

**BSc Environmental Forensics**  
**For students entering Part 1 in 2009/0**

**UCAS code: F410**

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	Earth Sciences, Environmental Sciences and Environmental Studies
Faculty:	Faculty of Science
Programme length:	3 years
Date of specification:	29/Oct/2009
Programme Director:	Dr Hazel McGoff
Programme Advisor:	Dr Hazel McGoff
Board of Studies:	Environmental Sciences
Accreditation:	None

**Summary of programme aims**

This course aims to provide students with a sound understanding of the techniques used to determine the provenance of natural and human-made materials found at investigation and crime scenes. In addition it addresses how these materials can be used by the police and other agencies as legally admissible evidence. It also aims to provide students with the technical and transferable skills and knowledge that are relevant to the application of environmental forensics in industry, research and the legal system.

**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 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 spreadsheets and graphical applications programs, using the internet), communicate effectively using a variety of means with a wide range of individuals, project planning (including in the 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 classes and independent project work. They will also have a sound knowledge of project safety procedures in the laboratory and field.

**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 students must make a selection (the optional part). Students must choose the optional modules, avoiding clashes on their timetable, and with guidance from the Programme Adviser to make 120 credits in each Part of the degree.

**Part 1 (three terms)**

*Compulsory modules*

<i>Mod Code</i>	<i>Module Title</i>	<i>Credits</i>	<i>Level</i>
ES1B1	Introduction to Environmental Science	10	4
ES1B2	Environmental Science Field Class	10	4
AR1TS3	Practising Archaeology: methods and approaches	20	4
LW1CCP	Criminology, Crime Prevention and Community Safety	10	4

**Optional modules (60 credits)**

Students with only GCSE Maths or equivalent should take:

ES1C1	Maths and Statistics	10	4
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Students should select 60 credits of optional modules from the list below or others, subject to approval from the Course Advisor and Board of Studies. Choice is subject to timetable constraints and students having the appropriate pre-requisites.

BI1BA12	The Living Cell	20	4
BI1EB2	Humans and the Changing World	10	4
BI1EF2	Ecology: Species and their Interactions	10	4
BI1EF23	Ecology: Species and their Interactions	20	4
BI1EG2	Plant Diversity, Structure and Utilisation	10	4
CH1IN1	Fundamentals of Atomic Structure and the Periodic Table	20	4
CH1OR1	Shape, Structure and Reactivity in Organic Chemistry	20	4
CH1PH1	Physical Processes and Molecular Organisation	20	4
ES1D2	Earth Materials	10	4
SS1A1	Introduction to Soil Science	10	4
IWLP	IWLP Languages	20	4

## Part 2 (three terms)

### Compulsory modules

AR2S1	Archaeological Sciences	20	5
GO2P5	Crime Scene Analysis	10	5
ES2K4	Skills for Environmental Scientists	20	5

### Optional Modules

#### A' level Chemistry

CH2FA	Forensic Analysis	10	5
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#### Others

AS2H	Forensic Statistics and Genetics	20	5
BI2EX5	Introduction to Entomology	10	5
BI2ETP3	Flora of the British Isles	10	5
BI2ED4	Evolution and Classification of Plant Biodiversity	10	5
ES2E4	Environmental Mineralogy	10	5
ES2F5	Soil Ecology & Function	10	5
GG2P3	Human Activity and Environmental Change	10	5
SS2A4	Transport Processes in Soil	10	5

## Part 3 (three terms)

### Compulsory modules

ES3H7	Environmental Forensics: Methods and Applications	20	6
ES3PR	Independent Project	40	6

### Optional Modules (60 credits)

AR3S1	Environmental Archaeology and the Cultural Landscapes of Prehistory	20	6
AR3S4	Micromorphology	20	6
AR3S12	Science and the Dead: Taphonomy and Molecular Analysis of Human Remains	20	6
ES3C7	Earth Systems Science	20	6
ES3E7	Fundamental & Applied Soil Ecology	10	6

## 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, CH1FA1, CH1FA2 and AR1TS3 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 AR2S1, GO2P5 and ES2K4 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 UCAS Tariff of 300 points. One subject from Maths, Physics, Chemistry, Biology, Geography, Geology or Environmental Science preferred;*Or*

International Baccalaureat: 25 points including Mathematics and Science;

*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 Centre. The Student Services Centre 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, 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 Diary (given to students at enrolment) or on the Student website.

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 scientists with a sound training in Environmental Forensics continues to grow and opportunities for graduates from this course include employment by commercial companies such as LGC Forensics and Manlove Forensics; government bodies such as the Forensic Science Service as well as police forces or post-graduate study.

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

Students may take language modules as options during this degree. Students may 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 and interactions between them.
2. The range of natural materials, physical, biological and chemical, their origins and characteristics.
3. Sampling strategies for natural materials e.g. minerals, soil, pollen, insects.
4. Analysis, including statistical analysis of environmental materials.
5. Relative importance and reliability of environmental forensic data.
6. The judicial system, the importance of the chain of evidence.
7. Ethics in scientific investigations.
8. A selected range of optional topics.
9. Safety issues and procedures in the laboratory and in the field.

#### Teaching/learning methods and strategies

Underlying knowledge in the essential areas is set out in lectures, in most cases directly supported by illustrative laboratory-based practicals. Field experience required for proper understanding is provided by the compulsory field courses in Part 1 and also practical case studies 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 environmental forensics- a rapidly developing area
5. integrate and apply concepts and principles from one area of 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 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 forensics are highlighted by contact with visiting experts in Part 2 and 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 in Part 3.

#### 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 wider importance of environmental forensic analyses in police investigations

#### 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 the field course and any field based project work.

#### Assessment

1 & 2 are tested both formatively in coursework and particularly during the final year projects and summatively in examinations. 2 is assessed by

means of coursework and project work, 4 & 5 during Part 3 core taught modules 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 the field course. 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.**