

## **BSc Soil Science**

**UCAS code: F920**

Awarding Institution: The University of Reading  
Teaching Institution: The University of Reading  
Relevant QAA subject benchmarking group: Earth Science, Environmental Sciences & Environmental Studies  
Faculty of Science: Programme length: 3 years  
For students entering Part 1 in 2003: Date of specification: 24/03/2003  
Programme Director: Dr C J B Mott  
Programme Adviser: Dr C J B Mott  
Board of Studies: Earth and Soil Science

### **Summary of programme aims**

The programme aims to provide a degree-level education in Soil Science, establishing a thorough scientific basis for the application of the subject to a wide variety of contemporary applications.

### **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 develop 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 students are expected to have gained experience and show competence in the following skills: IT (word-processing, data manipulation, use of simulation modelling techniques), scientific writing, oral presentation, teamworking, problem-solving, use of library resources, time management, career planning and management and simple risk assessment.

### **Programme content**

The profile which follows states which modules must be taken (the compulsory part), together with lists of modules from which the student must make a selection (the 'selected' part). Students must select from these modules as they wish, in consultation with their programme adviser, to make 120 credits in each Part. It is possible through option selection to study a foreign language, if desired, throughout the whole programme. The number of credits for each module is shown after its title.

#### **Part 1 (three terms): 2003/4**

		<i>Credits</i>	<i>Level</i>
<i>Compulsory modules (50 credits)</i>			
SS1A1	<i>Introduction to Soil Science</i>	10	C
SS1B1	<i>Biological Processes in Soil</i>	10	C
SS1A2	<i>Soils, Land and Environment</i>	10	C
SS1B2	<i>Soil Processes and Applications</i>	10	C
SS1A3	<i>Soil Field Studies</i>	10	C

*Selected Modules*

Any combination, to give a total of **70** credits, from the following list:

Available Part 1 modules from:

	<i>Credits</i>	<i>Level</i>
<u>Archaeology</u> (School of Human and Environmental Sciences)		
AR1RM1 <i>Introduction to Historic Archaeology</i>	20	C
AR1P1 <i>Introduction to World Prehistory</i>	20	C
AR1TS1 <i>Archaeological Practice</i>	20	C
<u>Biological Sciences</u> (School of Animal and Microbial Sciences)		
AM1M11 <i>Fundamental Microbiology</i>	10	C
AM1M12 <i>Important Microbes</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
BI1S10 <i>Chemistry for Biologists</i>	10	C
BI1Z10 <i>Ecology</i>	10	C
<u>Chemistry</u> (School of Chemistry)		
CH1I2 <i>Descriptive Inorganic Chemistry</i>	10	C
CH1O2 <i>Fundamental Organic Chemistry</i>	10	C
CH1P2 <i>Physical Biochemistry</i>	10	C
<u>Environmental Science</u> (School of Human and Environmental Sciences)		
ES1A2 <i>Essential Chemistry and Physics for Environmental Science</i>	10	C
<u>Geography</u> (School of Human and Environmental Sciences)		
GG1P1 <i>Climatology and Hydrology</i>	20	C
GG1P2 <i>Geomorphology and Biogeography</i>	20	C
<u>Geology</u> (School of Human and Environmental Sciences)		
GO1A1 <i>Earth Structure and Processes</i>	10	C
GO1B1 <i>Earth Materials</i>	10	C
CO1C2 <i>Earth History and Evolution</i>	10	C
GO1S1 <i>Essential Maths for Earth and Environmental Scientists</i>	10	C
GO1X1 <i>Introduction to Geological Fieldwork</i>	10	C
<u>Plant Science</u> (School of Plant Sciences)		
PS1AB2 <i>Physical Ecology</i>	10	C
PS1BA1 <i>How Plants Work</i>	10	C
PS1BB1 <i>Current Topics in Plant Biology</i>	10	C
PS1BA2 <i>Plant Development</i>	10	C
PS1BB2 <i>Morphology of Land Plants</i>	10	C
and may include     A language	20 credits	

**Part 2 (three terms): 2004/5**

		<i>Credits</i>	<i>Level</i>
<i>Compulsory modules (90 credits)</i>			
SS2A4	<i>Soil Physical Properties and their Measurement</i>	10	I
SS2B4	<i>Chemistry of Soil Constituents</i>	10	I
SS2C4	<i>Soil Microbiology and Biotechnology</i>	10	I
SS2D4	<i>Soils and Soil Development</i>	10	I
GO2J5	<i>Skills for Earth &amp; Environmental Scientists</i>	10	I
<i>Together with <b>three</b> from:</i>			
SS2A5	<i>Transport Processes in Soils</i>	10	I
SS2B5	<i>Soil Chemical Properties and Nutrient Availability</i>	10	I
SS2C5	<i>Soils and Environmental Pollution</i>	10	I
SS2D5	<i>Sustainable Land Management</i>	10	I
<i>and</i>			
SS2A6	<i>Soil Survey and Field Experimentation</i>	10	I

*Selected Modules*

Any combination, to give a total of **30** credits, chosen from the following list:

- (a) A Part 2 module in the Soil Science list not taken as a compulsory module
- (b) Suitable Part 2 modules offered by any of the departments listed under Part 1
- (c) A language (20 credits)

**Part 3 (three terms): 2005/6**

		<i>Credits</i>	<i>Level</i>
<i>Compulsory modules (100 credits)</i>			
SS3PS	<i>Soil Science Project</i>	40	H
SS3ISS	<i>Integrated Soil Science</i>	20	H
<b>Two</b> from:			
SS3A7	<i>Soil and Mineral Equilibria using MINEQL+</i>	10	H
SS3B7	<i>Soils, Vegetation and the Atmosphere</i>	10	H
SS3C7	<i>Soil and Land Evaluation</i>	10	H
together with <b>two</b> from			
SS3A8	<i>Soil Fertility Management</i>	10	H
SS3B8	<i>Soils and Mineral Weathering</i>	10	H
SS3C8	<i>Soils and the Global Environment</i>	10	H
SS3D8	<i>Soil Classification and Multivariate Methods</i>	10	H

*Selected modules*

Any combination, to give a total of **20** credits, chosen from the following list:

- (a) Part 3 module(s) in the Soil Science list not taken as a compulsory module
- (b) Suitable Part 3 modules offered by any of the departments listed under Part 1
- (c) A language (20 credits).

### **Progression requirements**

To proceed to Part 2 it is necessary to have obtained an overall average of at least 40% and at least 40% in any **four** of the five compulsory Soil Science modules. There is a pass threshold of 30% in **every** module. Marks of less than 30% in a total of 20 credits, other than those in Soil Science (SS), will be condoned provided that the candidate has pursued the course for the module with reasonable diligence and has not been absent from the examination without reasonable cause.

To proceed to Part 3 it is necessary to have obtained an overall average of at least 40% and at least 40% in any **eight** of the nine compulsory Soil Science modules. There is a pass threshold of 30% in **every** module. Marks of less than 30% in a total of 20 credits, other than those in Soil Science (SS), will be condoned provided that the candidate has pursued the course for the module with reasonable diligence and has not been absent from the examination without reasonable cause.

### **Summary of teaching and assessment**

Teaching is organised in modules that typically involve both lectures and practicals. Modules are assessed by a mixture of coursework (which may include tests) and formal examination. The Part 3 Project (SS3PS), however, is assessed only as coursework

Part 2 contributes one third to the overall assessment and Part 3 the remaining two thirds.

### **Admission requirements**

Entrants to this programme are normally required to have obtained:

UCAS Tariff: 260 points overall, including any two science subjects at A2 level.

Admissions Tutor: Dr Hazel McGoff ([h.j.mcgoff@rdg.ac.uk](mailto:h.j.mcgoff@rdg.ac.uk))

### **Support for students and their learning**

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 4000 current periodicals, has a range of electronic sources of information and houses a Student Learning Centre with some 200 workstations. There are language laboratory facilities available for students taking modules (available as an option within the BSc Soil Science programme) 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 Adviser, Hall Wardens and the Students' Union.

Within the providing department additional support is given through extensive personal contact during practical and field classes.

### **Career prospects**

Students have found employment in a wide range of environmentally related areas, especially in the consultancy industry, local government and research organisations.

### **Opportunities for study away from Reading**

It is possible within this programme for a student, provided he/she has passed Part 2, to accept a relevant placement in the UK or overseas for one year before beginning Part 3.

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

The programme aims to provide a degree-level education in Soil Science and to establish a thorough scientific basis for the application of the subject to a wide variety of contemporary applications. It aims to produce soil scientists who have some experience of the main areas of the subject and enough appreciation of a wider context into which their soils knowledge can be applied.

### **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. soil science as an integrated interdiscipline involving chemical, physical, biological and earth science aspects
2. the role of soils in the local and global environment
3. the management of soil quality

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

These topics are presented in formal lectures and seminar presentations, combined with practical and field classes. Integration across subject areas is encouraged, especially through field teaching, seminars and other discussion opportunities, together with a specific subject-integration module towards the end of the programme. Emphasis is placed on encouraging the student's own enthusiasms within the subject through the provision of special topic modules and a project incorporating both library and practical aspects.

##### *Assessment*

Knowledge is tested through a combination of coursework (including essays, reports on laboratory practical and fieldwork and tests, some of which is formative) with (summative) unseen examinations. Project dissertations and oral presentations also contribute.

## *Skills and other attributes*

### **B. Intellectual skills - able to**

1. Obtain and use information and ideas from both on- and off-line sources
2. Transfer and integrate appropriate knowledge and methods from one topic within the subject to another
3. Understand how scientific knowledge can be applied in a practical context
4. Understand the evolving state of knowledge in a rapidly developing field
5. Construct and test hypotheses
6. Plan, conduct and write a report on an independent research project

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

Soil Science is an applied discipline and the use of basic science applied to real life contexts is at the heart of all teaching in the subject. Science and its application to soil behaviour will be found in every soils module description offered. Field based and other practical work is used extensively to provide develop skill in 2 and 3.

Seminar and essay/report work is used to provide a context for 1 and 4. The long independent research project is designed to teach and use skills 5 and 6.

#### *Assessment*

Development of these skills is essential to permit the student to perform well in much of the coursework and in the examinations associated with the programme. Skills 2 and 4 are specifically tested in the examinations associated with the module in Integrated Soil Science, and skills 1, 3, 5 and 6 are tested in the research project report.

### **C. Practical Skills**

Students learn to carry out practical work, in laboratory and field, with an understanding of safety and risk. They gain experience of the following skills:

1. Soil analysis, chemical, physical and biological
2. Identification and assessment of soils in the field
3. Manipulation of computer simulation models
4. Data analysis using appropriate statistical techniques

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

These skills are taught specifically during practical and field classes. Individual tuition is given within a class context to ensure that techniques are understood. Some practical skills, including the use of high level research equipment, may be developed to an advanced level in the Part 3 research project.

#### *Assessment*

The development of practical skills is tested both formatively and summatively through written reports on practical work, presentations and fieldwork, and in the dissertation based on the research project.

**D. Transferable skills - able to**

1. use IT (including appropriate software packages)
2. communicate scientific ideas in written and oral form
3. work as part of a team
4. use library and internet resources
5. manage time
6. plan their career

**Teaching/learning methods and strategies**

Use of IT and library resources is embedded throughout the programme and is essential to complete much of the coursework. Written communication skills are developed through reports and essays and further in the preparation of the research project dissertation, activities which also require the use of library and internet resources. Oral skills are developed through seminars, some of which are organised on a small team basis. Teamwork is an essential element of field class work and is specifically tested in some laboratory work. Time management is essential for all laboratory and field activities, and is essential for the effective completion of the programme. There is a specific module on Career Management skills as well as discussion through the personal tutor system and the completion of a personal academic record.

*Assessment*

Development of skills under 1, 2 and 4 is essential for a good performance in much of the coursework associated with the programme. Effective use of skills 3 and 5 will also make an important contribution and skill 6 is specifically assessed.

*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 of the learning outcomes, content and teaching, learning and assessment methods of each module can be found in module and programme handbooks.