

PROGRAMME SPECIFICATION

This document describes **MSci Honours Degree programmes in 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 2017**.

The aims of the MSci Honours Degree programmes in 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).

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 become study part-time and 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 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). Stage four of the programme provides students with courses that encourage them to apply their previous knowledge, understanding and practical skills to a range of research level questions across a wide range of geological environments. In addition they get to nurture their chosen specialism and improve their research skills through undertaking a independent research project worth 50% of the year.

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 and understanding (gained in year 4) of :

- an area of specialism through the medium of independent research.
- the range of geological problems debated in the literature and the application of multidisciplinary approaches in tackling them.
- the mechanisms and feedbacks observed in a range of geological and environmental systems.
- the role of periodic, cyclic and irreversible processes that have led to the current state of the Earth and its environment.

Skills and other attributes

- develop a strategy for tackling a scientific problem;
- collect, document and analyse different types of data using appropriate techniques and methodologies;
- synthesise data and information, and recognise or formulate hypotheses for the interpretation of this information;
- recognise the importance of applying professional standards in scientific work.
- the description and interpretation of rocks and minerals in hand specimen and through the use of a petrological microscope;
- the analysis and interpretation in time and space of structural and stratigraphic data presented as geological maps;
- reduction and interpretation of geophysical and other remotely sensed data;
- the design and analysis of experiments in a safe and effective manner;
- the recording of relevant geological data in spatial context;
- the collection of rocks, minerals, fossils and environmental media in a safe, efficient and environmentally sensitive manner;
- the attainment of certain standards of numeracy;*
- the ability to use appropriate computer technology and communication using the internet;*
- the use of libraries and the retrieval of information from diverse sources;*
- the ability to assemble information, analyze and synthesize results and present them in a variety of reporting formats including short written reports, longer dissertations and presentation as posters and oral presentations;*
- working in a team, setting goals by discussion, and sharing information and ideas to develop a collective outcome to a problem.*
- The use of multiple mediums to communicate science to a wide range of audiences.*

Advanced skills and other attributes (gained in year 4)

- recognise and apply different theories, concepts and principles;
- 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.
- the use of appropriate techniques of data analysis for an independent research project.*
- safe and effective practice in an analytical laboratory.*
- 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.*
- communication of main aims, outcomes and impact of research to a variety of audiences; peer, research proposal review committee, academic staff.*

* transferable skills

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Teaching, learning and assessment

The learning outcomes are embedded within the mandatory and optional courses available to the students. 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. In stages one and two, different aspects are taught as 30 or 15 credit modules, these modules are linked through tutorial exercises and most importantly through the mandatory field and research skills programme where the application of theory and practical skills learnt in class are used to solve geological and environmental problems. In stage three, specialist topics utilise this broad geological grounding to build more in depth knowledge and understanding of certain geological sub-disciplines. Again integration of all aspects of the stage 3 taught programme occurs through independent projects and the year 3 taught field trip. Practical classes comprise 60% of the timetabled study time, reflecting the emphasis on learning through studying maps, rocks and class work exercises. Lectures are used to introduce material and provide a context for private study. Tutorials supplement and reinforce knowledge and understanding. An appropriate 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. Stage 4 is made up of equal parts taught courses and research project. Students can follow their desired specialism through their independent research project. This is supplemented by taught courses which provide the advanced knowledge, critical thinking and research skills required to complete a large research project to a high standard.

Assessment of skills, knowledge and understanding is by means of formal examinations, coursework practical exercises, literature research reports, fieldwork and laboratory exercises and reports, oral presentations and independent dissertations. Independent research projects in stage three provide opportunities to develop and integrate a wide range of discipline-specific and transferable skills and students are encouraged to regard these as an important forum for demonstrating their abilities. 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](#).

| <u>MSci Degree programmes in Geoscience</u> | <u>MSci Environmental Geoscience</u> |
|---|---|
| Stage 1 | Stage 1 |
| Students must take the following mandatory courses: GL1100 Global Tectonics (15 credits) GL1200 Introductory Sedimentology (15 credits) GL1460 Igneous and Metamorphic Geology (15 credits) GL1500 Physics and Chemistry of the Earth (15 credits) GL1600 Earth Structures (15 credits) GL1900 Scientific and Geological Field Skills (15 credits) non condonable GL1800 Introductory Palaeontology (15 credits) and either GL1300 Environmental Issues with Maths (15 credits) or GL1750 Petroleum Geology with Maths (15 credits) | Students must take the following mandatory courses: GL1100 Global Tectonics (15 credits) GL1200 Introductory Sedimentology (15 credits) GL1300 Environmental Issues with Maths (15 credits) GL1460 Igneous and Metamorphic Geology (15 credits) GL1500 Physics and Chemistry of the Earth (15 credits) GL1600 Earth Structures (15 credits) GL1900 Scientific and Geological Field Skills (15 credits) non condonable GL1800 Introductory Palaeontology (15 credits) |

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|---|---|
| <p>Stage 2</p> <p>Students must take the following mandatory courses: GL2200 Stratigraphy and the History of Life (15 credits) GL2210 Regional Geology (15 credits) GL2400 Igneous and Metamorphic Geology (15 credits) GL2410 Geochemistry (15 credits) GL2901 Advanced Scientific and Geological Field Skills (30 credits) non condonable</p> <p>and choose courses to the value of 45 credits from: GL2230 Sedimentary Basin Analysis (15 credits) GL2320 Geohazards (15 credits) GL2500 Applied Geophysics (15 credits) GL2520 Computational Earth Sciences (15 credits) GL2600 Structural Analysis and Remote Sensing (15 credits)</p> | <p>Stage 2</p> <p>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) GL2930 Geological field skills for Environmental students (15 credits) non condonable</p> <p>and courses to the value of either 45 credits from: GL2230 Sedimentary Basin Analysis (15 credits) GL2400 Igneous and Metamorphic Geology (15 credits) GL2500 Applied Geophysics (15 credits) GL2520 Computational Earth Sciences (15 credits) GL2600 Structural Analysis and Remote Sensing (15 credits)</p> |
| <p>Stage 3</p> <p>Students must take the following mandatory courses: GL3001 Advanced Concepts and Techniques in Geology (30 credits) GL3901 Independent Geological Field Mapping (30 credits)</p> <p>and choose courses to the value of 60 credits from: GL3200 Marine Geology (15 credits) GL3210 Advanced Topics in Sedimentology (15 credits) GL3300 Aqueous Geology (15 credits) GL3460 Volcanology (15 credits) GL3510 Planetary Geology and Geophysics (15 credits) GL3600 Advanced Techniques in Tectonic and Structural Interpretation (15 credits) GL3750 Mineral Resources (15 credits) GL3800 Advanced Palaeontology (15 credits)</p> | <p>Stage 3</p> <p>Students must take the following mandatory courses: GL3001 Advanced Concepts and Techniques in Geology (30 credits) GL3300 Aqueous Geology (15 credits) GL3321 Environmental Geology Project (30 credits) GL3940 Methods of Environmental Investigation (15 credits)</p> <p>and choose options equal to the value of 30 credits from: GL3200 Marine Geology (15 credits) GL3210 Advanced Topics in Sedimentology (15 credits) GL3340 GIS and Remote Sensing (15 credits) GL3460 Volcanology (15 credits) GL3750 Mineral Resources (15 credits) (Students may, with the permission of the Director of UG Teaching, replace one option with another 15 credit FHEQ level 6 course in Earth Sciences or Geography)</p> |
| <p>Stage 3 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. Students following MSci Geoscience with a Year of International Study are also 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 (GL4920).</p> | |
| <p>Stage 3 MSci with a Year in Industry degree - GL3141 Applied Geology (Industrial Placement) (30 credits) 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. Students will be assessed on 150 credits during</p> | |

the final stage of the programme. This course must be passed to graduate with the degree title MSci with a year in industry.

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| Stage 4 | Stage 4 |
| <p>Students must take the following mandatory courses: GL4012 Independent Geoscience Project (60 credits) – this course must be passed to graduate with the degree title MSci Geoscience GL4020 Formation and Evolution of the Continents (15 credits) GL4040 Evolution of the Modern Earth (15 credits) GL4930 Field and Research Skills (15 credits) GL4100 Research Proposal and Critical Review (15 credits)</p> | <p>GL4322 Independent Environmental Geoscience Project (60 credits) - this course must be passed to graduate with the degree title MSci Environmental Geoscience GL4040 Evolution of the Modern Earth (15 credits) GL4930 Field and Research Skills (15 credits)</p> <p>and choose options equal to the value of 30 credits from: GL4100 Research Proposal GL4300 Water Quality GL4310 Air Pollution GL4320 Modern Climate Change GL4370 Contaminated Land GL4380 Environmental Inorganic Analysis</p> |
| <p>Stage four (MSci Geoscience with an International Year) Students must take the following mandatory courses: GL4012 Independent Geoscience Project (60 credits) - this course must be passed to graduate with the degree title MSci Geoscience GL4020 Formation and Evolution of the Continents (15 credits) GL4040 Evolution of the Modern Earth (15 credits) GL4930 Field and Research Skills (15 credits) GL4920 Geological Mapping II (15 credits)</p> | |

Part-time students must take courses to the value of 60 credits each year – the split of courses to be agreed with the programme director.

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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 as outlined in the [College’s Undergraduate Regulations](#). However, on some programmes there may be a requirement to pass specific courses in order to progress to the next stage, or to qualify for a particular degree title and this will put restrictions on courses in which failing marks can be condoned (see programme structure above for details).

GL1900 must be passed in order to progress to stage 2 of all programmes

GL2901 or GL2930 must be passed in order to progress to stage 3 of MSci Geoscience and MSci Environmental Geoscience, respectively.

GL3141 Applied Geology (Industrial Placement) must be passed in order to qualify for 'Year in Industry' in the degree title.

GL3940 Methods of Environmental Investigation must be passed at the first attempt for progression to the final stage of the MSci.

Students on the International Year programme must pass GL3920 in order to graduate with the degree title MSci Geoscience with an International Year.

GL4012 and GL4322 must be passed to graduate with the degree title MSci.

Failure to meet progression requirements for stages 1 and 2 could result in transfer to the unaccredited BSc Geological Sciences programme.

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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 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 Earth Sciences 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

All the programmes are taught 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 programmes in Geoscience

MSci Geoscience (F601)

MSci Geoscience with a Year of International Study (F602)

MSci Geoscience with a Year in Industry (F642)

MSci Environmental Geoscience (F631)

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

MSci Environmental Geoscience with a Year in Industry (F644)

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