

**BSc Environmental Science**  
**For students entering Part 1 in 2008/9**

**UCAS code: F851**

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	Environmental Sciences
Faculty:	Science Faculty
Programme length:	3 years
Date of specification:	17/Aug/2010
Programme Director:	Dr Hazel McGoff
Programme Advisor:	Dr Hazel McGoff
Board of Studies:	Environmental Sciences
Accreditation:	Institute of Environmental Sciences

**Summary of programme aims**

The programme aims to provide students with a sound scientific understanding of the processes operating in the Earth system, and to apply this science to the understanding of current and future environmental issues. It also aims to provide students with the scientific and transferable skills that are relevant to the application of environmental science in research, industry and other areas such as government policy.

The programme aims to provide a thorough degree-level education in Environmental Science, with optional emphases being designed within Pathways, such as Environmental Change, Earth and Atmosphere, Environmental Management, Soil and Water.

Part 1 is designed to provide a sound foundation in Environmental Science, and supporting knowledge of relevant Chemistry, Physics and Mathematics to develop the knowledge and skills required for studying the environmental sciences. Options in mathematics depend on the mathematical skills of the student prior to entry. A wide range of subject options contribute, and shape the particular pathway chosen. Part 2 has a core of compulsory modules to develop further skills and technical experience in the core subject areas, with particular emphasis on environmental management. Options are designed to give depth to knowledge and methodology in key selected subject areas. Part 3 is integrative whilst providing scope for specialisation through the selection of options and through project work. The latter provides the student with the opportunity to demonstrate their ability to conduct and report on a detailed research investigation, drawing on their understanding of the fundamental concepts in Environmental Science.

**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 and the 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.

As part of this programme students are expected to have gained experience and show competence in the following transferable skills: IT (word-processing, using spreadsheet and graphical applications programs, scientific programming, internet), scientific writing, oral presentation, experimental methods (laboratory and field), team-working, use of library resources, career planning and management. They will have developed skills in team-working and leadership, and be confident and self-reliant, particularly as a result of experience during field courses and independent fieldwork. They will also have a sound knowledge of fieldwork safety procedure.

**Programme content**

The profile which 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 listed.

**Part 1 (three terms)**

*Compulsory modules*

<i>Module</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
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ES1A2	Essential Chemistry & Physics for Environmental Science	10	C
ES1B1	Introduction to Environmental Science	10	C
ES1B2	Environmental Science Field Class	10	C
ES1C1	Quantitative Skills for Environmental Scientists	10	C
ES1D1	Earth Structure and Processes	10	C
SS1A1	Introduction to Soil Science	10	C

### Optional modules (60 credits)

Students select a minimum of three contributory subjects to Environmental Science, including: Earth Science, Meteorology, Geography, Chemistry, Biology, Rural Environmental Science, Mathematics. They may also choose a language as part of the Institution-Wide Language Programme. Choice is subject to timetable constraints and students having appropriate pre-requisites. The choice of optional modules shapes the 'Pathway' through the degree.

### Recommended:

ES1D2	Earth Materials	10	C
SS1A2	Soils, Land and the Environment	10	C

### Others including:

#### Biology

BI1BA1	The Living Cell	10	C
BI1EB2	Humans and the Changing World	10	C
BI1ED2	Mammals: Diversity, Behaviour and Conservation	10	C
BI1EF2	Ecology: Species and their Interactions	10	C
BI1EF23	Ecology: Species and their Interactions	20	C
BI1EG2	Plant Structure and Functions	10	C

#### Archaeology

AR1TS2	Bones, Bodies and Burials: the Archaeology of Death	20	C
AR1TS3	Practising Archaeology: methods and approaches	20	C

#### Rural Science and Agriculture

AP1A10	Countryside & Environment	10	C
AP1A19	Environment in Practice	10	C

#### Mathematics

AS1A	Communicating with Statistics	20	C
CH1M2	Mathematics	20	C

#### Chemistry

CH1FC2	Fundamental Chemistry 2	10	C
CH1PH2	Physical Processes for Biologists	10	C
CH1IN2	Descriptive Inorganic Chemistry	10	C

#### Geography

GG1C	Climatology and Hydrology	10	C
GG1D	Hydrology	10	C
GG1GS	Geomorphology	10	C

#### Meteorology

MT11A	Introduction to Atmospheric Science	20	C
MT11B	Weather System Analysis	20	C

#### Languages

LA1XX1	IWLP Various Languages	20	C
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### Part 2 (three terms)

#### Compulsory modules

<i>Module</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
ES2M5	Quaternary Global Climate Change	10	I
ES2G4	Skills for Environmental Scientists	20	I
ES2F4	Soil Ecology and Functions	10	I
SS2D5	Sustainable Land Management	10	I

And one field class from:

AP2A21	Practical Environmental Sciences Field Class	10	I
ES2Z6	Environmental Science Field Class	10	I
SS2A6	Soil Science Field Class (SS2D4 prerequisite)	10	I

### Optional Modules (60 credits)

Students develop depth in a minimum of two contributory subjects to Environmental Science, including: Earth Science, Meteorology, Geography, Chemistry, Biology, Plant Sciences, Rural Environmental Science, Archaeology, Mathematics. They may also chose a language as part of the Institution-Wide Language Programme.

#### Recommended:

##### Earth Sciences

ES2E4	Environmental Mineralogy	10	I
ES2L4	Earth Surface Processes	10	I
GO2P5	Crime Scene Analysis	10	I
SS2D4	Soils and Soil Development	10	I
SS2A4	Transport Processes in Soils	10	I

#### Others Including:

##### Archaeology (20 to 40 credits)

AR2S1	Archaeological Science	20	I
AR2F5	Techniques in Artefact Interpretation	10	I

##### Rural Science and Agriculture (20 to 40 credits)

AP2A37	Practical Nature Conservation	10	I
AP2EE3	Environmental Economics (prerequisite AP1EE1)	10	I
AP2A39	Environment and the Farm Business (prerequisite AP1A02)	10	I
AP2A26	Forestry and Woodlands	10	I
AP2A38	Organic Farming	10	I
AP2A45	Environment in Practice 2	20	I

### Part 3 (three terms)

#### Compulsory modules

<i>Mod Code</i>	<i>Module Title</i>	<i>Credits</i>	<i>Level</i>
ES3D7	Land Evaluation	20	H

ES3IP	Independent Project	40	H
<b>Optional Modules (60 credits)</b>			
<b>Recommended:</b>			
ES3Z8	Earth Systems Field Class	10	H
ES3C7	Earth Systems Science	10	H
<b>Others including (subject to timetable constraints and students having appropriate pre-requisites):</b>			
Environmental Science (Up to 60 credits)			
ES3F8	Applied and Environmental Soil Biology	10	H
ES3H7	Forensic Issues and Practice	20	H
ES3I8	Carbon in the environment	10	H
ES3LP	Library Project	10	H
SS3A8	Management of Soil Fertility	10	H
Archaeology (20 credits)			
AR3S13	Vegetation History and Archaeobotany	20	H
Rural Science and Agriculture (10 to 40 credits)			
AP3A87	Environmental Management	10	H
AP3A89	Water, Agriculture and Irrigation	10	H
AP3EP3	Rural Policy and Countryside Planning	10	H
AP3A68	Wildlife in the Farming Environment	10	H
AP3A90	Climate Change and Food Systems	10	H
Biological Sciences (10 to 30 credits)			
BI3EL7	Plants & Climate	10	H
BI3EJ8	Conservation Biology	10	H
BI3EN7	Conservation & Biodiversity	10	H
Physical Geography (20 or 40 credits)			
GG334	Glacial and Periglacial Geomorphology	20	H
GG3AP	Air Pollution: Effects and Controls	20	H
GG361	Aquatic Environments: Problems and Management	20	H
GG362	Water Resources	20	H
GG3CC	Climate Change	20	H
Others			
LA1XX1	Institute Wide Language Programme	20	H

*Plus up to 20 other credits subject to approval by the Programme Adviser*

### **Progression requirements**

To gain a threshold performance at Part 1 a student shall normally be required to achieve an overall average of 40% over 120 credits taken in 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. In addition, students shall normally obtain at least 40% in the compulsory modules ES1B1, ES1B2, ES1A2, ES1C1, ES1D1 and SS1A1 averaged together.

To gain a threshold performance at Part 2 a student should normally be required to achieve an overall average of 40% over 120 credits taken in 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. In addition students shall normally obtain at least 40% in the compulsory modules SS2D5, ES2M5, ES2F4, ES2G4, and a field class module, averaged together.

Part 2 contributes one third (33%) of the overall assessment and Part 3 the remaining two thirds (67%).

To be eligible for Honours, students must normally pass Level 6 modules with a total credit of at least 100.

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

Teaching is organized in modules that typically involve lectures, problem solving classes, and practical classes. The assessment is carried out within the University's degree classification scheme, details of which are in the programme handbooks. The pass mark in each module is 40%. Parts 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. The Part 3 project involves a substantial component of independent learning, under the supervision and guidance of Project Supervisors. The projects are assessed on the basis of formal reports, oral presentations and development of independent learning skills.

### **Admission requirements**

Entrants to this programme are normally required to have obtained:

Grade C or better in English, Science and Mathematics in GCSE, and a minimum UCAS Tariff of 300 points including two full 'A' levels. One subject from Maths, Physics, Chemistry, Biology, Geography, Geology or Environmental Science preferred;

*Or* International Baccalaureat: minimum pass plus minimum 6,5,5 in Higher Level Subjects including at least one science or maths.

*Or* Irish Highers: four grade Bs and one grade C including two sciences.

**Admissions Tutor:** Dr JS Robinson

### **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, School Senior Tutors, the Students' Union, the Medical Practice and the Student Services Directorate. The Student Services Directorate is housed in the Carrington Building and includes the Careers Advisory Service, the Disability Advisory Service, Accommodation Advisory Team, Student Financial Support, Counselling and Study Advisors. Student Services has a Helpdesk available for enquiries made in person or online ([www.risisweb.reading.ac.uk](http://www.risisweb.reading.ac.uk)), or by calling the central enquiry number on (0118) 378 5555. 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 on everything from accommodation to finance. The Carrington Building is open between 8:30 and 17:30 Monday to Thursday (17:00 Friday and during vacation periods). Further information can be found in the Student website ([www.reading.ac.uk/student](http://www.reading.ac.uk/student)).

The providing Departments have well-equipped teaching laboratories, analytical laboratories and dedicated computer laboratories. Substantial collections of earth materials and maps are available for hands-on access by students. Within the providing Departments additional support for students is given through practical and field classes and in the course of the independent project. There is a Course Adviser to offer advice on the choice of modules throughout the programme.

### **Career prospects**

The requirement for environmental scientists with a sound scientific training continues to grow and opportunities for graduates from this course include employment by environmental consultants, water companies and the many offices of national and local government concerned with environmental issues as well as post-graduate study. Private industry is increasingly concerned to employ scientists to help minimise the adverse environmental impact of its activities.

### **Opportunities for study abroad or for placements**

Students following this degree programme may transfer to the parallel degree BSc Environmental Science with Professional Experience (F852) and complete an additional year of appropriate experience with a company overseas. Such transfers are only permitted if the student displays the appropriate ability to benefit from such a secondment, has taken appropriate options in Part 2, has the requisite degree of fluency in the foreign language required, and, if suitable industrial experience can be found for the student. Students may also participate in the

ERASMUS exchange scheme where one or two terms are spent studying in a European university. Further details are available from the Course Director and the Study Abroad Office.

## Programme Outcomes

### Knowledge and Understanding

#### A. Knowledge and understanding of:

1. Earth Systems including the lithosphere, hydrosphere, atmosphere and biosphere
2. Interactions between the processes operating in the different components of the Earth System.
3. The evolution of the Earth and the environment through different time scales, and the evidence for that change
4. Monitoring and management of natural and human-induced environmental change.
5. Scientific examination of the implications of sustainability and sustainable development.
6. A selected range of optional topics
7. Environmental issues and management with an interdisciplinary and integrative perspective.
8. Fieldwork safety issues and procedures.

#### Teaching/learning methods and strategies

Underlying knowledge in the essential areas is set out in lectures, in most cases directly supported by illustrative practicals. The essential field experience required for proper understanding is provided by compulsory field courses in Part 1 and Part 2, with additional optional field courses in Part 3. Students conduct an independent project in the form of practical investigation into an environmental topic in Part 3, with support and advice from academic and technical staff.

#### Assessment

Most knowledge is tested through a combination of coursework and unseen formal examinations. Dissertations and oral presentations also contribute in Part 3.

### Skills and other attributes

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

1. Think logically and critically in a scientific manner
2. Analyse and interpret environmental observations and data and recognise and identify issues and problems with that data
3. Organise tasks into a structured form
4. Understand the current state of knowledge of the environment - a rapidly developing area
5. Integrate and apply concepts and principles from one area of environmental science to another
6. Recognise the need for professional codes of conduct.

#### Teaching/learning methods and strategies

Logical and critical thinking is an essential part of interpreting environmental science data and materials, it is embedded throughout the programme. The ability to integrate and apply concepts and principles from one area of the subject to another are intrinsic to high-level performance in the programme. Current developments in environmental science are highlighted by contact with visiting experts in the field in Part 3.

#### Assessment

1 and 2 are assessed indirectly in most parts of the programme, 3 in the course of laboratory and fieldwork. 4 is focused on by courses in Parts 2 and 3, while 5 contributes to more successful work. 6 not directly assessed.

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

1. Plan, conduct and report on investigations, including the use of secondary data
2. Collect, record and analyse data using appropriate field and laboratory techniques
3. Reference work in an appropriate manner
4. Carry out a risk assessment for field and laboratory investigations
5. Consider the impact of field investigations on the environment as well as other interested parties.

#### Teaching/learning methods and strategies

Observing, recording and interpreting is taught in laboratory and field classes throughout the course. An investigative independent practical project is conducted by the student in Part 3, with advice from academic and technical staff. Risk assessment forms an essential part of each field course and any field based project work.

#### Assessment

1 and 2 are tested both formatively in coursework and particularly during the final year projects.

summatively in examinations. 2 is assessed by means of coursework and project work, 4 and 5 during field classes and project work.

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

1. Use IT (word-processing, using standard software and the Internet)
2. Understand issues of sample selection, accuracy, precision and uncertainty in field and laboratory work
3. Prepare, process, interpret and present data in an appropriate manner, using both quantitative and qualitative techniques
4. Communicate scientific ideas in verbal, written and graphic form to a variety of audiences.
5. Work as part of a team, identifying individual and collective goals, respecting the views and opinions of others and evaluating both individual and team performances.
6. Use library resources
7. Manage their time
8. Plan their career, developing skills for self-managed and lifelong learning.

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

The use of IT is embedded throughout the programme with special sessions in Part 1 and in the Skills Module in Part 2. Oral presentation and communication skills are developed in various modules, culminating in the Part 3 practical project. Career management is taught in the Part 2 Skills module. Teamworking is particularly emphasised in field courses. Time management is essential for the timely and effective completion of the programme. Library and internet resources are required for the literature review in Part 3, and contribute to the best performances throughout.

#### *Assessment*

1, 2, 3 and 4 are assessed through coursework and particularly in the Part 3 project. 5 in field courses, 6 in the Library Project and 8 in the skills module in Part 2. 7 is not directly assessed but contributes to successful performance throughout the programme.

**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.**