

## **BSc Biochemistry**

Awarding Institution:

Teaching Institution:

Relevant QAA subject benchmarking group(s):

Faculty of Life Sciences

For students entering Part 1 in 2002

Programme Director: Prof. IM Jones

Programme Adviser: Dr DS Leake

Board of Studies: Biomolecular Sciences

**UCAS code: C700**

The University of Reading

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Biosciences

Programme length: 3 years

Date of specification: March 2004

Accreditation: None

### **Summary of programme aims**

The aim of the course is to provide a sound education and training in biochemistry with a firm underpinning of chemistry. Emphasis is placed on the student being able to choose, as the course proceeds, those aspects of biochemistry provided by the participating departments that the student finds most rewarding. The subject matter of Parts 1 and 2 is broadly based with specialisation in Part 3 to provide a coherent, in-depth area of study which the student will select. Students are expected to gain a broad understanding of the concepts underpinning biochemistry and to demonstrate the ability to complete a detailed study of at least one discipline during Part 3. They will receive training and be expected to demonstrate competence in laboratory techniques in biochemistry, 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.

(For a full statement of the programme aims and learning outcomes see below)

### **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

### **Programme content**

The profile which follows states which modules must be taken (the compulsory part). 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.

#### **Part 1 (three terms)**

##### *Compulsory modules*

		<i>Credits</i>	<i>Level</i>
BI1C10	<i>Cell biology and biochemistry</i>	10	C
BI1M10	<i>Biodiversity</i>	10	C
BI1C11	<i>Genetics and molecular biology</i>	10	C

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BI1S11	<i>Concepts and skills 1</i>	10	C
CH1O2	<i>Fundamental organic chemistry</i>	10	C
CH1P2	<i>Physical Biochemistry</i>	10	C
AM1C14	<i>Biochemistry and metabolism</i>	10	C
AM1M13	<i>Practical biochemistry</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. A 20 credit module in chemistry, CH1O1, Introduction to organic chemistry may be taken instead of the 10 credit compulsory module CH1O2 listed above.

<b>Part 2 (three terms)</b>		<i>Credits</i>	<i>Level</i>
<i>Compulsory modules</i>			
AM2S31	<i>Concepts and skills 2</i>	10	I
AM2C31	<i>Molecular biology and bioinformatics</i>	10	I
AM2C33	<i>Pharmacology and toxicology</i>	10	I
AM2C34	<i>Cellular biology</i>	10	I
AM2C36	<i>Protein structure and function</i>	10	I
AM2C38	<i>Cell receptors and signal transduction</i>	10	I
AM2C40	<i>Recombinant DNA exercise</i>	10	I

### **Optional modules**

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

### *Optional modules:*

Students will choose additional modules up to a total of 120 credits subject to the agreement of the Programme Adviser. A wide choice of modules is available from within the School and in other Schools including Chemistry: details of available modules can be found in the programme handbook.

### **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.

### **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%). Modules in Part 1 and 2 are assessed by a mixture of coursework and formal examination. In Part 3 there are some modules which are assessed wholly by coursework and others wholly by examination; the details are given in the module descriptions.

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 Biology 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 expected to have achieved

**UCAS Tariff:** 260 points from no more than 4 A/AS levels, including B in A-level Chemistry and C in another A-level Science (preferably Biology), plus Mathematics, Double Science and English at Grade B at GCSE level. The university supports Key Skills and will take account of points awarded for Key Skills although they are not part of the entry requirements.

**Irish Highers:** BBBBC (inc. Chemistry and preferably Biology)

**IB:** 30 points (inc. Chemistry and preferably Biology)

Admissions Tutor: Dr. Simon 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.

### **Career prospects**

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After graduation, you will be qualified to undertake a biochemical career in any of a range of areas, or to use your skills and problem-solving abilities in careers not directly related to biochemistry. As a biochemist you will be eligible for membership of the Institute of Biology and Chartered Biologist status. You will be qualified to enter a variety of careers, 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 you could also enter a wide variety of commercial and business occupations.

### **Opportunities for study abroad**

Students of Biochemistry 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 involving AMS 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.

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

After Part 1, you will have gained an understanding of several of the basic concepts of modern biochemistry. After Part 2, you will have deepened your understanding of biological concepts and developed a range of expertise over the main areas of the subject. After Part 3, you will have studied selected subjects in depth and will be equipped to tackle detailed problems and analyses.

During these studies you 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. You will acquire a number of transferable skills including learning how to design and execute experiments (including working in a team), access information, interpret data using statistics and computing, write essays and reports and give oral presentations. Students are expected to gain a broad understanding of the concepts underpinning biochemistry and to demonstrate the ability to complete a detailed study of at least one discipline during 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:**

The fundamental concepts of biochemistry underpinned by a knowledge of organic and other branches of chemistry, and their application to biological systems.

##### **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 will also have the option of attending full-time field courses during the summer vacation. In Part 3 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.

##### ***Assessment***

Most knowledge is tested through a combination of coursework and unseen formal examinations. Dissertations, oral and poster presentations also contribute.

*Skills and other attributes*

**B. Intellectual skills** – able to:

1. think logically
2. analyse and solve problems.
3. organise tasks in a structured form
4. transfer appropriate knowledge and methods from one topic to another within the overall subject
5. plan, conduct and write a report on an independent project

**Teaching/learning methods and strategies**

Rational thought and logical analysis is embedded throughout the programme, where solutions to key problems in biology have come about through the application of chemical and biochemical concepts and experiments. 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, 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 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 is predominantly by examination. Critical evaluation of scientific data and literature is assessed in essay and dissertation form.

**C. Practical skills** – able to:

1. undertake biochemical laboratory tasks and techniques
2. Plan experiments and carry them out in the laboratory

**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**

By practical laboratory reports.

**D. Transferable skills – able to:**

1. Use IT
2. communicate scientific ideas
3. give oral and poster presentations
4. work as part of a team
5. use library resources
6. manage time
7. plan their career

**Teaching/learning methods and strategies**

Specific Concepts and Skills modules in Parts 1 and 2 teach skills using a combination of seminars, demonstrations and practical approaches. In addition, other modules include aspects of different skills. 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 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. The use of IT is embedded throughout the course.

*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.