

MEnvSci Environmental Science
For students entering Part 1 in 2011/2

UCAS code: F754

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| Awarding Institution: | University of Reading |
| Teaching Institution: | University of Reading |
| Relevant QAA subject Benchmarking group(s): | Earth Sciences, Environmental Sciences and Environmental Studies |
| Faculty: | Science Faculty |
| Programme length: | 4 years |
| Date of specification: | 12/May/2014 |
| Programme Director: | Dr Hazel McGoff |
| Programme Advisor: | Dr Hazel McGoff |
| Board of Studies: | Geography and Environmental Science |
| Accreditation: | Not applicable |

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.

Part 1 is designed to provide a sound foundation in Environmental Science, and supporting knowledge of relevant Chemistry, Physics and Mathematics. A wide range of subject options contribute, and shape the particular pathway chosen.

Part 2 has a core of compulsory modules to develop further technical skills with particular emphasis on understanding key environmental processes and their interactions. Options are designed to give depth to knowledge and methodology in selected subject areas. Placement learning and career management are also a key component of Part 2.

Part 3 is integrative whilst providing scope for specialisation through the selection of options.

Part 4 aims to provide the students with the intellectual skills required by professionals in environmental consultancy, contaminated land management and land remediation. The research project 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. Graduates from the course will have an in-depth knowledge of the chemical, physical and biological principles of Soil Science, experience of the major types of soil contamination, familiarity with regulatory and commercial aspects of contaminated land and land management and problem solving skills in relation to soil management and remediation.

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, field work 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 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 project work. 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, 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>Code</i> | <i>Module title</i> | <i>Credits</i> | <i>Level</i> |
|-------------|--|----------------|--------------|
| ES1A3 | Chemistry of the Earth and Environment | 10 | 4 |
| ES1A4 | Introduction to Physics of the Environment | 10 | 4 |
| ES1B1 | Introduction to Environmental Science | 10 | 4 |
| ES1B2 | Environmental Science Fieldclass | 10 | 4 |
| ES1D1 | Earth Structure and Processes | 10 | 4 |
| SS1A1 | Introduction to Soil Science | 10 | 4 |

Optional modules (60 credits)

Students select a minimum of three contributory subjects to Environmental Science, including: Earth Sciences, Meteorology, Geography, Chemistry, Biology, Rural Environmental Science. They may also chose a language as part of the Institute-wide Language Programme. Choice is subject to timetable constraints and students having appropriate pre-requisites.

Recommended:

| | | | |
|-------|------------------------|----|---|
| ES1D2 | Earth Materials | 10 | 4 |
| ES1F2 | Biogeography and Soils | 10 | 4 |

Others Including:

Biology

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|--------|--|----|---|
| BI1BA1 | The Living Cell | 10 | 4 |
| BI1ED2 | Mammals: Diversity, Behaviour and Conservation | 10 | 4 |
| BI1EF2 | Ecology: Species and their Interactions | 10 | 4 |
| BI1EF3 | Practical Field Ecology | 10 | 4 |

Archaeology

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|--------|---|----|---|
| AR1TS2 | Bones, Bodies and Burials: the Archaeology of Death | 20 | 4 |
| AR1TS3 | Practising Archaeology: methods & approaches | 20 | 4 |

Rural Science and Agriculture

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|--------|--|----|---|
| AP1A10 | Countryside & Environment | 10 | 4 |
| AP1A02 | Introduction to Agriculture & Food Systems | 10 | 4 |
| AP1EE3 | Economics 1 | 10 | 4 |
| AP1EF1 | The UK Food Chain | 10 | 4 |

Chemistry

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|--------|-----------------------------------|----|---|
| CH1FC1 | Fundamental Chemistry 1 | 10 | 4 |
| CH1IN2 | Descriptive Inorganic Chemistry | 10 | 4 |
| CH1PH2 | Physical Processes for Biologists | 10 | 4 |

Geography

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| GG1C | Climatology | 10 | 4 |
| GG1D | Hydrology | 10 | 4 |
| GG1GS | Geomorphology | 10 | 4 |

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|--------------------|----------------------------------|----|---|
| <i>Meteorology</i> | | | |
| MT11C | Introduction to Meteorology | 20 | 4 |
| MT11D | Weather and Climate Fundamentals | 20 | 4 |

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|------------------|-------------------------------------|----|---|
| <i>Languages</i> | | | |
| LA1XX1 | Institution Wide Language Programme | 20 | 4 |

Part 2 (three terms)

Compulsory modules

| <i>Code</i> | <i>Module title</i> | <i>Credits</i> | <i>Level</i> |
|-------------|--|----------------|--------------|
| ES2B4 | Predicting Natural and Contaminated Environments | 10 | 5 |
| ES2F4 | Soil Ecology and Functions | 10 | 5 |
| ES2G4 | Skills for Environmental Scientists | 20 | 5 |
| ES2H4 | Transport Processes in the Environment | 10 | 5 |

And one field class from:

| | | | |
|--------|---|----|---|
| ES2Z6 | Environmental Science Field Class | 10 | 5 |
| AP2A58 | Environmental Science and Management field Course | 10 | 5 |

Optional modules (60 credits)

Students develop depth in a minimum of two contributory subjects to Environmental Science, including: Earth Science, Meteorology, Geography, Chemistry, Biosciences, Rural Environmental Science, Archaeology. They may also choose a language as part of the Institute-wide Language Programme

Recommended:

Environmental Sciences

| | | | |
|-------|----------------------------------|----|---|
| ES2C5 | Crime Scene Analysis | 10 | 5 |
| ES2D5 | Sustainable Resource Management | 10 | 5 |
| ES2M5 | Quaternary Global Climate Change | 10 | 5 |
| ES2N5 | Laboratory Methods | 10 | 5 |

Others Including (subject to timetable constraints and students having appropriate pre-requisites):

Archaeology

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|-------|------------------------|----|---|
| AR2S1 | Archaeological Science | 20 | 5 |
|-------|------------------------|----|---|

Rural Science and Agriculture

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|--------|---|----|---|
| AP2A26 | Forestry and Woodlands | 10 | 5 |
| AP2A39 | Environment and the Farm Business (prerequisite AP1A02) | 10 | 5 |
| AP2A56 | Grassland Management and Ecology | 10 | 5 |
| AP2A57 | Methods in Ecology & Environmental Management | 10 | 5 |
| AP2A59 | Nature Conservation | 10 | 5 |

Bioscience

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|--------|---|----|---|
| BI2BN4 | Vertebrate Zoology - Structure, Form and Function | 10 | 5 |
| BI2EE4 | Evolutionary Biology | 10 | 5 |
| BI2EI4 | Invertebrate Zoology | 10 | 5 |
| BI2EN5 | Animal Behaviour | 10 | 5 |
| BI2EX5 | Introduction to Entomology | 10 | 5 |
| BI2EY5 | Birds: Diversity, Behaviour and Conservation | 10 | 5 |

Meteorology

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|-------|-----------------------------|----|---|
| MT24A | Atmosphere & Ocean Dynamics | 20 | 5 |
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|---------------------------|---|----|---|
| MT2BB | Atmospheric Physics | 20 | 5 |
| <i>Physical Geography</i> | | | |
| GG2ER | Energy Resources | 10 | 5 |
| GG2P1 | Geomorphological Hazards | 10 | 5 |
| GG2P3 | Human Activity and Environmental Change | 10 | 5 |
| GG2P5 | Hydrological Processes | 10 | 5 |
| GG2BC | Biogeography and Conservation | 10 | 5 |
| <i>Others</i> | | | |
| LA1XX1 | Institute Wide Language Programme | 20 | 5 |
| MM270 | Entrepreneurship | 20 | 5 |

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

Part 3 (three terms)

Compulsory modules

| <i>Code</i> | <i>Module title</i> | <i>Credits</i> | <i>Level</i> |
|-------------|--|----------------|--------------|
| GV3G8 | Contaminated Land Management | 10 | 6 |
| GV3I7 | Carbon and Global Change | 10 | 6 |
| AP3A87 | Environmental Management | 10 | 6 |
| GV3LP | Environmental Science Literature Project | 10 | 6 |
| GV3Z8 | Earth Systems Field Class | 10 | 6 |

Optional modules (70 credits of which at least 30 must be at level 6)

Archaeology

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|--------|---|----|---|
| AP3S15 | People, Plants and Environmental Change | 20 | 6 |
| AR3S16 | Climate Change and Human Society | 20 | 6 |

Rural Science and Agriculture

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|--------|---|----|---|
| AP3EP3 | Rural Policy and Countryside Planning | 10 | 6 |
| AP3A68 | Wildlife in the Farming Environment | 10 | 6 |
| AP3A89 | Water, Agriculture and Irrigation | 10 | 6 |
| AP3A90 | Climate Change & Food Systems | 10 | 6 |
| AP3A99 | Plants, Greenspace and Urban Sustainability | 10 | 6 |

Biological Sciences

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|--------|--|----|---|
| BI3EA7 | Insect Ecology and its Applications | 10 | 6 |
| BI3EB7 | Forensic Zoology | 10 | 6 |
| BI3EE7 | Urban Ecology | 10 | 6 |
| BI3EJ8 | Conservation Biology | 10 | 6 |
| BI3EM8 | Plants, Animals & Climate Change | 10 | 6 |
| BI3EN7 | Conservation and Biodiversity: Global and Local Scales | 10 | 6 |

Physical Geography

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|-------|---|----|---|
| GV3CC | Climate Change | 20 | 6 |
| GV342 | Environmental Modelling | 20 | 6 |
| GV361 | Aquatic Environments: Problems and Management | 20 | 6 |
| GV332 | Water Resources | 20 | 6 |

Others

| | | | |
|--------|-----------------------------------|----|---|
| LA1XX1 | Institute Wide Language Programme | 20 | 6 |
|--------|-----------------------------------|----|---|

Part 4 (three terms)

Compulsory modules

| <i>Code</i> | <i>Module title</i> | <i>Credits</i> | <i>Level</i> |
|-------------|------------------------------------|----------------|--------------|
| GVMIMP | Independent Project | 40 | 7 |
| GVMQAD | Quantitative Data Analysis | 10 | 7 |
| GVMSWQ | Soils and Water Quality | 10 | 7 |
| GVMWEM | Waste and Environmental Management | 10 | 7 |
| GVMREM | Remediation | 10 | 7 |

Optional modules (40 credits, all of which must be at Level 7 and subject to timetabling constraints and students having appropriate prerequisites)

Environmental science

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|---------|-------------------------------------|----|---|
| GVMCON | Soil Contaminants | 10 | 7 |
| GVMESB | Entrepreneurial and Business Skills | 10 | 7 |
| GVMFC | Integrated Soil Science Field Class | 10 | 7 |
| GVMPSIA | Practical Site Investigation | 20 | 7 |

Construction, Engineering and Management

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|--------|------------------------------------|----|---|
| CEMRUS | Sustainable Urban Systems | 10 | 7 |
| CEMREC | Energy, Carbon and the Environment | 10 | 7 |
| CEMRC1 | Carbon Management | 10 | 7 |

Agriculture, Policy and Development

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|--------|--|----|---|
| APMA62 | Nematodes as Pests and Beneficials | 10 | 7 |
| APMA68 | The Ecological Economics of Climate Change | 10 | 7 |
| APMA90 | Climate Change and Food Systems | 10 | 7 |

Law

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|--------|-------------------|----|---|
| LWMTEE | Environmental Law | 10 | 7 |
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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 be expected to obtain at least 40% in the compulsory modules ES1A3, ES1A4, ES1B1, ES1D1 and SS1A1 averaged together.

To gain a threshold performance at Part 2 a student shall 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, and achieve an overall weighted average of at least 50% at Part 2.

To gain a threshold performance at Part 3, a student shall normally be required to achieve an overall weighted average of 40% overall over 120 credits taken in Part 3, and a mark of at least 30% in individual modules amounting to not less than 100 credits.

To be eligible for Honours, students must normally pass all compulsory modules in both Parts 3 and 4.

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/eva-class.aspx

The weighting of the Parts/Years in the calculation of the degree classification is

Integrated Masters programmes (MEng, MMath, MChem, MEnvSci etc)

Part 2 20%
Part 3 40%
Part 4 40%

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 Parts 3 and 4 there are some modules which are assessed wholly by coursework and others wholly by examination: the details are given in the module descriptions. The research project undertaken in Part 4 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 320 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: Professor M E Hodson

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-sessional 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

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 MEnvSci Environmental Science with Professional Experience (F755). Such transfers are only permitted if the student displays the appropriate ability to benefit from such a secondment and has taken appropriate options in Part 2. Professional Experience may be with an overseas company or organisation provided that the student has the requisite degree of fluency in the foreign language required, and, if suitable industrial experience can be found. Students may also participate in the ERASMUS exchange scheme where one or two terms are spent studying in a European university. Exchanges are also available in the USA and Australia. Further details are available from the Course Director and the Study Abroad Office.

Non-credit bearing placements are also available. Students can undertake these at any time during their degree although placements should not interfere with normal timetabled classes. Placements may be with companies, voluntary and not-for-profit organisations, schools, museums or universities. The onus for finding placements is on the student but help is available from the Careers, Placement and Experience Centre, the SHES Placement Co-ordinator and the Programme Director. Student should register their placement activity with the Placement Co-ordinator who will ensure that appropriate Health and Safety precautions are in place, that the student will receive supervision during their activity and that placements are recorded on the final degree transcript. Additional voluntary activities are also possible through the RED scheme, CSV and Student Volunteering.

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 Parts 3 and 4. Students conduct an independent project in the form of practical investigation into an environmental topic in Part 4, 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 Parts 3 and 4.

Skills and other attributes

B. Intellectual skills - able to:

1. think logically and critically in a scientific

Teaching/learning methods and strategies

Logical and critical thinking is an essential part of

- 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

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

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.

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 Parts 3 and 4.

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 through 4, while 5 contributes to more successful work. 6 not directly assessed.

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 4, 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 & 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 & 5 during field classes and project work.

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. The component of oral and presentation skills increases through the years. Career management is taught in the Part 2 Skills module. Teamworking is particularly emphasised in field courses and the Part 4 Entrepreneurial and Business skills and Practical site investigation modules. Time management is essential for the timely and effective completion of the programme. Library and internet resources are required for the Part 3 library project and the research project in Part 4, and contribute to the best performances throughout.

Assessment

1, 2, 3 & 4 are assessed through coursework and particularly in the Part 3 project and Part 4 modules. 5 in field courses, 6 in the research 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.