

**BSc Microbiology**  
**For students entering Part 1 in 2013/4**

**UCAS code: C500**

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:	04/Mar/2015
Programme Director:	Dr Amanda Callaghan
Programme Advisor:	Dr Sheila MacIntyre
Board of Studies:	Biological Sciences
Accreditation:	None

**Summary of programme aims**

The programme in Microbiology introduces students to the vast array of microbes (bacteria, archaea, viruses, fungi and protozoa) around us; to their diversity, structure and influence on the world. Primary focus is on the disciplines of bacteriology and virology. The aim is to provide students with a solid foundation in the physiology, genetics and molecular biology of bacteria and viruses and an understanding of how these microbes interact with their environment and cause disease. Students have the option of focusing on aspects of microbiology that most interest them - medical, molecular or environmental. The programme has a strong practical emphasis, providing students with the basic laboratory skills required for a career in either applied or research microbiology.

In Part 1, students will gain an understanding of the basic concepts of modern microbiology and also of the biochemistry, genetics and cell biology that will support further studies. Part 2 deepens the student's understanding of how viruses and bacteria survive, multiply, interact with their environment and cause disease through core studies on their structure, cellular processes, and medical significance. These studies on microbial function are underpinned by modules on mammalian immunology and cell biology. Part 3 involves in-depth studies of selected aspects of bacterial function, viral pathogens, and applications of these microbes. The final year aims to bring the student's understanding to the forefront of selected areas of microbial research, through lectures, directed studies and presentations as well as a lab-based project. At each stage, optional choices give the student the opportunity of studying biomolecular, clinical or environmental aspects of microbiology in further depth.

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. Students will acquire a number of transferable skills, including: design and execution of experiments (including working in a team); accessing information; interpretation of data using statistics; computing; essay and report writing; and oral and poster presentation.

**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, 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 which follows states which modules must be taken (the compulsory part), together with recommended and optional modules thought to be most appropriate for microbiologists. The compulsory modules provide the core of the Microbiology degree, recommended modules provide important background to aspects of Microbiology and together with optional modules allow students to tailor their programme to fields of Microbiology of particular interest. Students must choose modules (offered by SBS, School of Chemistry, Food Biosciences and Pharmacy 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.

**Part 1 (three terms)**

*Compulsory modules*

<i>Mod Code</i>	<i>Module Title</i>	<i>Credits</i>	<i>Level</i>
BI1BA1	The Living Cell	10	4
BI1BB2	Biochemistry and Metabolism	10	4
BI1BC2	Genes and Chromosomes	10	4
BI1BD1	Introductory Microbiology	10	4
BI1BG3	Practical Biochemistry	10	4

*Also students without AS Chemistry or an equivalent qualification must take:*

<b>CH1FC1</b>	<b>Fundamental Concepts in Chemistry 1</b>	<b>10</b>	<b>4</b>
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**To achieve a total of 120 credits, select modules from the list of recommendations (from either or both lists of recommended modules) and options 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.**

**Recommended modules for those with interest in molecular and medical microbiology** (it is highly recommended that you take at least 3 of these modules)

<b>BI1BA2</b>	<b>The Living Cell (part 2)</b>	<b>10</b>	<b>4</b>
<b>BI1BE2</b>	<b>Pathology: Introduction to Human Disease</b>	<b>10</b>	<b>4</b>
<b>BI1BF1</b>	<b>Laboratory and Study Skills for Biomedicine</b>	<b>10</b>	<b>4</b>
<b>PM1PB2A</b>	<b>Human Physiology</b>	<b>10</b>	<b>4</b>
<b>OR PM1PB2</b>	<b>Human Physiology</b>	<b>20</b>	<b>4</b>

**Recommended modules for those with interest in environmental microbiology**

<b>BI1EC1</b>	<b>Exploiters and Exploited</b>	<b>10</b>	<b>4</b>
<b>OR BI1EC12</b>	<b>Exploiters and Exploited</b>	<b>20</b>	<b>4</b>
<b>BI1BF1</b>	<b>Laboratory and Study Skills for Biomedicine</b>	<b>10</b>	<b>4</b>
<b>BI1EG1</b>	<b>Plant Diversity, Structure and Utilisation</b>	<b>10</b>	<b>4</b>

**Additional Optional modules**

<b>AP1A18</b>	<b>Digestion and Nutrition</b>	<b>10</b>	<b>4</b>
<b>CH1FC3</b>	<b>Molecular Studies for the Life Sciences</b> (for students taking CH1FC1 or who have A2 level Chemistry at Grade C or below)	<b>10</b>	<b>4</b>
<b>LA1XX</b>	<b>Institution-Wide Language Programme</b>	<b>20</b>	<b>4/5</b>
<b>PY1IN</b>	<b>Introduction to Neuroscience</b>	<b>10</b>	<b>4</b>

**Students with strength in A2 level Chemistry may take:**

<b>CH1OR2</b>	<b>Fundamentals of Organic Chemistry</b>	<b>10</b>	<b>4</b>
<b>CH1PH2</b>	<b>Physical Processes for Biologists</b>	<b>10</b>	<b>4</b>

## **Part 2 (three terms)**

*Compulsory modules*

<i>Code</i>	<i>Module title</i>	<i>Credits</i>	<i>Level</i>
ST2S2	Applied Statistics for the Life Sciences	10	5
BI2BD4	Life and Death of a Cell	10	5
BI2BR4	Function of the Bacterial Cell	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
BI2BM34	Professional Career Development	10	5
BI2BO4	Virology	10	5
BI2BP6	Practical Skills: Recombinant DNA Exercise	10	5

**Recommended Modules** (10 or 20 credits) Students are expected to select at least 1 of these modules and may take all 3

BI2BL5	Protein Structure and Function <i>a</i>	10	5
BI2BU45	Science Communication <i>a,b,c</i>	10	5
FB2MF2	Microbial Hazards in Food <i>c</i>	10	5

**Optional modules (10-30 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, exceptionally, from other Schools. Timetable restrictions may apply.*

BI2BA5	Clinical Biochemistry	10	5
BI2BB4	Endocrinology	10	5
BI2BE4	Pharmacology and Toxicology <i>c</i>	10	5
BI2BG5	Animal, Plant and Microbial Development <i>a b</i>	10	5
BI2BQ5	Clinical Haematology and Cellular Pathology <i>a c</i>	10	5
BI2BT5	Introduction to Bioinformatics & Computational Biology <i>a b</i>	10	5
BI2EE4	Evolutionary Biology	10	5
BI2EH4	Introduction to History and Philosophy of Science	10	5
BI2PMI*	Summer Placement in Microbiology	10	5
GV2F4	Soil Ecology and Function <i>b</i>	10	5
LA1XX1	Institution-Wide Language Programme	20	4/5

*a:* Recommended for students with an interest in Molecular and Medical Microbiology

*b:* Recommended for students with an interest in Environmental Microbiology

*c:* Recommended for students with an interest in Clinical or Food Microbiology

\* *Takes place in the summer vacation, after Part 1 examinations*

**Part 3 (three terms)***Compulsory modules*

<i>Code</i>	<i>Module title</i>	<i>Credits</i>	<i>Level</i>
BI3BC7	Bacterial Pathogens	10	6
BI3BG8	Mechanisms for Microbial Functions	10	6
BI3BJ8	Viral Pathogens	10	6
BI3BN8	Use and Abuse of the Microbial World	10	6

**Also, students must take:**

Either

BI3PROB	Research Project in Biomedical Sciences Section	40	6
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Or

BI3PROD	Research Project in Biomedical Sciences Section	20	6
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**Optional modules**

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.*

BI3BA7	Medical Genetics	10	6
BI3BB7	Selected Topics in Endocrinology and Endocrine Disease	10	6
BI3BD8	Cancer	10	6
BI3BE8	Cardiovascular Disease	10	6
BI3BF7	Cell Communication and Disease <i>a</i>	10	6
BI3BI8	Neurobiology	10	6
BI3BP7	Systems Biology	10	6
BI3S78	Seminars in Biology	10	6
BI3B67*	Microbiology Field Course <i>a c</i>	20	6

BI3EO8	Science in Culture	10	6
BI3EP7	Wildlife Diseases	10	6
GV3F8	Applied and Environmental Microbiology <i>b</i>	10	6
FB3N3	Bioavailability, Diet and Gut Health <i>a b c</i>	10	6

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

a: Recommended for students with an interest in Molecular and Medical Microbiology

b: Recommended for students with an interest in Clinical or Food Microbiology

c: Recommended for students with an interest in Environmental Microbiology

**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 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 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 individual 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.

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 an overall weighted average mark of 40%, at least 40% in modules amounting to 80 credits in Part 3, and must gain a mark of at least 40% in the Research Project module. For a Pass degree, candidates must have an average of at least 35% and at least 35% in modules amounting to 80 credits in Part 3, and must gain a mark of at least 35% in the Research Project module.

**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](http://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 some aspects of practical classes or study sessions. 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%).

### **Admission requirements**

Entrants to this programme are normally required to have obtained:

**UCAS Tariff:** Grades BBB/ABC from three A levels including Biology at grade B plus one other science. Grades ABB from three A levels including Biology will also be considered for applicants without a second science A level.

Acceptable science subjects: Chemistry, Physics, Maths, Further Maths, Statistics, Psychology, Geography, Applied Science, Environmental Studies, Geology.

Exclusions: General Studies, Critical Thinking and Citizenship A levels, Key Skills and the Extended Project.

**International Baccalaureate:** 30 points overall including 6 in Biology and 5 in a second science, both at higher level.

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

**Admissions Tutor:** Dr Robert Jackson

### **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](http://www.reading.ac.uk/student)

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

### **Career learning**

#### **Career prospects**

Reading Microbiology graduates are qualified to enter a variety of careers in academia, industry and public health bodies. Many of our students continue in a research career or find employment in universities, the Health Protection Agency, Environment Agency or in Research Institutes, others have found positions in Industry (Pharmaceutical, Biomedical, Agrochemical or local water authorities). Some graduates continue their training, for example in medicine, forensic science or the teaching profession. As scientists with developed numeracy and communication skills, our graduates also have qualifications suited to a wide variety of occupations in commerce, business and scientific journalism. Honours graduates will be eligible for membership of the Institute of Biology and Chartered Biologist status.

#### **Opportunities for study abroad**

As part of the degree programme students have the opportunity to study abroad at an institution with which the University has a valid agreement.

#### **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.

#### **Study Abroad:**

The Erasmus programme enables undergraduates to undertake project work for one term in their final year at one of a number of European Universities. Recent exchanges involving School of Biological Science 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.

### **Placement opportunities**

#### **Industrial Placement:**

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### **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 fundamental concepts of microbiology, such as the classification, identification and laboratory manipulation of microbes.
2. Core principles of bacterial and viral structure, physiology and genetics.
3. Details of their interactions with mammalian host at the molecular level, underpinned by a knowledge of other branches of immunology, molecular and cell biology.
4. Principles of prevention and treatment of microbial diseases

##### **Teaching/learning methods and strategies**

Formal lectures and practicals supported by tutorials in specific areas related to microbiology (in Part 2), group work and miniprojects.

##### *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
6. The ability to formulate and test hypotheses.

##### **Teaching/learning methods and strategies**

Rational thought and logical analysis is developed throughout the programme, building to an ability to deduce how solutions to key problems in biology are derived through the application of experimental procedure.

##### *Assessment*

A mixture of written examinations, and continuous assessments such as practical write ups, essays and poster and oral presentations.

##### **C. Practical skills - *able to*:**

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

##### **Teaching/learning methods and strategies**

Formal practical classes, project in Part 3 in an area of microbiology

laboratory

*Assessment*

By practical laboratory reports.

**D. Transferable skills - able to:**

**Teaching/learning methods and strategies**

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

The use of IT is embedded throughout the course.

*Assessment*

The skills will enhance the performance of students in both coursework and unseen examinations.

**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.**