

BSc Biomedical Sciences
For students entering Part 1 in 2012/3

UCAS code: C741

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	Biosciences
Faculty:	Life Sciences Faculty
Programme length:	3 years
Date of specification:	12/May/2014
Programme Director:	Dr Amanda Callaghan
Programme Advisor:	Dr David Leake
Board of Studies:	Biological Sciences
Accreditation:	Institute of Biomedical Science

Summary of programme aims

The programme in Biomedical Sciences aims to provide students with the opportunity to study disease in humans and animals, by providing a fundamental background in molecular and cell biology and physiology, which is balanced with applied laboratory skills in biochemistry, microbiology, physiology and histology. The overall aims of the degree course in Biomedical Sciences are to provide a broad understanding of the biological basis of disease and concentrates on the interface between normal and abnormal biology. The basis for this is a study of the disciplines of biochemistry, microbiology and physiology. Emphasis is placed on sound understanding of chemistry as a basis for the appreciation of the biological processes involved. Students will study the normal and pathological state at every level, from genes and enzymes through cells, tissues and whole animals. They will learn about the biology of pathogens and the interactions of these and other disease agents with the host.

During their studies, students will be exposed to a variety of information sources and techniques and be trained in various skills including those used in reasoning, argument and communication. Several transferable skills will be acquired, including the ability to design and execute experiments in the laboratory (including working in a team), access information, interpret data using statistics and computing, write essays, scientific papers and reports, and give oral and poster presentations.

Transferable skills

During the course of their studies at Reading, all students will be expected to enhance their academic and personal transferable skills. In following this programme, students will have had the opportunity to develop such skills, in particular relating to career management, communication (both written and oral), information handling, numeracy, problem-solving, team working in the laboratory, and use of information technology, and will have been encouraged to further develop and enhance the full set of skills through a variety of opportunities available outside their curriculum.

Students will also gain experience in the methodology of research and scholarship.

Programme content

The profile below states which modules must be taken (the compulsory part), together with optional modules thought to be most appropriate for Biomedical Scientists. Students must choose modules offered by the School of Biological Sciences (SBS), School of Chemistry, Food and Pharmacy or School of Agriculture, Policy and Development or other University of Reading Schools and Departments, subject to the agreement of the Programme Adviser, to a total of 120 credits in each Part (year).

Part 1 (three terms)

Compulsory modules

BI1BB2	Biochemistry and Metabolism	10	4
BI1BC2	Genes and Chromosomes	10	4
BI1BD1	Introductory Microbiology	10	4
BI1BE2	Pathology: Introduction to Human Disease	10	4
BI1BF1	Laboratory and Study Skills for Biomedicine	10	4
BI1BG3	Practical Biochemistry	10	4
BI1PB2	Human Physiology	10	4
BI1BA1	The Living Cell	10	4
BI1BA2	The Living Cell (2)	10	4

Also, Students without AS Chemistry or an equivalent qualification (such as International Foundation Chemistry A from the University of Reading) must take:

CH1FC1	Fundamental Concepts in Chemistry 1	10	4
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Also, Students without A2 level Chemistry or an equivalent qualification (such as International Foundation Chemistry B from the University of Reading) must take:

CH1FC3	Molecular Studies for the Life Sciences	10	4
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Optional modules (up to 20 credits)

Students will choose further modules, to achieve a total of 120 credits, from the list of recommendations below. Subject to agreement from the Programme Adviser, alternative modules may be chosen from the School of Biological Sciences or from other Schools. Timetable restrictions may apply.

AP1A18	Digestion and Nutrition	10	4
BI1ED2	Mammals: Diversity, Behaviour and Conservation	10	4
CH1FC1*	Fundamental Concepts in Chemistry 1	10	4
CH1FC3**	Molecular Studies for the Life Sciences	10	4
CH1IN2	Descriptive Inorganic Chemistry	10	4
CH1OR2	Fundamentals of Organic Chemistry	10	4
CH1OR4	Further Fundamental Organic Chemistry for Biologists	10	4
CH1PH2	Physical Processes for Biologists	10	4
LA1XX1	Institution Wide Language Programme	20	4
PY1IN	Introduction to Neuroscience	10	4

*Optional for students who have AS level Chemistry at grade C or below. Students cannot take this module if they have A2 level Chemistry.

**Optional for students who have A2 level Chemistry at grade C or below. Students cannot take this module if they have A2 level Chemistry at grade A or B.

Part 2 (three terms)

Compulsory modules

ST2S2	Applied Statistics for the Life Sciences	10	5
BI2BB4	Endocrinology	10	5
BI2BC4	Human Development, Organogenesis & Anatomy	10	5
BI2BD4	Life and Death of a Cell	10	5
BI2BE4	Pharmacology and Toxicology	10	5
BI2BI5	Immunology	10	5
BI2BJ5	Microbiology: a Medical Perspective	10	5
BI2BK5	Molecular Biology of the Gene: Expression, Function and Analysis	10	5
BI2BQ5	Clinical Haematology and Cellular Pathology	10	5
BI2BM34	Professional Career Development	10	5
BI2BA5	Clinical Biochemistry	10	5

Optional modules (10 credits)

Students will choose further modules, to achieve a total of 120 credits, from the list of recommendations below. Subject to agreement from the Programme Adviser, alternative modules may be chosen from the School of Biological Sciences or from other Schools. Timetable restrictions may apply.

Recommended module:

BI2BO4	Virology	10	5
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Other options:

BI2BG5	Animal, Plant and Microbial Function	10	5
BI2BL5	Protein Structure and Function	10	5
BI2BP6	Practical Skills: Recombinant DNA Exercise	10	5

BI2BR4	Function of the Bacterial Cell	10	5
BI2BT5	Introduction to Bioinformatics and Computational Biology	10	5
BI2BU45	Science Communication	10	5
BI2EH4	Introduction to History and Philosophy of Science	10	5
PY2NS1	Neuroscience 1	10	5
PY2NS2	Neuroscience 2	10	5

Part 3 (three terms)

Compulsory modules

<i>Code</i>	<i>Module title</i>	<i>Credits</i>	<i>Level</i>
BI3BA7	Medical Genetics	10	6
BI3BD8	Cancer	10	6
BI3BE8	Cardiovascular Disease	10	6
BI3BI8	Neurobiology	10	6
BI3BF7	Cell Communication and Disease	10	6
BI3PRO	Research Project	40	6

Optional modules (30 credits)

Students will choose further modules, to achieve a total of 120 credits, from the list of recommendations below.

Subject to agreement from the Programme Advisor, alternative modules may be chosen from the School of Biological Sciences or from other Schools. Timetable restrictions may apply.

BI3BB7	Selected Topics in Endocrinology and Endocrine Disease	10	6
BI3BC7	Bacterial Pathogens	10	6
BI3BG8	Mechanisms for Microbial Function	10	6
BI3BH8	Mammalian Reproduction	10	6
BI3BJ8	Viral Pathogens	10	6
BI3BN8	Use and Abuse of the Microbial World	10	6
BI3BP7	Systems Biology	10	6
BI3B67*	Microbiology Field Course	20	6
BI3EO8	Science in Culture	10	6
BI3S78	Seminars in Biology	10	6
FB3N2A	Diet and Disease	10	6
FB3N2B	Genes, Lifestyle and Nutrition	10	6
FB3N3	Bioavailability, Diet and Gut Health	10	6

***Takes place in Summer Term, after Part 2 examinations**

Progression requirements

To gain a threshold performance at Part 1 and qualify for the CertHE, a student shall normally be required to achieve an overall average of 40% over 120 credits taken at Part 1, where all the credits are at 4 level or above, and achieve 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 **and**:

- obtain a weighted average of at least 40% over the compulsory Part 1 modules (BI1BA1; BI1BA2; BI1BB2; BI1BC2; BI1BD1; BI1BE2; BI1BF1; BI1BG3 and PM1PB2) **AND**
- obtain marks of at least 40% in 80 credits of compulsory Part 1 modules **AND**
- obtain marks of at least 30% in all compulsory part 1 modules.

To gain a threshold performance at Part 2 and qualify for the DipHE, a student shall normally be required to achieve:

- an overall average of 40% over 120 credits taken at Part 2; and

- marks of at least 40% in modules amounting to not less than 80 credits; and
- marks of at least 30% in modules amounting to not less than 120 credits.

In order to progress from Part 2 to Part 3, a student shall normally be required to achieve a threshold performance at Part 2 **AND**

- obtain a weighted average of at least 40% over the modules AS2A1, BI2BA5, BI2BB4; BI2BC4; BI2BD4; BI2BE4; BI2BI5; BI2BJ5; BI2BK5; BI2BM34 and BI2BQ5 **AND**
- obtain marks of at least 40% in 90 credits from the modules AS2A1, BI2BA5, BI2BB4, BI2BC4, BI2BD4, BI2BE4, BI2BI5, BI2BJ5, BI2BK5, BI2BM34 and BI2BQ5 **AND**
- obtain marks of at least 30% in the modules AS2A1, BI2BA5, BI2BB4, BI2BC4, BI2BD4, BI2BE4, BI2BI5, BI2BJ5, BI2BK5, BI2BM34 and BI2BQ5

Part 2 contributes one third of the overall assessment and Part 3 the remaining two thirds. In order to obtain a degree, students must gain an overall weighted average of at least 35% and achieve 80 credits in Part 3 with a mark of at least 35% including BI3PRO. In order to be eligible for Honours, students must gain an overall weighted average mark of at least 40% **AND** obtain a weighted average mark of at least 40% for the following compulsory Part 3 modules: BI3BA7; BI3BD8; BI3BE8; BI3BF7; BI3BI8 and BI3PRO **AND** no more than 20 credits of compulsory modules between 30 and 38% **AND** no compulsory modules below 30%. Honours degrees are accredited by the Institute of Biomedical Science (IBMS) but pass degrees are not.

Assessment and classification

The University's Honours classification scheme is:

<i>Mark</i>	<i>Interpretation</i>
70% - 100%	First class
60% - 69%	Upper Second class
50% - 59%	Lower Second class
40% - 49%	Third class
35% - 39%	Below Honours Standard
0% - 34%	Fail

For the University-wide framework for classification, which includes details of the classification method, please see: www.reading.ac.uk/internal/exams/Policies/exa-class.aspx

The weighting of the Parts/Years in the calculation of the degree classification is

Three-year programmes

Part 2 one-third

Part 3 two-thirds

Teaching is organised in modules. Teaching in Part 1 consists of lectures and practical classes with small group work being largely restricted to the Laboratory and Study Skills for Biomedicine module. Modules can be assessed by 100% coursework but more usually are assessed by a combination of coursework (20%) and formal examination (80%).

In Parts 2 and 3, 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 (usually 30%) and formal examination (usually 70%).

The assessment is carried out within the University's degree classification scheme, details of which are in the School of Biological Sciences Undergraduate Handbook.

Admission requirements

Entrants to this programme are normally required to have obtained:

UCAS Tariff: 320 points from no more than 4 subjects at A level or AS subjects, including at least two full A levels. Subjects to include at least grade B in two Science A Levels, including Biology. 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 6 in Biology and 6 in another Science.

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

This degree is accredited with the Institute of Biomedical Science.

Admissions Tutor: Dr Andrew Bicknell

Support for students and their learning

University support for students and their learning falls into two categories. Learning support is provided by a wide array of services across the University, including: the University Library, the Careers, Placement and Experience Centre (CPEC), In-session English Support Programme, the Study Advice and Mathematics Support Centre teams, IT Services and 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 Tutors, the Students' Union, the Medical Practice and advisers in the Student Services Centre. The Student Services Centre is housed in the Carrington Building and offers advice on accommodation, careers, disability, finance, and wellbeing, academic issues (eg problems with module selection) and exam related queries. Students can get key information and guidance from the team of Helpdesk Advisers, or make an appointment with a specialist adviser; Student Services also offer drop-in sessions and runs workshops and seminars on a range of topics. For more information see www.reading.ac.uk/student

The Programme Advisor is available to offer advice on the choice of modules within the degree course.

Career prospects

After graduation, Biomedical Sciences students will be qualified to undertake a career in a range of areas relevant to the degree, such as a career in the biomedical profession in hospital laboratories, public health institutions or the pharmaceutical industry, or careers in universities, research institutes or in clinical trials. Many of our students have in the past gone on from this degree to study for a MSc or PhD and some have studied medicine, dental or veterinary sciences. Others have used their skills and problem-solving abilities in careers not directly related to biomedical sciences.

Institute of Biomedical Science

Our degree in Biomedical Sciences is accredited by the Institute of Biomedical Science (IBMS) and can lead to State Registration by the Health and Care Professions Council (HCPC). Graduates with an honours degree in Biomedical Sciences will therefore receive an accredited degree. As stated on its website (<http://www.ibms.org>), the Institute of Biomedical Science (IBMS) is the professional body for those who work within the field of biomedical science. Its principal aims are to represent its members, set standards of behaviour for its members, enable career development, educate its members, promote biomedical science to the public and award qualifications appropriate to the collective knowledge and skill base of its members. The Institute was founded in 1912 and represents over 19,000 members employed predominately within the healthcare arena but also within university and veterinary laboratories, government agencies and other services. Other members also work in related commercial fields and academia. Although most Institute members live and work in the United Kingdom and the Republic of Ireland, many other members are employed throughout the world.

The roles of the IBMS are:

- To aid and support the development of biomedical science, both nationally and internationally.
- Develop professional standards to guide those who practice biomedical science and to ensure patient safety.
- Assess competence to practise as Health and Care Professions Council (HCPC) registered biomedical scientists.
- Represent the interests of biomedical science, provide advice and work with UK governments, public and independent healthcare providers, media, universities, industry and commercial sector, professional organisations and all other partners.
- Provide professional support and benefits for members.
- Develop qualifications, training and diplomas for members to demonstrate levels of expertise and competency along a career pathway.
- To enable members to achieve their highest potential via continuing professional development and other professional activities.
- Inform and guide biomedical scientists through media, professional and scientific publications, meetings and events.
- Promote public awareness of biomedical science.
- Award the designation of Chartered Scientist to qualifying members.
- Fund research and support charitable causes in biomedical science.
- Maintain a historical archive of the Institute and biomedical science profession.

Classes of membership for individuals:

There are various classes of membership for individuals:
eStudent membership

eStudent is an online class of Institute membership for those currently studying for a biomedical science or related degree. To be eligible for eStudent membership you must be studying for an undergraduate degree in biomedical science, studying for a postgraduate degree in biomedical science (MSc, PhD) or studying for an undergraduate or postgraduate degree related to biomedical science. You can complete an eStudent online application and pay a £10 annual membership fee.

Associate membership

Associate is the non-corporate class of Institute membership for persons who are not eligible for corporate membership but who possess a minimum level of educational and vocational standards that recognise the ability to gain a good knowledge and understanding of a subject area of work or study, and to perform varied tasks with some guidance or supervision (e.g. GCSE, City & Guild Level 2) and are working within the field of, or related to, biomedical science. All applications will be considered on an individual basis.

Licentiate

Licentiate is the initial class of corporate membership for a person who has been awarded the Institute's Certificate of Competence or demonstrated equivalence as determined by the Institute through an individual assessment.

Member

Member is the next class of corporate membership and applicants to the class of Member will be required to have a minimum two years' professional experience as a Licentiate and hold an Institute Specialist Diploma or a Diploma of Specialist Practice.

Fellow

Fellow is the highest corporate class of Institute membership and applicants to the class of Fellow will be required to have a minimum of three years' professional experience as a Member and hold an Institute Higher Specialist Diploma or Diploma of Higher Specialist Practice.

Registration

All biomedical scientists wishing to practise in the UK under the protected title of biomedical scientist must be registered with the Health and Care Professions Council (HCPC). The Health and Care Professions Council (HCPC) (<http://www.hpc-uk.org/>) is an independent, UK-wide regulatory body responsible for setting and maintaining standards of professional training, performance and conduct for the healthcare professions under its regulation. The standards for registration are known as the standards of proficiency. The IBMS endorses the HCPC's standards and the requirement for biomedical scientists and its members to integrate and maintain them as part of safe practice. The IBMS and HCPC are two separate organisations but work in close co-operation for the fundamental and primary aim of patient safety, to represent the interests of the profession.

Opportunities for study abroad or for placements

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

A. Knowledge and understanding of:

1. The basic principles underlying the biological basis of disease in man and animals, underpinned by relevant aspects of chemistry
2. Different levels of biological organisation from genes and enzymes, cells and tissues, organs, and whole animals.
3. Immunology to understand animals responses to disease
4. Normal and abnormal biology of animals and their development.

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 Part 2 and includes additional teaching methods such as seminars and tutorial sessions in course specific areas. Students will also undertake one module taught by members of the Royal Berkshire Hospital Pathology department. In Part 3 students will be able to specialise in biomedical sciences for in-depth study and will undertake a research project with one-to-one supervision by a member of academic staff or equivalent.

Assessment

Knowledge and understanding gained in the majority of modules will be assessed by a combination of coursework and formal examination. Some modules will be assessed by 100% coursework. The project undertaken in Part 3 will be assessed primarily by written report.

Skills and other attributes

B. Intellectual skills - able to:

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

Teaching/learning methods and strategies

Basic skills associated with problem solving and data analysis are taught in a specific module using a variety of teaching methods. These skills are further developed in individual modules, students in small groups will be taught how to construct and logically investigate a hypothesis and to analyse the data produced. In Part 3 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.

Assessment

Assessment of 1 and 2 is by examination. Critical evaluation of scientific data and literature is assessed in essay and dissertation form.

C. Practical skills - able to:

1. Conduct practical laboratory work safely and successfully.
2. Design and undertake a programme of scientific investigation

Teaching/learning methods and strategies

Practical laboratory skills will be taught in Departmental teaching laboratories. Further practical skills may also form part of the Part 3 project, where students will be taught on a one-to-one basis how to design and implement a programme of scientific investigation.

Assessment

Skill 1 is typically assessed by course work, while skill 2 is assessed by written report.

D. Transferable skills - able to:

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

Teaching/learning methods and strategies

Specific modules in Parts 1 and 2 teach skills 1 to 4 using a combination of seminars, demonstrations and practical approaches. In addition, other modules include aspects of different skills, including team working as part of structured group work and many modules include an integral component of written and oral communication as coursework. In Part 3 students undertake a detailed solo project during which their individual planning and time management skills are developed through contact with their academic supervisor.

Assessment

Skills are assessed by coursework as part of the

Professional Career Development module. In addition, most individual modules include written and oral coursework as 20-30% of the total module assessment.

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 be expected 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 module description and in the programme handbook. The University reserves the right to modify this specification in unforeseen circumstances, or where the process of academic development and feedback from students, quality assurance process or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.