

BSc Biomedical Sciences
For students entering Part 1 in 2009/0

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:	09/Jan/2012
Programme Director:	Dr Demetris Savva
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 which is balanced with applied laboratory skills in biology, microbiology and chemistry.

The overall aims of the degree 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 line with the University's Strategy for Learning and Teaching. 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 Biosciences 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

<i>Code</i>	<i>Module title</i>	<i>Credits</i>	<i>Level</i>
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
PM1PB2	Human Physiology	10	4
BI1BA12	The Living Cell	20	4

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

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

CH1FC2	Fundamental Concepts in Chemistry 2	10	4
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Optional Modules (up to 20 credits)

Further modules may be taken from the School of Biological Sciences or from other Schools (e.g. School of Chemistry, Food and Pharmacy and School of Agriculture, Policy and Development) after consultation with the Programme Adviser.

AP1A18	Digestion and Nutrition	10	4
BI1ED2	Mammals: Diversity, Behaviour and Conservation	10	4
CH1FC1*	Fundamental Concepts in Chemistry 1	10	4
CH1FC2**	Fundamental Concepts in Chemistry 2	10	4
CH1IN2	Descriptive Inorganic Chemistry	10	4
CH1OR2	Fundamentals of Organic Chemistry	10	4
CH1ORB	Organic Chemistry for Biologists	20	4
CH1PH2	Physical Processes for Biologists	10	4
HC1PH1	Introduction to Public Health	20	4
PY1IN	Introduction to Neuroscience	10	4
LA1XX1	Institution wide language programme	20	4

**Optional if you have AS level Chemistry at grade C or below. You cannot take it if you have A2 level Chemistry*

***Optional if you have A2 level Chemistry at grade C or below. You cannot take it if you have A2 level Chemistry at grade A or B*

Part 2 (three terms)

Compulsory modules

<i>Code</i>	<i>Module title</i>	<i>Credits</i>	<i>Level</i>
AS2A1	Statistics for Life Sciences	10	5
BI2BA4	Clinical Biochemistry	10	5
BI2BB4	Endocrinology	10	5
BI2BC4	Human Development, Organogenesis and 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
BI2BM5	Science Communication	10	5
BI2BQ5	Clinical Haematology and Cellular Pathology	10	5

Optional modules (10 credits)

Students will choose further modules from the School of Biological Sciences or from other Schools (e.g. School of Chemistry, Food and Pharmacy) up to a total of 120 credits subject to the agreement of the Programme Adviser and timetable restrictions.

Recommended module:

BI2BO4	Virology	10	5
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Other options:

BI2BL5	Protein Structure and Function	10	5
BI2BP6	Practical Skills: Recombinant DNA Exercise	10	5
BI2BR4	Function of the Bacterial Cell	10	5
BI2EH4	Introduction to History and Philosophy of Science	10	5
PY2N1X	Neuroscience 1 for Combined Honours	10	5
PY2N2X	Neuroscience 2 (Cognitive Neuroscience)	10	5

Part 3 (three terms)

Compulsory modules

<i>Mod Code</i>	<i>Module Title</i>	<i>Credits</i>	<i>Level</i>
BI3PRO	Research Project	40	6
BI3BA7	Medical Genetics	10	6
BI3BD8	Cancer	10	6
BI3BF7	Cell Communication and Disease	10	6
BI3BE8	Cardiovascular Disease	10	6
BI3BI8	Neurobiology	10	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 Adviser, alternative modules may be chosen from the School of Biological Sciences or, exceptionally, from other Schools. Timetable restrictions may apply.

AS3A1	Epidemiology	10	6
AS3A2	Clinical Trials	10	6
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
FB3N2A	Diet and Disease	10	6
FB3N2B	Genes, Lifestyle and Nutrition	10	6
FB3N3	Bioavailability, Diet and Gut Health	10	6

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 level 4 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 mark of at least 40% in each of the following compulsory Part 1 modules: BI1BA12; BI1BB2; BI1BC2; BI1BD1; BI1BE2; BI1BF1; BI1BG3; and PM1PB2.

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 a mark of at least 30% in individual modules amounting to not less than 100 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 to achieve a mark of at least 40% in each

of the following compulsory Part 2 modules: AS2A1; BI2BA4; BI2BB4; BI2BC4; BI2BD4; BI2BE4; BI2BI5; BI2BJ5; BI2BK5; BI2BM5: 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 at least 40% in the following compulsory modules at Part 3: BI3BA7; BI3BD8; BI3BE8; BI3BF7; BI3BI8; and BI3PRO. In order to be eligible for Honours, students must gain an overall weighted average mark of at least 40% and obtain at least 40% in the following compulsory Part 3 modules: BI3BA7; BI3BD8; BI3BE8; BI3BF7; BI3BI8; and BI3PRO. Honours degrees are accredited by the Institute of Biomedical Science (IBMS) but pass degrees are not.

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 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: 300 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 A level Biology and one other Science A level (preferably Chemistry) 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 (preferably Chemistry).

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 Student Employment, Experience and Careers Centre (SEEC), 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. 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 Adviser is available to offer advice on the choice of modules within the degree course.

Career prospects

After graduation, Biomedical Sciences students are eligible for membership of the Society of Biology and can achieve Chartered Biologist status. They 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 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 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 for the intake of students into Part 1 from October 2007 onwards is accredited by the Institute of Biomedical Science (IBMS) and can lead to State Registration by the Health Professions Council (HPC). Graduates with an honours degree in Biomedical Sciences will, therefore, receive an accredited degree. The Institute of Biomedical Science (www.ibms.org) is the professional body for biomedical scientists in the UK. It was founded in 1912 and is based in London. The IBMS aims to promote and develop biomedical science and its practitioners. It has about 16,000 members, who are employed mainly in NHS, veterinary and private laboratories, the National Blood Authority, Health Protection Agency, Medical Research Council and Department for Environment, Food and Rural Affairs (DEFRA), but other members work in related commercial fields and some are employed in teaching. Most members work in the UK, but many are employed in other countries.

As listed on their website, the role of the IBMS is to:

- Set standards of practice to protect patients
- Represent the interests of biomedical science to government, media and universities
- Advise government departments and national organisations on all matters relating to biomedical science
- Promote public awareness of biomedical science
- Award Chartered Scientist status
- Assess competence for biomedical scientists to practise
- Assess qualifications for registration with the Health Professions Council
- Accredit university degrees
- Update members through scientific meetings and professional events
- Organise a continuing professional development scheme
- Issue scientific and professional publications
- Provide legal and technical help for members
- Fund research
- Provide assessors for senior job interviews

The IBMS is responsible for Biomedical Scientist Registration. As explained on the Institute's website, it:

- Assesses and approves undergraduate and postgraduate qualifications held by individual applicants Issues the certificate of competence registration portfolio
- Conducts portfolio assessments
- Approves degree courses
- Approves laboratories for registration training
- Maintains a database of laboratories approved for training
- Awards the certificates of competence required for registration by the Health Professions Council
- Awards its own Certificate of Competence in Biomedical Science, in recognition of attaining this first level of professional competence

Health Professions Council

The Health Professions Council (HPC; www.hpc-uk.org) is the independent statutory regulator that works to protect the health of patients using health professionals registered in the UK. It was created in 2001 and is based on London. It registers about 205,000 health professionals in 15 professions. One of the profession groups is that of Biomedical scientists and about 21,000 of these scientists are registered with the HPC. The HPC sets standards for professional training, performance and conduct and keeps a register of health professionals who meet its standards.

Opportunities for study abroad or for placements

Industrial Placement:

Students who are interested in a scientific career, whether in industry, research or some other related field can apply for a year's placement between Parts 2 and 3. Students who wish to apply would normally be expected to have a weighted average of at least 60% in Part 1.

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

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

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 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

Teaching/learning methods and strategies

The Laboratory and Study Skills for Biomedicine module, in Part 1, and Science Communication, in Part 2, teach skills 1 to 4 using a combination of

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

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 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. Some modules include oral presentations.

Assessment

Skills are assessed by coursework as part of the Science Communication 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.