BSc Environmental Earth Science

UCAS code: F925

Awarding Institution: The University of Reading
Teaching Institution: The University of Reading
Relevant QAA subject benchmarking group(s): Earth Sciences, Environmental Sciences and Environmental Studies

Faculty of Science
Programme length: 3 years
For students entering Part 1 in 2002
Date of specification: Apr 2004
Programme Director: Dr T R Astin (SHES)
Programme Adviser: Dr T R Astin (SHES)
Board of Studies: Environmental Sciences

Summary of programme aims
The course is designed to provide a broad based education in earth science with a sound basis in geology and soil science, an understanding of the environment, and an appreciation of the impact of human activity on the environment. (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 students are expected to have gained experience and show competence in the following transferable skills: IT (word-processing, using standard software packages), scientific writing, oral presentation, team-working, problem-solving, use of library resources, time-management and career planning and management. They will have developed skills in observing and recording data, teamworking and leadership, and be confident and self-reliant, particularly as a result of experience on field courses. They will also have a sound knowledge of fieldwork safety procedures.

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 'selected' 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)		*Credits*	*Level*	*Term*
Compulsory modules (60 credits)				
GO1A1	*Earth Structure & Processes*	10	C	1
GO1B1	*Earth Materials*	10	C	1
GO1C2	*Earth History & Evolution*	10	C	2
GO1X2	*Introduction to Geological Fieldwork*	10	C	E.Vac
SS1A1	*Introduction to Soil Science*	10	C	1
SS1A2	*Soils, Land and Environment*	10	C	2

Optional modules (60 credits)

Recommended:		*Credits*	*Level*	*Term*
GO1S1	*Essential Maths for Earth & Environmental Scientists*	10	C	1
ES1A2	*Essential Chemistry & Physics for Earth & Environmental Scientists*	10	C	2
Others Including:				
AM1L10	*Animal Biology*	20	C	1,2
AM1S10	*Introduction to Biology* (OK without A level Biology)	10	C	2
AM1Z10	*The Whole Mammal*	10	C	1
AM1Z11	*Environmental Biology*	10	C	1
AR1TS1	*Archaeology Practice*	20	C	1,2
AR1P1	*Introduction to World Prehistory*	20	C	1,3
AR1RM1	*Introduction to Historic Archaeology*	20	C	
BI1C10	*Cell Biology and Biochemistry*	10	C	1
BI1C11	*Genetics and Molecular Biology*	10	C	2
BI1M10	*Biodiversity*	10	C	1
BI1Z10	*Ecology*	20	C	2
BI1Z11	*Community Ecology*	10	C	3
CH1C	*Chemistry C* (OK without A level Chemistry)	20	C	1,2,3
CH1I1	*Introduction to Inorganic Chemistry*	20	C	1,2,3
CH1I2	*Descriptive Inorganic Chemistry*	10	C	2
CH1O2	*Fundamental Organic Chemistry*	10	C	1
CH1P2	*Physical Biochemistry*	10	C	1
GG1P1 & GG1P2	*Physical Geography*	40	C	1,2
MT11A	*Introduction to Atmospheric Science*	20	C	1,2
MT11B	*Weather System Analysis*	20	C	1,2
PS1BA1	*How Plants Work*	10	C	1
PS1BA2	*Plant Development*	10	C	2
PS1BB1	*Current Topics in Plant Biology*	10	C	1
PS1BB2	*Morphology of Land Plants*	10	C	2
SS1B1	*Biological Processes in Soil*	10	C	1
SS1B2	*Soil Processes and Applications*	10	C	2
SS1A3	*Soil Science Field Studies*	10	C	3
SS1C1	*Soil Use and Management*	10	C	1

Part 2 (three terms : 2003-2004)

Compulsory modules (60 credits)		*Credits*	*Level*	*Term*
ES2A5	*Environmental Systems*	10	I	5
GO2A4	*Introductory Environmental Geochemistry*	10	I	4
GO2C4	*Sedimentology*	10	I	4
GO2J5	*Skills for Earth & Environmental Scientists*	10	I	5
GO2X5	*Environmental Geology Field Class*	10	I	E.Vac
GO2Y3	*Geological Field Techniques Field Class*	10	I	S.Vac

Optional Modules (60 credits)

Recommended:				
SS2D4	*Soils and Soil Development*	10	I	4
GO2I5	*Analytical Geochemistry*	10	I	5

Others Including:

AM2Z32	*Vertebrate Zoology*	10	I	4
AM2Z34	*Invertebrate Zoology*	10	I	5
AM2Z36	*Development*	10	I	5
BI2B31	*Macro Evolution*	10	I	4
BI2Z31	*Micro Evolution*	10	I	5
GO2B4	*Crust and Mantle Processes*	10	I	4
GO2F4	*Geophysics*	10	I	5
GO2D5	*Global Change Through Geological Time*	10	I	5
GO2G5	*Structural and Engineering Geology*	10	I	4
MT24A	*Atmosphere & Ocean Dynamics*	20	I	4,5
MT24B	*Atmospheric Physics*	20	I	4,5
MT24C	*Numerical Methods for Environmental Science*	10	I	4
SS2A4	*Soil Physical Properties and their Measurement*	10	I	4
SS2B4	*Chemistry of Soil Constituents*	10	I	4
SS2C4	*Soil Microbiology & Biotechnology*	10	I	4
SS2A5	*Transport Processes in Soils*	10	I	5
SS2B5	*Soil Chemical Conditions & Nutrient Availability*	10	I	5
SS2C5	*Soils and Environmental Pollution*	10	I	5
SS2D5	*Sustainable Land Management*	10	I	5
SS2A6	*Soil Survey and Experimentation*	10	I	6

Part 3 (three terms: 2004-2005)

Compulsory modules (60 credits)		*Credits*	*Level*	
ES3A8	*Environmental Issues*	10	H	8
GO3B7	*Environmental and Global Geochemistry*	10	H	7
GO3PR7	*Independent Project*	30	H	7
GO3LP	*Library Project*	10	H	7

Optional Modules (60 credits)

Including:

GO3S7	*Palaeoclimatology*	10	H	7
GO3T7	*Palaeobiology*	10	H	7
GO3F7	*Geological Hazards & Risks*	10	H	7
GO3X8	*Earth Systems Field Class*	10	H	8
SS37C	*Soil and Land Evaluation*	10	H	7
SS38C	*Soils and the Global Environment*	10	H	8
SS3A7	*Soil Contaminants*	10	H	7
SS3B7	*Soils, Vegetation and the Atmosphere*	10	H	7
SS3A8	*Soil Fertility Management*	10	H	8
SS3D8	*Soil Classification and Multivariate Methods*	10	H	8
AR3S1	*Environmental Archaeology and the Cultural Landscape of Prehistory*	20	H	7
AR3S2	*Environment and Landscape in Historic Periods*	20	H	8
GG330	*Dryland Environments*	20	H	7
GG332	*Estuarine and Coastal Processes*	20	H	7
GG335	*Ice Sheets and Climate Change*	20	H	8

Progression requirements
Students must obtain at least 40% in Part 1 in addition to obtaining at least 40% in modules GO1A1, GO1B1, GO1C2, GO1X2, SS1A1 and SS1A2 averaged together, and gaining at least 30% in every module. Students must obtain at least 40% overall in Part 2, in addition to obtaining at least 40% in modules GO2A4, GO2C4, GO2J5, GO2X5, GO2Y3, and ES2A5 averaged together, and gaining at least 30% in every module. Marks of less than 30% in a total of 20 credits, in Part 1 and in Part 2, 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 and formal examinations. Part 3 project work, however, is monitored by means of tutorials with an individual advisor, and is assessed as coursework.
Degree Assessment: Part 2 will contribute 33% of the marks for the Final Degree classification.
Part 3 will contribute 67% of the marks for the Final Degree classification.

Admission requirements
Entrants to this programme are normally required to have obtained:
Grade C or better in English GCSE; and achieved
UCAS Tariff: 260 points from 3 A Levels or 300 points from 4 A Levels. Must include at least two subjects from Maths, Physics, Chemistry, Biology, Geography, Geology or Environmental Science.

Admissions Tutor: Dr Hazel McGoff

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.

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

Students following this degree programme may transfer to the parallel degree BSc Environmental Geology with Professional Experience 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.

Educational aims of the programme

The course is designed to provide a broad based education in earth science with a sound basis in geology and soil science, an understanding of the environment, and an appreciation of the impact of human activity on the environment.

Part 1 is designed to provide a sound foundation in geology and soil science, with particular reference to materials, structures and processes, an introduction to field work and the opportunity to select introductory modules from a range of disciplines. Part 2 devotes special attention to the development of skills and technical experience, with further importance placed on fieldwork and emphasis on the surface and near-surface environments and environmental systems. Part 3 is integrative and focuses on environmental issues, resources and management while providing scope for some 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 Earth Science.

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:	**Teaching/learning methods and strategies**
1. Earth materials and how they are formed 2. The evolution of the Earth and the environment through geological time, and how that understanding is arrived at 3. Processes in the surface and near-surface environment, including interactions between the solid Earth, hydrosphere, atmosphere and biological agents, including man. 4. Environmental systems 5. Earth's physical resources, their occurrence, location by man and the environmental issues associated with their exploitation 6. A selected range of optional topics 7. Environmental issues and management with an interdisciplinary and integrative perspective. 8. Fieldwork safety issues and procedures	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 earth science and environmental observations and data and recognise and identify issues and problems
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. plan, conduct and write a report and give an oral presentation on an independent project.

Teaching/learning methods and strategies

Logical and critical thinking is an essential part of interpreting earth 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 is assessed by project work in Part 3.

C. Practical skills – able to:

1. accurately observe, record and interpret earth materials and data
2. conduct a practical earth science project
3. carry out a risk assessment for fieldwork in a given area.

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 III, 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 is tested both formatively in coursework and summatively in examinations. 2 is assessed by means of the project report. 3 is assessed practically through coursework and project.

D. Transferable skills – able to:

1. use IT (word-processing, using standard software and the Internet)
2. communicate scientific ideas
3. give oral presentations
4. work as part of a team
5. use library resources
6. manage time
7. plan their career.

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 resources are required for the literature review in Part 3, and contribute to the best performances throughout.

Assessment

1, 2 and 3 are assessed through coursework and particularly in the Part 3 project. 4 in field courses, 5 in the Library Project and 7 in the skills module in Part 2. 6 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 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.