Programme Information		
Programme Title	Programme Code	HECoS Code
Earth and Planetary Science with a Year Abroad	F520	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MSci	4 years	Full time	Annually in October	240	480
BSc (Hons)	3 years	Full time	N/A*	180	360
BSc (Ordinary)	3 years	Full time	N/A*	150	300
Diploma of Higher Education	2 years	Full time	N/A*	120	240
Certificate of Higher Education	1 year	Full time	N/A*	60	120

* The Certificate, Diploma and BSc are exit awards, and are not available for entry.
All students must apply to and join a BSc (Hons) or MSci programme initially.

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Engineering
Teaching Institution	Imperial College London	Department	Earth Science and Engineering
Associateship	Royal School of Mines	Main Location of Study	South Kensington Campus
External Reference			
Relevant QAA Benchmark Statement(s) and/or other external reference points		QAA Subject Benchmark Statement for Earth Science, Environmental Sciences and Environmental Studies	
FHEQ Level		MSci: Level 7 BSc: Level 6 Diploma: Level 5 Certificate: Level 4	
EHEA Level		MSci: 2nd Cycle BSc: 1st Cycle	
External Accreditor(s) (if applicable)			
External Accreditor 1:	N/A		
Accreditation received:	N/A	Accreditation renewal:	N/A

Collaborative Provision			
Collaborative partner	Collaboration type	Agreement effective date	Agreement expiry date
N/A	N/A	N/A	N/A

Specification Details	
Programme Lead	Dr Mark Sutton, Director of Undergraduate Studies
Student cohorts covered by specification	2021-22entry
Date of introduction of programme	October 2020
Date of programme specification/revision	October 2021

Programme Overview

The Earth and Planetary Science programme is designed to educate and inspire future geoscientists with interests in planetary science, providing them with a strong theoretical and practical foundation in earth science and its application to planetary science. Geological and geophysical knowledge and skills are increasingly important in the study of solid planetary bodies in the Solar System. With the abundance of active and forthcoming planetary missions, there is enormous interest in the planetary sciences and a need for students versed in the fundamentals of the geosciences but with an awareness of current knowledge and research problems across the planetary sciences.

The programme seeks to build understanding of the Earth and other solid bodies in the Solar System. For the Earth, the fundamentals are the geology and geophysics of the planet, and how its interior, surface, atmosphere, life and external influences operate, interact and evolve. For the terrestrial planets, major moons and minor bodies, the fundamentals are their formation, evolution and interaction together with their physics, chemistry and geology, and the processes that govern their interiors, their surfaces and, where present, their atmospheres.

Earth and planetary scientists seek to understand the Earth and other planets through observation, and to make inferences based on fundamental scientific principles. This programme is designed to provide students with the necessary interdisciplinary skills in physics, chemistry, maths, engineering, computing and geoscience to achieve this. Learning objectives prioritise physical processes, emphasising evidence and quantitative explanation. The focus of the programme is in developing students with a fundamental grounding in geology, geochemistry and geophysics who apply this to planetary science.

The first two years introduce and consolidate the fundamentals of the subject; the fourth year allows greater specialisation and choice, and enable students to explore and develop their ability for original research within major independent projects in both years. Classroom teaching is enhanced by fieldwork throughout the degree as students develop their oral, written and observational skills. Fieldwork locations are continually updated; recent destinations have included introductory geological fieldwork in the Baetics of southern Spain, geophysics in Cyprus, preparation for geological mapping in the Pyrenees and Scottish Highlands, independent mapping in the Alps and Greek islands, and advanced fieldwork in Sardinia and in the Italian Apennines.

In the third year, you will complete your independent project, and spend a year studying at another leading university outside the UK. The year abroad is not an easy option – it will throw up cultural, academic and organisational challenges – but it nonetheless provides a hugely rewarding opportunity for some of our best students to expand their knowledge, self-confidence and experience. We send only a handful of students overseas each year, and each posting is bespoke to the student involved. In recent years, students on ESE Year Abroad degrees have spent time abroad at MIT in Boston, at Berkeley in San Francisco, at UCLA in Los Angeles, at ANU in Canberra, at UBC in Vancouver, and at University of Utrecht in the Netherlands. If you have proficiency in an appropriate language, then it is also possible to study in Europe. Competition for places abroad is strong, and normally only students achieving first-class marks in years 1 and 2 will be eligible for selection.

Students are able to choose modules throughout the programme in order to follow a more physics-rich or more geology-rich pathway, involving greater or lesser degrees of fieldwork, and leading to different specialisms and career paths. Students will have the opportunity to learn about current active and upcoming planetary missions with academics involved in these missions. Students will be able to pursue individual projects based on datasets derived from these missions.

Besides obtaining the core knowledge and skills necessary for a career in the earth science, graduates of the new programme will gain specialist understanding and practical skills in geological, geochemical and geophysical aspects of planetary science. We are a hybrid department, populated by both engineers and scientists; while our degrees are primarily science-based, we engage our engineers actively within the undergraduate programme to engender within our science graduates an understanding of engineering principle, ethos and practice. This bespoke training will ensure that they are well placed to pursue research careers in planetary science, and will have gained the breadth of knowledge required to undertake a broad range of space-related employment.

Transferring between programmes

The wider Geoscience programme is constructed such that MSci Earth and Planetary Scientists who are appropriately qualified, can readily transfer to other geoscience BSc or MSci degree programmes including Geophysics, Geology, and Earth Science. This last programme is designed specifically for students who are unable, or do not wish, to undertake the full fieldwork programme that is required for accreditation within the Geology degree. You must normally transfer to another degree no later than January of your second year.

Learning Outcomes

Upon successful completion of four years of study (leading to the award of an MSci for students graduating after four years), a typical Earth and Planetary Science with a Year Abroad graduate will be able to:

1. Demonstrate mastery of the terminology of geology, geophysics and planetary science.
2. Demonstrate a comprehensive knowledge of the principal characteristics of the interior, surface, atmosphere and biosphere of the Earth, their history through time, the observations and methods of geology, geophysics and geochemistry, and the physical and chemical processes that explain these characteristics and observations.
3. Explain accurately the historical, current and likely future methods used to detect and observe planets, moons, asteroids, exoplanets, and other bodies under a wide range of conditions, and be able to report and explain the principal results produced by these methods.
4. Use effectively the principal techniques and theories of mathematics, physics, chemistry, engineering and computer programming required across geoscience.
5. Demonstrate a high-level of professional skill in written, verbal and online technical communication, engaging and persuasive presentation, problem solving and project management.
6. Demonstrate accuracy in identifying important rocks, and apply geological principles in the field.
7. Demonstrate a comprehensive knowledge of the principal characteristics of the terrestrial planets, major moons and minor bodies in the Solar System, their formation, evolution and interaction, the observations and methods of planetary observation, and the physical, chemical and geological processes that explain these characteristics and observations.
8. Evaluate geological, geophysical, geochemical and remote sensing data, and infer appropriately by extrapolating realistically from incomplete or inadequate data.
9. Work independently, evaluate progress, and report technical observations, methods and conclusions effectively.
10. Demonstrate awareness of societal and industrial needs, practical engineering solutions to real-world problems, and environmental and human impact in relation to geoscience.
11. Discuss with confidence the theories, principles, and outstanding controversies for major processes, phenomena and observations within earth and planetary science.
12. Synthesise observations, evidence and theory across different areas of earth and planetary science, recognising and explaining similarities and differences between different objects, locations, times and circumstances.
13. Apply some of the major methods used to make and analyse observations within earth and planetary science.
14. Demonstrate broad experience of international earth and planetary science practice and the development of professional collaboration with peers overseas, overcoming and benefiting from differences in culture, terminology and practice between different international organisations.
15. Demonstrate mastery of at least one advanced technique for acquiring, generating, analysing, evaluating or challenging observations or theory within earth and planetary science.

16. Conceive, design, execute, critique, revise, document and present an original research project.
17. Synthesise original scientific literature extending into active research areas at the boundaries of the subject.
18. Analyse major unsolved questions within earth and planetary science, understanding their history, context and importance, and being confident in formulating, evaluating and advancing well-argued opinions on how these questions might be resolved.

Upon successful completion of three years of study (leading to the award of an BSc for students graduating after three years), a typical Earth and Planetary graduate will be able to:

1. Demonstrate mastery of the terminology of geology, geophysics and planetary science.
2. Demonstrate a comprehensive knowledge of the principal characteristics of the interior, surface, atmosphere and biosphere of the Earth, their history through time, the observations and methods of geology, geophysics and geochemistry, and the physical and chemical processes that explain these characteristics and observations.
3. Explain accurately the historical, current and likely future methods used to detect and observe planets, moons, asteroids, exoplanets, and other bodies under a wide range of conditions, and be able to report and explain the principal results produced by these methods.
4. Use effectively the principal techniques and theories of mathematics, physics, chemistry, engineering and computer programming required across geoscience.
5. Demonstrate a high-level of professional skill in written, verbal and online technical communication, engaging and persuasive presentation, problem solving and project management.
6. Demonstrate accuracy in identifying important rocks, and apply geological principles in the field.
7. Demonstrate a comprehensive knowledge of the principal characteristics of the terrestrial planets, major moons and minor bodies in the Solar System, their formation, evolution and interaction, the observations and methods of planetary observation, and the physical, chemical and geological processes that explain these characteristics and observations.
8. Evaluate geological, geophysical, geochemical and remote sensing data, and infer appropriately by extrapolating realistically from incomplete or inadequate data.
9. Work independently, evaluate progress, and report technical observations, methods and conclusions effectively.
10. Demonstrate awareness of societal and industrial needs, practical engineering solutions to real-world problems, and environmental and human impact in relation to geoscience.
11. Discuss with confidence the theories, principles, and outstanding controversies for major processes, phenomena and observations within earth and planetary science.
12. Synthesise observations, evidence and theory across different areas of earth and planetary science, recognising and explaining similarities and differences between different objects, locations, times and circumstances.
13. Apply some of the major methods used to make and analyse observations within earth and planetary science.
14. Demonstrate broad experience of international earth and planetary science practice and the development of professional collaboration with peers overseas, overcoming and benefiting from differences in culture, terminology and practice between different international organisations.

Upon successful completion of two years of study (leading to the award of DipHE for students exiting after two years), a typical student will be able to:

1. Demonstrate accuracy in their use of the terminology of Earth and planetary science.
2. Demonstrate a good knowledge of the principal characteristics of the interior and surface of the Earth, their histories, and the physical and geological processes that explain these characteristics.
3. Explain the methods used to make observations about the surface and interior of the Earth and other planets, and be able to report the principal results produced by these methods.
4. Apply the principal techniques and theories of mathematics, physics, chemistry, engineering and computer programming to geoscience.
5. Write accurately about technical subjects and about geoscience.

6. Demonstrate accuracy in identifying important rocks, and apply geological principles in the field.
7. Demonstrate a good knowledge of the principal characteristics of the terrestrial planets, major moons and minor bodies in the Solar System, and the physical processes that explain these characteristics and observations.
8. Evaluate geological, geophysical, geochemical and remote sensing data.
9. Work independently, evaluate progress, and report technical observations, methods and conclusions effectively.
10. Demonstrate awareness of societal and industrial needs, practical engineering solutions to real-world problems, and environmental and human impact in relation to geoscience.

Upon successful completion of one year of study (leading to the award of CertHE for students exiting after one year), a typical student will be able to:

1. Demonstrate accuracy in their use of the terminology of Earth and planetary science.
2. Describe the principal characteristics of the interior and surface of the Earth and other planets, and the processes that explain these characteristics.
3. Outline some of the methods used to make observations about the surface and interior of the Earth and other planets, and be able to report the main results produced by these methods.
4. Apply mathematics, physics, chemistry and computer programming to problems in geoscience.
5. Write accurately about technical subjects and about geoscience.
6. Identify important rocks in hand specimens.

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial College degree programme. The Graduate Attributes are available at: www.imperial.ac.uk/students/academic-support/graduate-attributes

Entry Requirements	
Academic Requirement	**<u>A-level</u>** A minimum of AAA overall or equivalent. To include Mathematics and at least one of the following subjects: Physics, Chemistry, Geology, Biology, Geography. General Studies and Critical Thinking are **not** accepted. **<u>International Baccalaureate</u>** A minimum of 38 points overall. To include a minimum of 6 at higher level in Mathematics and in at least one of the following: Biology, Chemistry, Geography or Physics. For further information on entry requirements, please go to https://www.imperial.ac.uk/study/ug/apply/requirements/ugacademic/
Non-academic Requirements	N/A
English Language Requirement	Standard requirement Please check for other Accepted English Qualifications
Admissions Test/Interview	All short-listed candidates are invited for interview. Interviews normally take place within the Department at Imperial College on Wednesdays between October and March. During the interview visit, students meet key members of staff, and have a 30-minute one-to-one interview; existing undergraduates on the programme show prospective students around the department. Both staff and students are on hand during the day to answer questions about the programme, the Department, the College, and life as a student in London.

	For those, typically overseas students, who are unable to attend an interview in person, interviews and Q&A sessions are also be held remotely via video conference or Skype. There are no admissions tests.

The programme's competency standards documents can be found at:
http://www.imperial.ac.uk/engineering/departments/earth-science/current-student-staff-info/ug/

Learning & Teaching Approach

Earth and planetary science is an inherently interdisciplinary and practical science, which lends itself to a diverse range of classroom, laboratory and field-based teaching methods. As a geoscientist at Imperial, you will learn about both the latest data acquired for example by a rover on Mars, or by the most recent high-tech mass spectrometer uncovering the isotopic chemistry of life in an ancient ocean, first-hand from the scientists who are making these discoveries, and about established theories and observations that provide the foundations for our modern understanding. Reflecting this, our teaching approach is dynamic and flexible, matching the breadth, diversity and rapid evolution of our subject matter.

In the first two years, the major taught elements of the programme are provided by:

- formal lectures to develop necessary theory and background, and expand your intellectual understanding,
- supervised problem and laboratory classes to advance your practical skills and hands-on experience,
- and elective field modules, run typically in the mountain belts and islands of southern Europe and in the highlands of Scotland, that integrate this theory and practice, building upon your direct observations in the field to advance your confidence and reinforce the knowledge gained during earlier classroom-based learning.

Most modules involve both theory and practical elements in which the two teaching styles are blended together, so that both forms of learning typically occur within a single class-room session involving student participation integrated into formal lectures. The advantage of this approach is that learning is carefully scaffolded for the student, for example delivering new terminology, concepts and ideas at the beginning of a session, and then immediately reinforcing and integrating this information in a teacher-facilitated, student-focussed practical lab class, where knowledge is applied to real-world problems. During most practical classes, graduate teaching assistants are on-hand to support the lecturer and to provide you with continuous opportunities to check and extend your understanding, ask questions, and engage in an informed and productive dialogue.

You will often be encouraged to work in small groups during practical classes and to engage in discussion with your peers and teachers about the material covered. During taught fieldwork, novice geologists are immediately introduced to the professional standards and competencies expected by employers, and you will be working with established industry equipment, procedures and practices. The aim is to foster a sense of community amongst your peers, and to help you to develop your professional identity by working to professional standards from the outset. The learning gained from this combined lecture-practical-fieldwork approach are supported and strengthened by small-group tutorials, group seminars, and computer-programming workshops. Ultimately, this blended approach to learning will help to make you into a professional geologist, confident in the necessary mathematics, physics and chemistry, able to write original computer programs, and with skills and knowledge applicable across the breadth of the Earth and planetary sciences.

In year three, you will study abroad. The details and the experience of this are bespoke to the individual student and individual partner university – but you will always experience diverse and wide-ranging programme delivered in a research-intensive environment by international leaders in their subjects.

For MSci students, the fourth and final year involves advanced taught modules and the major MSci research project. The results of many MSci projects are of publishable quality, and some are published in peer-reviewed academic journals. MSci projects vary hugely from student to student, and may involve almost any combination of fieldwork, laboratory experiment, computer simulation, theory and practical work. An MSci project will develop your high-level transferable skills in scientific research, synthesis, analysis, collaboration and project management, help you to master some advanced techniques, technologies and ideas, and expose you to rigours of solving real difficult scientific and technical problems in a finite time.

Throughout the programme, a number of workshops, tutorials and other activities run that are designed to build a particular focus, and develop particular skills, in each year. These are:

- Year 1 – Science Focus: builds core skills in geoscience, mathematics, physics and chemistry.
- Year 2 – Engineering Focus: builds awareness of society, industry, and practical solutions to problems.
- Year 3 – N/A (you will be studying abroad)

- Year 4 – Research Focus: develops skills in project design, advanced research methods, and frontier geoscience, and actively explores the scientific boundaries of human knowledge.

Throughout the programme, extensive use is made of technology to enhance and support you in the classroom, during private study, and on fieldwork. If, for example, you choose to take an elective module that covers processes on another planet, then you may find yourself involved in a virtual field trip to the surface of that planet, or if you study advanced seismic interpretation, then you will be using advanced 3D commercial software to explore the subsurface of the Earth for valuable resources. Lecturers also seek to integrate technology into their day-to-day teaching, using online voting, instructional videos and e-books to support and diversify your learning experience.

Workload

Module size at Imperial is measured in ECTS (European Credit Transfer System) credits. One ECTS represents about 25 hours of student effort for a typical conscientious student, including formal teaching, fieldwork, private study, examination preparation and assessment. A full academic year involves 60 ECTS, or about 1500 hours of study in total.

A typical module taught over one term will be worth 5 ECTS. It will involve about 30 hours of formal teaching in lectures, practicals, tutorials and workshops, about 64 hours of coursework, problem solving, private study and project work, and about 30 hours of revision for a one-hour examination. There is significant variation in this balance between different modules, but all modules of equivalent value involve similar levels of commitment and workload.

Lectures, practicals and other formal activities take place on weekdays only, with Wednesday afternoons normally remaining free. There is no teaching at weekends except for field modules that are run outside London; these typically run for ten to twelve days and so nearly always involve a weekend spent on fieldwork. We do not normally schedule teaching out of term time, though it can sometimes be necessary for field modules to run into vacations because of practical restrictions on accommodation, transport or even the state of the tide at coastal locations. Although it is possible to complete the independent geological project entirely within term time, many students chose to extend this highly rewarding field project into the summer vacation between years two and three.

Assessment Strategy

Assessment Methods

You will have already experienced various forms of academic assessment during your previous education. At Imperial, we use assessment in two ways: Formative assessment is used to develop your skills, knowledge and understanding, and to help you judge your own progress; formative assessment does not contribute to your final marks and class of degree awarded. Summative assessment involves formal assessment of your work, through examination, coursework and project work; summative assessment does contribute to your final result.

Formative assessment is provided throughout the programme in a variety of forms. Almost all practical classes, problem classes, workshops, and field trips involve formative assessment throughout, supported by direct verbal feedback from lectures and graduate teaching assistants in the classroom, the provision of worked examples and correct solutions for practicals and coursework, and written comments in field and laboratory notebooks. Fieldwork provides ample opportunity for formative feedback, as students and teachers engage in dialogue at the outcrop. Many lectures involve mini tests, and other forms of rapid assessment within the lecture or associated practical class, and tutorial work and small independent projects in the first two years provide more-structured formative assessment.

Summative assessment is provided through formal written examinations, practical examinations, assessed coursework, and independent project, laboratory and fieldwork reports. Some specialist elective modules may involve assessment of oral presentations, posters and team performance. All assessment is aligned with the intended learning outcomes for the taught modules, and is intended to act as a method of consolidating learning through revision and application, rather than simply as a measure of progress.

The exact balance of summative assessment through the programme depends upon which elective modules are taken, but is likely to be approximately:

	Coursework	Practical	Examination
Year 1	10%	20%	70%
Year 2	10%	30%	60%
Year 3	Varies	Varies	Varies
Year 4	5%	55%	40%

Coursework: unsupervised written assessment such as essays and problem sheets – typically you will conduct coursework independently outside normal timetabled classes.

Practical: assessment of your performance in timetabled practical, laboratory and field classes, and in major projects – typically assessment is through project reports, field and laboratory notebooks, verbal and poster presentations, oral examinations, and group exercises.

Examination: invigilated assessment, including practical examinations and supervised in-class tests as well as conventional written examinations – typically you will answer previously unseen questions in a fixed time period.

In Earth and Planetary Science, many examinations will have a strong practical element. As the programme progresses, the importance of examination decreases, and more weight is placed upon performance in independent projects.

Academic Feedback Policy

Timely, well-structured, relevant feedback is an integral part of the learning process; it is prioritised by teachers and highly valued by students in Earth Science and Engineering. Feedback is provided frequently and in many different formats throughout the programme. Both written and verbal feedback is provided during practical and problem classes, in workshops, in tutorials, during field work, and in response to assessed and unassessed coursework. Much of this feedback is instant; it occurs as students are engaging with the task, and helps them to check their understanding, and evaluate their own progress, in real time. For example, during fieldwork, verbal feedback is provided constantly throughout the working day, allowing students to change and improve their learning approaches in an iterative fashion. Students are encouraged to reflect and act upon their feedback, particularly with regard to their written projects in years one, two and three, which build in complexity and difficulty. Written feedback on minor coursework is normally be provided within two weeks of submission.

Feedback will normally be individual on assessed summative coursework and project work, and will normally be generic on unassessed formative coursework, provided verbally or in writing, typically during the next teaching session or delivered online. Feedback on major projects will normally be provided within five weeks in term time; this is typically written feedback focussed on how the student could improve the work for the future

Generic feedback is provided on all examinations, once summative marks are released; where appropriate, individuals can request to be given supervised access to their exam scripts. The College's Policy on Academic Feedback and guidance on issuing provisional marks to students is available at:

https://www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Re-sit Policy

The College's Policy on Re-sits is available at: www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Mitigating Circumstances Policy

The College's Policy on Mitigating Circumstances is available at: www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Additional Programme Costs		
This section should outline any additional costs relevant to this programme which are not included in students' tuition fees.		
Description	Mandatory/Optional	Approximate cost
Field clothing	Mandatory	£150 total
Accommodation and transport during independent mapping fieldwork between years two and three	Optional	Variable depending upon location, but typically in the range £0 – £800, with a class median value of around £400. The project can be cost free for a location close to home.
Costs associated with the year abroad	Mandatory	Each year-abroad placement is different, and it is therefore difficult to give exact information about costs. If you spend an academic year abroad, you will retain your student status at Imperial so that you will normally remain eligible for the same loans and grants that you would receive in London. As an exchange student, you will not pay tuition fees to the host institution abroad. The College also offers significant discounts on its tuition fees for UK and EU students for the year spent abroad, so typically the total cost can be lower than a conventional year spent at Imperial. You will need to budget for the costs of travel to and from your overseas university including visa costs where required.
Funding is available for students who may require additional support towards mandatory fieldwork costs. You should refer to the departmental webpages for the latest funding schemes and application deadlines: https://www.imperial.ac.uk/earth-science/current-student-staff-info/ug/ (see Funding & Scholarships tab)		

Important notice: The Programme Specifications are the result of a large curriculum and pedagogy reform implemented by the Department and supported by the Learning and Teaching Strategy of Imperial College London. The modules, structure and assessments presented in this Programme Specification are correct at time of publication but might change as a result of student and staff feedback and the introduction of new or innovative approaches to teaching and learning. You will be consulted and notified in a timely manner of any changes to this document.

Programme Structure[1]					
Year 1 – FHEQ Level 4 Students study all core and compulsory modules, and one elective module from group A, one elective module from Group B, and one elective from group K.					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
EART40001	Dynamic Earth and Planets	Core		1 & 2	7.5
EART40002	Stratigraphy and Geomaterials	Core		1	7.5
EART40008	Deforming the Earth	Core		2	5
EART40005	Maths Methods 1	Core		1	5
EART40011	Physical and Surface Processes	Core		2	7.5
EART40012	Volcanism and Internal Processes	Core		2	5
EART40003	Programming for Geoscientists	Compulsory		1	5
EART40010	Geology in the Field	Elective	K	3	7.5
EART40014	Field Geology and Thermodynamics	Elective	K	3	7.5
EART40013	Maths Methods 2	Elective	A	2	5
EART40009	Life over Deep Time	Elective	A	2	5
EART40006	Chemistry for Geoscientists	Elective	B	1	5
EART40007	Low Temperature Geochemistry	Elective	B	1	5
				Credit Total	**60**

[1] **Core** modules are those which serve a fundamental role within the curriculum, and for which achievement of the credits for that module is essential for the achievement of the target award. Core modules must therefore be taken and passed in order to achieve that named award. **Compulsory** modules are those which are designated as necessary to be taken as part of the programme syllabus. Compulsory modules can be compensated. **Elective** modules are those which are in the same subject area as the field of study and are offered to students in order to offer an element of choice in the curriculum and from which students are able to select. Elective modules can be compensated.

Year 2 - FHEQ Level 5 Students study all core modules, plus three modules from group F and one from group G.					
Code	Module Title	Core Compulsory	Group	Term	Credits
EART50001	Solar System Science	Core		1	5
EART50002	High-temperature Geochemistry	Core		1	5
EART50003	Maps and Structures	Core		1	5
EART50009	Remote Sensing Earth and Planets	Core		2	5
EART50004	Pure and Applied Geophysics	Core		1 & 2	7.5
EART50017	Palaeontology and Optical Petrology	Elective	F	1 & 2	7.5
EART50010	Maths for Scientists and Engineers	Elective	F	1 & 2	7.5
EART50007	Igneous and Metamorphic Geology	Elective	F	2	7.5
EART50018	Seismology and Numerical Methods	Elective	F	2	7.5
EART50011	Mechanics and Waves	Elective	F	1 & 2	7.5
EART50008	Sediments and Stratigraphy	Elective	F	1 & 2	7.5
EART50012	Environmental Geochemistry and Climate Report	Elective	G	2 & 3	10
EART50005	Rocks and Structures in the Field	Elective	G	2 & 3	10
EART50006	Field Geophysics	Elective	G	2 & 3	10
				Credit Total	**60**

Year 3 - FHEQ Level 6 Students may take up to 30-ECTS equivalent at level-7.					
Code	Module Title	Core	Level	Term	Credits
	Year Abroad Placement (normally including an independent project and an equivalent to I-Explore)	Core	6 & 7	1, 2 & 3	60
				Credit Total	**60**

Year 4 - FHEQ Level 7 Students study all core modules, plus **either**: five modules from group D and one module from group J, **or**: six modules from group D. Students may take a maximum of three level-6 modules which may include I-Explore as an elective for credit. Students must have earned 60 ECTS at Level 7 by the end of Year 4.						
Code	Module Title	Core Elective	Group	Term	Level	Credits
EART70009	MSci Independent Project	Core		1	7	30
EART70019	Field Geology of an Active Mountain Belt	Elective	J	3	7	5
EART70157	Geophysical Synthesis Group Project	Elective	J	3	7	5
					Credit Total	**60**

Year 3/4 - FHEQ Level 6/7 – Group D electives Different sub-sets of modules are offered each year, with a minimum of 12 subjects normally available.						
Code	Module Title	Core Elective	Group	Term	Level	Credits
EART60008	Mining Environmental Management	Elective	D	2	6	5
EART60009	Ore Deposits	Elective †	D	2	6	5
EART60011	Environmental Seminars	Elective	D	2	6	5
EART60010	Hydrogeology and Fluid Flow	Elective	D	2	6	5
EART60028	Tectonics of the Oceans	Elective	D	2	6	5
EART60024	Planetary Surfaces	Elective †	D	2	6	5
EART60014	Advanced Programming	Elective	D	2	6	5
EART60021	Gravity, Magnetism and Orbital Dynamics	Elective *	D	2	6	5
EART60016	Geological and Coastal Engineering	Elective	D	2	6	5
EART60017	Astrobiology	Elective	D	2	6	5
EART60018	Earth Systems	Elective	D	2	6	5
	I-Explore	Elective	D	1 &/or 2	6	5
EART70004	Planetary Chemistry	Elective	D	2	7	5
EART70155	Planetary Physics	Elective *	D	2	7	5
EART70152	Palaeobiology	Elective †	D	2	7	5
EART70153	Palaeoceanography	Elective	D	2	7	5
EART70008	Geohazards	Elective	D	2	7	5
EART70048	Geodynamics	Elective *	D	2	7	5

EART70010	Applied Geomorphology	Elective †	D	2	7	5
EART70049	Collisions and Craters	Elective	D	2	7	5
EART70012	Meteorites	Elective	D	2	7	5
EART70013	Geophysical Inversion	Elective *	D	2	7	5
EART70014	Advanced Exploration Geophysics	Elective *	D	2	7	5
EART70151	Geological Reactive Transport	Elective	D	2	7	5
EART70016	Minerals Processing	Elective	D	2	7	5
EART70050	Magmatic Processes and Products	Elective †	D	2	7	5
EART6XXXX	Data Science and Machine Learning for Geoscientists	Elective	D	2	6	5
EART70015	Advanced Exploration Seismology	Elective *	D	2	7	5

* These electives are most suitable for students who have chosen earlier physics-based electives.
† These electives are most suitable for students who have chosen earlier geology-based electives

Progression and Classification

Progression

Year One: Candidates must normally achieve an aggregate mark of at least 70.00% for the year, must pass all core modules, and must have earned at least 60 ECTS credits for the year. No more than 5 ECTS may be earned as compensated passes during the year. Candidates who do not meet this requirement but meet the progression requirements for MSci Geophysics will be transferred onto that degree scheme.

Year Two: Candidates must achieve an aggregate mark of at least 40.00% for the year, must pass all core modules, and must have earned at least 60 ECTS credits for the year. No more than 5 ECTS may be earned as compensated passes during the year. Candidates must also perform at a high level (normally at least 70.00%) in term 1 modules in year two, as adjudicated by the examination board or a sub-board designated by the examination board for this purpose. Candidates who do not meet this additional requirement will be transferred onto the MSci Geophysics degree scheme.

Year Three: Candidates must achieve an aggregate mark of at least 40.00% for the year, must pass all core modules, must have earned at least 60 ECTS credits for the year, and must have earned at least 45 credits at level 6 or higher. No more than 15 ECTS may be earned as compensated passes during the year.

Year Four: Candidates must achieve an aggregate mark of at least 50.00% for the year, must pass all core modules, must have earned at least 60 ECTS credits for the year, and must have earned at least 60 credits at level 7. No more than 15 ECTS may be earned as compensated passes during the year.

- The pass mark for modules at levels 4, 5 and 6 is 40.00%, and at level 7 is 50.00
- At the discretion of the Board of Examiners, compensated passes may be awarded in non-core modules at levels 4, 5 and 6 that have been awarded 30% or higher, and in non-core modules at level 7 that have been awarded 40% or higher. Compensated passes are not allowed in core modules. Marks for modules awarded a compensated pass are included in year and programme overall weighted marks.
- A single compulsory I-Explore co-curricular module must be taken, and subsequently passed or awarded a compensated fail, but will not be included in calculating the aggregate mark for the year. If optional additional co-curricular modules are taken for credit, then their marks will be included in calculating the aggregate mark for the year.
- The marks for both level-6 and level-7 modules are included in calculating aggregate marks in year 3 and in year 4.

Classification

The marks from modules in each year contribute towards the final degree classification using the weighting:

	BSc	MSci
Year 1:	7.50%	7.50%
Year 2:	35.00%	20.00%
Year 3:	57.50%	36.25%
Year 4:	-	36.25%

Final degrees are classified as:

First:	70.00% or above for the average weighted module results
Upper Second:	60.00% or above for the average weighted module results
Lower Second:	50.00% or above for the average weighted module results
Third:	40.00% or above for the average weighted module results

Please find the full Academic Regulations at https://www.imperial.ac.uk/about/governance/academic-governance/regulations/. Please follow the prompts to find the set of regulations relevant to your programme of study.

Programme Specific Regulations
Policies and regulations may vary for students on a year abroad. You are encouraged to familiarise yourself with the relevant policies and regulations which will underpin your studies while abroad before you go. If you have any questions, please talk to your host institution or your home departmental contact.

Supporting Information
The Programme Handbook is available at: http://www.imperial.ac.uk/engineering/departments/earth-science/current-student-staff-info/ug/
The Module Handbook is available at: http://www.imperial.ac.uk/engineering/departments/earth-science/current-student-staff-info/ug
The College's entry requirements for postgraduate programmes can be found at: www.imperial.ac.uk/study/pg/apply/requirements
The College's Quality & Enhancement Framework is available at: www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance
The College's Academic and Examination Regulations can be found at: www.imperial.ac.uk/about/governance/academic-governance/regulations
Imperial College is an independent corporation whose legal status derives from a Royal Charter granted under Letters Patent in 1907. In 2007 a Supplemental Charter and Statutes was granted by HM Queen Elizabeth II. This Supplemental Charter, which came into force on the date of the College's Centenary, 8th July 2007, established the College as a University with the name and style of "The Imperial College of Science, Technology and Medicine". www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/
Imperial College London is regulated by the Office for Students (OfS) www.officeforstudents.org.uk/advice-and-guidance/the-register/
This document provides a definitive record of the main features of the programme and the learning outcomes that a typical student may reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities provided. This programme specification is primarily intended as a reference point for prospective and current students, academic and support staff involved in delivering the programme and enabling student development and achievement, for its assessment by internal and external examiners, and in subsequent monitoring and review.

Modifications			
Description	**Approved**	**Date**	**Paper Reference**
N/A	N/A	N/A	N/A