ROYAL HOLLOWAY
University of London

PROGRAMME SPECIFICATION

This document describes the **MSci Honours Degree programmes in Environmental Geoscience**. This specification is valid for new entrants from **September 2006**.

The aims of the MSci Honours Degree programmes in Environmental Geoscience are:

- to provide a sound and extensive basis for the study of the Geological Sciences relating to the natural environment, meeting the requirements for programme accreditation by the Geological Society and the general requirements of the subject benchmarking statement;
- to provide students with knowledge of the science, and equip them with discipline-specific and transferable skills;
- to provide students with core knowledge and a range of key skills;
- to offer a range of specialist courses and research projects which allow students to develop expertise and research interests in their chosen field;
- to produce graduates who are equipped with knowledge and skills appropriate for careers in the Earth Sciences and other disciplines;
- and to equip students to carry out independent advanced studies in the Environmental Earth Sciences.

The programmes are normally delivered in four stages, each of which comprises one year of full-time study during which the student must follow courses to the value of four units (one unit is equivalent to 30 national credits). It is characterised by the provision of a broad base in skills and knowledge in stages one and two followed by opportunities for specialisation in stages three and four. The courses also have strong compulsory spines of fieldwork. Training in data collection, data analysis and presentation of reports is provided in core courses and independent project work is included in the final stage of the degree programme. Stage one courses follow a common core of four units which provide a broadly-based introduction to the subject, providing students with basic knowledge and understanding, discipline-specific skills, and transferable skills**.** Stage two contains six core Earth Sciences courses, plus one compulsory course in Geography; these are integrated courses in substantial areas of the discipline which form a bridge between the introductions provided in stage one and the research-led specialist options in stages three and four. These specialist courses are closely informed by the active research of staff and the needs of industry, particularly in the general areas of: Ancient and Modern Earth Systems (modern atmospheres, surface processes), Tectonics and Basins (sedimentology, mountain evolution, uplift, and erosion, numerical modelling, lithospheric processes), Geochemistry (palaeoceanography, crust-mantle evolution, volcanic arcs) and Resources.

Students may also interrupt their formal studies and work for 9-12 months in an industrial or public-service laboratory on an approved programme of work in the general field of environmental earth science. Reports of the work undertaken will be assessed and contribute to the 5 year 'Year in Industry' degree programme.

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This document provides a summary of the main features of the programme(s), and of the outcomes which a student might reasonably be expected to achieve if full advantage is taken of the learning opportunities provided. Further information is contained in the College prospectus, the College Regulations and in various handbooks issued to students upon arrival. Whilst Royal Holloway keeps all its information for prospective applicants and students under review, programmes and the availability of individual courses are necessarily subject to change at any time, and prospective applicants are therefore advised to seek

confirmation of any factors which might affect their decision to follow a specific programme. In turn, Royal Holloway will inform applicants and students as soon as is practicable of any substantial changes which might affect their studies.

Learning outcomes

Teaching and learning in the programmes are closely informed by the active research of staff. In general terms, the programmes provide opportunities for students to develop and demonstrate the following learning outcomes:

Knowledge and understanding of

- the scientific, interdisciplinary study of the physical, chemical and biological processes operating on and within the Earth;
- the interaction of these processes in the consideration of the Earth as a dynamic system through time, (crust-mantle processes, surface processes, biosphere, atmosphere and hydrosphere);
- the structure and composition of the Earth;
- the study of geological materials (minerals, rocks, fluids);
- the use of geological maps to represent three-dimensional spatial variations and their interpretation in a temporal framework;
- the techniques of investigation in the geological sciences (geophysical, geochemical, remote sensing, geological data collection and analysis);
- the evolution of life and changing environments through the study of palaeobiology, palaeoecology, palaeoenvironmental and sedimentological analysis;
- geodynamic processes at the scale of local and global tectonics;
- stratigraphic principles and techniques (litho-, bio-, chrono- and sequence stratigraphy);
- the application of the Earth Sciences to resource exploitation (hydrocarbons, minerals, water), civil and environmental engineering (construction, waste disposal) and environmental hazards (earthquakes, volcanic eruptions, floods, landslides);
- the social and political role of the Earth Sciences in the exploitation and conservation of geological resources. (Advanced knowledge is gained in selected subject areas from optional courses taken in the fourth year and in-depth understanding of a topic developed in the context of independent research projects in the final year)

Skills and other attributes

The development of **intellectual skills** forms the basis of all the programmes. By achieving the learning outcomes specified for each course students will be able to:

- recognise and apply different theories, concepts and principles;
- develop a strategy for tackling a geological problem;
- collect and document different types of geological data using appropriate techniques and methodologies;
- apply appropriate numerical, statistical and instrumental techniques to the analysis of geological data;
- recognise applicable theories or formulate new hypotheses for the interpretation of geological information;
- carry out independent, innovative research into a topic and present the results to a professional standard;

Practical skills may be divided into those developed in the *laboratory* and those which are *field*-based. Laboratories used by students on these programmes include classrooms where specimens and maps can be handled and geochemical analytical laboratories. *Laboratory* skills focus on:

- the description and interpretation of specimens of rocks, fossils and minerals;
- the analysis and interpretation in time and space of structural and stratigraphic data presented as geological maps and the reduction and interpretation of remotely sensed, geophysical and geochemical data;
- the use of appropriate techniques of data analysis for an independent research project;
- safe and effective practice in an analytical laboratory;

Field training is a core element of all degree programmes. The following aspects of skills development in the field are covered in stage one and two courses, and further developed in more advanced field classes:

- the recording of a wide variety of geological and geomorphological data (including structural, sedimentary and palaeontological) in a spatial and stratigraphic context;
- the collection of rocks, minerals, fossils and fluids in a safe, efficient and environmentally sensitive manner;
- the acquisition of geochemical and geophysical data;

- the planning and execution of field work in a safe and considerate way, having due regard for all regulations covering health, safety and access rights; carrying out a hazard assessment.

There is a range of **transferable skills** that are integral to training in the geological sciences. Considerable emphasis is placed on the development of these skills to ensure that graduates of these programmes are equipped to use appropriate technology, communicate effectively and work effectively in a geological or non-geological environment. These skills may be grouped along the following lines:

- the attainment of a reasonable standard of numeracy;*
- the use of appropriate computer technology;*
- use of libraries and the retrieval of information from diverse sources;*
- the ability to assemble information, analyse and synthesise results and present them in a variety of reporting formats including short, concise written reports, longer dissertations, presentation as posters and verbally in seminars;*
- the ability to work independently on a research project;*
- working in a team, setting goals by discussion, and sharing information and ideas to develop a collective outcome to a problem.*

Personal and social skills are fostered in a general way as part of the degree programme. These include: personal motivation; the ability to work autonomously and with others; self-management; the ability to work towards and meet deadlines; intellectual integrity; awareness of responsibility; interest in lifelong learning; flexibility and adaptability; creativity.*

* transferable skills

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Teaching, learning and assessment

A progression of knowledge and understanding is achieved by starting with a basic grounding, which is subsequently reinforced and developed through application to specialist topics. Practical classes comprise 60% of the timetabled study time, reflecting the emphasis on learning through studying maps, rocks, minerals, fossils and classwork exercises. Lectures are used to introduce material and provide a context for private study. Tutorials supplement and reinforce knowledge and understanding. A comprehensive field programme provides opportunities for students to apply concepts developed in the classroom and lecture theatre and is considered to be a fundamental aspect of the teaching programme. Field and laboratory project work carried out as individuals or in teams represents an opportunity for students to develop in-depth knowledge of specialist areas.

Transferable, laboratory and field skills are identified within the learning outcomes of course units and summarized in a skills progression chart in the undergraduate handbook. A progression of skills development is provided through the introduction of most basic skills in stages one and two, a core course of Advanced Concepts and Techniques in Geology in stage three, and the opportunity to apply skills to specialised areas in stages three and four. Assessment of skills, knowledge and understanding is by means of formal examinations, coursework practical exercises, literature research reports, fieldwork exercises and reports, oral presentations and independent dissertations. Full details of the assessments for individual courses can be obtained from the Department.

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Details of the programme structure

Please note that not all courses run each year. A full list of courses including optional courses for the current academic year can be obtained from the Department.

MSci Degree programmes in Environmental Geoscience

Stage one:

Students must take:

GL1100 Global Tectonics (½ unit)
GL1200 Introductory Sedimentology, (½ unit)
GL1300 Environmental Issues (½ unit)
GL1460 Igneous and Metamorphic Geology (½ unit)
GL1500 Physics and Chemistry of the Earth (½ unit)
GL1600 Earth Structures (½ unit)
GL1700 Mathematics for Geologists (½ unit)
GL1800 Introductory Palaeontology (½ unit)

Stage two:
Students must take:
GL2200 Stratigraphy and the History of Life (½ unit)
GL2210 Regional Geology (½ unit)
GL2320 Geohazards (½ unit)
GL2410 Geochemistry (½ unit)
GL2901 Field Methods in Geology (1 unit)

And 1 unit of courses from:
GL2400 Igneous and Metamorphic Geology (½ unit)
GL2500 Applied Geophysics (½ unit)
GL2600 Structural Analysis and Remote Sensing (½ unit)
Or appropriate courses from Geography

Students may also choose to take:
GL3141 Applied Geology (Industrial Placement) (1 unit) in addition to final year courses. This is a 9-12 month work experience placement, between stages two and three or between stages three and four.

Stage three:
Compulsory courses students must take and pass in order to progress:
GL3940 Methods of Environmental Investigation (½ unit)
Students must also take:
GL3001 Advanced Concepts and Techniques in Geology (1 unit)
GL3350 Environmental Geoscience Report (½ unit)

and choose options equal to the value of 2 full units from:
GL3210 Advanced Topics in Sedimentology (½ unit)
GL3300 Aqueous Geology (½ unit)
GL3340 GIS and Remote Sensing (½ unit)
GL3460 Volcanology (½ unit)
GL3750 Mineral Resources (½ unit)
(In lieu of some of the options, students may take courses from Stage three of the MSci Geoscience.)

Stage four:
Students must take:
GL4321 Independent Environmental Geoscience Project (1 unit)

and choose options equal to the value of 3 units from:
GL4300 Water quality (½ unit)
GL4340 Oceans and Atmospheres (½ unit)
GL4370 Contaminated Land (½ unit)
GL4380 Environmental Inorganic Analysis (½ unit)
GL4310 Air pollution (½ unit)
GL4910 Environmental Field Investigations (½ unit)

(In lieu of some of the options, students may take courses from Stage four of the MSci Geoscience.)

Part-time students must take courses to the value of two units each year. For the Msci Geoscience with a Year in Industry, part-time students must complete the year in industry in full-time mode.

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Progression and award requirements
The progression and award requirements are essentially the same across all Honours Degree programmes at Royal Holloway. Students must pass units to the value of at least three units on each stage of the programme. Part-time students must pass courses to the value of one unit to progress to the second year of the stage. Students are considered for the award and classified on the basis of a weighted average. This is calculated from marks gained in courses taken in stages two, three and four, and gives twice the weighting to marks gained in stage three and four. In order to progress to stage four, students must have

passed 10 courses units and achieved an average across stages two and three of at least 50%. GL3940 (Environmental field investigations) is a compulsory course (must be passed for progression), but for all programmes there are also core courses in all years for which students must register and complete (see details of programme structure above). In order to qualify for the award, students must gain a weighted average of at least 35%.

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Student support and guidance

- Personal Advisers: All students are allocated a personal adviser who meets with them regularly through the programme. The personal adviser's role is to advise on academic, pastoral and welfare issues. Students may choose to be allocated a different personal adviser at any stage during the programme.
- Degree Programme coordinators and the Academic Coordinator provide a back-up system of academic, pastoral and welfare advice.
- All members of staff are available and accessible during office hours.
- Detailed student handbook and course resources, provided via the Web where appropriate.
- Representation on the Student-Staff Committee.
- Extensive supporting materials and learning resources in College and University libraries and Computer Centre.
- Dedicated departmental teaching-laboratories and computing facilities.
- College Careers Service and departmental Careers Service liaison officer.
- Access to all College and University support services, including Student Counselling Service, Health Centre, Students' Union and the Education Support Office for students with special needs.

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Admission requirements

The Department's standard conditional offer is available on the Course Catalogue web page. However, the Department also has considerable flexibility in its admissions and offers policy and strongly encourages applications from non-standard applicants. Students whose first language is not English may also be asked for a qualification in English Language at an appropriate level. It may also be helpful to contact the Admissions Office for specific guidance on the entrance requirements for particular programmes.

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Further learning and career opportunities

Graduates from Earth Sciences degree programmes have successfully progressed into a wide range of professions, while some have continued onto Postgraduate studies. In addition to the services offered by the College Careers Service, the Department has strong alumni links. Links with employers are fostered through the Department's External Advisory Board. The following Masters programmes are available within the Department: MSc Petroleum Geoscience (Basin Evolution and Dynamics), MSc Petroleum Geoscience (Tectonics), MSc Environmental Diagnosis and Management, MSc Geology by Research, and there is also the relevant MSc in Quaternary Science in the Department of Geography. The degree programmes are accredited by the Geological Society of London as a pathway to professional status for graduates. For further details please refer to the Careers Service.

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Indicators of quality and standards

Royal Holloway's position as one of the UK's leading research-intensive institutions was confirmed by the results of the most recent Research Assessment Exercise (RAE 2008) conducted by the Higher Education Funding Council (HEFCE). The new scoring system for the RAE 2008 measures research quality in four categories, with the top score of 4* indicating quality that is world-leading and of the highest standards in terms of originality, significance and rigour. 60% of the College's research profile is rated as world-leading or internationally excellent outperforming the national average of 50%. The College is ranked 16th in the UK for research of 4* standard and 18th for 3* and 4* research. The Department of Earth Sciences was ranked joint 7th in the top 10 universities in the country in terms of proportion of 3* and 4* research, with 70% of its research profile being of 3* and 4* standard.

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List of programmes

All the programmes are taught entirely by staff at Royal Holloway, University of London, and lead to awards of the University of London. Programmes in Geoscience (with the exception of Petroleum Geology) are subject to accreditation by the Geological Society of London and the aims and outcomes reflect this. The QAA subject benchmark statements in Earth Sciences, Environmental Sciences and Environmental Studies describe the general features which one might expect from Honours Degree programmes in the subject, and can therefore be used as a point of reference when reading this document (see www.qaa.ac.uk). UCAS codes are given in parentheses (see www.ucas.ac.uk).

MSci Degree programme in Environmental Geoscience

MSci Environmental Geoscience (F631)
MSci Environmental Geoscience with a Year in Industry (F644)

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