

## **BSc Pathobiology**

**UCAS code: B132**

Awarding Institution:  
Teaching Institution:  
Relevant QAA subject benchmarking group(s):  
Programme length: 3 years  
Faculty of Life Sciences  
For students entering Part 1 in 2002  
Programme Director: Professor IM Jones  
Programme Adviser: Dr DS Leake  
Board of Studies: Biomolecular Sciences  
Accreditation: None

The University of Reading  
The University of Reading  
Biosciences

Date of specification: March 2004

### **Summary of programme aims**

This unique degree focuses on the biological basis of disease in man and animals. The subject matter of Part 1 is concerned with the concepts of biology and aspects of chemistry fundamental to the interface between normal and abnormal biology. Part 2 builds on this to develop the biological expertise required for understanding disease. In Part 3 students will study selected topics in Pathobiology in depth. The students will receive training and be expected to demonstrate competence in laboratory techniques in biology and chemistry, the use of computers to access information resources and the use of statistical programmes for data analyses. Students will be expected to acquire individual and group communication skills in written work and in oral and poster presentations. The development of critical reading skills will be strongly encouraged.

### **Transferable skills**

The University's Strategy for Teaching and Learning has identified a number of generic transferable skills that 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

### **Programme content**

The profile that follows states which modules must be taken (the compulsory part), together with one or more lists of modules from which the student must make a selection (the 'optional' modules). Students must 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.

<b>Part 1 (three terms)</b>		<i>Credits</i>	<i>Level</i>
<i>Compulsory modules</i>			
BI1S11	<i>Concepts and skills in biology 1</i>	10	C
BI1C10	<i>Cell biology and biochemistry</i>	10	C
BI1C11	<i>Genetics and molecular biology</i>	10	C
BI1M10	<i>Biodiversity</i>	10	C
AM1M13	<i>Practical biochemistry</i>	10	C
<i>At least 20 credits from:</i>			
CH1I2	<i>Descriptive inorganic chemistry</i>	10	C
CH1P2	<i>Physical biochemistry</i>	10	C
CH1O2	<i>Fundamental organic chemistry</i>	10	C
CH1O1	<i>Introduction to organic chemistry</i>	20	C
<i>Recommended modules</i>			
AM1C12	<i>Animal physiology</i>	10	C
AM1C14	<i>Biochemistry and metabolism</i>	10	C
AM1M11	<i>Fundamental microbiology</i>	10	C
AM1Z10	<i>The whole mammal</i>	10	C

#### *Optional modules*

Students will choose additional modules up to a total of 120 credits subject to the agreement of the Programme Adviser. Details of available modules can be found in the programme handbook.

<b>Part 2 (three terms)</b>		<i>Credits</i>	<i>Level</i>
<i>Compulsory modules</i>			
AM2S31	<i>Concepts and skills in biology 2</i>	10	I
AM2C31	<i>Molecular biology and bioinformatics</i>	10	I
AM2C33	<i>Pharmacology and toxicology</i>	10	I
AM2C34	<i>Introduction to human disease</i>	10	I
AM2C35	<i>Cellular biology</i>	10	I
AM2M35	<i>Medical microbiology</i>	10	I
AM2Z35	<i>Immunology</i>	10	I
AM2Z36	<i>Development</i>	10	I
AM2C40	<i>Recombinant DNA exercise</i>	10	I

#### *Optional modules*

Students will choose additional modules up to a total of 120 credits (normally from the list below) subject to the agreement of the Programme Adviser.

AM2C32	<i>Endocrinology</i>	10	I
AM2C37	<i>Cardiovascular and respiratory systems physiology</i>	10	I
AM2C38	<i>Receptors and signal transduction</i>	10	I
AM2C39	<i>Regulation of gene expression</i>	10	I
<i>No more than two of:</i>			
AM2M31	<i>Viruses and their hosts</i>	10	I
AM2M33	<i>Practical virology</i>	10	I
AM2M34	<i>Molecular genetics of bacteria</i>	10	I

<b>Part 3 (three terms)</b>		<i>Credits</i>	<i>Level</i>
<i>Compulsory modules</i>			
AM3S75	<i>Project</i>	40	H
AM3S76	<i>Essays and seminars</i>	20	H
AM3C79	<i>Pathology and clinical biochemistry</i>	10	H

#### *Optional modules*

Students will choose additional modules in Pathobiology (normally from the list below) up to a total of 120 credits subject to the agreement of the Programme Adviser.

AM3C71	<i>B&amp;P of cardiovascular disease</i>	10	H
AM3C72	<i>Life and death of the cell</i>	10	H
AM3C73	<i>Chromosome mapping and genetic disease</i>	10	H
AM3C74	<i>Bioinformatics</i>	10	H
AM3C76	<i>Neurobiology</i>	10	H
AM3C78	<i>Mammalian reproduction</i>	10	H
AM3C80	<i>Cancer</i>	10	H
AM3M72	<i>Bacterial pathogenicity</i>	10	H
AM3M73	<i>Viruses as pathogens</i>	10	H
AM3Z71	<i>Developmental biology</i>	10	H
AM3Z75	<i>Evolutionary genetics and phylogeny</i>	10	H

#### **Progression requirements**

To proceed to Part 2 it is sufficient to have obtained at least 40% in all modules averaged together and to have no module mark below 30%. However, module marks equivalent to 20 credits may be condoned if the student has attempted the examination and shown reasonable diligence in attending the modules.

To proceed from Part 2 to Part 3 it is sufficient to obtain an overall average of at least 40% and have no module mark below 30%. However, module marks equivalent to 20 credits may be condoned if the student has attempted the examination and shown reasonable diligence in attending the modules.

Part 2 contributes one third of the overall assessment and Part 3 the remaining two thirds. In order to be eligible for Honours, students must gain at least 40% in all Part 3 examinations averaged together and must gain at least 40% in the Biology Project module.

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

#### **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 Concepts and Skills 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 (30%) and formal examination (70%). Part 2 contributes one third of the overall assessment and Part 3 the remaining two thirds. In order to be eligible for Honours, students must gain at

least 40% in all Part 3 examinations averaged together and must gain at least 40% in the 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: (points/grades 260/eg BCC)

The 300 points should normally be from no more than 4 A/AS levels, including B in A-level Chemistry and C in another A-level Science (preferably Biology).

The university supports Key Skills and will take account of points awarded for Key Skills although they are not part of the entry requirements.

At GCSE: B in Maths, Science and English.

Irish Highers: BBBBC (including Chemistry & preferably Biology)

IB: 30 points (including Chemistry & preferably Biology)

GNVQ is accepted and mature students are also encouraged to apply

Admissions Tutor: Dr S C Andrews

### **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, 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 Animal and Microbial 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 also houses an extensive Zoological museum and collection. This provides a rich source of material and specimens that are incorporated into several modules.

### **Career prospects**

Reading Pathobiology 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 (hospital laboratories, research institutes and bodies such as the Environment Agency) and forensic science. As numerate scientists they also enter a wide variety of commercial and business occupations.

### **Opportunities for study abroad**

Pathobiology Students can take part in the Erasmus exchange programme in which they can spend the first term of Part 3 studying in a variety of other European Universities. Recent

exchanges by AMS students have taken place with the Universities of Bergen, Cork, Crete, Montpellier, Rostock, Tours, Uppsala and Zaragoza.

### **Educational aims of the programme**

The overall aims of the degree course in Pathobiology 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, physiology and zoology. 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. The subject matter of Parts 1 and 2 is broadly based but streamed towards providing a sound basis for more in depth studies of Pathobiology Part 3.

### **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 Parts 2 and 3 and includes, depending on the modules chosen, additional teaching methods such as seminars and discussion sessions. 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 pathobiology 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 :**

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 Concepts and Skills 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 teamworking 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**

Numeracy and Problem Solving are assessed by specific exam. 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.

*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 module and programme handbooks.