

PROGRAMME SPECIFICATION

This document describes the **MSci Honours Degree programmes in Environmental Geoscience (including the Year in Industry and the Year of International Study options)**. This specification is valid for new entrants from **September 2016**.

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.

Programmes are delivered in four stages, each of which normally comprises one year of full-time study, during which the student must follow courses to the value of 120 credits. Although full-time attendance is the normal mode of study, in certain circumstances it may be possible to study part-time and take each stage of the programme over two years (60 credits per year). In this case there are no specific requirements in terms of the order in which the respective courses are taken. Please note, however, that the Year in Industry and Year Abroad programmes cannot be taken on a part time basis.

Courses are 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 compulsory Earth Sciences courses, plus one 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.

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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 the list of available courses offered is subject to change and not all courses run each year. A full list of courses for the current academic year can be obtained from the [Department](#).

MSci Degree programmes in Environmental Geoscience

Stage one:

Students must take the following **mandatory** courses:

GL1100 Global Tectonics (15 credits)

GL1200 Introductory Sedimentology, (15 credits)

GL1300 Environmental Issues (15 credits)

GL1460 Igneous and Metamorphic Geology (15 credits)

GL1500 Physics and Chemistry of the Earth (15 credits)

GL1600 Earth Structures (15 credits)

GL1800 Introductory Palaeontology (15 credits)

GL1900 Scientific and Geological Field Skills (15 credits) non condonable

Stage two:

Students must take the following **mandatory** courses:

GL2200 Stratigraphy and the History of Life (15 credits)

GL2210 Regional Geology (15 credits)

GL2320 Geohazards (15 credits)

GL2410 Geochemistry (15 credits)

Students take either+

GL2901 Advanced Scientific and Geological Field Skills (30 credits)

OR

GL2930 Geological field skills for Environmental students (15 credits)

+ Please note that the department recommend students take GL2930. Students wishing to take GL2901 should discuss this with the Director of UG Teaching.

And courses to the value of either 45 or 30 credits from:

GL2230 Sedimentary Basin Analysis (15 credits)

GL2400 Igneous and Metamorphic Geology (15 credits)

GL2500 Applied Geophysics (15 credits)

GL2600 Structural Analysis and Remote Sensing (15 credits)

GL2520 Computational Earth Sciences (15 credits)

Or appropriate courses from Geography (with permission from the Director of Undergraduate Teaching).

Stage three:

Students must take the following **mandatory** courses:

GL3001 Advanced Concepts and Techniques in Geology (30 credits)

GL3340 GIS and Remote Sensing (15 credits)

GL3350 Environmental Geoscience Report (15 credits)

GL3940 Methods of Environmental Investigation (15 credits) non condonable

and choose options equal to the value of 45 credits from:

GL3200 Marine Geology (15 credits)

GL3210 Advanced Topics in Sedimentology (15 credits)

GL3300 Aqueous Geology (15 credits)

GL3460 Volcanology (15 credits)

GL3600 Advanced Techniques in Tectonic and Structural Interpretation (15 credits)

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GL3750 Mineral Resources (15 credits)

GL3800 Advanced Palaeontology (15 credits)

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

Between stages three and four students may also choose to take:

GL3141 Applied Geology (Industrial Placement) (30 credits). This is a 9-12 month work experience placement which leads to the MSci with a Year in Industry degree. Students will be assessed on 150 credits during the final stage of the programme.

Students following **the MSci Geoscience with a Year of International Study** must instead take a selection of courses equivalent to a full academic year of study at an agreed, partner institution overseas; choice of courses is carried out under the guidance of the Programme Coordinator.

Stage four:

Students must take:

GL4322 Independent Environmental Geoscience Project (60 credits) non condonable

and choose options equal to the value of 60 credits from:

GL4100 Research Proposal and Critical Review (15 credits)

GL4250 Earth Surface Processes (15 credits)

GL4300 Water quality (15 credits)

GL4310 Air pollution (15 credits)

GL4230 Modern Climate Change (15 credits)

GL4340 Oceans and Atmospheres (15 credits)

GL4370 Contaminated Land (15 credits)

GL4380 Environmental Inorganic Analysis (15 credits)

GL4400 Advanced Igneous Petrogenesis (15 credits)

GL4500 Seismic Processing and Interpretation (15 credits)

GL4510 Geodynamics and Plate Tectonics (15 credits)

GL4620 Interpretation of Structural Settings (15 credits)

GL4810 Terrestrial Palaeoecology (15 credits)

GL4820 Palaeoclimates (15 credits)

GL4910 Environmental Field Investigations (15 credits)

(In lieu of some of the options listed above, students may, with the agreement of the UG Director of Teaching, take courses from Stage four of the MSci Geoscience.)

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Progression and award requirements

The [College's Undergraduate Regulations](#) include full details on progression and award requirements for all undergraduate programmes offered by the College.

Additionally, GL1900 must be passed in order to progress from the first to second stage. GL3940 Methods of Environmental Investigation must be passed at the first attempt for progression to the final stage of the MSci. GL4322 Individual Environmental Geoscience Project is non condonable for the award of the MSci.

Students on the Year in Industry programme must pass GL3141 Applied Geology (Industrial Placement) in order to qualify for the degree title of MSci Environmental Geoscience with a Year in Industry.

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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 and Employability Service and Departmental Careers and Employability Tutor.
- Access to all College and University support services, including Student Counselling Service, Health Centre, Students' Union and the Disability and Dyslexia services for students with disabilities and Specific Learning Difficulties.

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Admission requirements

Details of the Department's typical offer for each programme of study is available on the [Course Finder](#) 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. For further guidance it may be helpful to contact the [Recruitment and Partnership Office](#).

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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, 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 Excellence Framework (REF 2014) conducted by the Higher Education Funding Council (HEFCE). The scoring system for the REF 2014 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 and 3* indicating research that is internationally excellent. 81% of the College's research profile was deemed to be within the 4* or 3* categories, an increase of over 20% since 2008. This results for the quality of our research outputs placed Royal Holloway 15th in the UK based on an overall Grade Point Average (GPA) score and 20th in the UK for 4* and 3* research. The Department of Earth Sciences is ranked 14 in the UK for research of 4* standard and 2 for 3* and 4* research and is ranked within the top 5 departments for their subject in the UK.

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List of programmes with details of awards, degree titles, accreditation and teaching arrangements

All the programmes are taught entirely by staff at Royal Holloway, University of London, and lead to awards of the University of London. Single honours programmes in Earth Sciences 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)

MSci Environmental Geoscience with a Year of International study (FP42)

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