

## PROGRAMME SPECIFICATION

This document describes **MSci Honours Degree programmes in Geoscience or Petroleum Geoscience**, with an option to undertake either a Year in Industry or a Year of International Study in an overseas university. This specification is valid for new entrants from **September 2006**.

The aims of the MSci Honours Degree programmes in Geoscience or Petroleum 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;
- to equip students to carry out independent advanced studies in the Earth Sciences;
- to provide an avenue for talented and motivated students to gain greater academic and cultural breadth in their degree by incorporating a year of study at an international university selected to complement their chosen area of study in Earth Sciences (for students following MSci Geoscience with a Year of International Study).

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 eight core Earth Sciences courses; 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, palaeobiology, ancient Earth systems), Tectonics and Basins (sedimentology, mountain evolution, uplift, and erosion, numerical modelling, seismic interpretation, lithospheric and asthenospheric processes) and Geochemistry (palaeoceanography, crust-mantle evolution, plumes and ridges, volcanic arcs).

Students on the International Study programme spend stage three of their programme studying at a partner institution selected in consultation with the Programme Coordinator and College advisors. Students are encouraged to pursue courses that provide a different perspective on geological science, broaden their experience of practical geology, or provide instruction in subjects not taught as specialised courses at RHUL.

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 applied geology. Reports of the work undertaken will be assessed and contribute to the final award. In these cases the programme will last for 5 years.

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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.

*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 and geophysical 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:

- the recording of a wide variety of geological and geophysical 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 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. These include:

- 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 summarised 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 Geoscience or Petroleum 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)  
GL1750 Introduction to Petroleum Geology (½ unit)  
GL1800 Introductory Palaeontology (½ unit)

Students take 8 of these 9 options. Geoscience students can choose between GL1300 and GL1750. Petroleum students must take GL1750 and cannot do GL1300.

### **Stage two:**

Students must take:

GL2200 Stratigraphy and the History of Life (½ unit)  
GL2210 Regional Geology (½ unit)  
GL2400 Igneous and Metamorphic Geology (½ unit)  
GL2410 Geochemistry (½ unit)  
GL2500 Applied Geophysics (½ unit)  
GL2600 Structural Analysis and Remote Sensing (½ unit)  
GL2901 Field Methods in Geology (1 unit)

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, normally between stages three and four and leads to the MSci with a Year in Industry degree.

### **Stage three:**

Students following MSci Geoscience must take:

GL3001 Advanced Concepts and Techniques in Geology (1 unit)  
GL3901 Independent Geological Field Mapping (1 unit)

and choose options equal to the value of 2 full units from a list of Stage three courses offered by the Department.

Students following 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 institution overseas; choice of courses is carried out under the guidance of the Programme Coordinator.

Student following MSci Petroleum Geoscience must instead take:

GL3001 Advanced Concepts and Techniques in Geology (1 unit)  
GL3210 Advanced Techniques in Sedimentology (½ unit)  
GL3250 Regional Tectonic Analysis (½ unit)  
GL3600 Techniques in Tectonic and Structural Interpretation (½ unit)  
GL3700 The Geology of Petroleum (½ unit)  
GL3951 Independent Field Mapping (Sedimentary Basins) (1 unit)

Note: GL3901/3951 are compulsory courses (must be passed) for progression to the 4<sup>th</sup> year.

### **Stage four:**

Students following MSci Geoscience must take:

GL4111 Independent Geoscience Project (1 unit)

and choose options equal to the value of either 2 or 3 full units from a list of Stage four courses offered by the Department. In lieu of some of the options, students may take courses from Stage four of the MSci Environmental Geoscience.

Student following MSci Petroleum Geology must instead take:

GL4500 Seismic Processing and Interpretation (½ unit)  
GL4510 Geodynamics and Plate Tectonics (½ unit)  
GL4511 Petroleum Geology Project (1 unit)  
GL4620 Interpretation in Structural Settings (½ unit)  
GL4711 Petroleum Geology and Evaluation (1 unit)  
GL4720 Reservoir Characterisation (½ unit)

Part-time students must take courses to the value of two units each year.

Please note: Students following MSci Geoscience with a Year of International Study are required to complete an independent field mapping project during the senior stages of their study. This requirement is normally split equally between Year 3 (GL3920) and Year 4 (GI4920). Students studying part-time may complete the course with International Study, however, the year abroad component must be taken full time.

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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 at 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%. The independent field mapping (GL3901 or GL3951) (or its equivalent for special circumstances, GL3131) is a compulsory course (which 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. Students following the MSci Geoscience with a Year of International Study are allocated a personal adviser who has direct knowledge of international university education, and can therefore provide a valid perspective and first-hand advice on international study.
- 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 16<sup>th</sup> in the UK for research of 4\* standard and 18<sup>th</sup> for 3\* and 4\* research. The Department of Earth Sciences was ranked joint 7<sup>th</sup> 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 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](http://www.qaa.ac.uk)). UCAS codes are given in parentheses (see [www.ucas.ac.uk](http://www.ucas.ac.uk)).

### **MSci Degree programmes in Geoscience or Petroleum Geology**

MSci Geoscience (F601)

MSci Geoscience with a Year of International Study (F602)

MSci Geoscience with a Year in Industry (F642)

MSci Petroleum Geology (F622)

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