Royal Holloway, University of London
Course specification for an undergraduate award
MSci Earth, Climate and Environmental Change (F767)

Section 1 – Introduction to your course
This course specification is a formal document, which provides a summary of the main features of your course and the learning outcomes that you might reasonably be expected to achieve and demonstrate if you take full advantage of the learning opportunities that are provided. Further information is contained in the College prospectus, and in various handbooks, all of which you will be able to access online. Alternatively, further information on the College's academic regulations and policies can be found here. Further information on the College's Admissions Policy can be found here. Your degree course in MSci Earth, Climate and Environmental Change is delivered in four stages, each of which comprises one year of full-time study during which you must follow modules to the value of 120 credits. Although full-time attendance is the normal mode of study, the MSci Earth, Climate and Environmental Change is also available in part time mode, whereby you would normally take 60 credits per year. Modules are characterised by the provision of a broad base in skills and knowledge in stages one and two, followed by opportunities for specialisation and choice in stage three culminating in a final year research project supervised by a member of the Earth Science staff. Some modules also have an element of compulsory fieldwork. Training in data collection, data analysis and presentation of reports is provided in core modules along with a range of transferrable skills that contribute to the successful progression of Earth Science graduates into a wide range of careers. Teaching and learning in the course are designed to provide graduates with a sound basis of knowledge and skills in the Earth, Climate and Environmental sciences akin to those required by a professionals in these three sectors. Specialist modules offered in stages two and three are closely informed by the active research of staff in our department other departments in the school. Stage four of the course provides you with modules that encourage you to apply your previous knowledge, understanding and practical skills to a range of research level questions across a wide range of geological environments. In addition you get to nurture your chosen specialism and improve your research skills through undertaking an independent research project worth 50% of the year. While Royal Holloway keeps all the information made available under review, courses and the availability of individual modules, especially optional modules are necessarily subject to change at any time, and you are therefore advised to seek confirmation of any factors which might affect your decision to follow a specific course. In turn, Royal Holloway will inform you as soon as is practicable of any significant changes which might affect your studies. The following is brief description for some of the most important terminology for understanding the content of this document: *Degree course* – May also be referred to as 'degree programme' or simply 'programme', these terms refer to the qualification you will be awarded upon successful completion of your studies. *Module* – May also be referred to as 'course', this refers to the individual units you will study each year to complete your degree course. Undergraduate degrees at Royal Holloway comprise a combination of modules in multiples of 15 credits to the value of 120 credits per year. On some degree courses a certain number of optional modules must be passed for a particular degree title.

Section 2 – Course details			
Date of specification update	February 2021	**Location of study**	Egham Campus
Course award and title	MSci Earth, Climate and Environmental Change	**Level of study**	Undergraduate
Course code	3525	**UCAS code**	F767
Year of entry	2021/22		
Awarding body	Royal Holloway, University of London		
Department or school	Earth Sciences	**Other departments or schools involved in teaching the course**	N/A although modules from Geography and Biology are encouraged to be taken in the third year.
Mode(s) of attendance	Full-time or part-time	**Duration of the course**	Four years full-time / eight years part-time
Accrediting Professional, Statutory or Regulatory Body requirement(s)	N/A		
Link to Coursefinder for further information:	https://www.royalholloway.ac.uk/studying-here/	**For queries on admissions:**	study@royalholloway.ac.uk.

Section 3 – Degree course structure

3.1 Mandatory module information
The following table summarises the mandatory modules which students must take in each year of study

Year	Module code	Module title	Contact hours*	Self-study hours	Written exams**	Practical assessment**	Coursework**	Credits	FHEQ level	Module status (see below)
1	GL1100	Planetary Geomorphology	40	110	50%	20%	30%	15	4	MC
1	GL1200	Introductory Sedimentology	48	102	50%	50%	0%	15	4	MC
1	GL1230	Numerical Toolkit for Earth and Environmental Scientists	40	110	25%	0%	75%	15	4	MC
1	GL1350	Introduction to Environmental and Climate Change	40	110	40%	5%	55%	15	4	MC
1	GL1500	Physics and Chemistry of the Earth	64	86	40%	0%	60%	15	4	MC
1	GL1760	Earth resources	38	112	50%	0%	50%	15	4	MC
1	GL1800	Introductory Palaeontology	84	66	50%	0%	50%	15	4	MC
1	GL1900	Scientific and Geological field skills	80	70	0%	5%	95%	15	4	MNC
2	GL2320	Geohazards	48	102	40%	15%	45%	15	5	MC
2	GL2340	GIS and remote sensing	30	120	60%	40%	0%	15	5	MC
2	GL2410	Geochemistry	27	123	60%	0%	40%	15	5	MC
2	GL2450	Groundwater hydrology	30	120	50%	0%	50%	15	5	MC

2	GL2460	Research in Earth, Climate and Environmental Change	29	121	0%	10%	90%	15	5	MC
2	GL2520	Computational Earth Sciences	30	120	50%	0%	50%	15	5	MC
2	GL2800	Oceanography	30	120	50%	0%	50%	15	5	MC
3	GL3330	Advanced Practical Meteorology	68	82	40%	0%	60%	15	6	MC
3	GL3650	Modern Climate Change	36	114	50%	0%	50%	15	6	MC
3	GL3880	Palaeoclimate	31	119	50%	0%	50%	15	6	MC
3	GL3451	Earth, Climate and Environmental Change research project	30	270	0%	10%	90%	30	6	MNC
3	GL3940	Methods of Environmental Investigation	79	71	0%	10%	90%	15	6	MNC
4	GL4012	Independent Geoscience Project	6	594	0%	0%	100%	60	7	MNC
4	GL4040	Evolution of the Modern Earth	60	90	50%	0%	50%	15	7	MC
4	GL4930	Field and research skills	53	97	50%	0%	50%	15	7	MC

This table sets out the most important information for the mandatory modules on your degree course. These modules are central to achieving your learning outcomes, so they are compulsory, and all students on your degree course will be required to take them. You will be automatically registered for these modules each year. Mandatory modules fall into two categories; 'condonable' or 'non-condonable'.

In the case of mandatory 'non-condonable' (MNC) modules, you must pass the module before you can proceed to the next year of your course, or to successfully graduate with a particular degree title. In the case of mandatory 'condonable' (MC) modules, these must be taken but you can still progress or graduate even if you do not pass them. Please note that although Royal Holloway will keep changes to a minimum, changes to your degree course may be made where reasonable and necessary due to unexpected events. For example; where requirements of relevant Professional, Statutory or Regulatory Bodies have changed and course requirements must change accordingly, or where changes are deemed necessary on the basis of student feedback and/or the advice of external advisors, to enhance academic provision.

*Contact hours come in various different forms, and may take the form of time spent with a member of staff in a lecture or seminar with other students. Contact hours may also be laboratory or, studio-based sessions, project supervision with a member of staff, or discussion through a virtual learning environment (VLE). These contact hours may be with a lecturer or teaching assistant, but they may also be with a technician, or specialist support staff.

**The way in which each module on your degree course is assessed will also vary, however, the assessments listed above are all 'summative', which means you will receive a mark for it which will count towards your overall mark for the module, and potentially your degree classification, depending on your year of study. On successful completion of the module you will gain the credits listed. 'Coursework' might typically include a written assignment, like an essay. Coursework might also include a report, dissertation or portfolio. 'Practical assessments' might include an oral assessment or presentation, or a demonstration of practical skills required for the particular module.

3.2 Optional modules

In addition to mandatory modules, there will be a number of optional modules available during the course of your degree. The following table lists a selection of optional modules that are likely to be available. However, not all may be available every year. Although Royal Holloway will keep changes to a minimum, new options may be offered or existing ones may be withdrawn. For example; where reasonable and necessary due to unexpected events, where requirements of relevant Professional, Statutory or Regulatory Bodies (PSRBs) have changed and course requirements must change accordingly, or where changes are deemed necessary on the basis of student feedback and/or the advice of External Advisors, to enhance academic provision.There may be additional requirements around option selection; please contact the Department for further information.

Year 2	Year 3	Year 4
GL2200 Stratigraphy and the History of Life GL2230 Sedimentary Basin Analysis GL2500 Applied Geophysics GL2730 Geothermal Energy	Modules from the Earth science department such as; GL3300 Hydrogeology GL3360 Environmental Biogeochemistry GL3690 Applied Geochemistry GL3510 Planetary Geology and Geophysics GL3760 Solar, Wind and Marine Energy GL3780 Subsurface storage of CO_2 and Energy and/or modules from the departments of Geography or Biological sciences.	GL4100 Research Proposal and Critical Review GL4300 Water Quality GL4310 Air Pollution

3.3 Optional module requirements

In stage two, you must choose modules to the value of 15 credits
In stage three, you must choose modules to the value of 30 credits
In stage four, you must choose modules to the value of 30 credits

Section 4 - Progressing through each year of your degree course
For further information on the progression and award requirements for your degree, please refer to Royal Holloway's Academic Regulations. As part of your degree course you may also be required to complete a module to develop your academic writing skills. This module does not carry credit but passing it is a requirement to progress to the next year of study. Although full-time attendance is the normal mode of study, this course is also available in part time mode, whereby students would normally take 60 credits per year.

Section 5 – Educational aims of the course
The aims of this course are: • to provide a sound and extensive basis for the study of the Earth, Climate and Environmental sciences; • to provide you with knowledge of the science, and equip them with discipline-specific and transferable skills, including the ability to reflect critically on the data you are presented; • to provide a flexible and progressive structure in which you are able to gain knowledge, understanding and appropriate skills relating to distinctive research specialisms; • to offer a range of specialist modules and research projects which allow you to develop expertise and research interests in your chosen field; • to equip you with the knowledge and skills appropriate for a career in the Earth, Climate or Environmental Sciences, and generally to provide you with a range of personal attributes relevant to the world beyond Higher Education, enabling you to engage in lifelong learning and to contribute to the wider community. • to equip you to carry out independent advanced studies in the Earth Sciences suitable for scientific research.

Section 6 - Course learning outcomes

In general terms, the courses provide opportunities for students to develop and demonstrate the following learning outcomes. (*Categories – Knowledge and understanding (K), Skills and other attributes (S), and Transferable skills (*)*)

1. The scientific, interdisciplinary study of the physical, chemical and biological processes operating on and within the Earth and solar system (K);
2. 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) (K);
3. The structure and composition of the Earth (K);
4. The study of geological materials (minerals, rocks, liquids and gases) (K);
5. The use of maps to represent three-dimensional spatial variations and their interpretation in a temporal framework (K);
6. The techniques of investigation in the Earth, Climate and environmental sciences (geophysical, geochemical, remote sensing, climatic, environmental, geological data collection and analysis*) (K);*
7. The evolution of life and changing environments through the study of palaeobiology, palaeoecology, palaeoenvironmental and sedimentological analysis (K);
8. Metrological and oceanographic techniques (K);
9. 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) (K);
10. The social and political role of the Earth Sciences in the exploitation and conservation of geological resources (K);
11. Preparing effective maps and diagrams using a range of appropriate technologies *(S)**
12. Taking responsibility for own learning, and developing habits of reflection on that learning (S)*
13. An area of specialism through the medium of independent research (K);
14. The range of geological problems debated in the literature and the application of multidisciplinary approaches in tackling them (K);
15. The mechanisms and feedbacks observed in a range of climatic and environmental systems (K);
16. Recognise and apply different theories, concepts and principles (S);
18. Develop a strategy for tackling a scientific problem (S);
19. Collect, document and analyse different types of data using appropriate techniques and methodologies (S);
20. Synthesise data and information, and recognise or formulate hypotheses for the interpretation of this information (S);
21. Recognise the importance of applying professional standards in scientific work (S);
22. Understand uncertainty with regard to numerical measurements and its application to Earth, Climate and environmental problems(S);
23. Reduction and interpretation of geophysical and other remotely sensed data (S);
24. The design and analysis of experiments in a safe and effective manner (S);
25. The recording of relevant Earth, climatic and environmental data in spatial context (S);
26. The collection of rocks, minerals, fossils and environmental media in a safe, efficient and environmentally sensitive manner (S);
27. The attainment of certain standards of numeracy (S*);
28. The ability to use appropriate computer technology and communication using the internet (S*);
29. The use of libraries and the retrieval of information from diverse sources (S*);
30. 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; (S*);
31. Working in a team, setting goals by discussion, and sharing information and ideas to develop a collective outcome to a problem (S*);
32. The use of multiple mediums to communicate science to a wide range of audiences (S*);
33. The use of appropriate techniques of data analysis for an independent research project (S*);
34. Safe and effective practice in an analytical laboratory (S*);
35. 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 (S*);The consideration of ethics, uncertainty, advanced presentation skills to the undertaking of scientific research (S*);

17. Apply appropriate numerical, statistical and instrumental techniques to the analysis of Earth, Climate and Environmental data (S);	36. The consideration of ethics, uncertainty, advanced presentation skills to the undertaking of scientific research (S*).

Section 7 - Teaching, learning and assessment

What

The course will allow the participant to become knowledgeable and skilled in the mechanisms and systems behind modern climate change, Earth and environmental Sciences. The course will take participants on a hypothetical journey from the centre of our own Earth through the lithosphere, atmosphere, hydrosphere and out into space and other planets. The course will equip students with the knowledge of these systems and skills to describe model and make predictions about these systems. A progression of knowledge and understanding is achieved by starting with a basic grounding in Earth, Environment and Climate processes and skills, which is subsequently reinforced and developed through application to specialist topics.

How

In stages one and two, the principles, mechanism and topics of Earth Sciences are introduced and surveyed as 15 credit modules. These modules are linked through tutorial exercises, practical classes and two field courses where the application of theory and practical skills learnt are used to understand, synthesize, and model Earth, climate and environmental problems. In stage three, specialist topics utilise this broad Earth Science grounding to build more in-depth knowledge and understanding of advanced sub-disciplines. The choice in stage three allows participants to pick topics they wish to explore in more detail and mechanisms in which they wish their understanding to become more deeply enriched. Integration of all aspects of the stage three taught modules occurs through a research project allowing deep focus into an Earth Science topic and the opportunity to learn sub-discipline skills in an area that fascinates the participant, and a field module that demonstrates how ideas and models can be applied to the real world by exploring the real world and applying often basic concepts to understand and explain to others what is being observed. Stage four is made up of equal parts taught modules and research project. You can follow your desired specialism through your independent research project. This is supplemented by taught modules which provide the advanced knowledge, critical thinking and research skills required to complete a large research project to a high standard. The field work will also teach critical skills in observation science enabling course participants to be able to read observational data and to take useful quantitative measurements of a studied environment. Practical classes comprise the majority of the timetabled study time showing how Earth science principles can be applied to understand and predict the behaviours of the planet; and reflecting the emphasis on learning through studying class work exercises. Practical classes will also deliver skills in Earth Science though handling, observation, measurement and thinking through Earth Science problems. Lectures are used to introduce the principles, mechanisms and models of Earth Science and survey the components that make up Earth Science from deep mantle to the planets around other stars and provide a structure around which to undertake private study. Tutorials supplement and reinforce knowledge and understanding, and allow students to revise, reinforce and explore deeper ideas learnt in other parts of the curriculum. Field, laboratory, practical and project work carried out as individuals or in teams represents an opportunity for the participant to develop in-depth knowledge and skills of and in specialist areas. Transferable, laboratory and field skills are identified within the learning outcomes of modules and summarized in a skills progression chart in the undergraduate handbook.

Assess

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. There will be a range of methods of assessing participants understanding from weekly "homeworks" to larger and more complex pieces of work produced in formats and styles needed for life after the degree (i.e. FAQ, reports, web pages and journalistic pieces). Independent research projects in stage three provide opportunities to develop and integrate a wide range of discipline-specific and transferable skills in a topic of the participants choosing and allows time and guidance for the participant to use the skills they have gained in the course to full effect and you are encouraged to regard these as an important forum for demonstrating your abilities. Full details of the assessments for individual modules can be obtained from the Department. A breakdown of assessment types for individual modules is shown in section 3.

Section 8 – Additional costs
The department will provide you with a set of essential fieldwork equipment, for example a hard hat, compass in your first year. There are mandatory field trips in year 1, for which you will be asked to make a contribution towards costs of £250. There are mandatory field trips in years 3 and 4, for which you will be asked to make a contribution towards costs of £200 per year. There are no fieldtrips in year 2 so there are no additional costs for that year. The remaining costs towards field trips are subsided by the department.
These estimated costs relate to studying this particular degree course at Royal Holloway. General costs such as accommodation, food, books and other learning materials and printing etc., have not been included, but further information is available on our website.

Section 9 – Indicators of quality and standards	
QAA Framework for Higher Education Qualifications (FHEQ) Level	4-7
Your course is designed in accordance with the FHEQ to ensure your qualification is awarded on the basis of nationally established standards of achievement, for both outcomes and attainment. The qualification descriptors within the FHEQ set out the generic outcomes and attributes expected for the award of individual qualifications. The qualification descriptors contained in the FHEQ exemplify the outcomes and attributes expected of learning that results in the award of higher education qualifications. These outcomes represent the integration of various learning experiences resulting from designated and coherent courses of study.	
QAA Subject benchmark statement(s)	http://www.qaa.ac.uk/quality-code/subject-benchmark-statements
Subject benchmark statements provide a means for the academic community to describe the nature and characteristics of courses in a specific subject or subject area. They also represent general expectations about standards for the award of qualifications at a given level in terms of the attributes and capabilities that those possessing qualifications should have demonstrated.	

Section 10 – Further information
This specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate when taking full advantage of the learning opportunities that are available. More detailed information on modules, including teaching and learning methods, and methods of assessment, can be found via the online Module Catalogue. The accuracy of the information contained in this document is reviewed regularly by the university, and may also be checked routinely by external agencies, such as the Quality Assurance Agency (QAA). Your course will be reviewed regularly, both by the university as part of its cyclical quality enhancement processes, and/or by your department or school, who may wish to make improvements to the curriculum, or in response to resource planning. As such, your course may be revised during the course of your study at Royal Holloway. However, your department or school will take reasonable steps to consult with students via appropriate channels when considering changes. All continuing students will be routinely informed of any significant changes.

Section 11 – Intermediate exit awards (where available)		
You may be eligible for an intermediate exit award if you complete part of the course as detailed in this document. Any additional criteria (e.g. mandatory modules, credit requirements) for intermediate awards is outlined in the sections below.		
Award	**Criteria**	**Awarding body**
Diploma in Higher Education (DipHE)	Pass in 210 credits of which at least 90 must be at or above FHEQ Level 4 and at least 120 of which must be at or above FHEQ Level 5	Royal Holloway and Bedford New College
Certificate in Higher Education (CertHE)	Pass in 120 credits of which at least 90 must be at or above FHEQ Level 4	Royal Holloway and Bedford New College

Section 12 - Associated award(s)	
MSci Earth, Climate and Environmental Change (F767)	