ROYAL HOLLOWAY
University of London

PROGRAMME SPECIFICATION

This document describes the **Joint Honours Degree programme in Geology and Biology**. For Joint Honours Degree programmes, please also refer to the equivalent document(s) for the other subject(s). This specification is valid for new entrants from **September 2007.**

The aims of the Joint Honours Degree programme in Geology and Biology are to:

- provide a sound knowledge and understanding of the organismal and molecular principles of Biology through a core of courses, and develop an insight into the current frontiers of knowledge, primarily through a series of specialised level 3 courses;
- provide a sound and extensive basis for the study of the Geological Sciences, meeting the requirements for programme accreditation by the Geological Society where appropriate and the general requirements of the subject benchmarking statement;
- develop, through a flexible and progressive structure, a range of subject-specific and transferable skills, including practical laboratory skills, fieldwork skills, self-management, information retrieval, communication and presentation skills, working with others, decision making and meeting deadlines, that equip students for future employment;
- offer a range of specialist courses and experience of independent research through a final year project, which allow students to develop expertise and research interests in their chosen field;
- produce graduates who can work safely and responsibly with biological materials, laboratory equipment and in the field;
- produce graduates who are equipped with knowledge and skills appropriate for careers in the Earth Sciences and other disciplines as well as equip them for appropriate cross-disciplinary careers, for instance palaeobiology.

The programme is delivered in three 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). The curriculum is based around a core of mandatory units running through all three years providing a broad base in skills and knowledge in stages one and two, followed by opportunities for specialisation in stage three as well as an individual project. Students take an equal number of Biology and Geology courses (two units each per year). **Stage one** comprises a fixed selection of core courses and seeks to provide grounding for the study of both subjects at degree level. In **Stage two**, students take 7 core courses building on foundations laid in the first year and choose 1 further Biology option from a list. These courses also provide a basis for research-led specialist options in stage three. **Stage three**, allows students to complete an individual research project in either Biology or Geology, which provides training in a specialised research area and also in generic skills such as independent working, literature searching, report writing, use of word processing, graphics and statistics.. The remaining courses closely reflect the research interests of members of staff who are all specialists in their fields. The programme which is run jointly between the School of Biological Sciences and the Department of Earth Sciences seeks to provide an integrated education in the relevant areas of each subject.

Further information

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 programme are closely informed by current developments in the subjects and by the active research of staff. In general terms the programme provides a variety of opportunities for students to develop and demonstrate these learning outcomes.

Knowledge and understanding

- an understanding of the ecological, evolutionary, cellular, molecular and physiological principles that underlie life processes;
- a critical understanding of the diversity and complexity of life and life processes;
- a familiarity with terminology, nomenclature and classification systems;
- a critical understanding of ecological systems and of the interrelationships between organisms and the environment they live in;
- a critical understanding of genetics and of the evolutionary processes that give rise to the diversity and complexity of life;
- a knowledge and critical understanding of the appropriate experimental methods (both laboratory and fieldwork based) and strategies for the investigation of relevant areas of biology;
- understanding cutting edge developments in a range of areas specific to the subject;
- knowledge and engagement with philosophical and ethical issues arising from some of the current developments in the biosciences;
- a knowledge of the variety of sources of bioscience information and strategies for accessing these;
- 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.

Skills and other attributes

- a range of laboratory and fieldwork techniques of key importance in biology;
- working safely in a scientific laboratory and in the field, with awareness of standard safety protocols;
- the ability to apply relevant numerical skills, including statistics to biological data;
- the ability to access information from a variety of sources in order to maintain and enhance knowledge of the Biosciences and to communicate the principles clearly in oral and written forms;
- assessing the merits of contrasting subject-specific theories, paradigms, concepts and principles;
- applying subject-specific knowledge and understanding to address familiar and unfamiliar problems;

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;
- apply appropriate statistical and logical tests to hypotheses;
- synthesise data and information to present a concise reasoned summary of results;
- recognise the importance of applying professional standards in geology.

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 hand specimens of rocks and minerals;
- the use of a petrological microscope in the analysis of rocks and minerals;
- the identification and interpretation of fossil specimens;
- the analysis and interpretation in time and space of structural and stratigraphic data presented as geological maps;
- the use of appropriate techniques of analysis;
- reduction and interpretation of geophysical data;
- 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 structural data in spatial context;
- the recording of sedimentary and palaeontological data in a stratigraphic context;
- recording a wide variety of geological and geomorphological data in map and notebook form;
- the collection of rocks, minerals, fossils and fluids in a safe, efficient and environmentally sensitive manner;
- the acquisition of 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.
- the ability to plan, design and execute an independent piece of research through a theoretical or practical project in biology or geology, including the production of the final report;
- the attainment of a reasonable standard of numeracy;*
- taking personal responsibility for learning, and developing habits of reflection on that learning;*
- identifying, retrieving (from diverse sources including the use of online computer searches and the referencing of source materials), sorting and exchanging information;*
- abstracting, analysing and synthesising information, and developing a reasoned argument;*
- critically interpreting and evaluating experimental data and relevant literature, analysing and solving problems, and decision-making;*
- written communication and verbal presentation;*
- the use of appropriate information technology (including spreadsheets, databases, word processing, graphical and presentation packages, email and WWW);*
- interpersonal skills, including working in groups/teams and recognising and respecting the viewpoints of others;*
- CV and career preparation;*
- Further 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

The overall strategy is to provide a progressive approach to biological and geological concepts and systems of increasing complexity through teaching methods that aid learning and stimulate interest. Teaching is mostly by means of lectures, laboratory and fieldwork classes, seminars, tutorials,

study/revision sessions, with knowledge and understanding further developed by guided independent study. Learning and analytical ability are developed and reinforced through problem solving, essay writing, practical classes (both laboratory and fieldwork), critical evaluation and by giving students the opportunity to design, execute and evaluate their own experiments. Students are encouraged to acquire further knowledge beyond taught material, e.g. by reading topical reviews, original research literature and attending research seminars, especially in the final year. Lectures are used to introduce material and provide a context for private study. Tutorials supplement and reinforce knowledge and understanding, while 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. Training in intellectual and key transferable skills is embodied throughout the programme and forms a strong element of the tutorial and study session programmes. All students are required to meet basic standards in information technology, for which training is provided by the College Computer Centre, through the General Information Technology Skills course.

Assessment of knowledge and understanding is by means of formal examinations at the end of each year, practical assignments (both laboratory and fieldwork based) and other coursework, oral presentations and an independent research project and the independent literature report. Skills are additionally assessed by means of independent fieldwork (for example, independent mapping); 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 School of Biological Sciences or the Department of Earth Sciences.

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Details of the programme structure(s)
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 School of Biological Sciences or the Department of Earth Sciences.

Stage one:
Students must take:
BS1040 The Diversity of Life (1 unit)
BS1050 Ecology: Animal Behaviour to Environmental Conservation (1 unit)
GL1800 Introductory Palaeontology (½ unit)
GL1200 Introductory Sedimentology (½ unit)
GL1100 Global tectonics (½ unit)
GL1XXX Igneous and Structures (½ unit)

Stage two:
Students must take:
BS2010 Invertebrate Biology: Structure, Behaviour and Evolution (½ unit)
BS2110 Practical Field Ecology (½ unit)
BS2120 Biological Data Analysis and Interpretation (½ unit)
GL2210 Stratigraphy and Earth History (½ unit)
GL2200 Stratigraphic and Sedimentological Analysis (½ unit)
GL2810 History of Life (½ unit)
GL2900 Field Methods in Geology (½ unit)

and choose one option from the following:
BS2150 Applications of Molecular Genetics in Biology (½ unit)
BS2030 Plant Geography (½ unit)
BS2040 Cell Biology (½ unit)
BS2050 Essential Human Physiology in Health and Disease (½ unit)
BS2060 Developmental Biology (½ unit)
BS2140 Animal Behaviour (½ unit)
BS2001X Marine Biology (½ unit)

Stage three:
Students must take:
BS3140 Evolution (½ unit)
GL3800 Advanced Paleontology (½ unit)

and either:
BS3010 Individual Research Project Biology (1 unit) OR
GL3131 Individual Research Project Geology (1 unit)

and choose four options from the following (ensuring that there are 2 whole units each in Geology and Biology):
BS3020 Special Study: Dissertation (½ unit)
BS3030 Biology of Parasitic Diseases (½ unit)
BS3060 Conservation Biology (½ unit)
BS3120 Population and Community Ecology (½ unit)
BS3130 Insect Physiology (½ unit)
BS3160 Behavioural Ecology (½ unit)
BS3180 Marine Ecology and Biodiversity (½ unit)
BS3190 Climate Change: Plants and the Environment (½ unit)
BS3001X Marine Microbiology (½ unit)
GL3210 Advanced Topics in Sedimentology (½ unit)
GL3250 Regional Tectonic Analysis (½ unit)
GL3300 Aqueous Geology (½ unit)
GL3340 GIS and Remote Sensing (½ unit)
GL3460 Volcanology (½ unit)
GL3510 Planetary Geology and Geophysics (½ unit)
GL3600 Advanced Techniques in Tectonic & Structural Interpretation (½ unit)
GL3750 Mineral Resources (½ unit)

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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. 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 (see programme structure above). 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 and three, and gives twice the weighting to marks gained in stage three. In order to qualify for the award, students must gain a weighted average of at least 35% and BSXXXX and GLXXXX courses must each constitute at least 1/3 of the courses passed.

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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, but with referral of students for professional help, e.g. counselling, if required. Students work closely with their Personal Advisers in tutorial groups of around 7, primarily throughout the teaching terms.
- The Director of Teaching and Programme Directors provide a back-up system of academic, pastoral and welfare advice.
- Provision of study skills sessions both during the induction week and at appropriate times throughout the academic year for introduction to a range of specific study skills.
- All staff are available and accessible through an open-door policy or by operating a defined office hours system.
- Staff-undergraduate ratio of 1:15 (2009-10).
- Representation on the Student-Staff Committee.
- Detailed student handbook and course resources.

- A collection of articles and books supporting teaching and learning housed in the School Office.
- Extensive supporting materials and learning resources in College libraries, computer centre, School website and Moodle.
- Dedicated School teaching laboratories are housed in the School of Biological Sciences (Bourne) Building.
- The School of Biological Sciences has 2 Educational Support Office Network members.
- College Careers Service and School Careers Liaison Officer, supplemented by a dedicated careers area.
- Access to all College and University support services, including Student Counselling Service, Health Centre 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 Biological Sciences degree programmes have successfully progressed into a wide range of professions, while some have continued onto Postgraduate studies. 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 School of Biological Sciences was ranked joint 3rd 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 Biological Sciences are not subject to accreditation by a professional body. The QAA subject benchmark statement in Biosciences describes 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).

Joint Honours Degree programmes with Biological Sciences as an equal component

BSc Geology and Biology (FC61)

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