr Ross Cameron

Support for students and their learning

University support for students and their learning falls into two categories. Learning support includes IT Services, which has several hundred computers and the University Library, which across its three sites holds over a million volumes, subscribes to around 4,000 current periodicals, has a range of electronic sources of information and houses the Student Access to Independent Learning (S@IL) computer-based teaching and learning facilities. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is provided by Personal Tutors, School Senior Tutor, the Careers Advisory Service, the University's Special Needs Advisor, Study Advisors, Hall Wardens and the Students' Union.

In addition to the above, the School of Biological Sciences has several well-equipped teaching laboratories and a dedicated computer laboratory providing students with in-house access to on-line educational material. The School of Biological Sciences also houses an extensive zoological museum and collection, a herbarium and botanic garden. These provide a rich source of material and specimens that are incorporated into several modules.

Career prospects

Reading Biological Science graduates are eligible for membership of the Institute of Biology and can achieve Chartered Biologist status. They are qualified to enter a variety of careers in the biological sciences, including work in industry (pharmaceuticals, biomedical, agrochemicals), government service (research institutes and bodies such as the Environment Agency) and other public bodies (local conservation units, animal charities). As numerate scientists they also enter a wide variety of commercial and business occupations.


Opportunities for study abroad

Students of Biological Sciences can take part in the Erasmus exchange programme in which they can spend the first term of Part 4 studying in a variety of other European Universities. Recent exchanges involving School students have taken place with the following: University of Tours, France; Odense University, Denmark; Uppsala University, Sweden; University College Cork, Ireland; University of Zaragoza, Spain; ENSA, Montpellier, France; University of Cagliari, Sardinia. Students also have the opportunity to go to Rostock University, Germany and Siena University, Italy.


Programme Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

Knowledge and Understanding

| | | |
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| <p>A. Knowledge and understanding of:</p> <ol style="list-style-type: none"> 1. The basic principles underlying the biological sciences 2. The variety of groups of living organisms, from viruses and bacteria to complex multicellular organisms such as mammals and flowering plants 3. Different levels of biological organisation of living organisms, from the molecular, biochemical and cellular to the physiological, environmental and ecological 4. In depth understanding of least one specialist field of biology, the precise area to be selected by the student. |  | <p>Teaching/learning methods and strategies Compulsory and optional modules in Parts 1 and 2 introduce students to the diversity of living organisms at a variety of levels. A wide range of teaching strategies is employed in these modules, initially in relatively large-group lecture and practical sessions in Part 1. Smaller group teaching comes to dominate in Parts 2 and 3 and includes, depending on the modules chosen, additional teaching methods such as seminars, fieldwork and discussion sessions. Students within the Environmental stream will also attend full-time field courses during vacations. In Part 4 students will be able to select a specific area of biology for in-depth study and will undertake a research project with one-to-one supervision by a member of academic staff or equivalent.</p> <p>Assessment Knowledge and understanding gained in the majority of modules will be assessed by a combination of coursework and formal examination. Some modules, for example field courses, will be assessed by 100% coursework. The project undertaken in Part 4 will be assessed primarily by written report.</p> |
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Skills and other attributes

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| <p>B. Intellectual skills – able to:</p> <ol style="list-style-type: none"> 1. Address problems in a logical and structured manner 2. Manipulate and analyse numerical data 3. Construct and test hypotheses 4. Critically evaluate scientific literature and data |  | <p>Teaching/learning methods and strategies Basic skills associated with problem solving and data analysis are taught in specific modules using a variety of teaching methods. These skills are further developed in individual modules, for example on field courses students in small groups will be taught how to construct and logically investigate a hypothesis and to analyse the data produced. In Part 4 students are able to enhance their critical and analytical skills by undertaking a project and to demonstrate this by presenting the results in an accompanying dissertation.</p> <p>Assessment Assessment of 1 and 2 is by examination. Critical evaluation of scientific data and literature is assessed in essay and dissertation form.</p> |
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| <p>C. Practical skills – able to:</p> <ol style="list-style-type: none"> 1. Conduct practical laboratory and/or fieldwork safely and successfully. 2. Design and undertake a programme of scientific investigation | → | <p>Teaching/learning methods and strategies Practical laboratory skills will be taught in School teaching laboratories while fieldwork forms an integral part of several modules and is specifically taught on field courses. Further practical and field skills may also form part of the Part 4 project, where students will be taught on a one-to-one basis how to design and implement a programme of scientific investigation.</p> <p>Assessment Skill 1 is typically assessed by course work, while skill 2 is assessed by written report.</p> |
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| <p>D. Transferable skills:</p> <ol style="list-style-type: none"> 1. To be able to communicate effectively in both written and oral form 2. To be numerate and capable of approaching problems in a logical and structured manner 3. To be able to operate effectively as part of a team 4. To be familiar with IT operation and resources 5. To be able to work independently 6. To be able to effectively plan and time manage projects | → | <p>Teaching/learning methods and strategies Specific modules throughout the programme teach skills 1 to 4 using a combination of seminars, demonstrations and practical approaches. In addition, other modules include aspects of different skills, for example field courses include teamworking as part of structured group work and many modules include an integral component of written and oral communication as coursework. In Part 4 students undertake a detailed solo project during which their individual planning and time management skills are developed through contact with their academic supervisor.</p> <p>Assessment Numeracy and problem solving are assessed by specific exam in the Part 1 module Experiments: Design and Interpretation, the Part 2 module Statistics for Life Sciences and the Part 4 module Advanced Experimental Design and Interpretation. Other skills are assessed by coursework as part of the Concepts and Skills modules. In addition, most individual modules include written and oral coursework as 30% of the total module assessment.</p> |
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Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably expect to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the programme handbooks and module descriptions (<http://www.info.rdg.ac.uk/Module/>).