School of Earth & Environmental Sciences

Earth Sciences (ES) modules

ES1001 Planet Earth				
SCOTCAT Credits:	20	SCQF Level 7	**Semester:**	1
Academic year:	2017/8 & 2018/9			
Planned timetable:	12.00 noon - 1.00 pm Mon - Fri			
This module provides a foundation into the study of Earth and environmental sciences. The key elements of the planet will be introduced. The bulk structure of the solid Earth (and the other planets of our solar system), and the dynamic hydrosphere and atmosphere will be covered from planetary to atomistic scales. Practical and transferable skills will be developed in tutorials and laboratory exercises which include the identification of minerals and rocks both in hand specimen and using microscopes. Fieldwork will be introduced as two half-day excursions. University-level study skills associated with this module include working in groups, oral and written presentations, advanced use of the University's internet and library facilities for data acquisition, and critically assessing scientific data and reports.				
Programme module type:	Compulsory for BSc Geology, Environmental Earth Science, joint degrees with Biology and Chemistry, and MGeol Earth Sciences			
Anti-requisite(s):	GG1011		**Required for:**	ES2001
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, tutorials and skills sessions, and 1 x 2-hour practical (x 10 weeks); 7-hours fieldwork in total.			
	Scheduled learning: 77 hours		**Guided independent study:** 123 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 30%, Coursework = 20%			
	As used by St Andrews: 2-hour Written Examination = 50%, 2-hour Practical Examination = 30%, Coursework = 20%			
Re-assessment pattern:	2-hour Written Examination = 80%, Coursework = 20%, No Re-assessment if Coursework mark is <4			
Module coordinator:	Dr S Mikhail			
Module teaching staff:	Earth and Environmental Sciences staff			

ES1002 Earth Resources and Environment

SCOTCAT Credits:	20	SCQF Level 7	**Semester:**	2
Academic year:	2017/8 & 2018/9			
Planned timetable:	12.00 noon - 1.00 pm Mon - Fri; 2.00 pm - 4.00 pm Thu and Fri			
This module builds on the understanding of planet Earth gained in ES1001, with an underlying theme of the Earth's resources and environment. The processes in action at different tectonic settings (volcanism, metamorphism etc) and the natural hazards induced by these processes leads into Earth resources (metals, hydrocarbons and energy) and the applied nature of Earth Sciences in problem-solving resource and environmental issues. Key skills for Earth and environment scientists are developed and the module includes a 4-day residential field excursion to the northeast of Scotland around Easter. All travel and accommodation costs associated with the field work are provided by the School of Earth and Environmental Sciences.				
Programme module type:	Compulsory for BSc Geology, Environmental Earth Science, joint degrees with Biology and Chemistry, and MGeol Earth Sciences			
Pre-requisite(s):	Normally ES1001		**Anti-requisite(s):**	GG1012
Required for:	ES2001			
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, tutorials and 1 x 2-hour practical (x 11 weeks), plus 40 hours of fieldwork over the semester.			
	Scheduled learning: 117 hours		**Guided independent study:** 83 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 25%, Coursework = 25%			
	As used by St Andrews: 2-hour Written Examination = 50%, 2-hour Practical Examination = 30%, Coursework = 20%			
Re-assessment pattern:	2-hour Written Examination = 80%, Coursework = 20%, No Re-assessment if Coursework mark is <4			
Module coordinator:	Dr T Raub			
Module teaching staff:	Earth and Environmental Sciences staff			

ES1802 The Geological History of Scotland

SCOTCAT Credits:	12	SCQF Level 7	**Semester:**	Summer
Academic year:	2017/8			
Availability restrictions:	Available only to non-graduating students			
Planned timetable:	Mon - Fri, variable hours			

This module introduces students to Earth Science using the geological history of Scotland as a case study. This is a four-week course that focuses on applying scientific method through collection and interpretation of field data collect by students. An emphasis is placed on identifying the distinction between data and interpretation, thinking in four dimensions and hypothesis testing. No prior knowledge of geology is required. Scotland is the ideal natural laboratory; it offers classic exposures of a variety of rock types relevant to key periods of time throughout three billion-years of Earth's history. The taught content of the module includes lectures, practical classes and field excursions. Assessments are comprised of written exams (multiple choice/short answer questions, an illustrated essay), a lab exam, field notebook presentation, participation in group discussions and written reports.

Programme module type:	Summer module for non-graduating students only.	
Pre-requisite(s):	Currently enrolled in a third level institution. Completion of at least one year in a third level institution. Letter of recommendation from this institution / obtained at a 3.0 GPA in one science subject.	
Learning and teaching methods and delivery:	**Weekly contact**: Each week of this module will typically consist of 7 hrs of lectures - lab classes. In addition students will take part in an average of 9 of fieldwork each week. Students are expected to completed the directed reading assignments and read outside of this literature in their own spare time.	
	Scheduled learning: 65 hours	**Guided independent study:** 55 hours
Assessment pattern:	**As defined by QAA:** Written Examinations = 35%, Practical Examinations = 15%, Coursework = 50%	
	As used by St Andrews: 2-hour Written Examination = 35%, Practical Examination = 15%, Coursework = 50%	
Re-assessment pattern:	3-hour Written Examination = 100%	
Module coordinator:	Dr W McCarthy	

ES2001 Dynamic Earth: The Earth System

SCOTCAT Credits:	30	SCQF Level 8	**Semester:**	1
Academic year:	2017/8 & 2018/9			
Planned timetable:	10.00 am - 11.00 am Mon - Fri; 2.00 pm - 5.00 pm Tue			
This module reflects an up-to-date approach to understanding of the behaviour of the solid Earth and its interaction with the atmosphere and biosphere and beyond. It will provide detailed training in some of the processes acting at or near the Earth's surface (for example the dynamics of erosional processes). The evolution of the planet as a whole (including the evolution of life) from magma oceans in the early Earth to the present day will be covered in detail. Practical and theoretical training in geophysical methods for probing the near surface of the Earth will be provided.				
Programme module type:	Compulsory for BSc Geology, Environmental Earth Science, joint degrees with Biology and Chemistry, and MGeol Earth Sciences			
Pre-requisite(s):	ES1001 and ES1002 or equivalent		**Required for:**	ES2002, ES2003
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures and 1 x 3-hour laboratory per week, and occasional tutorials; 16 hours fieldwork			
	Scheduled learning: 96 hours		**Guided independent study:** 204 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 30%, Coursework = 20%			
	As used by St Andrews: 2-hour Written Examination = 50%, 3-hour Practical Examination = 30%, Coursework = 20%			
Re-assessment pattern:	2-hour Written Examination = 80%, Coursework = 20%, No Re-assessment if Coursework mark is <4			
Module coordinator:	Dr C Rose			
Module teaching staff:	Earth and Environmental Sciences staff			

ES2002 Dynamic Earth: Magma, Minerals and Metamorphism

SCOTCAT Credits:	30	SCQF Level 8	**Semester:**	2
Academic year:	2017/8 & 2018/9			
Planned timetable:	10.00 am - 11.00 am Mon, Wed, Fri; 2.00 pm - 5.00 pm Tue			
This module focuses on the geology and geochemistry of the solid Earth and high temperature processes in the Earth's interior. The mineral building blocks of the Earth will be covered in detail, as well as volcanic and metamorphic processes and geodynamics. A key component of this course is the residential field course to central Spain around the time of the Easter vacation, where independent field mapping will be introduced. All travel and accommodation costs associated with the field work are provided by the School of Earth and Environmental Sciences.				
Programme module type:	Compulsory for BSc Geology, BSc Environmental Earth Sciences and joint degrees with Biology and Chemistry, and MGeol Earth Sciences.			
Pre-requisite(s):	Normally ES2001		**Anti-requisite(s):**	GS2012
Learning and teaching methods and delivery:	**Weekly contact**: 3 lectures and 1 x 3-hour laboratory per week and occasional tutorials; 54 hours fieldwork.			
	Scheduled learning: 120 hours		**Guided independent study:** 188 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 20%, Coursework = 30%			
	As used by St Andrews: 2-hour Written Examination = 50%, 2-hour Practical Examination = 20%, Coursework = 30%			
Re-assessment pattern:	2-hour Written Examination = 80%, Coursework = 20%, No Re-assessment if Coursework mark is <4			
Module coordinator:	Dr W McCarthy			
Module teaching staff:	Earth and Environmental Sciences staff			

ES2003 Dynamic Earth: Earth Surface Processes

SCOTCAT Credits:	30	SCQF Level 8	**Semester:**	2
Academic year:	2017/8 & 2018/9			
Planned timetable:	Lecture: 10.00 am - 11.00 am Tue, Thu and 2.00 pm - 3.00 pm Mon. Practical 3.00 pm - 6.00 pm Mon			
This module focuses on the low temperature processes that occur in the outer envelopes of the Earth, including land-atmosphere interactions, glacial processes, tectonic geomorphology, geomicrobiology and oceanography. Relationships between physical, chemical and biological processes occurring along Earth's surface, and their impact on climate, will be explored using case studies. A key component of this course will be fieldwork to sites of environmental interest developing field skills in water/sediment sampling and analysis, and unravelling contaminant flow-patterns.				
Programme module type:	Compulsory for BSc Environmental Earth Science and MGeol Earth Sciences. Optional for BSc Geology.			
Pre-requisite(s):	ES2001			
Learning and teaching methods and delivery:	**Weekly contact**: 3 x 1-hour lectures and 1 x 3-hour laboratory per week; 12 hours of tutorials and 16 hours fieldwork over the semester.			
	Scheduled learning: 94 hours		**Guided independent study:** 206 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Re-assessment pattern:	2-hour Written Examination = 80%, Coursework = 20%, No Re-assessment if Coursework mark is <4			
Module coordinator:	Dr N Allison			
Module teaching staff:	Earth and Environmental Sciences staff			

ES2004 Practical and Field Skills for Earth Sciences (Direct Entrants)

SCOTCAT Credits:	30	SCQF Level 8	**Semester:**	Whole Year
Academic year:	2017/8 & 2018/9			
Availability restrictions:	Available only to students who have been accepted for direct 2nd year entry to an Earth Science degree programme.			
Planned timetable:	12.00 noon - 1.00 pm Mon - Fri; practical 2.00 pm - 4.00 pm Thu or Fri			

This module is only available to students who have been accepted for direct 2nd year entry to an Earth Science degree programme. It provides basic practical and fieldwork skills that are not taught at secondary school and which characterise University-taught, accredited Earth Science programmes. Students will take part in level 1 practical and field-based exercises, and then apply these skills to the level 2 teaching programme. The students will also attend those aspects of the lecture programme that are not covered in A-level or Higher Geology curricula. The learning in this module will supplement and complement the ES2001, 2002 & 2003 teaching.

Programme module type:	Compulsory for Direct entrants to Second Year Geology		
Pre-requisite(s):	Direct Second Year acceptance to BSc Geology, BSc Environmental Earth Science or MGeol Earth Science Degrees		
Co-requisite(s):	Normally ES2001, ES2002 and ES2003	**Anti-requisite(s):**	ES1001, ES1002
Learning and teaching methods and delivery:	**Weekly contact**: Weekly lectures, practical classes, and fieldwork. Generally 5 hours per week lecture/lab time plus associated field classes.		
	Scheduled learning: 190 hours	**Guided independent study:** 110 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 50%, Coursework = 50%		
	As used by St Andrews: Coursework = 100% (made up of Group Work and 2 Field Excursions = 50%, Practical Examinations = 50%)		
Re-assessment pattern:	2-hour Written Examination = 100%		
Module coordinator:	Dr C Rose		
Module teaching staff:	Earth and Environmental Sciences staff		