This pamphlet should be read in conjunction with the College Prospectus and the information it contains is subject to the terms and conditions set out in the College Prospectus
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## GEOLOGY OF THE SOLAR SYSTEM 15 credits SCES009H4

### MODULE OUTLINES LEVEL 5 (2ND YEAR MODULES)

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<td>IGNEOUS PETROLOGY 15 credits</td>
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<td>SCES005H5</td>
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<td>15</td>
<td>SCES006H5</td>
</tr>
<tr>
<td>PRINCIPLES OF SEDIMENTOLOGY 15 credits</td>
<td>15</td>
<td>SCES008H5</td>
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<tr>
<td>STRUCTURAL GEOLOGY I 15 credits</td>
<td>15</td>
<td>EASC011H5</td>
</tr>
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<td>FORENSIC GEOLOGY 15 credits</td>
<td>15</td>
<td>EASC074H5</td>
</tr>
<tr>
<td>INTRODUCTION TO ASTROBIOLOGY 15 credits</td>
<td>15</td>
<td>EASC064H5</td>
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<tr>
<td>GEOLGY OF THE SOLAR SYSTEM II 15 credits</td>
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### MODULE OUTLINES LEVEL 6 (3RD/4TH YEAR MODULES)

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<tr>
<td>PETROLEUM GEOLOGY 15 credits</td>
<td>15</td>
<td>SCES018H6</td>
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<tr>
<td>METAMOPHIC PROCESSES 15 credits</td>
<td>15</td>
<td>SCES037H6</td>
</tr>
<tr>
<td>STRUCTURAL GEOLOGY II 15 credits</td>
<td>15</td>
<td>EASC018H6</td>
</tr>
<tr>
<td>ADVANCED PALAEOECOLOGY 15 credits</td>
<td>15</td>
<td>EASC021H6</td>
</tr>
<tr>
<td>MAGMATIC PROCESSES 15 credits</td>
<td>15</td>
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<td>ENVIRONMENTAL ISOTOPES 15 credits</td>
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<td>SCIENTIFIC COMPUTING AND DATA MODELLING 15 credits</td>
<td>15</td>
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<td>PALAEOECOLOGY 15 credits</td>
<td>15</td>
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<td>GLOBAL TECTONICS 15 credits</td>
<td>15</td>
<td>EASC041H6</td>
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<td>GEOLOGICAL HAZARDS 15 credits</td>
<td>15</td>
<td>EASC044H6</td>
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<td>CHEMISTRY &amp; POLLUTION OF SOIL, AIR AND WATER 15 credits</td>
<td>15</td>
<td>EASC045H6</td>
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<td>EARTH'S RESOURCES &amp; RAW MATERIALS 15 credits</td>
<td>15</td>
<td>EASC048H6</td>
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<td>PALAEOCLIMATOLOGY 15 credits</td>
<td>15</td>
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<td>PHYSICAL PRINCIPLES OF ASTRONOMY 15 credits</td>
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<td>REMOTE SENSING AND PLANETARY SURFACES 15 credits</td>
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<td>SCES002H6</td>
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<td>TECTONIC GEOMORPHOLOGY 15 credits</td>
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### FIELD CLASS MODULES

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<tr>
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<th>Credits</th>
<th>Code</th>
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<tr>
<td>ASSESSED FIELD TECHNIQUES 4 x 15 credits</td>
<td>60</td>
<td>SCES053H5, EASC054H5, EASC056H6, EASC055H6</td>
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<tr>
<td>FIELD CLASS FOR PLANETARY SCIENCE 15 credits</td>
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### PROJECTS/ MAP AND THESIS

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<th>Credits</th>
<th>Code</th>
</tr>
</thead>
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<td>SCES016D6</td>
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<td>PROJECT FOR BSc GEOLOGY 60 credits</td>
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<td>SCES021D6</td>
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<tr>
<td>PROJECT FOR PLANETARY SCIENCE WITH ASTRONOMY 60 credits</td>
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<tr>
<td>ENVIRONMENTAL GEOLOGY PROJECT 60 credits</td>
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<tr>
<td>MAP &amp; THESIS 60 credits</td>
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<td>SCES015D6</td>
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Submission information for Projects/Map and Thesis

Mitigating, Deferral or Withdrawal for Project or Map and Thesis Submission
## Introduction

This pamphlet provides a guide to the BSc and Certificate programmes given in the Department of Earth and Planetary Sciences at Birkbeck. The prerequisites defined for each programme are in terms of modules at Birkbeck; exemptions and equivalent modules elsewhere can be considered.

## Modules Available for Study

This is a comprehensive list of modules we offer. You will find further information about these modules in the second part of this document (pages 35 onwards). Modules are listed according to level, with introductory modules listed as “first year” (Level 4) to advanced modules listed as “third and fourth year” (Level 6). Keep in mind that depending on which programme you are enrolled on, different restrictions and requirements may apply to your module choices. See below for details on compulsory modules for our BSc and Certificate programs. The modules listed mostly have a value of 15 credits (i.e. half-modules), except where indicated otherwise.

<table>
<thead>
<tr>
<th>Level</th>
<th>Module Code</th>
<th>Module Title</th>
<th>Credits</th>
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<td>1st year</td>
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<td>Introduction to Geology</td>
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<tr>
<td>1st year</td>
<td>EASC057H4</td>
<td>Foundations of Mineralogy</td>
<td></td>
</tr>
<tr>
<td>1st year</td>
<td>EASC038H4</td>
<td>Introduction to Geochemistry</td>
<td></td>
</tr>
<tr>
<td>1st year</td>
<td>EASC042H4</td>
<td>Invertebrate Palaeontology</td>
<td></td>
</tr>
<tr>
<td>1st year</td>
<td>EASC050H4</td>
<td>Earth History</td>
<td></td>
</tr>
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<td>1st year</td>
<td>EASC053H4</td>
<td>Assessed Field Techniques 1</td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td>SCES010H5</td>
<td>Geology of the Solar System I</td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td>SCES001H4</td>
<td>Foundations of Astronomy</td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td>EASC005H5</td>
<td>Geophysics</td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td>EASC011H5</td>
<td>Structural Geology I</td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td>SCES005H5</td>
<td>Igneous Petrology</td>
<td></td>
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<tr>
<td>2nd year</td>
<td>EASC006H5</td>
<td>Metamorphic Petrology</td>
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</tr>
<tr>
<td>2nd year</td>
<td>SCES008H5</td>
<td>Principles of Sedimentology</td>
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</tr>
<tr>
<td>2nd year</td>
<td>EASC054H5</td>
<td>Assessed Field Techniques 2</td>
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<tr>
<td>2nd year</td>
<td>EASC064H5</td>
<td>Introduction to Astrobiology</td>
<td></td>
</tr>
<tr>
<td>2nd year</td>
<td>EASC074H5</td>
<td>Forensic Geology</td>
<td></td>
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<tr>
<td>2nd year</td>
<td>SCES010H5</td>
<td>Geology of the Solar System 2</td>
<td></td>
</tr>
<tr>
<td>3rd and 4th year</td>
<td>EASC018H6</td>
<td>Structural Geology II</td>
<td></td>
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<tr>
<td>3rd and 4th year</td>
<td>EASC021H6</td>
<td>Advanced Palaeontology</td>
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<tr>
<td>3rd and 4th year</td>
<td>EASC029H6</td>
<td>Magmatic Processes</td>
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<td>3rd and 4th year</td>
<td>EASC059H6</td>
<td>Volcanism of the Solar System</td>
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<td>3rd and 4th year</td>
<td>EASC041H6</td>
<td>Global Tectonics</td>
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<td>3rd and 4th year</td>
<td>EASC048H6</td>
<td>Earth's Resources &amp; Raw Materials</td>
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<td>3rd and 4th year</td>
<td>EASC055H6</td>
<td>Assessed Field Techniques 3</td>
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<tr>
<td>3rd and 4th year</td>
<td>EASC039H6</td>
<td>Palaeoecology</td>
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<tr>
<td>3rd and 4th year</td>
<td>EASC044H6</td>
<td>Geological Hazards</td>
<td></td>
</tr>
<tr>
<td>3rd and 4th year</td>
<td>EASC045H6</td>
<td>Chemistry and Pollution of Water, Soil and Air</td>
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<td>3rd and 4th year</td>
<td>EASC066H6</td>
<td>Tectonic Geomorphology</td>
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<td>3rd and 4th year</td>
<td>EASC056H6</td>
<td>Assessed Field Techniques 4</td>
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<tr>
<td>3rd and 4th year</td>
<td>SCES014H6</td>
<td>Palaeoclimatology</td>
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<tr>
<td>3rd and 4th year</td>
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<td>Petroleum Geology</td>
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<tr>
<td>3rd and 4th year</td>
<td>SCES022H6</td>
<td>Physical Principles of Astronomy</td>
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<tr>
<td>3rd and 4th year</td>
<td>SCES002H6</td>
<td>Comets, Asteroids and Meteorites</td>
<td></td>
</tr>
</tbody>
</table>
These modules are independent study modules, usually taken in the 3rd year of the 3-year (UCAS) programme, 3rd and 4th year of the 4-year programme, and 5th and 6th year of the decelerated 6-year degree programme, and are specific to different degree programmes:

- Mapping & Thesis BSc Geology
- Project BSc Earth Sciences
- Environmental Geology Project
- Project BSc Geology
- Project BSc Planetary Science with Astronomy
- Advanced Topics in Planetary Science
- Planetary Science Field Work
Programmes of Study in the Department of Earth and Planetary Sciences

All of the degrees offered by the Department conform to the Common Awards Scheme. Degrees are made up of 15, 30 and 60 credit modules. Modules are assessed at Levels 4, 5 and 6. The BSc Degree is made up of 360 credits. More on the policies and regulations of the College can be found at: http://www.bbk.ac.uk/registry/policies/regulations

BSc degrees

We offer four different BSc degrees:

- BSc Geology (accredited by the Geological Society) (This can be studied via a 4-year route, a decelerated 6-year route, or by a 3-year full-time UCAS route)
- BSc Environmental Geology
- BSc Earth Sciences
- BSc Planetary Science with Astronomy (This can be studied via a 4-year part-time route or by a 3-year full-time UCAS route)

Certificates of Higher Education

We offer a range of Certificates designed to enhance expertise in particular subject areas within the Earth and Planetary Sciences. Certificate students may transfer up to a BSc degree program at any point before completion of their Certificate requirements. The certificates offered are:

- Certificate in Geology
- Certificate in Planetary Science with Astronomy
- Certificate in Mineralogy and Volcanology
- Certificate in Earth History and Palaeontology
- Certificate in Forensic Geology

Graduate Certificates

We offer Graduate certificates as follows for students who already have a BSc degree:

- **Graduate Certificate in Geology**
The Graduate Certificates are 2-year programmes and you will need to gain 60 credits. This will normally include four 15-credit modules from Years 3 and 4 of the BSc Geology degree. Please note that advanced modules are usually taught in alternate years and will not be available every year.

- **Graduate Certificate in Environmental Geology**
The Graduate Certificate in Environmental Geology is a 2-year programme and you will need to gain 60 credits. This will normally include four 15-credit modules from Years 3 and 4 of the BSc Environmental Geology. Advanced modules are usually taught in alternate years and will not be available every year.

- **Graduate Certificate in Planetary Science and Astronomy**
The Graduate Certificate in Planetary Science and Astronomy is a 2-year programme and you will need to gain 60 credits. This will normally include four 15-credit modules from Years 3 and 4 of the BSc Planetary Sciences with Astronomy. Advanced modules are usually taught in alternate years and will not be available every year.

Non-degree students

Non-degree students may take exams, but their credits do not count toward an academic qualification.
Non-degree students who decide they want to transfer up to a BSc programme should do so as soon as possible. There are limits on the number of modules studied at a non-degree level that can be transferred to a degree programme, any transfer will be subject to approval by the Degrees Committee.

The following shows a flowchart outlining possible progression routes through the various study programmes toward completion. Below you will find more detailed information about programme requirements for BSc degrees and Certificates.
Entry

Non-degree study

Credit for previous study

Certificate programmes (120 credits of study)

Transfer to degree

BSc degree programmes: four options

BSc Earth Sciences
12 full modules (at least 5 at advanced Level 6) including Project BSc Earth Sciences, with no fieldwork requirement. Usually taken by distance learning.

BSc Geology (accredited degree)
(3 years full-time [UCAS], 4 years part-time [decelerated]). 12 full modules (at least 5 at advanced Level 6), including Assessed Field Techniques, Map and Thesis / Field-based project.

BSc Environmental Geology
12 full modules (at least 5 at advanced Level 6), including Assessed Field Techniques, an Environmental Geology BSc project, and 105 credits of environmental geology modules.

BSc Planetary Science with Astronomy
(3 years full-time [UCAS], 4 years part-time [decelerated]). 12 full modules (at least 5 at advanced Level 6), including a planetary science project.
BSc Geology 4 Year Part-Time

The BSc Honours degree in Geology is accredited by the Geological Society. It can be taken in 3 years (UCAS entry), 4 years (normal, part-time) or 6 years (decelerated). Students take a total of twelve full modules, of which at least 5 must be at advanced level (3rd/4th year optional modules). Students can take a minimum of three of the four Assessed Field Techniques 15 credit modules plus the 60-credit module of either Map & Thesis or field-based Geology Project which are compulsory.

Some modules at 1st and 2nd year level are designed for other degree programmes, and are not part of the compulsory curriculum for BSc Geology students. It is possible for BSc Geology students to take these modules if they wish, but they may not substitute these modules for any of the required modules listed below, and students are advised to consult with their tutor before taking any optional 1st/2nd year modules, since grades earned may not ultimately count toward their degree. The modules available are as follows (except where indicated, most are ½ modules whose values are 15 credits). Note that students on the 6-year decelerated degree will only take the modules indicated with a * in their 1st year (total of 60 credits), and will take modules indicated with a ^ in their 2nd year (60 credits including AFT1). They will complete their 3rd year by taking modules indicated (60 credits, including AFT2), and will take Geophysics in their 4th year. They are expected to undertake their Map and Thesis, or Field-based Project, in their 5th/6th years, together with optional modules.

Students are expected to attend Assessed Field Techniques I and to complete the registration process for this module in good time. This does require the payment of a deposit to ensure hotel places are secured. Students who do not complete the registration process for Assessed Field Techniques I by the specified date will be transferred to the BSc Earth Sciences which does not require students to attend any of the Assessed Field Technique classes as compulsory modules.

Compulsory 1st year modules (given every year)
EASC001S4 Introduction to Geology (30 credits)*
EASC057H4 Foundations of Mineralogy^
EASC038H4 Introduction to Geochemistry^
EASC042H4 Invertebrate Palaeontology*
EASC050H4 Earth History*
EASC053H4 Assessed Field Techniques 1^

optional 1st year module
SCES010H5 Geology of the Solar System I
SCES001H4 Foundations of Astronomy

Compulsory 2nd year modules, given every year
EASC005H5 Geophysics
EASC011H5 Structural Geology I
SCES005H5 Igneous Petrology
EASC006H5 Metamorphic Petrology
SCES008H5 Principles of Sedimentology
EASC054H5 Assessed Field Techniques II

optional 2nd year modules
EASC064H5 Introduction to Astrobiology
EASC074H5 Forensic Geology
SCES010H5 Geology of the Solar System 2
These modules are given in alternate years:

3rd and 4th year

- EASC018H6 Structural Geology II
- EASC021H6 Advanced Palaeontology
- EASC029H6 Magmatic Processes
- EASC041H6 Global Tectonics
- EASC048H6 Earth's Resources & Raw Materials
- EASC055H6 Assessed Field Techniques 3 (compulsory)
- EASC059H6 Volcanism in the Solar System
- EASC039H6 Palaeoecology
- SCES014H6 Palaeoclimatology
- EASC044H6 Geological Hazards
- EASC045H6 Chemistry and Pollution of Water, Soil and Air
- EASC066H6 Tectonic Geomorphology
- SCES018H6 Petroleum Geology
- SCES002H6 Comets, Asteroids and Meteorites
- SCES019H6 Scientific Computing and Data Modelling
- SCES036H6 Environmental Isotopes
- SCES035H6 Remote Sensing and Planetary Surfaces
- SCES037H6 Metamorphic Processes
- EASC056H6 Assessed Field Techniques 4

Compulsory 4th year module

Either SCES015D6 Mapping & Thesis (60 credits)
Or SCES021D6 Project for BSc Geology (60 credits)

**BSc Geology 3-Year Full Time**

Compulsory 1st year modules (given every year)

- EASC001S4 Introduction to Geology (30 credits)
- EASC007H4 Foundations of Mineralogy
- EASC038H4 Introduction to Geochemistry
- EASC042H4 Invertebrate Palaeontology
- EASC050H4 Earth History
- EASC053H4 Assessed Field Techniques 1

Compulsory 2nd year modules, given every year

- SCES005H5 Igneous Petrology
- SCES006H5 Metamorphic Petrology
- SCES008H5 Principles of Sedimentology
- EASC011H5 Structural Geology I
- EASC005H5 Geophysics
- EASC054H5 Assessed Field Techniques 2

Compulsory 3rd year modules, given every year

- SCES005H5 Igneous Petrology
- SCES006H5 Metamorphic Petrology
- SCES008H5 Principles of Sedimentology
- EASC011H5 Structural Geology I
- EASC055H6 Assessed Field Techniques 3
To fulfil The Geological Society requirement for accreditation, full-time BSc Geology students need to take at least three AFT modules and complete the Map and Thesis which will give you enough days in the field to qualify for membership. Therefore, students enrolled on the three year BSc Geology Degree are normally required to register for the Map and Thesis rather than the Geology Project.

These modules are given in alternate years – you would take modules from this list in the second and third year.

2nd and 3rd year
- EASC018H6 Structural Geology II
- EASC021H6 Advanced Palaeontology
- EASC029H6 Magmatic Processes
- EASC041H6 Global Tectonics
- EASC048H6 Earth's Resources & Raw Materials
- EASC055H6 Assessed Field Techniques 3 (compulsory)
- EASC059H6 Volcanism in the Solar System
- EASC039H6 Palaeoecology
- SCES014H6 Palaeoclimatology
- EASC044H6 Geological Hazards
- EASC045H6 Chemistry and Pollution of Water, Soil and Air
- EASC066H6 Tectonic Geomorphology
- SCES018H6 Petroleum Geology
- SCES002H6 Comets, Asteroids and Meteorites
- SCES019H6 Scientific Computing and Data Modelling
- SCES036H6 Environmental Isotopes
- SCES035H6 Remote Sensing and Planetary Surfaces
- SCES037H6 Metamorphic Processes
- EASC056H6 Assessed Field Techniques 4

Changing from 4-year degree to 3-year degree

Students on the part-time BSc Degree in Geology who have achieved an overall grade of a 2:1 in their first year modules may be allowed to transfer to the full-time BSc Degree. Students interested in doing this are required to discuss it first with their Programme Director (Professor Hilary Downes) and should note the following:
(i) The workload will increase from 90 credits to 120 credits per year (i.e. from three to four evenings per week);
(ii) The annual fee will increase, and there are also strict limits on the amount of time that full-time students are allowed to work during their studies. Students should therefore seek advice from the Student Funding Advice Team regarding fee and student loan status before transferring to the full-time programme. Information can be found at: http://www.bbk.ac.uk/mybirkbeck/finance/studentfinance/contact-us
**BSc Environmental Geology**

The requirements for the BSc Environmental Geology degree are similar to those of the BSc Geology, outlined above, with some exceptions. The programme normally extends over four years. Students take a total of twelve modules, of which at least 5 must be at an advanced level.

It is compulsory to take the four Assessed Field Techniques classes. While the 3rd/4th year modules are optional, it is compulsory to take at least three 15-credit modules of Environmental Geology. The Environmental Geology modules are: Earth’s Resources and Raw Materials, Tectonic Geomorphology, Geological Hazards, and Chemistry and Pollution of Water, Soil and Air. The module “Environmental Geology Project” is also compulsory.

Please refer to the list outline under “BSc Geology” for the modules available from first year to fourth year level on the BSc Environmental Geology. Please also note that the same restrictions apply to students wishing to take any of the optional 1st or 2nd year modules.

**BSc Earth Sciences**

The BSc Earth Sciences is a degree, designed particularly with the Distance Learner in mind. The main difference between this degree and the BSc Geology is that there is no specified fieldwork requirement. Students take a total of 12 modules, of which at least 5 must be at an advanced level.

Some modules at 1st and 2nd year level are designed for other degree programs, and are not part of the compulsory curriculum for BSc Earth Science students. It is possible for BSc Earth Science students to take these modules if they wish, but they may not substitute these modules for any of the required modules listed below, and students are advised to consult with their tutor before taking any optional 1st/2nd year modules, since grades earned may not ultimately count toward their degree. The modules available are as follows (module value 15 credits except where indicated).

**Compulsory 1st year modules (given every year)**
- EASC001S4 Introduction to Geology (30 credits)
- EASC005H4 Geophysics
- EASC011H5 Structural Geology I
- SCES005H5 Igneous Petrology
- SCES006H5 Metamorphic Petrology
- EASC013S5 Principles of Sedimentology

**optional 1st year modules**
- SCES010H5 Geology of the Solar System I
- EASC053H4 Assessed Field Techniques 1

**Compulsory 2nd year modules, given every year**
- EASC005H5 Geophysics
- EASC011H5 Structural Geology I
- SCES005H5 Igneous Petrology
- SCES006H5 Metamorphic Petrology
- EASC013S5 Principles of Sedimentology

**optional 2nd year modules**
- EASC064H5 Introduction to Astrobiology
- EASC054H5 Assessed Field Techniques 2
- EASC074H5 Forensic Geology
- SCES010H5 Geology of the Solar System 2
The following modules are given in alternate years:

3rd and 4th year

- EASC018H6 Structural Geology II
- EASC021H6 Advanced Palaeontology
- EASC029H6 Magmatic Processes
- EASC041H6 Global Tectonics
- EASC048H6 Earth's Resources & Raw Materials
- EASC055H6 Assessed Field Techniques 3
- EASC059H6 Volcanism of the Solar System
- SCES002H6 Comets, Asteroids and Meteorites
- EASC039H6 Palaeoecology
- SCES014H6 Comets, Asteroids and Meteorites
- EASC044H6 Geological Hazards
- EASC045H6 Chemistry and Pollution of Water, Soil and Air
- EASC066H6 Tectonic Geomorphology
- EASC056H6 Assessed Field Techniques 4
- SCES018H6 Petroleum Geology
- SCES016D6 Project for Earth Science (60 credit)
- SCES019H6 Scientific Computing and Data Modelling (new 2016/17)
- SCES036H6 Environmental Isotopes
- SCES035H6 Remote Sensing and Planetary Surfaces
- SCES037H6 Metamorphic Processes

Compulsory 4th year module
- SCES016D6 Project for Earth Science (60 credit)

BSc Planetary Science with Astronomy 4 Year

This degree is designed to give students a broad introduction to the Earth and Planetary sciences within their wider astronomical context. The programme includes a strong emphasis on the geological investigations of the planets and moons of the Solar System, as well as introductory modules on astronomy and astrobiology (the search for life in the Universe). The BSc Planetary Science with Astronomy is available as a 4 year part-time or 3 year full-time programme.

Changing from 4-year degree to 3-year degree

Students on the part-time BSc Degree in Planetary Science with Astronomy who have achieved an overall grade of a 2:1 in their first year modules may be allowed to transfer to the full-time BSc Degree. Students interested in doing this are required to discuss it first with their Programme Director (Professor Ian Crawford) and should note the following:

(i) The workload will increase from 90 credits to 120 credits per year (i.e. from three to four evenings per week);
(ii) Additionally, because the first year of the full-time B.Sc. programme also contains 120 credits, it will be necessary to take the two 15-credit modules not taken in the first year during the remaining two years. Because of time-table clashes, it is very likely that these will have to be done in a ‘distance learning’ mode (i.e. through Moodle, but without face-to-face contact with the lecturer).
(iii) The annual fee will increase, and there are also strict limits on the amount of time that full-time students are allowed to work during their studies. Students should therefore seek advice from the Student Funding Advice Team regarding fee and student loan status before transferring to the full-time programme. Information can be found here: http://www.bbk.ac.uk/mybirkbeck/finance/studentfinance/contact-us

- 12 -
All students on this degree programme study the same modules in the first two years and then choose from a wide array of options in their final two years. Students take a total of twelve modules, of which at least 5 must be at an advanced level. The modules available are as follows (module values are 15 credits except where indicated).

**Compulsory 1st year modules (given every year)**
- EASC001S4 Introduction to Geology (30 credits)
- SCES010H4 Geology of the Solar System I
- EASC038H4 Introduction to Geochemistry
- EASC057H4 Foundations of Mineralogy
- SCES001H4 Foundations of Astronomy

**Optional 1st year 15-credit module (given every year)**
- EASC054H5 Assessed Field Techniques 1

**Compulsory 2nd year modules, given every year**
- SCES010H5 Geology of the Solar System II
- SCES005H5 Igneous Petrology
- EASC064H5 Introduction to Astrobiology
- EASC005H5 Geophysics

**Optional modules**
- EASC050H5 Earth History
- EASC011H5 Structural Geology I
- EASC054H5 Assessed Field Techniques 1 or 2
- PHAS1130 Observational Astronomy (at UCL)
- SCE006H5 Metamorphic Petrology

**3rd and 4th years**

**Compulsory 3rd/4th year modules**
- EASC059H6 Volcanism in the Solar System
- SCES002H6 Comets, Asteroids and Meteorites
- SCES003H6 Scientific Computing and Data Modelling
- SCES022H6 Physical Principles of Astronomy
- SCES035H6 Remote Sensing and Planetary Surfaces
- SCES047H6 Exploration and Modelling of Planetary Interiors
- EASC072H6 Advanced Topics in Planetary Science
- SCES016D6 Project for Planetary Sciences with Astronomy (60 credits)

**Note:** Students on the Part-time Planetary Science with Astronomy Degree will take Geology of the Solar System II in year two.

**Optional 3rd and 4th year modules given in alternate years:**
- EASC018H6 Structural Geology II
- EASC029H6 Magmatic Processes
- EASC041H6 Global Tectonics
- EASC048H6 Earth’s Resources & Raw Materials
- EASC055H6 Assessed Field Techniques 3
- EASC044H6 Geological Hazards
- EASC045H6 Chemistry and Pollution of Water, Soil and Air
You may also take modules in other subjects, including optional field modules, to complement your geological studies or to broaden your scientific background and skills.

**BSc Planetary Science with Astronomy 3 Year Full Time**

All students on this degree programme study the modules over three years and will choose from a wide array of options in year two. Students take a total of twelve modules, of which at least 5 must be at an advanced level. The modules available are as follows (module values are 15 credits except where indicated). Students take 120 CATS per year. **Students on the full time BSc Planetary Science with Astronomy Degree will attend classes four evenings a week and will take Geology of the Solar System I and II in their first year.**

### Compulsory 1st year modules (given every year)
- EASC001S4 Introduction to Geology (30 credits)
- SCES010H4 Geology of the Solar System I
- SCES010H5 Geology of the Solar System II
- EASC038H4 Introduction to Geochemistry
- EASC057H4 Foundations of Mineralogy
- SCES001H4 Foundations of Astronomy

### Choose one Optional 1st year 15-credit modules (given every year)
- EASC054H5 Assessed Field Techniques I
- EASC050H4 Earth History

### Compulsory 2nd year modules, given every year
- SCES005H5 Igneous Petrology
- EASC064H5 Introduction to Astrobiology
- EASC005H5 Geophysics
- SCES002H6 Comets, Asteroids and Meteorites (offered alternate years)
  Or
- EASC059H6 Volcanism in the Solar System (offered alternate years)
- SCES003H6 Scientific Computing and Data Modelling (offered alternate years)
  Or
- SECS022H6 Physical Principles of Astronomy (offered alternate years)
- SCES047H6 Exploration and Modelling of Planetary Interiors (offered alternate years)
  Or
- SCES035H6 Remote Sensing and Planetary Surfaces (offered alternate years)
All three pairs of modules listed ‘Or’ above are compulsory modules but are offered in alternate years. For each pair, students will take both modules (one in year 2 and one in year 3), but the order will depend on which module of the pair is on when the student reaches year 2.

### Two Optional 2nd Year modules:

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Module Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCES008H5</td>
<td>Principles of Sedimentology</td>
</tr>
<tr>
<td>EASC011H5</td>
<td>Structural Geology I</td>
</tr>
<tr>
<td>EASC054H6</td>
<td>Assessed Field Techniques 2</td>
</tr>
<tr>
<td>PHAS1130</td>
<td>Practical Astronomy at UCL (subject to availability)</td>
</tr>
<tr>
<td>SCE006H5</td>
<td>Metamorphic Petrology</td>
</tr>
<tr>
<td>SCES019H6</td>
<td>Scientific Computing and Data Modelling (available 2016/17)</td>
</tr>
<tr>
<td>SCES048H6</td>
<td>Field class for Planetary Science</td>
</tr>
</tbody>
</table>

### 3rd year

#### Compulsory 3rd year modules

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Module Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCES002H6</td>
<td>Comets, Asteroids and Meteorites (offered alternate years)</td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
<tr>
<td>EASC059H6</td>
<td>Volcanism in the Solar System (offered alternate years)</td>
</tr>
<tr>
<td>SCES03H6</td>
<td>Scientific Computing and Data Modelling (offered alternate years)</td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
<tr>
<td>SECS022H6</td>
<td>Physical Principles of Astronomy (offered alternate years)</td>
</tr>
<tr>
<td>SCES047H6</td>
<td>Exploration and Modelling of Planetary Interiors (offered alternate years)</td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
<tr>
<td>SCES035H6</td>
<td>Remote Sensing and Planetary Surfaces (offered alternate years)</td>
</tr>
<tr>
<td>EASC072H6</td>
<td>Advanced Topics in Planetary Science</td>
</tr>
<tr>
<td>SCES016D6</td>
<td>Project for Planetary Sciences with Astronomy (60 credits)</td>
</tr>
</tbody>
</table>

"NASA image"
Certificates

Most of our Certificates of Higher Education require students to study over a period of 2 years, earning a total of 120 credits. Most of the modules are 15 credits with some at 30 credits. Some modules are compulsory depending on the subject specialisation, and some modules are optional. Students may transfer from certificate to BSc level at any time prior to completion of the modules designated for the certificate.

Certificate in Geology

This is a two year programme. Students need to gain 120 credits and can choose modules from year 1 and 2 of the BSc Geology degree. This will normally include one 30 credit module, Introduction to Geology and six 15 credit modules from the first and second years of the BSc Geology degree.

Year 1 (60 credits total) Introduction to Geology (30 credits), Foundations of Mineralogy (15 credits), Earth History (15 credits).

Year 2 (60 credits total) Igneous Petrology, Metamorphic Petrology, Principles of Sedimentology, plus choice from Introduction to Geochemistry, Invertebrate Palaeontology, Geophysics, Structural Geology I, Assessed Field Techniques 1.

Certificate in Planetary Science with Astronomy

This is a two year programme. Students need to gain 120 credits and can choose modules from year 1 and 2 of the BSc Planetary Science with Astronomy degree.

Year 1:  
Introduction to Geology (30 credits), Geology of the Solar System I (15 credits), Foundations of Astronomy (15 credits)

Year 2:  
Core modules: Geology of the Solar System II, Introduction to Astrobiology  
Plus a choice of two 15-credit modules from: Introduction to Geochemistry; Foundations of Mineralogy; Geophysics; Global Tectonics; Introduction to Astrobiology; Assessed Field Techniques; Volcanism in the Solar System.

Certificate in Earth History and Palaeontology

Study over two years – total 120 credits.

Year 1  
Compulsory modules: Introduction to Geology (30 credits); Earth History (15 credits); Invertebrate Palaeontology (15 credits)

Year 2  
One compulsory 15-credit module: Principles of Sedimentology (15 credits)  
Choice of three 15-credit modules from: Advanced Palaeontology, Palaeoecology, Tectonic Geomorphology, or Introduction to Astrobiology.
Certificate in Mineralogy and Volcanology

Study over two years – total 120 credits.

Year 1:
Compulsory modules: Introduction to Geology (30 credits); Introduction to Geochemistry (15 credits); Foundations of Mineralogy (15 credits).

Year 2
Two compulsory 15-credit modules: Igneous Petrology (15 credits); Metamorphic Petrology (15 credits).

Choice of two 15 credit modules from: Magmatic Processes, Volcanism in the Solar System, or Earth’s Resources and Raw Materials.

Certificate in Forensic Geology

Study over two years – total 120 credits.

Year 1
Two compulsory modules: Introduction to Geology (30 credits), Introduction to Geochemistry (15 credits), Invertebrate Palaeontology (15 credits)

Year 2
Two compulsory modules: Principles of Sedimentology (15 credits) Palaeoecology (15 credits); Forensic Geology (15 Credits) plus one option at 15 credits.

Graduate Certificate in Geology

You can choose a total of 4 modules (60 credits) from Years 3 and 4 of the BSc Geology degree. Graduate Certificate modules are taught in alternate years and will not be available every year.

Graduate Certificate in Environment Geology

You can choose modules from Years 3 and 4 of the BSc Environmental Geology degree. This is a two year programme. Students need to gain 60 credits. This will normally include four 15 credit modules. Graduate Certificate modules are taught in alternate years and will not be available every year.
General Information for Students in Earth and Planetary Sciences

The recommended reading lists given are not intended to be comprehensive, and in advanced modules in particular further references (including original literature) will be given. For 3rd & 4th year modules it is essential for students to begin relevant reading during the summer vacation. Books suggested for purchase by students are indicated by an asterisk, but in some modules the relative merits of possible alternatives will be discussed by the lecturer.

Normal teaching is in the evenings between 6pm and 9pm, and the normal pattern is for a lecture (about one hour) to be followed by related practical work after a short break. Graduate demonstrators are employed to assist with larger practical classes. Classes are held each week during the autumn and spring terms. Our 15-credit modules consist of 11 weeks of lectures during either the autumn or spring term, followed by revision for each module in the summer term. Friday evenings are reserved for consolidation, revision and study skills classes, and departure for field classes. Additional reading, unsupervised study and practical work, and submission of essays etc will be necessary if a module is to be completed satisfactorily. Examinations are usually held in May and June during the day.

Tutorial arrangements
Students entering the first year of the degree are encouraged to consult the Admissions Tutor (Dr Charlie Underwood) should difficulties or problems arise. Following consultations during the second year of the degree, students are assigned to a member of the academic staff who will act as adviser throughout the remainder of the degree. The same member of academic staff will also supervise the assigned student's work in their Mapping & Thesis or Project. Students entering directly the 2nd or 3rd year of the degree will be immediately assigned to an adviser/supervisor.

Fieldwork
For some modules weekend field classes may be organised. Longer field classes during the Easter vacation are generally year-based rather than related to a specific module.

Easter Field Classes
Easter field classes form an integral part of the BSc Geology and BSc Environmental Geology. Apart from exceptional circumstances, which should be reported to the undergraduate tutor, the department requires all BSc Geology and Environmental Geology students to attend three such field classes during their programme. (This will not apply to the BSc in Earth Sciences or BSc in Planetary Science with Astronomy). Field-class attendance and performance will contribute to the 15-credit modules of Assessed Field Techniques.

Safety on fieldwork
Fieldwork is an activity which involves some special risks and hazards as it takes students onto coastal cliffs and high mountains and into rivers, quarries and mines. Consequently it is vital that all students read and follow the safety procedure outlined in the safety material provided to them. Students should also be familiar with the Department Fieldwork Safety Code of Practise. All students should submit their signed Student Declaration of Safety Information to the Department Administrator before they attend any field classes.

Exams
Exams are held in the daytime. Please ensure you have made appropriate arrangements for taking leave during the examination period.
EXAMINATIONS

INTRODUCTION
The following describes how degree programmes in Geology, Environmental Geology, Earth Sciences, and Planetary Sciences with Astronomy are examined, and explains the Scheme for the Award of Honours for BSc degrees at Birkbeck College.

The examination of degree programmes are the responsibility of the College Sub-Board of Examiners in Geology. The Sub-Board includes as Internal (College) members who are the academic staff. There are also three Visiting Examiners, of whom one is from another College of the University of London (the Intercollegiate Examiner) and the other two are from another University. The Geology Sub-Board reports to the College Board of Examiners for the BSc Degree, and the Visiting Examiners also report independently to the College and the University.

Exams are normally held in the Summer term in May and early June during the day (morning or afternoon). The exam timetable is set by College Exams office and may be held in College or in the Department.

Please ensure you have made appropriate arrangements for taking leave during the examination period.

STRUCTURE OF THE BSc DEGREES
The BSc programmes are modular in structure, with the subject matter organised into 30-credit or 15-credit modules. Students take 12 full modules (360 credits) of which 5 must be taken at an Advanced level, and each module or half-module is examined separately. The College Boards and Sub-Boards normally require all finalist candidates to undergo an oral examination (“viva”) as described below.

STRUCTURE OF MODULE EXAMINATIONS
The detailed structure of the examination varies from one module to another. With the exception of the field- or project-based module, there is normally an unseen written Theory paper and there is often also a Practical paper (copies of past papers can be downloaded from the College Library). For many modules there is also assessment of course-work (e.g. essays, project report, laboratory notebooks). Information about module examination elements and their relative weighting (% of total marks) will be given to students during the module.

SETTING EXAMINATIONS
For each module the examination is set by the teacher(s) with responsibility for the module. Each question and the balance of the examination are carefully vetted by the Sub-Board of Examiners and independently by the Visiting Examiners.

MARKING EXAMINATIONS
Marking of all examination scripts is carried out by two Internal examiners who act independently and then agree marks. The scale of marks used is the College Common Scale, which specifies the following categories:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honours Class 1</td>
<td>70% and above</td>
</tr>
<tr>
<td>Honours Class 2i</td>
<td>60%-69%</td>
</tr>
<tr>
<td>Honours Class 2ii</td>
<td>50%-59%</td>
</tr>
<tr>
<td>Honours Class 3</td>
<td>40%-49%</td>
</tr>
<tr>
<td>Fail</td>
<td>25%-39%</td>
</tr>
<tr>
<td>Bad Fail</td>
<td>24% and below</td>
</tr>
</tbody>
</table>
A description of what is required for the various ranges of marks is shown below:

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>First class (80-100)</td>
<td>Outstanding answer, at a level of sophistication far beyond that of most candidates. Evidence of wide reading, synthesis, criticism, quotations of recent literature, own opinion. Exceptionally clear, well structured logical answer.</td>
</tr>
<tr>
<td>First class (70-79)</td>
<td>Excellent answer, sophisticated and extremely clear. Well structured, well written and logical, with clear evidence of background reading.</td>
</tr>
<tr>
<td>Upper Second (60-69)</td>
<td>Competent and almost complete answer, well presented, accurate recall, clear understanding of material. May contain some evidence of background reading.</td>
</tr>
<tr>
<td>Lower Second (50-59)</td>
<td>Clear, reasonably complete answer, good recall of material. Presentation and organisation not as good as that of an Upper Second, and answer is not as comprehensive.</td>
</tr>
<tr>
<td>Fail (25-39)</td>
<td>Inaccurate answer, much may be irrelevant. Little evidence of understanding.</td>
</tr>
<tr>
<td>Bad Fail (0-24)</td>
<td>Totally inaccurate or irrelevant answer; may be very short or incoherent; no evidence of understanding. Individual correct facts may attract marks.</td>
</tr>
</tbody>
</table>

The marked scripts are then assessed by one of the Visiting Examiners, who ensures that the Internal Examiners have acted fairly and that the standards are comparable with those elsewhere in the British University system. The marks for each element of the module examination (Theory paper, Practical paper, course-work as appropriate) are then combined to produce an overall percentage mark for the module.

**SCHEME FOR THE AWARD OF HONOURS**

This Scheme is indicative only and is subject to alteration from time to time. It is published for the general guidance of students and is not the sole determinant of the classification of a degree. Preliminary assessment of Honours for the BSc Degrees will be determined from the mean mark calculated using the modules’ values and the following weighting factors:

- **Weight 0:** modules at Level 4 and equivalent modules in ancillary subjects.
- **Weight 1:** modules at Level 5 and equivalent modules in ancillary subjects.
- **Weight 2:** Earth and Planetary Science modules at Level 6, advanced modules in ancillary subjects and advanced modules in other Colleges.
VIVAS

All students have a 30 minute examination (Viva) with one of the external examiners when they graduate. Vivas are arranged after the examinations, usually near the end of June. The purpose of the Viva is to determine the student’s understanding of the subject. The external examiners usually ask questions about the student’s map and thesis or project, together with some broader questions.

The final results for each candidate are determined not only on the basis of the grades or marks awarded to the candidate in the individual elements of the examination, but also on the assessment by the examiners, taking account of advice of Visiting Examiners, of the overall performance of the candidate. Various factors may be taken into account in arriving at the final result, such as the distribution of marks awarded to the candidate over the various elements, the strength or weakness shown in relation to that in other elements, any special difficulties known to have been experienced by the candidate at the time of the examination (e.g. illness). Distance Learners can take this oral examination by Skype if necessary.

MODULE CONFIRMATION, EXAMINATION, RESULTS AND ENROLMENT PROCESS

The information in this section outlines the module confirmation, examination, module choice and re-enrolment process for students in the Department. The examination process begins with the Student Module Confirmation Procedure which takes place between December to February each year.

STUDENT MODULE CONFIRMATION PROCEDURE

Each academic year in December to February you will receive an email asking you to log into your My Birkbeck Profile to confirm the modules you are taking are correct. The email will be sent to the current personal email account listed on the record. This process is different from when you inform your Programme Administrator of your module option choices and is your only opportunity to check and confirm that your modules are correctly listed on your record and are locked for the academic year.

Your list of modules should include all the modules you are taking in that academic year, not just those assessed by examination, but also those assessed by coursework, dissertation, project etc., as this will ensure the marks and grades you achieve are properly recorded and reported to you at the end of the year.

You will need your Birkbeck username and password to log in. If your details are correct, please click the 'Confirm my Modules' button and follow any further instructions. Please contact the Department if your module records are incorrect and need updating. You should be able to confirm the modules that you have enrolled on for 2016/17. Once you confirm, Examinations will then set up an examinations record and you will be entered for the exam.

It is important that you confirm your modules by the specified deadline, as the examination timetable is compiled on the information you confirm. Examinations cannot guarantee to accommodate you for your examinations if you fail to confirm your modules by the given deadline.

Special examination provision

During this process you will be also given the opportunity to notify us whether you require consideration for special examination arrangements for reason of health/disability, including dyslexia.
If you have any specific questions regarding disability or dyslexia provision, please speak to our Disability Office who will be able to advise you. Even if you have already discussed provision with the Disability Office, please provide a full explanation of your circumstances during the module confirmation process. You can also specify date(s) where religious commitments may prevent you from taking an examination. Examinations will try but cannot guarantee, that they will be able to avoid such dates. We recommend that as much as possible you keep the summer examination period (early May to early-June) free.

If you have had any unforeseen problem during the academic year, which may affect your performance at examinations or in coursework, you need to complete a “Mitigating Circumstances” form. Information on mitigating circumstances can be found here: [http://www.bbk.ac.uk/mybirkbeck/services/administration/assessment/exams/mitigating-circumstances](http://www.bbk.ac.uk/mybirkbeck/services/administration/assessment/exams/mitigating-circumstances)

DEPARTMENTAL BOARD OF EXAMINERS MEETING:

The Board of Examiners meeting usually takes place in late June or early July. At this meeting examination results for all modules are considered and ratified. The marks for all students who are completing their degrees that year are discussed and the degree classifications agreed. The External Examiners also take part in this process, to ensure that our degrees are of the same quality as those given by other UK Universities.

RE-ADMISSION DECISIONS

The Department holds two re-admissions meetings: the first in late June or early July and the second in mid-September.

At the first meeting, progression decisions are made for all students progressing to the 2nd, 3rd or 4th year of study.

**Progression rules for the first Re-admissions Board:**

1. Students who have passed all of their exams at 40% or over will progress to the next year of study.
2. Students who have failed a module with less than 35% will normally be required to repeat the module next year. If you have passed the coursework for the module, these marks will stand and you will not have to repeat these items.
3. Students who have failed up to 2 modules with 35 – 39% will be offered resit exams in September (or will be required to submit missing coursework by September 2nd). You do not have to accept the offer of a resit examination. You may decline it and retake the module in the following year.
4. Students who have failed more than 2 modules with 35 – 39% will be offered up to two resit exams in September, but will have to retake the other modules in the following year. Again, you can decline the offer of a resit examination if you wish and retake the module in the following year.
5. Students who have achieved 30 – 39% on a non-core module may be offered a compensated fail. This means that the mark for this module is recorded on your transcript and will be included in your final overall mark, and the module also counts towards your total number of modules. The compensated fail decision will show on your record. You do not have to accept an offer of a compensated fail. You can decline the offer of a compensated fail if you wish and choose to re-take the module.
RESULTS

Students will be informed of the outcome of this Re-admissions meeting by the Department via letter from the beginning of August. Re-admissions decisions are usually entered on the College system from August 1st onward when Registry opens the progression process to all Departments.

Enrolment papers are sent by Registry to students within two weeks of the decision being entered by the administrators. Module choice forms or details of the modules available for the next academic year will be sent to you by the Department with the re-admission letters.

**Continuing students:** Module results will be available on your “My Birkbeck” Profile page before the end of July. The Examinations Department is responsible for releasing results.

Students progressing to the next year of their programme will be informed of this by the Departmental Administration. Students will be sent a re-admissions letter by email with a module choice form attached or details of the modules included in the body of the re-admissions letter, and will be given advice on module options for the next academic year.

**Final year students** who have completed their programme of study successfully will be contacted by the Administrative Staff. Details of when graduands can expect to receive their transcripts and information regarding graduation arrangements will be included. Results are usually released by the Examinations Department from the third Friday in July after 4pm via your My Birkbeck Profile page.

Registry will also dispatch your final transcript to your registered contact address at this time. Please ensure your contact details are updated via your My Birkbeck Profile page.

**IF YOU HAVE FAILED AN EXAM AT FIRST SITTING**

If you failed an examination with 35-39%, you will be offered the opportunity to resit your exams(s) in September. You will be contacted individually by email with the details of the nature of the resit examination, date and time. A Reassessment decision is indicated on your ‘My Birkbeck profile’ by the letters ‘FR’ in the grade column next to the element (coursework or examination) of a module which has yet to be passed. The department cannot progress you until the results of your resits are confirmed.

**RESIT EXAMINATIONS WILL BE HELD BETWEEN LATE AUGUST AND EARLY SEPTEMBER.**

**IN SOME EXCEPTIONAL CASES, AN EXAMINATION MAY BE REPLACED BY AN ADDITIONAL PIECE OF COURSEWORK. THE DEADLINE FOR SUBMISSION OF MISSING OR ADDITIONAL COURSEWORK WILL BE SEPTEMBER 2nd.**

**SECOND RE-ADMISSIONS BOARD**

The second Re-admissions Board is usually held in mid-September after all resit exam scripts and submitted coursework have been marked. All progression decisions made at this meeting will be released to Registry on the day of the meeting.
Progression Rules for Students who have taken September Resit examinations:

1. Students who have passed their resit exam(s) at 40% or over will progress to the next year of study.

2. Students who have failed a resit exam with less than 39% will be required to re-take the module in the next academic year. If you have passed the coursework for the module, these marks will stand and you will not have to repeat these items. You may be allowed to progress to study some new modules alongside the modules which must be retaken.

3. Students who have failed a resit with 30 – 39% may be offered a compensated fail. This means that the mark for this module is recorded on your transcript and will be included in your final overall mark, and the module also counts towards your total number of modules. You do not have to accept an offer of a compensated fail. The compensated fail decision will show on your record.

4. If a student has failed a resit of a module which is a pre-requisite for a module in the next academic year, the student will NOT normally be able to register for that next module. The modules such students are able to study next year will be decided at the second readmissions meeting.

5. Full-time students who have failed a resit will be required to repeat that module next year. If they have failed more than two resit modules, they will be required to repeat the entire year. This will affect the number of modules such students can study in the next academic year and means that it could take more than 3 years to complete their programme of study.

The Departmental Administration will notify students of the decision by email within a few days of the second readmissions meeting and will explain which modules they can register for.

An amended module choice form or details of the modules available in the body of the re-admissions letter will be emailed to these students. Module results will be available on your “My Birkbeck” Profile normally within a week. If you have passed your resit(s), the Department will inform the Registry. Registry will then update your record and send you an enrolment email for your next year plus details of how to arrange for payment.

IF YOU HAVE FAILED A RESIT EXAM

If you have failed a resit examination, the Department will contact you and give information on which modules you have to retake next year, and which additional modules you will be able to take. In your ‘My Birkbeck profile’ a fail will be indicated by the letter ‘F’ in the grade column of the module.

If you have to repeat an entire year, you will be charged pro-rata for each module up to a maximum of the full fee for the programme year.

ENROLLED AND TAKING LESS THAN THE NORMAL FULL STUDY LOAD

If you are taking a reduced Study Load:

The full fee, pro-rated to the number of modules based on credits being taken, will be applied up to a maximum of the full fee for the programme year. The calculations are based on the assumption that all full time Undergraduate students take up to 120 credits per year and part-time students take up to 90 credits per year. The fee structure set by Registry may be subject to change. The fee calculation the Registry uses is:
<table>
<thead>
<tr>
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<th>UG Degree</th>
<th>Mode: PT 4 Year</th>
<th>UG Degree</th>
</tr>
</thead>
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<td>Credits</td>
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<tr>
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<td>1/8 full year fee</td>
<td>15</td>
<td>1/6 full year fee</td>
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<th>Cert HE (up to 60 Credits per year)</th>
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<td>1 year full fee</td>
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</table>

*Students take 30 credits per year on the Graduate Certificate and take 60 credits over two years*

If you are Repeating All or Some Modules

If you have been given permission to repeat all or some of your modules in the programme year you may be permitted to retake modules while also studying new modules. The full fee, pro-rated to the overall number of credits being taken (new and repeated modules) will be applied, up to a maximum of the full fee for the programme year. The pro-rata fee is calculated automatically from the progression decision inputted by the Department.

THE MODULE CHOICE FORM

All students will be sent a module choice form or details of module choices in the body of the readmissions letter from the Department. When you have received confirmation of your exam results, please complete the form and submit it to the Department. The Department will add your name to your chosen modules. Module choices usually take one and three days to be updated on your profile.

THE DEADLINE FOR SUBMISSION OF MODULE CHOICE FORMS TO THE DEPARTMENT IS USUALLY THE THIRD FRIDAY IN SEPTEMBER. WE CANNOT GUARANTEE THAT ANY MODULE CHOICE FORMS SUBMITTED TO US AFTER THIS DATE WILL SHOW ON YOUR “MY BIRKBECK” ACCOUNT BY THE FIRST DAY OF TERM.

RE-ENROLMENT

Once a progression decision has been confirmed, the Department will inform the Registry who will then update your record and send you details of how to enrol by email plus details of the fee for the year and how to arrange for payment. Follow the details included in the enrolment email as to how to enrol correctly.

IF YOU HAVE A LIBRARY OR FEE DEBT, THE DEPARTMENT WILL NOT BE ABLE TO PROGRESS YOU AND YOUR ENROLMENT. REGISTRY WILL NOT SEND YOU DETAILS OF
HOW TO ENROL. ONCE ANY DEBTS ARE PAID, REGISTRY WILL THEN SEND YOU ENROLMENT DETAILS VIA EMAIL. FAILURE TO ENROL IN TIME WILL MEAN THAT YOU WILL NOT HAVE ACCESS TO OUR MODULE CONTENT AVAILABLE VIA MOODLE, NOR THE LIBRARY OR ITS RESOURCES BY START OF TERM. YOU WILL NOT BE ABLE TO VIEW YOUR TIMETABLE ON YOUR ‘MY BIRKBECK’ PROFILE.

If you do not enrol in a timely manner you will not get access to the virtual learning material and will fall behind in your studies. Students can also be terminated from a programme of study due to non-payment of fees.

**STUDENTS RETURNING TO COMPLETE ONLY THEIR PROJECT OR MAP AND THESIS MODULE**

Once you have confirmed that you are returning to complete your Project or Map and Thesis module, we will complete an online progression form for you which will be processed by the Registry. The Registry will send you details about how to enrol and what your fee is likely to be.

Fees are usually set at a pro-rata rate of the year’s full programme fee. Students who are receiving supervision plus access to the College Library and IT resources will pay the pro-rate fee. The exam only fee is only paid by students who are writing up their project or map and thesis at home with no input or supervision from the Department. The fee structure set by Registry may be subject to change.

**Failure and Re-assessment of a Module**

To satisfactorily complete a module, students must achieve an overall mark of 40% or more.

A student who fails to pass a module at their first attempt may be re-assessed or may be required to re-take. Re-assessment is where a student will re-attempt a failed element of a failed module. A re-take required attendance at the module’s lectures as well as another attempt at the assessment. A decision on whether students will be permitted to be re-assess in one or more elements of a module that has not been passed is at the discretion of the sub-board of examiners.

A student whose module result is less than 35% will be required to re-take the entire module. Such students will need to re-enrol for the module, re-attend the module and retake the coursework and exam required for the module.

**Reassessment**

Resit examinations are arranged for all modules in the September preceding the start of the new academic year. Students must inform the administrator if they wish to take up an offer of reassessment.

**Number of Attempts**

Students are permitted three attempts at passing a module (the original attempt plus two further attempts). If a student fails any module for the third time, their place on their programme of study will be withdrawn.

**Completion of Modules**

Students passing a module cannot retake a module to gain a higher mark.

For more information see ‘The Module Confirmation, Examination, Resulting and Enrolment Process for Students in the Department of Earth and Planetary Sciences’ on page 20.
Capping of Re-assessed Exams and Modules

Birkbeck has introduced a new policy on the re-assessment grading of coursework and exams. **All re-assessed work will be capped at 40% (max) in line with other universities.** From 2015/16 the College Common Awards Scheme regulations will be changed to include an amendment to the regulation of reassessments. From 2015/16 any reassessment awarded will be subject to a cap at the pass mark (40% undergraduate and 50% postgraduate) except where mitigating circumstance have been accepted on the failed assessment, and students will be permitted to re-submit without penalty.

- Students who fail an assessment in 2015/16 and awarded a reassessment opportunity will have their reassessment subject to a cap.
- Any student awarded a reassessment opportunity in 2014/15 or before will not be subject to a cap for a reassessment taken in 2015/16.
- The cap does not apply to a retake of a module

More Information is provided on the Regulations webpage of the My Birkbeck website here: [http://www.bbk.ac.uk/mybirkbeck/services/rules](http://www.bbk.ac.uk/mybirkbeck/services/rules)

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**Plagiarism Statement**

**What is plagiarism?**

Plagiarism, the act of taking somebody else's work and presenting it as your own, is an act of academic dishonesty, and Birkbeck takes it very seriously.

Examples of plagiarism include (but are not restricted to):

- copying the whole or substantial parts of a paper from a source text (e.g. a web site, journal article, book or encyclopaedia), without proper acknowledgement
- paraphrasing another's piece of work closely, with minor changes but with the essential meaning, form and/or progression of ideas maintained
- piecing together sections of the work of others into a new whole
- procuring a paper from a company or essay bank (including Internet sites)
- submitting another student's work, with or without that student's knowledge
- submitting a paper written by someone else (e.g. a peer or relative) and passing it off as one's own
- representing a piece of joint or group work as one's own.

If you knowingly assist another student to plagiarise (for example, by willingly giving them your own work to copy from), you are committing an examination offence.

**Academic declaration form**

When submitting coursework (e.g. essay, coursework or dissertation), **you will need to sign an academic declaration form**, stating that you have read the sections of plagiarism in your Departmental Handbook and confirming that the work is your own, with the work of others fully acknowledged.
What happens if plagiarism is suspected?

Where an examiner (of examinations and other written coursework) suspects plagiarism, s/he has a responsibility to report this to the College. Where there is evidence of plagiarism, the relevant procedures in the regulations will be followed and the person responsible will be contacted accordingly.

Further information and regulations
http://www.bbk.ac.uk/mybirkbeck/services/rules/Assessment%20Offences.pdf

Student Support and Learning Resources

Student Centre

The site below collates a range of information you will need to help you study at Birkbeck. Please go to: http://www.bbk.ac.uk/mybirkbeck/guides

Academic Support

Academic support is available from a number of sources within the College including Birkbeck’s Study Skills support team, Birkbeck Students’ Union and IT Services.

College Study Skills Support

Study skills advice and support are provided by Birkbeck’s Study Skills Support Team. Our aim is to help you develop your personal and/or professional skills and to improve your learning.

We can help students both new to Higher Education and who are returning to study in developing the skills that you need to carry out effective and enjoyable study. This includes help and advice in areas such as academic writing, note taking, managing and planning your time, revision and preparing for exams, advice on IT skills, dealing with stress. More information on the services and the learning support available to you can be found here: http://www.bbk.ac.uk/mybirkbeck/services/facilities

Library services

Library web site: http://www.bbk.ac.uk/lib/ Library Entrance: Ground floor of the main building

Once you are fully enrolled you are automatically a member of the Library. You will need your Student ID Card to activate the turnstile and to take books out.

Borrowing Books

You can have up to 10 books on loan at any one time. Most books can be borrowed for 3 weeks. Some books, videos and DVDs can be borrowed for one week.

Your Subject Librarian

Subject Librarians are responsible for liaising with specific schools and departments, collection development, information skills training and providing a reference and enquiry service for Library users. Subject or reference queries or enquiries about electronic resources can be directed to the Help Desk in the first instance. Help Desk hours 020 7631 6063 library-help@bbk.ac.uk
Your Subject librarian is Emma Illingworth. Please contact her if you need any help with using the Library’s resources and/or finding information over and above that which you can get from the Library help desk. She is available for telephone and email help, and group or one-to-one information sessions by appointment.

More information on other services and resources available to students can be found at: http://www.bbk.ac.uk/geology/current-students/

Moodle Virtual Learning Environment - VLE

The College uses the Moodle Virtual Learning Environment to provide an online resource where students can gain access to important module information such as lecturer notes and slides, module announcements, timetables and more.

Once students have enrolled, they will be sent a username and password to access Moodle.

Students can access Moodle at: http://www.moodle.bk.ac.uk

When logging into Moodle for the first time you will be presented with a list of modules you are enrolled on for the current academic year, as well as a link to the generic Department of Earth and Planetary Sciences Moodle space.

Clicking on the name of a module will take you to that module’s content space. Here you will find module specific information such as the contact details of the module convener, copies of notes and slides from lectures that have already taken place, and a message board for discussing material covered with your classmates. Some modules may also use Moodle to allow students to submit assignments electronically.

As access is limited to modules for which you are enrolled, you should save to your personal computer any material you may want to refer to in the future.

The main Moodle page, which is the first screen seen after login, displays up-to-date announcements about your programme. Module administrators will use Moodle as the principle means of making announcements, so it is vital that students check it regularly.

For more information about using Moodle go to: https://moodle.bbk.ac.uk

Your academic contact for Moodle in the Department is Steve Hirons s.hirons@bbk.ac.uk who, as well as teaching on our programmes, is the Director for the Centre for learning and professional development.
Disability Statement for the Dept. of Earth and Planetary Sciences

The Disability Office
At Birkbeck there are students with a wide range of disabilities including dyslexia, visual or hearing impairments, mobility difficulties, mental health needs, medical conditions, respiratory conditions. Many of them have benefited from the advice and support provided by the College’s Disability Office. The College has a Disability Office located in room G12 on the ground floor of the Malet Street building. We have a Disability Service Manager, Mark Pimm, a Disability Administrator, John Muya and a Mental Health Advisor, Elizabeth Hughes. We will shortly be appointing an SpLD Advisor.

All enquiries should come to the Disability office, who will determine the appropriate referral to specialist staff. They can provide advice and support on travel and parking, physical access, the Disabled Students Allowance, special equipment, personal support, examination arrangements etc. If you have a disability or dyslexia, we recommend you come to our drop in session where we can discuss support and make follow up appointments as necessary. The drop-in sessions are between 4pm and 6pm Monday to Thursday. The Disability Office can also complete an Individual Student Support Agreement form with you, confirming your support requirements and send this to your School and relevant Departments at the College so they are informed of your needs.

Access at Birkbeck
Birkbeck’s main buildings have wheelchair access, accessible lifts and toilets, our reception desks have induction loops for people with hearing impairments and we have large print and tactile signage. Disabled parking, lockers, specialist seating in lectures and seminars and portable induction loops can all be arranged by the Disability Office.

The Disabled Students Allowance
UK and most EU students with disabilities on undergraduate and postgraduate programmes are eligible to apply for the Disabled Students' Allowance (DSA). The DSA usually provides thousands of pounds worth of support and all the evidence shows that students who receive it are more likely to complete their programmes successfully. The Disability Office can provide further information on the DSA and can assist you in applying to Student Finance England for this support.

The Personal Assistance Scheme
Some students need a personal assistant to provide support on their programmes, for example a note-taker, sign language interpreter, reader, personal assistant, disability mentor or dyslexia support tutor. Birkbeck uses a specialist agency to recruit Personal Assistants and they can assist you with recruiting, training and paying your personal assistant. Please contact the Disability Office for information on this scheme.

Support in your School and Department
The provision which can be made for students with disabilities by Schools is set out in the Procedures for Students with Disabilities. This is available from the Disability Office and on the disability website (see below). Your School will receive a copy of your Individual Student Support Agreement from the Disability Office. This will make specific recommendations about the support you should receive from the School. Whilst we anticipate that this support will be provided by the Programme Director, tutors and School Administrator in the School of Arts also has a Student Disability Liaison Officer. If you experience any difficulties or require additional support from the School then they may also be able to assist you. They may be contacted through the School Office or the Disability Office.

The provision which can be made for students with disabilities by Departments is set out in the Procedures for Schools for Compliance with the Disability Discrimination Act. This is available
from the Disability Office and the Disability website (see below). Your Department will receive a copy of your Individual Student Support Agreement from the Disability Office. This will make specific recommendations about the support you should receive from the School.

Whilst we anticipate that this support will be provided by the Programme Director, tutors and Department Administrator, the Department of Earth and Planetary Sciences also has a Disability Liaison Officer, Dr Andy Beard. If you experience any difficulties or require additional support from the School then they may also be able to assist you. They may be contacted on 0203 073 8024 or at: a.beard@ucl.ac.uk.

Support in Central Computing Services and Library Services
There is a comprehensive range of specialist equipment for students with disabilities in IT Services. This includes software packages for dyslexic students (e.g. Claroread and Inspiration), screen reading and character enhancing software for students with visual impairments, specialist scanning software, large monitors, ergonomic mice and keyboards, specialist orthopaedic chairs etc. For advice and assistance please contact Disability IT Support. There is also a range of specialist equipment in the Library including a CCTV reading machine for visually impaired students as well as specialist orthopaedic chairs and writing slopes. The Disability Office refers all students with disabilities to the Library Access Support service who provides a comprehensive range of services for students with disabilities.

Specific Learning Difficulties (Dyslexia)
Mature students who experienced problems at school are often unaware that these problems may result from their being dyslexic. Whilst dyslexia cannot be cured, you can learn strategies, which make studying significantly easier. If you think you may be dyslexic, you should contact the Disability Office who can screen you and where appropriate refer you to an Educational Psychologist for a dyslexia assessment. These assessments cost £225. Some students can receive assistance in meeting this cost from their employer. In exceptional cases students may receive assistance from the Access to Learning Fund.

Examinations
Students with disabilities and dyslexia may be eligible for special arrangements for examinations e.g. extra time, use of a word processor, amanuensis, enlarged examination papers etc. In order to receive special arrangements a student must provide medical evidence of their disability (or an Educational Psychologists report if you are dyslexic) to the Disability Office. For main College summer examinations you are given the opportunity to declare that you require special provision on your assessment entry form. Students who require provision should then attend an appointment with the Disability Office to discuss and formalise the appropriate arrangements. The closing date for making special examination arrangements in College examinations is March 15th and beyond this date consideration will only be given to emergency cases.

The Disability Handbook
The Disability Handbook provides detailed information on the support available from the College. Copies are available from all main reception areas, the Disability Office and from the College disability web site at: http://www.bbk.ac.uk/disability/policies

Further information: Contacting the Disability Office
Full information on disability support is at:
http://www.bbk.ac.uk/mybirkbeck/services/facilities/disability
For further information or to make an appointment to see the Disability office, please call the Student Centre on 020 7631 6316 or email disability@bbk.ac.uk. Alternatively appointments are available from Monday to Thursday between 2pm and 6pm.
Careers

What you can do whilst studying, to secure get the job you want on graduating:

1. Finding and applying for jobs

   a. To book a one-to-one appointment with one of the Birkbeck Careers Service team:

      - email employability@bbk.ac.uk;
      or
      - visit one of the team in the Employability Space, located within the Student Centre at Malet St.

   b. If you are interested in seeing a Career Coach, there will be 6 coaches available for in-depth support. To request a session:

      - email career-coaching@bbk.ac.uk
      or
      - visit one of the team in the Employability Space.

   c. Workshops run by the Birkbeck Careers team include:

      • Networking Yourself;
      • Social Media & Online Strategy;
      • Going Global;
      • CV and Interview Masterclass;
      • Understanding Emotional Intelligence;
      • LinkedIn or Locked Out;
      • Identify Your Transferrable Skills;
      • Going Solo; Working With Recruitment Agencies.

   Places on these workshops can be booked at:


   The aim of these workshops is to help you find the type of work you are looking for; write effective CVs; submit strong applications; and excel at interview. We would strongly advise you to attend as many of these workshops as possible, regardless of whether you are new to the workplace or studying at Birkbeck to change careers. The Careers Service can help ‘career changers’ present their past experience to best advantage.

2. Finding paid work to strengthen your CV

Birkbeck has an onsite recruitment agency called Birkbeck Talent.

Whether you are new to the workplace or experienced in your professional field, Birkbeck Talent aims to support you find paid work to strengthen your CV. We would strongly advise you to make contact with the Birkbeck Talent team as soon as possible to see how you can effectively position yourself for the career you want. Email talent@bbk.ac.uk for more information.
When Birkbeck Talent launches for all students in 2015-16, you will be able to register with Birkbeck Talent, and search for relevant roles through your My Birkbeck Profile.

3. Have you ever considered a career in Technology or Health & Social Care?

Birkbeck Careers has partnered with leading employers to develop the Work Readiness Programme. The programme:

- will introduce you to healthcare employers in the areas of social work, counselling, healthcare management, psychotherapy, medicine-related careers and psychology; as well as technology employers in digital marketing, big data, software engineering, project management, UX design, IT consulting and many more.
- will provide you with training directly from these employers to advance your employability skills;
- includes a range of workshops, skills training and other events, as well as one-on-one support and opportunities for work experience.

Join the Work Readiness Programme to meet employers such as the NHS, Macmillan Cancer Research, Think Ahead, The Frontline, the West London Alliance, PwC, Glassdoor, Pebble {code}, Media Math, Zealify, J.P. Morgan and many more.

To find out more please visit: [www.workreadinessprogramme.com](http://www.workreadinessprogramme.com)

To apply contact us at: work.readiness@bbk.ac.uk

4. Have you ever considered a career in teaching?

In 2016/17 the School of Science aims to pilot the Undergraduate Ambassador Scheme [http://bit.ly/1MGKeK1]. This will provide the opportunity to gain a structured experience in schools, buddied to a teacher in your discipline. The scheme will be open to students in their penultimate year of study. Participants will need to make themselves available for one day a week for at least one term. They will receive training prior to starting in the school and mentoring from the teacher whilst on the scheme. They will observe teaching, undertake a little, supported teaching themselves and undertake a project to support learning and teaching in the school.

Please note, participants receive no remuneration for taking part in this scheme and should only volunteer on this understanding. Students seeking paid employment should make contact with Birkbeck Talent [see above].

If you are interested in taking part in 2016/17:
- please express your interest by emailing Roz Dixon at r.dixon@bbk.ac.uk;
- you are also encouraged to take part in as many of the workshops offered by the Careers Service as possible [see above]. This will give you the best chance of securing a place on this scheme which will be by application and subject to interview.
5. Gaining ‘hands on’ experience of research in Geology

The academic team at Birkbeck run their own research projects throughout the year. Experience of research in Geology can be gained by providing voluntary support for one of these academics’ projects. Contact the adminin office at s.jenkins@bbk.ac.uk.

Taking part in this scheme provides invaluable insight into the research process and helps students gain a deeper understanding of their discipline. It may also provide a useful addition the student’s CV. However, please note, this work is not remunerated in any way and students should only volunteer if this is acceptable to them. Students seeking paid employment should make contact with Birkbeck Talent [see above].

6. Birkbeck’s Mentoring Programme for finalists:

Birkbeck is piloting a mentoring scheme that matches finalists with alumni from the same discipline. Mentors are volunteers who receive training by Birkbeck at the outset of the scheme.

The aim is to make this scheme available across the School of Science in 2016/17. This is a competitive scheme to which students apply, making clear what they hope to achieve by taking part. Successful candidates will receive some initial training to help them make use of the opportunity and will meet with their mentor approximately 3 times over the 6 month period.

If you are going to be a finalist next year [in 2016/17] and think you might find mentoring useful in your final year, you are strongly encouraged to take part in as many of the workshops offered by the Birkbeck Careers Service as possible [see above], as this will give you the best chance of securing a place on this competitive scheme.

7. Masters programmes: The Department of Earth and Planetary Sciences

We offer a part-time taught 2-year MSc in Geochemistry, with annual intake. We also offer a part-time MPhil Earth Sciences and a part-time MPhil in Geology.
# Contacts in the Department of Earth and Planetary Sciences

## Academic and Academic-Related

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## Technical

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## Administration

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## Postal Address

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**Website:** [www.bbk.ac.uk/geology](http://www.bbk.ac.uk/geology)
MODULE OUTLINES LEVEL 4 (1ST YEAR MODULES)
INTRODUCTION TO GEOLOGY (30 credits) EASC001S4

MAIN OBJECTIVES
To introduce the basic facts and concepts of geology.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Knowledge and understanding of the basic tenets of geology and geophysics with refresher material provided on basic science.

COGNITIVE SKILLS
The student will develop an understanding of hypothesis development and be given examples of hypothesis testing. This will involve theoretical understanding of relevant concepts, critical assessment of results and outcomes and experience of real situations.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
The students will be made aware of relevant concepts used in studies of geology and geophysics. They will be trained to use petrographic and binocular microscopes. They will be trained to draw accurate cross-sections across geological and topographic maps.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
The student will gain skills such as writing, comprehension of scientific concepts, mathematical calculation, manipulation of data, independent study, and confidence in their abilities to follow a problem through to its end. They will be proficient in the use of microscopes and have some understanding of the 3-dimensional aspects of geological and topographical maps.

CONTENT
The module deals with the origin and structure of the Earth, the nature of the geological record and the processes which have formed the common rock-types. The module introduces fundamental techniques of geology including the use of the petrographic microscope and the construction and interpretation of geological maps. Major topics include: mineralogy, sedimentology, igneous and metamorphic petrology, structural geology, geophysics and plate tectonics. Identification of minerals and rocks in hand-specimen and thin-section forms a major part of the practical side of the module.

RECOMMENDED READING

FIELDWORK One 1-day field trip.

MODULE EXAMINATION
One 3-hour theory paper and one 3-hour practical paper.

LECTURER
Dr Simon Drake
EARTH HISTORY (15 credits) EASC050H4

MAIN OBJECTIVES
To familiarise students with methods used to establish age relations and teach skills required to reconstruct geological history. To introduce some of the main themes of Earth history, particularly those from the geological evolution of the British Isles and adjacent areas.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Students will learn about the main periods of geological time and the major events that have punctuated Earth’s history.

COGNITIVE SKILLS
Information assimilation and recollection.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Principles of stratigraphy and plate tectonics, and a familiarity with the geological timescale.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Map interpretation; thinking in 3-D.

PREREQUISITES
Some knowledge of plate tectonics; module can be studied concurrently with Introduction to Geology.

CONTENTS

RECOMMENDED READING
[As the name implies, this is an introductory text, easy to read and well illustrated]

FIELDWORK
Joint with Introduction to Geology (one day).

MODULE EXAMINATION
One 2-hour combined theory and practical paper (80%); essay and coursework (20%).

LECTURER: Dr Phil Hopley
INTRODUCTION TO GEOCHEMISTRY (15 CREDITS) EASC038H4

MAIN OBJECTIVES
To provide the principles of inorganic chemistry necessary for an understanding of mineralogy, petrology and low-temperature geological processes. To develop the mathematical skills necessary for understanding these inorganic chemical principles. To develop practical skills in solving geochemical problems through a series of written exercises.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Understanding of abstract concepts in geochemistry. Ability to recognise specific groups of chemical elements and their role in geological processes. Ability to see the relevance of chemistry in other areas of geology. Awareness of micro- and macro-scales in geochemistry.

COGNITIVE SKILLS
Synthesise information on a variety of geochemical topics. Ability to relate specific chemical knowledge to a geological context. Ordering and prioritising. Pragmatic thinking and analysis

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Graph construction and interpretation. Mathematical skills. Ability to think in 3 dimensions. Balancing chemical equations. Ability to prepare and write summaries of chemical concepts.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Mathematical skills; writing skills; self-motivation, time management and organisation; data analysis, ability to write concise reviews of technical subjects

PREREQUISITES
None

CONTENT AND ORGANISATION
Atomic structure; the periodic table; bonding and electronegativity; chemical reactions and formulae; chemical equilibrium; the nature of minerals; properties of water and solutions; the phase rule and elementary phase diagrams; kinetics of geological processes; thermo-dynamics; the chemistry of the Earth; the use of isotopes in geology.
Bi-weekly assignments including chemical calculations will be set and discussed in class.

ASSESSMENT
The module will be assessed by four bi-weekly exercises (worth 40% of final mark), and an examination (worth 60% of final mark).

MODULE TEXT

LABORATORY WORK
None

LECTURER
Professor Karen Hudson-Edwards
INVERTEBRATE PALAEONTOLOGY (15 credits) EASC042H4

MAIN OBJECTIVES
The module will introduce the main common and important groups of invertebrate fossils. Concepts covered within each fossil group will include evolution, extinction, palaeobiology and functional morphology and geological uses. In addition the module will cover basic palaeontological principles, in particular classification, fossil preservation and fossil behaviour (in the form of trace fossils).

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT

COGNITIVE SKILLS
Observational skills using hand specimens and photographs. Relating morphology of extinct organisms to biology and behaviour.

SUBJECT SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Recognition and identification of fossils in the field and laboratory. Use of fossils in various geological applications. Interpretation of trace fossils.

GENERAL/TRANSFERABLE SKILLS
Detailed observation. Interpretation based on incomplete data. Time and project management. Integration of theory.

PREREQUISITES
None.

CONTEXT AND ORGANISATION
Principles of classification and preservation. Palaeobiology and significance of sponges, corals, gastropods, bivalves, cephalopods, echinoderms, brachiopods, trilobites and graptolites. Trace fossils (fossil behaviour).

RECOMMENDED READING
To be introduced during module.

FIELDWORK
None / Combined field class with Earth History and Introduction to Geology.

MODULE ASSESSMENT
3 hour combined practical and theory examination (80%), Practical file (20%).

LECTURER
Dr. Charlie Underwood.
FOUNDATIONS OF MINERALOGY (15 credits) EASC057H4

MAIN OBJECTIVES
The module will introduce the major rock-forming minerals, attempting to provide a basic understanding of their structural and chemical characteristics, and general indication of their origins. The optical properties of the minerals will be discussed, and practical classes will be run to illustrate the minerals in thin section and hand specimens.

KNOWLEDGE AND UNDERSTANDING
Understand basic concepts in mineralogy. Relate structure chemistry and properties of minerals.

COGNITIVE SKILLS
Interpreting information from hand specimens and thin sections, graphs. Developing reasoning based on evidence from hand specimens and thin sections.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Handling data from tables and graphs. Interpreting data, including optical and compositional effects.

GENERAL/TRANSFERABLE SKILLS
Interpreting data. Numeracy. Scientific literacy. Use of graphs and tables

CONTENT AND ORGANISATION
- Symmetry & Crystallography
- Optics
- Factors that determine mineral structures
- Mineral and Silicate Classification
- Olivine and Garnet Groups
- Al$_2$SiO$_3$ Polymorphs
- Pyroxene Group
- Amphibole Group
- Sheet Minerals
- Silica Polymorphs
- Feldspars, and other minerals

RECOMMENDED READING
- Introduction to Mineral Sciences by Putnis (CUP)
- Mineralogy for students by Battey & Pring (Longman)
- An Introduction to Rock Forming Minerals by Deer, Howie and Zussman (Longman)

MODULE ASSESSMENT
- 2 hour Theory examination (60%)
- Course work (40%) Four pieces of assessed work.

LECTURER: Mr Steve Hirons
FOUNDATIONS OF ASTRONOMY (15 credits) SCES001H4

MAIN OBJECTIVES
The module is designed to provide a basic introduction to the science of astronomy.

COGNITIVE SKILLS
Understanding of scientific hypothesis development and testing. Ability to relate specific knowledge to a broader context.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
To understand and synthesise original research findings. To think quantitatively. To discuss the relationship between theory, empirical data and models.

GENERAL/TRANSFERABLE SKILLS
Familiarity with basic scientific concepts. Writing and presentation skills. Interpreting numerical and graphical data.

PREREQUISITES
None

LECTURE CONTENT
Astronomical nomenclature (constellations; star names and catalogues; stellar magnitudes; non-stellar objects; etc); Astronomical coordinate systems; Astronomical distance scale; Techniques of astronomical observation (electromagnetic spectrum; telescopes; spectroscopy); Stars (classification; energy sources; Hertzsprung-Russell Diagram; stellar evolution; nucleosynthesis); Interstellar medium; Structure of the Milky Way Galaxy; Extragalactic astronomy; Cosmology

PRACTICAL CONTENT
There will be one visit to a professional observatory arranged during the module. In addition, practical observations will be conducted with the Department’s own telescope in the UCL Front Quad weather permitting.

COURSEWORK
There will be two pieces of assessed coursework, consisting either of two problem papers or one problem paper and one 1200 word essay.

RECOMMENDED READING
Introduction to Astronomy and Cosmology by Ian Morison (John Wiley, 2008).

MODULE EVALUATION
One 2.5 hour written examination (75%) and continuous assessment of practical and written work (25%)

LECTURER Professor Ian Crawford
GEOLOGY OF THE SOLAR SYSTEM I (15 credits) SCES009H4

MAIN OBJECTIVES
To introduce students to the geological histories, and geological processes, of other planets, and to illustrate how this knowledge has led to our current understanding of the origin and evolution of the Solar System. The module is designed to give students taking the B.Sc. Degree in Planetary Science with Astronomy and the Certificate in Planetary Science with Astronomy a basic introduction to planetary geology, with particular emphasis on the geology of the Moon.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Knowledge and understanding of the basic geology and geophysics of the other planets
Understanding of the various techniques used to acquire geological knowledge of other planets
Detailed understanding of our current knowledge of the origin and evolution of the Moon and its implications for understanding of other rocky planets.

COGNITIVE SKILLS
Understanding of scientific hypothesis development and testing
Ability to relate specific knowledge to a broader context

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Analysis and interpretation of planetary remote sensing data; Interpretation of images; creation of maps; interpretation of maps; Ability to transfer geological knowledge gained in the context of the Earth to wide range of different planetary environments.
Demonstrate knowledge of the specific aspects of planetary and lunar geology.
Demonstrate an understanding of how this knowledge has been arrived at, and the relationship between theories, hypotheses and observations in the planetary sciences.

GENERAL/TRANSFERABLE SKILLS
Familiarity with basic scientific concepts; Writing and presentation skills; Interpreting numerical and graphical data

PREREQUISITES
None (but ‘Introduction to Geology’ should be taken in parallel).

LECTURE CONTENT

PRACTICAL CONTENT
Construction of geological maps from orbital images of terrestrial planets
Study of meteorites and moon rocks (the latter in thin section using a petrographic microscope)
Visit to NASA’s UK Regional Planetary Image Facility (at University College London), plus one other relevant visit to an external facility

RECOMMENDED READING
Planetary Geology: An Introduction, by Claudio Vita-Finzi and Dominic Fortes

MODULE EVALUATION
One 2.5 hour written examination (85%) and continuous assessment of practical and written work (15%)

LECTURER  Professor Ian Crawford
MODULE OUTLINES  LEVEL 5 (2ND YEAR MODULES)
GEOPHYSICS (15 credits) EASC005H5

MAIN OBJECTIVES
Introduce the basic principles of Geophysics
Understand the application of geophysical principles in the study of the Earth’s interior

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
To describe the basic principles of seismology, gravity, magnetic and other geophysical methods
To describe how principles of geophysics can be applied to enhance our understanding of the Earth
To apply basic mathematical and physical concepts in the study of geophysics

COGNITIVE SKILLS
To present basic numerical arguments
To explain the relationship between methodologies and geological applications

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
To think quantitatively
To discuss the relationship between geophysical data and geological interpretation
Presentation of scientific ideas through activities

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Interpreting numerical and graphical data
Writing and presentation skills

PREREQUISITES
Introduction to Geology; GCSE mathematics

CONTENT AND ORGANISATION
Introduction to geophysics and seismology, basic seismic refraction and reflection methods, earthquake seismology, isostasy and gravity methods, geomagnetism and magmatic methods, introduction to electrical, electromagnetic and other geophysical methods. Geological applications of seismic gravity and magnetic methods.

RECOMMENDED PRE-MODULE READING
Lowrie, W., Fundamentals of Geophysics, Cambridge University Press

MODULE EXAMINATION
Written examination (80%) and assignments (20%)

LECTURER
Dr James Hammond
IGNEOUS PETROLOGY (15 credits) SCES005H5

**MAIN OBJECTIVES**
To introduce the main concepts of igneous petrology and to relate the occurrence of igneous rocks to plate tectonics and orogenic activity. To introduce students to the study of igneous rocks by means of the petrological microscope so that students can identify and interpret their mineralogy and textures.

**KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT**
Understanding the chemistry and mineralogy of igneous rock; relating igneous rocks to plate tectonics; understanding of basic petrogenetic processes.

**COGNITIVE SKILLS**
Interpreting information derived from thin-section and hand-specimen analysis; developing reasoning based on evidence from mineralogy and chemistry of rocks.

**SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS**
Basic scientific literacy; understanding of binary and ternary phase diagrams; ability to place various types of rock in a plate tectonic context

**GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)**
Interpreting numerical and chemical data; writing scientific descriptions of rock samples; writing and presentation skills; use of graphs and diagrams.

**PREREQUISITES**
A pass in Introduction to Geology, Foundations of Mineralogy, or an equivalent module.

**CONTENT AND ORGANISATION**
The recognition, geological occurrence and petrogenesis of common igneous rocks. Classification of igneous rocks; recognition of rock-structure and textures; the generation and consolidation of magma; the use of experimental data from natural and synthetic melts; the relationship between metamorphism, igneous activity and plate tectonics. The integration of descriptive and interpretative petrology is the main aim of practical work.

**RECOMMENDED READING**

**FIELDWORK:** One weekend field class in Cornwall (with Metamorphic Petrology)

**MODULE EXAMINATION**
One 3-hour combined theory and practical exam, plus assignments (10%) and a written report (10%).

**LECTURER:** Professor Hilary Downes
METAMORPHIC PETROLOGY (15 credits) SCES006H5

MAIN OBJECTIVES
To introduce the main concepts of metamorphic petrology and to relate the occurrence of metamorphic rocks to plate tectonics and orogenic activity. To introduce students to the study of metamorphic rocks by means of the petrological and binocular microscope so that students can identify and interpret their mineralogy and textures.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Understanding the chemistry and mineralogy of metamorphic rock; relating metamorphic rocks to plate tectonics; understanding of basic petrogenetic processes.

COGNITIVE SKILLS
Interpreting information derived from thin-section and hand-specimen analysis; developing reasoning based on evidence from mineralogy and chemistry of rocks.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Basic scientific literacy; ability to place various types of rock in a plate tectonic context.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Interpreting numerical and chemical data; writing scientific descriptions of rock samples; writing and presentation skills; use of graphs and diagrams.

PREREQUISITES
A pass in Introduction to Geology, Foundations of Mineralogy, or an equivalent module.

CONTENT AND ORGANISATION
The recognition, geological occurrence and petrogenesis of common metamorphic rocks. Classification of metamorphic rocks; recognition of rock-structure and textures; relationship between metamorphism and plate tectonics. The nature of metamorphic reactions; metamorphic grade; metamorphic facies; high- and low-pressure metamorphism. The integration of descriptive and interpretative petrology is the main aim of practical work.

RECOMMENDED READING
The books listed below are all very good but of very different styles. I would recommend you look in the library (if possible) before you purchase to see which suits best.

Best, M.G. 1982. Igneous and Metamorphic Petrology. Freeman. [A good all-round text].

FIELDWORK: One weekend field class in Cornwall (optional)

MODULE EXAMINATION
One 3-hour combined theory and practical paper, plus assignments

LECTURER: Mr Steve Hirons
PRINCIPLES OF SEDIMENTOLOGY (15 credits) SCES008H5

MAIN OBJECTIVES
Introduction to sedimentary processes; Instruction in Sedimentary petrography; Introduction to facies analysis; Illustration of clastic and carbonate sedimentary environments; Introduction to sequence stratigraphy.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Description of sedimentary petrography and diagenesis. Understanding of sedimentary processes and environments. Interpretation of sedimentary environments.

COGNITIVE SKILLS
Data analysis and critical assessment of varied data sets. Extracting relevant data and justifying interpretations. Thinking in 3-D.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Ability to select relevant information from multiple data sets; Make rational interpretations from proxy data; Handling uncertainty.

PREREQUISITES
Normally a pass in A-level Geology or Introduction to Geology or equivalent.

CONTENT AND ORGANISATION

RECOMMENDED READING
* Boggs, S. Principles of Sedimentology and Stratigraphy. Merrill.
* module texts
+additional reading

FIELDWORK
One weekend field class examining modern and ancient sedimentary environments.

MODULE EXAMINATION
One essay (20%) 3 hour practical examination (80%)

LECTURERS
Professor Charlie Bristow, Professor Andy Carter
STRUCTURAL GEOLOGY I (15 CREDITS) EASC011H5

MAIN OBJECTIVES
To introduce the basic tenets of structural geology.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Knowledge and understanding of the basic tenets of structural geology and its relationship with plate tectonics.

COGNITIVE SKILLS
The student will develop an understanding of hypothesis development and be given examples of how these might be tested, involving analysis of databases, theoretical understanding of relevant concepts, critical assessment of results and outcomes, and experience of real situations reported in research papers. They will be encouraged to think about the 3-dimensional aspect of geological structures through stereographic projection and map interpretation techniques.

SUBJECT-SPECIFIC PRACTICAL/ PROFESSIONAL SKILLS
The student will be made aware of relevant databases and how they might be used in studies of geology and geophysics. They will be trained to read and interpret geological maps. They will be able to plot structural orientation data on stereographic projections to aid 3D visualisation.

GENERAL/ TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
The student will gain skills such as comprehension of scientific data and papers, mathematical calculation, manipulation of data research techniques, independent study, IT skills and confidence in their abilities to follow a problem through to its end. They will be accomplished at map reading/interpretation and 3D visualisation. They will learn to use an electronic library.

PREREQUISITES
A pass in A-level Geology (or equivalent), or Introduction to Geology.

CONTENT AND ORGANISATION
The plate tectonic setting of structures and deformation. Characteristics of tectonic structures: a review of the main features of faults, shear zones, folds, foliations, lineations and deformation fabrics. Formation of tectonic structures: a review of deformation mechanisms and the nature of stress and strain. Structural associations: the geometry and kinematics of thrust, normal and strike-slip fault systems. Development of poly-phase structures. Practical work will include structural interpretation of maps and cross-sections, the representation of structures using stereographic projections and the techniques of field structural geology.

RECOMMENDED READING:

MODULE EXAMINATION
One 3 hour theory paper and one 3-hour practical paper.

LECTURER: Professor Gerald P Roberts
FORENSIC GEOLOGY EASC074H5 (15 credits)
DISTANCE LEARNING ONLY

PREREQUISITES
You can study this module if you are enrolled on the following programmes: Certificate in Forensic Geology; BSc Environmental Geology (option only); BSc Earth Science (option only)
A pass in Introduction to Geology, Introduction to Geochemistry and Invertebrate Palaeontology.

MAIN AIMS
The module provides a basic introduction forensic geology – the application of the principles of geological sciences to the identification and evaluation of geological materials that may relate to forensic investigation. The module will: Provide students with an overview of the history and development of forensic geology; Review the substantiation of compliance with laws, procedures, standards and ethics related to professional forensic geological investigation; Introduce techniques used to carry out forensic geological investigation and illustrate with examples, the wide variety of geological materials associated with crime, and the identification and classification of these.

MODULE OBJECTIVES
Knowledge and understanding in the context of the subject.
Understanding the process and systems related to forensic geology.

COGNITIVE SKILLS
Interpreting information derived from thin-section and hand specimen analysis: developing reasoning based on evidence from physical and chemical properties of geological material.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Interpreting numerical and chemical data; writing scientific descriptions of rock, mineral, soil, fossil and pollen samples; writing and presentation skills; use of graphs and diagrams.

MODULE CONTENTS
The module examines the background to, and physical and chemical properties of geological materials used in, forensic science. Lectures will focus on the History and development of forensic geology, compliance with laws, procedures, standards and ethics, rocks, sand, coal, fossils, pollen, spore, paints and building materials in forensic investigations, and geophysical methods of forensic investigation.

READING
Research papers relating to the module will be found in the following journals; Forensic Science International; Journal of Raman Spectroscopy; Journal of Forensic Science.

ASSESSMENT
70% one three-hour theory paper; 30% assessed practical
Practical will consist of exercises in handling and interpreting geological data and materials related to forensic cases.

LECTURER Professor Karen Hudson Edwards
INTRODUCTION TO ASTROBIOLOGY (15 credits) EASC064H5

MAIN OBJECTIVES
The module is designed to provide a basic introduction to the exciting new field of astrobiology the study of the astronomical and planetary context within which life on Earth has evolved, and the implications for the prevalence of life elsewhere in the Universe. It will therefore aim to:
1. Introduce students to the astronomical background of the origin of life, including the origin of the necessary chemical elements and the origin and evolution of the Solar System;
2. Introduce the concept of pre-biological chemical evolution, and familiarize students with the key theories and experimental results in this area;
3. Provide students with an overview of the history of life on Earth, and its relevance for life elsewhere, with special reference to extremophilic life;
4. Outline the prospects for life elsewhere in the Universe, both in our own Solar System and on the newly discovered planets around other stars;
5. Introduce students to the scientific and philosophical issues concerning the possibility of extraterrestrial intelligence.

COGNITIVE SKILLS
Understanding of scientific hypothesis development and testing. Ability to relate specific knowledge to a broader context.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Ability to integrate a wide range of knowledge, from several different scientific disciplines.

GENERAL/TRANSFERABLE SKILLS
Familiarity with basic scientific concepts. Writing and presentation skills. Interpreting numerical and graphical data.

PREREQUISITES
None.

LECTURE CONTENT

PRACTICAL CONTENT
Study of meteorites and moon rocks (the latter in thin section using a petrographic microscope)

COURSEWORK
Two c.1000 word essays on astrobiological topics

RECOMMENDED READING
Life in the Solar System and Beyond, by Barrie W. Jones, Springer Praxis, 2004

MODULE EVALUATION
One 2.5 hour written examination (75%) and continuous assessment of practical and written work (25%)

LECTURER Professor Ian Crawford
GEOLOGY OF THE SOLAR SYSTEM II (15 credits) SCES01H5

MAIN OBJECTIVES
To introduce students to the geological histories, and geological processes, of other planets, and to illustrate how this knowledge has led to our current understanding of the origin and evolution of the Solar System.

The module is designed to give students taking the B.Sc. Degree in Planetary Science with Astronomy and the Certificate in Planetary Geology with a basic introduction to planetary geology, with particular emphasis on the Solar System beyond the Earth-Moon system.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Knowledge and understanding of the basic geology and geophysics of the other planets
Understanding of the various techniques used to acquire geological knowledge of other planets
Understanding of how a comparison of the geologies of the different planets informs our understanding of the origin and evolution of the Solar System as a whole

COGNITIVE SKILLS
Understanding of scientific hypothesis development and testing; Ability to relate specific knowledge to a broader context.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Analysis and interpretation of planetary remote sensing data; Interpretation of images; creation of maps; interpretation of maps; Ability to transfer geological knowledge gained in the context of the Earth to wide range of different planetary environments.

Demonstrate knowledge of the specific aspects of planetary geology outlined in the syllabus.
Demonstrate an understanding of how this knowledge has been arrived at, and the relationship between theories, hypotheses and observations in the planetary sciences.

GENERAL/TRANSFERABLE SKILLS
Familiarity with basic scientific concepts; Writing and presentation skills; Interpreting numerical and graphical data

PREREQUISITES
Must take "Geology of the Solar System I" before this module, and have either completed "Introduction to Geology" or take it concurrently, as specified in the Programme Specification.

LECTURE CONTENT
Geology of Mars, Geology of Venus, Geology of Mercury, Geology of outer Solar System Moons,
Introduction to Planetary Atmospheres, Introduction to Asteroids, Meteorites and Comets
Origin of the Solar System

PRACTICAL CONTENT
Students will have the opportunity to examine hand specimens and petrographic thin-sections of various kinds of meteorite and/or lunar samples, and perform analyses of planetary remote-sensing data.


MODULE EVALUATION
One 2.5 hour written examination (85%) and continuous assessment of practical and written work (15%)

LECTURER Dr Peter Grindrod
MODULE OUTLINES LEVEL 6 (3RD/4TH YEAR MODULES)
PETROLEUM GEOLOGY (15 credits) SCES018H6

MAIN OBJECTIVES
Many of our students seek employment in the oil and gas industry after graduation. This module aims to provide them with an understanding of the principles of petroleum geology and demonstrate how knowledge of geology can be applied in the exploration and production of oil and gas.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Understanding of the essential components of a hydrocarbon play, which includes source rocks, reservoir rocks, trap formation as well as maturation and migration of hydrocarbons.

COGNITIVE SKILLS
Understanding of scientific hypothesis development and testing. Ability to relate specific knowledge to a broader context.

GENERAL/TRANSFERABLE SKILLS
Comprehension of scientific data and papers. Interpreting data. Use of graphs and tables. Written presentation skills. Oral presentation skills.

PREREQUISITES
Principles of Sedimentology

LECTURE CONTENT
Principles of Petroleum Geology: Onshore UK case study, source rock deposition, productivity versus preservation, maturation and migration of hydrocarbons, reservoir rocks, traps for oil and gas, petroleum geology of the North Sea, North Sea reservoirs, student poster presentations, production geology, exploration geology, basin analysis

PRACTICAL CONTENT
Poster presentation on North Sea Oil field

LEARNING OUTCOMES
On successful completion of this module a student will be expected to be able to:

- Understand the essential features of a hydrocarbon play.
- Explain where oil and gas come from.
- Able to attend an interview with a petroleum exploration or production company.

Module Evaluation
One 2.5 hour examination (75%) and Poster presentation on North Sea Oil field (25%)

Recommended Reading:
There is no set text book for this module but these two books provide useful background reading in addition to journal articles.


LECTURER: Professor Charlie Bristow
METAMORPHIC PROCESSES (15 credits) SCES037H6

MAIN OBJECTIVES
The module is designed to give students on the undergraduate programmes, an opportunity to learn about ‘cutting edge’ developments in contemporary metamorphic processes and petrology from active researchers in the field. To this end, the module will consist of a series of 11 lectures given by Birkbeck staff and invited researchers from the joint Birkbeck/UCL research school.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
After completing the module, students will have a thorough understanding and appreciation of the current state of research in metamorphic processes and where those activities are focused. In addition, through the completion of a theoretical and practical assessment, students will gain experience in assimilating information from the literature and knowledge gained from practical work and be able to present it in a coherent and intelligible manner.

Metamorphic Processes will introduce the concepts of current research ideas into petrogenesis of metamorphic rocks. The module will show the importance of structural and textural development and how these relate to tectonic movements on the mega, meso and micro-scale. Students will integrate data gained from thin-section analysis and begin to understand the complexities of multiple deformational events recorded in suites of metamorphic rocks. This advanced module would extend the student knowledge and develop an understanding of current research ideas relating structural and textural features to metamorphic processes such as mineral growth during plate tectonic movements and mountain building.

COGNITIVE SKILLS
On successful completion of this module a student will be expected to be able to demonstrate an in-depth knowledge and understanding of metamorphic processes and how these relate to tectonic movements on a local and global scale. Students will not only develop individual study skills but will also gain in practical and writing skills as well as a comprehension of current research directions.

PREREQUISITES: Introduction to Geology, Foundations of Mineralogy Metamorphic Petrology

LECTURE CONTENT
1. Thermodynamics and mineral reactions
2. Geothermometry/Geobarometry
3. Patterns of low-grade metamorphism in metapelitic and metabasic rocks
4. Isotopic dating of low-grade metamorphic rocks
5. P-T-t paths and Tectonic Environment, heat and fluid flow
6/7. Metamorphic textures and processes
8. High temperature metamorphism and anatexis
9. Metamorphic core complexes and gneiss domes
10. Metamorphism and mountain belts

RECOMMENDED READING
To be confirmed by Steve Hirons – email: s.hirons@bbk.ac.uk

MODULE EVALUATION
Critical review of current research paper (A four-page appraisal of a research paper) 10%
Practical assessment (Completion of a practical workbook) 40%
Final 3 hour unseen exam 50%

LECTURER Steve Hirons
STRUCTURAL GEOLOGY II (15 credits) EASC018H6

MAIN OBJECTIVE
To address topics of current interest in structural geology and tectonics.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Knowledge and understanding of advanced concepts in structural geology and their relationships with plate tectonics, the hydrocarbon and minerals industries and seismic hazard analysis.

COGNITIVE SKILLS
Hypothesis development and testing using analysis of databases, theoretical understanding of relevant concepts, critical assessment of results and outcomes. Drawing and interpreting geological cross-sections using advanced section balancing techniques.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Awareness of relevant databases and their use in studies of geology and geophysics. Reading and interpreting geological maps. Interpreting seismic reflection profiles in terms of structural geology. Interpreting the microstructural evolution of fault zones using a petrological microscope.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Writing, comprehension of scientific data and papers, mathematical calculation, manipulation of data using relevant software/research techniques, independent study, IT skills. Use of an electronic library. Map reading/interpretation and 3D visualisation, cross-section construction, interpretation of seismic reflection data and microstructural interpretation.

PREREQUISITES
A good pass in Structural Geology I or equivalent.

CONTENT AND ORGANISATION
Methods used for validating cross-sections to investigate the significance of strain accumulation during formation of fault-related folds. Data from the Western Alps to assess the links between the superficial and deep structure. Data from areas of continental extension to assess structural geometries and mechanisms of continental extensional tectonics. Theoretical models of faulting, case studies of earthquakes and rock deformation experiments to assess the links between fluid migration, faulting and earthquakes. Compressional structures in pre-existing extensional basins; Inversion Tectonics. Structures associated with emplacement of salt bodies and igneous intrusions; interplay between regional tectonic stresses and gravitational forces.

PRACTICAL WORK
Examination of structural geometries on published maps and cross-sections; Interpretation of deep seismic reflection profiles, seismic refraction profiles and gravity data; Interpretation of seismic reflection profiles from oil and gas fields; Mohr diagrams; Flinn plots and the centre-to-centre methods of strain analysis; Restoration of cross-sections using line-length and excess-area methods; Examination of the microstructures and deformation mechanisms of brittle fault-rocks.

RECOMMENDED READING
Recent research papers will be recommended.

MODULE EXAMINATION
One 3-hour theory paper and one 3-hour practical paper.

LECTURER: Professor Gerald P Roberts
ADVANCED PALAEONTOLOGY (15 credits) EASC021H6

MAIN OBJECTIVES
The module will give students an understanding of a range of topics relevant to the classification, study, and use of fossils. This will give an overview of palaeontology as a science and the nature and mode of palaeontological study. This module will focus on the topics that are not included elsewhere, such as the applied aspects of palaeontology and the palaeontological record of vertebrates, plants and microfossils. One or more of these aspects will be used in a palaeontological project.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT

- The classification of organisms
- Field and laboratory techniques
- Evolution and the fossil record
- Relating fossils to living organisms
- The application of fossils in dividing geological time

COGNITIVE SKILLS

- Observational skills

SUBJECT SPECIFIC PRACTICAL/PROFESSIONAL SKILLS

- Techniques in collecting and studying fossils in the field.
- Taxonomy
- Use of fossils in relative dating
- Relating fossil and living organisms

PREREQUISITES

Invertebrate Palaeontology or equivalent

CONTENT AND ORGANISATION

- Principles of classification
- Methods in palaeontological research
- Innovations in vertebrate evolution
- Fossils as organisms
- Uses of fossils
- Micropalaeontology

RECOMMENDED READING

To be introduced during the module.

FIELDWORK

None. Personal fieldwork or museum work possible.

MODULE EXAMINATION

One 3 hour theory examination (70%).
Project (30%)

LECTURER: Dr Charlie Underwood.
MAGMATIC PROCESSES (15 credits) EASC029H6

OBJECTIVES
To introduce modern concepts of petrogenesis, including the major magmatic processes. To show the importance of geochemical data in the study of igneous petrology. To introduce students to the integration of thin-section petrography and geochemical data in order to understand the origin of suites of igneous rocks.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Understanding modern concepts of igneous petrology
Relating petrographic and geochemical information to deduce origin of igneous rocks

COGNITIVE SKILLS
Interpreting information from thin-sections and integrating this with geochemical data
Developing reasoning based on evidence from thin-section observations and geochemical data

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Handling data in form of tables and graphs; Interpreting data, including chemical variation diagrams, isotope diagrams and trace element figures.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Interpreting data; Numeracy; Scientific literacy; Use of graphs and tables.

PREREQUISITES
A pass in Igneous Petrology.

CONTENT AND ORGANISATION
The module will cover the following topics: the generation of magmas, their subsequent behaviour and evolution; application of trace elements and radiogenic isotopes to the study of the origin of igneous rocks. Tectonic setting of major igneous rock associations. Processes at constructive and destructive plate margins. Origin and evolution of alkaline rocks. Evidence for crustal contamination, magma mixing and liquid immiscibility in the formation and evolution of magmas. Practicals will consist of petrographic examination and description of igneous rocks in thin section, plus the application of chemical calculations to petrogenetic problems.

RECOMMENDED READING
*Wilson, M. Igneous Petrogenesis. 1988. Unwin Hyman (recommended)
N.B. An optical mineralogy textbook (such as a 2nd hand copy of Kerr’s “Optical Mineralogy”) will be useful for practical work.

MODULE EXAMINATION
One 3-hour theory paper (50%) and a portfolio of practical work (50%).

LECTURER
Professor Hilary Downes
ENVIRONMENTAL ISOTOPES (15 credits) SCES036H6

MAIN OBJECTIVES
To introduce modern concepts of isotope geochemistry; To develop practical skills in solving mathematical and conceptual isotope geochemical problems; To develop a critical understanding of the use of isotopes in determining past and present environmental concepts and change

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
This module provides an understanding of how isotope geochemistry is used to trace and determine the behaviour of the Earth’s environment, both in the present, and in geological history. Topics such as the evolution of the Earth’s atmosphere and oceans, the interaction between them and the continents, and the causes and consequences of environmental perturbations will be covered.

Students will develop practical skills in solving isotope geochemical problems, develop a critical understanding of current and past research in environmental isotope geochemistry, develop the ability to extract the fundamental results in a research topic and to summarise those results in a poster, and develop skills in isotope geochemical calculations and theory through completion of a portfolio of practical work.

COGNITIVE SKILLS
On successful completion of this module a student will be expected to be able to:

Subject-specific/Intellectual
Understand the (i) modern concepts of isotope geochemistry, (ii) the additional constraints and understanding isotope geochemistry provides to comprehension of the Earth’s environment. Analyse, evaluated and interpret multidisciplinary data. Develop evidence-based reasoning. Put subject-specific information into a broader context.

Practical/ Personal / Social
Interpreting data; Numeracy; Scientific literacy; Use of graphs and tables. Research well-defined subject matter and prepare and write reports. Written presentation skills. Independent study.

GENERAL TRANSFERABLE SKILLS
Critical analysis and understanding of data; dealing with scientific debate; presentation skills; scientific scepticism

PREREQUISITES : None

LECTURE CONTENT
1 – Concepts of isotope geochemistry; 2 – The source of Earth’s oceans; 3 – History of atmospheric oxygen: the first whiff; 4 – History of atmospheric oxygen: a breathable atmosphere; 5 – Climate stabilisation; 6 – History of atmospheric CO₂; 7 – Oceanic chemistry and productivity; 8 – Chemical evolution of the Phanerozoic oceans; 9 – Timing and rates of continental change; 10 – Dating sea-level change; 11 – Isotopes in the Critical Zone

RECOMMENDED READING
Isotopes: Principals and Applications, 3rd. ed. Faure, G and Mensing, T.M.
Geochemistry: An Introduction, Albarede, F.
Isotope Geochemistry, White, W.M., Wiley

MODULE EVALUATION One 3 hour theory examination (70%), portfolio of practical work (20%), Poster Presentation (10%).
LECTURER Dr Philip Pogge von Strandmann
SCIENTIFIC COMPUTING AND DATA MODELLING (15 CREDITS)  
SCES019H6

MAIN OBJECTIVES
The main aims of the module are to provide training in scientific computing and data modelling in geoscience through the use of the MATLAB platform. MATLAB is a relatively inexpensive, widely used and flexible computing platform, allowing both face-to-face and distance-learning students to engage with computing exercises and learning materials on their own computers or computing devices. The data modelling components will complement the theories introduced in the Geophysics module, whereas the scientific programming components may be relevant to project work in the BSc programmes. Numerical and statistical methods used in scientific computing will also be introduced in the module.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
On successful completion of this module a student will be expected to be able to:

Subject and practical:
1. Understand and write MATLAB codes, including data visualisation, processing, analysis and modelling
2. Apply MATLAB codes to geoscience datasets;
3. Interpret and critically evaluate results from data modelling;
4. Apply numerical and statistical methods to scientific computing and data modelling.

Intellectual:
1. Evaluate the characteristics, limitations and complexity of datasets and models in geoscience;
2. Develop an integrated approach to programming and modelling;
3. Evaluate the limitations of scientific computer codes.

RECOMMENDED READING

ASSESSMENT
Written examination (50%) and one written report (50%). TBC

LECTURER
Dr James Hammond
PALAEOECOLOGY (15 credits) EASC039H6

MAIN OBJECTIVES
The module will introduce and build upon the principles and applications of fossil preservation, ecology of fossil organisms and the changes in life through geological time. The module concentrates on applications of theory and enhances relevant skills in addition to knowledge.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Fossil preservation involving both biotic and geological processes; Nature of bias within the fossil record; Exceptional fossil assemblages and their significance; Relationships between fossil assemblages and their depositional and preservational palaeoenvironments; Biotic and abiotic limitations on the spatial and temporal distribution of organisms; The nature of extinction events.

COGNITIVE SKILLS
Observational skills using hand specimens and in the field. Detailed recording of quantitative and qualitative data.

SUBJECT SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Interpretation of fossil assemblages. Interpretation of palaeoenvironments

GENERAL/TRANSFERABLE SKILLS
Detailed observation. Interpretation based on incomplete data. Time and project management. Integration of theory. Written presentation skills. Oral presentation skills.

PREREQUISITES
Invertebrate Palaeontology, Principles of Sedimentology, Earth History

CONTENT AND ORGANISATION
Decay, quality of assemblages; scavenging, transport; shell beds; diagenesis; exceptional faunas. Marine environment and palaeoenvironment; Communities, tiering, diversity; replacement; Trace fossil assemblages; Palaeobiogeography.

RECOMMENDED READING
Other readings to be introduced during the module.

FIELDWORK
One day field class to Sheppey, Kent

MODULE ASSESSMENT
3 hour combined practical and theory examination (70%)
Written project (20%)
Oral presentation (10%)

LECTURER:
Dr Charlie Underwood
GLOBAL TECTONICS (15 credits) EASC041H6

MODULE AIM
To provide a global understanding of causes and consequences of present and past plate tectonic and associated geodynamic processes.

COGNITIVE SKILLS
Analysing, evaluating, and interpreting multidisciplinary data. Development of evidence-based reasoning.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Ability to work with information from a diverse range of sources. Interpreting field observations and analytical data, use of graphs and tables. Researching defined subject matter and preparing and writing reviews.

CONTENT AND ORGANISATION

PREREQUISITES
Good passes in Structural Geology 1, Geophysics, and Igneous and Metamorphic Petrology are preferred.

RECOMMENDED READING
A significant component of the module material will come from research papers available online. The following textbooks also contain many useful chapters:


MODULE ASSESSMENT
One 3 hour written paper (70%) Course work (30%).

LECTURER
Professor Andy Carter
GEOLOGICAL HAZARDS (15 Credits) EASC044H6

MAIN OBJECTIVES
To convey an understanding of the origin and scale of natural geological hazards including earthquakes and landslips, volcanic hazards and floods. To show how the risk associated with geological hazards can be reduced, and to introduce the practical application and limitation of hazard monitoring and prediction.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Students will learn about earthquake, volcanic and tsunami hazards, and secondary hazards.

COGNITIVE SKILLS
Analysing, evaluating, and interpreting data; knowledge-based reasoning; information assimilation and recollection.

SUBJECT-SPECIFIC PRACTICAL/ PROFESSIONAL SKILLS
Hazard mapping; Appreciating the role of the geologist in hazard mitigation.

GENERAL/ TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Graphical presentation of information in the form of a poster; Interpreting practical experimental data. Presenting work to a deadline.

PREREQUISITES
Good pass in Introduction to Geology and Structural Geology preferred, but will also be open to Birkbeck Geography, Environmental Science and UCL Environmental Geoscience students.

CONTENT AND ORGANISATION
Earthquake hazards including wave types, origin and location of earthquakes, magnitude scales, ground acceleration, effects of bedrock geology; long-term prediction, historical records, palaeoseismology, recurrence intervals, fault slip-rates, and fault behaviour models. Short-term prediction and mitigation. Landslides, classification and translation processes, monitoring and prediction. Volcanic hazards, types of eruptions, scale of eruption., Volcanic mudflows (lahars), their origin and effects. Methods of monitoring and predicting volcanic eruptions, levels of volcanic hazard alert. Mitigation of volcanic risks. Tsunamis, their origin, recurrence and monitoring and warning times. Occurrence in the geological record. Floods in the geological record including exceptional high magnitude floods. Discussion on the scale of recent and historic natural disasters.

RECOMMENDED READING
References will be made to journal publications.

ASSESSMENT
1 essay, 1 presentation, 2 practical reports, 1x 3-hour written exam.

LECTURERS Prof Charlie Bristow (Module Co-ordinator); Prof Gerald Roberts.
CHEMISTRY AND POLLUTION OF WATER, SOIL AND AIR
(15 credits) EASC045H6

OBJECTIVES
To provide a global understanding of the geochemistry of water, soil and air at the Earth, including the impact of changes brought about by human activity (pollution, climate change, etc.). To develop practical skills in solving geochemical problems. To develop a critical understanding of current and past research in low-temperature geochemistry.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Understand the (i) underlying controls on water, soil and air chemistry and pollution, (ii) concepts of geochemical cycles and relationships between water, soil and air; (iii) anthropogenic influences on natural Earth surface geochemistry.

COGNITIVE SKILLS
Analyse, evaluate and interpret multidisciplinary data. Develop evidence-based reasoning. Put subject-specific information into a broader context.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Scientific literacy. Graphical skills. Ability to prepare a properly documented review article. Ability to access a variety of information sources. Ability to solve difficult chemical problems.

GENERAL/TRANSFERABLE SKILLS
Mathematical, writing, and communication skills; self-motivation, time management and organisation; data analysis; ability to write concise reviews of technical subjects.

PREREQUISITES
Pass in A-level Geology or Introduction to Geology; Pass in Introduction to Geochemistry.

CONTENT AND ORGANISATION
Geochemical cycles, natural and polluted ocean, estuary, river and ground waters, chemical weathering, soil composition and chemistry, contaminated land, waste disposal, surface radioactivity, atmospheric chemistry and pollution.

RECOMMENDED READING
Selected readings from the journals Applied Geochemistry, Geochimica et Cosmochimica Acta, Chemical Geology, and others that are available through ScienceDirect.

MODULE ASSESSMENT
One 3-hour theory paper (70%). Assessed practical report (30%). Practicals will consist of exercises in handling and interpretation of geochemical data, for which access to the computer program Excel (or a similar spreadsheet program) will be needed.

LECTURER Professor Karen Hudson-Edwards.
EARTH'S RESOURCES & RAW MATERIALS (15 credits) EASC048H6

MAIN OBJECTIVES
This advanced module aims to cover the formation of economic deposits with examples from the extractive industries. Key subjects we will cover include the principles and economics of ore geology, the features and genesis of deposits of magmatic, hydrothermal and sedimentary origina and the environmental impacts of mining.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Students will gain understanding in the economics of ore deposits.

COGNITIVE SKILLS
Information assimilation and recollection.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Essential concepts in ore geology and ore exploration.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Graphic presentation of information on a poster; data collection and interpretation.

PREREQUISITES
The course is suitable for students on the BSc Geology and BSc Environmental Geology programmes. Some knowledge, and an interest in sedimentology (Principles of Sedimentology) and Igneous Petrology and Metamorphic Petrology is required.

CONTENT AND ORGANISATION
The module examines the formation and distribution of ores deposits of economic importance. Lecture topics are concerned with the economics of ore deposits, and ores/economic deposits developed in sedimentary rocks, including coal, placer deposits, evaporites, residual deposits and ironstones, and those developed in igneous and metamorphic rocks (e.g., volcanogenic massive sulphides, diamonds). Building and industrial resources, and the environmental impacts of mining, will also be discussed.

TEXTBOOKS

ASSESSMENT
One 3-hour theory paper (70%); assessed essay (15%) and assessed practicals (15%)

LECTURERS Dr Andrew Beard; Prof Karen Hudson-Edwards
PALAEOClimatology (15 credits) SCES014H6

Main Objectives
Palaeoclimatology is a relatively new geological discipline that has been the focus of intense research in recent years due to societal concerns about anthropogenic climate change. The aim of this module is to give students a solid understanding of the principals of palaeoclimatology, natural climate change in deep time and an appreciation of the role of palaeoclimatology in the prediction of future climate change.

Knowledge and Understanding
This module will take an Earth System approach, covering climate forcing and climate responses across the full range of spatial and temporal scales, from the Precambrian to the Holocene. Students will be introduced to the wide range of geochemical proxies and climate modelling approaches used in palaeoclimatology. By the end of this module, students will be able to evaluate future climate change scenarios and formulate their own opinions on the issue of anthropogenic climate change.

Cognitive Skills
Analysing and interpreting palaeoclimate proxies from a range of sources (e.g. geochemical, palaeobiological and stratigraphical). Evaluating the validity of different climate proxies.

Subject-Specific Practical/Professional Skills
Proxy evaluation, model-data comparison.

General / Transferable Skills
Producing spread-sheets and plotting graphs in Excel. An in-depth understanding of the science behind anthropogenic climate change.

Prerequisites
Introduction to Geology is advised, but is not essential.

Content and Organisation

Practicals: The practical sessions will include paper-based and excel-based exercises, and will give students hands-on experience of the methods used in palaeoclimatology, such as energy balance models, stable isotope datasets, and time-series analysis. There will also be the opportunity for students to produce their own dendrochronological record of late Holocene climate.

Recommended Reading

Module Assessment
Examination (3 hours): 70%
Laboratory Practical: 10%
Essay (2000 words): 20%

Lecturer: Dr Phil Hopley
PHYSICAL PRINCIPLES OF ASTRONOMY (15 credits) SCES022H6

MAIN OBJECTIVES
The module is designed to give students taking the B.Sc. Degree in Planetary Science with Astronomy a quantitative understanding of key physical processes and concepts that underpin the disciplines of astronomy and astrophysics. Specific topics to be covered are outlined below.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
The module is designed to provide a quantitative understanding of key physical and astrophysical concepts underpinning the science of astronomy.

Key topics covered will be: Celestial Mechanics (including classical mechanics, gravity, orbits), Time (solar time, sidereal time, atomic time), Electromagnetic Radiation (wave/particle duality, blackbody radiation, Doppler effect); The Analysis of Starlight (stellar luminosity, stellar colours, effective temperature; atomic basis of spectroscopy); Interstellar Processes (interstellar reddening, interstellar spectroscopy; dust properties; interstellar chemistry), and High-Energy Astrophysics (introduction to special relativity, cosmic rays, physics of neutron stars and black holes).

COGNITIVE SKILLS
Demonstrate knowledge of the specific aspects of astronomy and astrophysics outlined in the syllabus, demonstrate an understanding of how this knowledge has been arrived at and the relationship between theories, hypotheses and observations in the planetary sciences, demonstrate skills such as writing, numerical reasoning, and the comprehension of scientific concepts.

GENERAL TRANSFERABLE SKILLS
Comprehension of scientific data and papers. Interpreting data. Use of graphs and tables. Written presentation skills. Oral presentation skills.

PREREQUISITES
Foundations of Astronomy, Geophysics

LECTURE CONTENT
Celestial Mechanics (2 lectures), Time (1 lecture), Electromagnetic Radiation (1 lecture), Analysis of Starlight (3 lectures), Interstellar Processes (2 lectures), High Energy Astrophysics (2 lectures)

RECOMMENDED READING
‘Introduction to Astronomy and Cosmology’ by Ian Morison (John Wiley, 2008) [Also the set book for Foundations of Astronomy – students should be familiar with this book].

‘Introductory Astronomy and Astrophysics’ by Stephen A. Gregory and Michael Zeilik (Saunders Golden Sunburst Series, 1997) [Still an excellent introduction to the quantitative side of astrophysics. Too expensive to buy, but the Birkbeck library has copies].


MODULE EVALUATION One 2.5 hour written examination (75%) and Assessed work: Two problem sheets will be set during the module to assess students’ understanding of the module content (25%)

LECTURER Professor Ian Crawford
REMOTE SENSING AND PLANETARY SURFACES (15 credits)
SCES035H6

MAIN OBJECTIVES
The module will provide an advanced understanding of the processes governing the evolution of planetary surfaces and the remote sensing methods used in their exploration. By integrating the technical methodology with the most recent discoveries and paradigms, students will learn not only the current state of knowledge in planetary surface processes, but also how to critically assess the advantages and limitations of different remote sensing techniques.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
The module will provide an advanced understanding of the processes governing the evolution of planetary surfaces and the remote sensing methods used in their exploration

COGNITIVE SKILLS
On successful completion of this module a student will be expected to be able to: analyse, evaluate, and interpret remote sensing data; demonstrate an understanding of how different observational techniques can be used to test hypotheses and form theories regarding planetary surface processes.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Knowledge of the specific aspects of remote sensing and planetary surfaces processes; basic knowledge of Geographic Information Systems; spectroscopy for determining composition.

INTELLECTUAL:
Demonstrate an understanding of how different observational techniques can be used to test hypotheses and form theories regarding planetary surface processes.

GENERAL/TRANSFERABLE SKILLS
Familiarity with basic scientific concepts; Writing and presentation skills; The use and interpretation of image, numerical and graphical data.

PREREQUISITES
Geology of the Solar System I and Geology of the Solar System II

LECTURE CONTENT

Recommended reading TBC

MODULE EVALUATION
Practical activity: Two practicals (20%), Report and presentation: One 2000 word report and 10 minute presentation (20%), Exam: One 3 hour written examination (60%)

LECTURER Dr Peter Grindrod
EXPLORATION AND MODELLING OF PLANETARY INTERIORS (15 CREDITS) SCES047H6

MAIN OBJECTIVES
- To introduce contemporary concepts in planetary exploration and mineral physics, showing how these work together to build a picture of planetary interiors.
- To provide a descriptive foundation for the mathematical and physical concepts involved in this work.
- To develop a critical awareness of the limitations inherent in studying such remote and inaccessible parts of planetary bodies

On successful completion of this module a student will be expected to be able to:
Subject-specific:

Understand the physical and mathematical basis for remote sensing of planetary interiors as well as the range of laboratory techniques and computer models required to interpret these data;

Intellectual:

(i) Synthesize diverse pieces of information into a coherent story in the context of lab- and computer-based testing of observationally formulated hypotheses; (ii) appreciate the limitations inherent in various techniques and be aware of over-interpretation or speculation in the literature;

Personal / Social:
Prepare a presentation that collates diverse information into a succinct and interesting narrative.

Lecture content
Lecture 1: Mineralogy of comets, asteroids and meteorites as an insight into planetary composition; Lecture 2: Use of seismic waves to probe planetary interiors; Lecture 3: Application of gravity and planetary spin; Lecture 4: Application of planetary magnetism; Lecture 5: Laboratory methods to learn about materials under planetary conditions; Lecture 6: Properties of silicate rocks (mantles); Lecture 7: Properties of metallic alloys (cores); Lecture 8: Properties of planetary ices; Lecture 9: Sources of heat – origins of differences between otherwise similar planetary bodies; Lecture 10: Planetary crusts; Lecture 11: Exoplanets – a universe of potentially weird objects

Assessment and Weighting

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Weighting</th>
<th>Description</th>
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<tbody>
<tr>
<td>Thematic essays</td>
<td>30%</td>
<td>Three 1500 word essays relating to recent advances in each of the major themes of the module</td>
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<tr>
<td>Oral presentation</td>
<td>10%</td>
<td>oral presentation on relevant topic of student’s choice</td>
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<tr>
<td>Written examination</td>
<td>60%</td>
<td>2½ hr written exam</td>
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Pre-Requisites
Geology of the Solar System I and Geology of the Solar System II

Reading List:
To be confirmed by Tutor.

Tutor: TBC
VOLCANISM IN THE SOLAR SYSTEM (15 credits) EASC059H6

OBJECTIVES
This module aims to: 1) introduce students to the nature of volcanism on the Earth and other planets; 2) expand their understanding of the processes that drive volcanism; 3) explain the differences in volcanic activity on different bodies in the Solar System; 4) show how volcanic activity is related to the chemical and physical properties of magmas and the nature of the planetary body. A mixture of terrestrial and planetary material will be presented.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Understanding of the diversity of magmas that form volcanoes on the terrestrial planets and icy satellites; understanding volcanic processes and products.

COGNITIVE SKILLS
Ability to synthesise information from different sources. Hypothesis testing. Critical assessment of results.

SUBJECT SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Ability to distinguish and classify volcanic structures and products using maps, hand-specimens and thin-sections.

GENERAL/TRANSFERABLE SKILLS
Poster presentation skills (use of PC, software packages, scanner, web, printer). Numeracy, scientific literacy, computer literacy

PREREQUISITES
Passes in Introduction to Geology, Foundations of Mineralogy, Igneous Petrology.

CONTENT AND ORGANISATION
The module will consist of 11 lectures and practicals on volcanic activity on Earth (6 lectures), the Moon, Mars, Venus, Io and the icy moons. Practical material will include hand-specimens and thin-sections of volcanic rocks, together with maps and digital images of volcanoes, analogue modelling of lava flows, and sieving of an unconsolidated pyroclastic deposit.

RECOMMENDED READING
“Volcanoes” by P Francis and C Oppenheimer (2nd edition), OUP. 2004

MODULE EXAMINATIONS
The module will be assessed on a series of practical assignments (15%), a poster on a specified topic (10%) and a 3 hour written examination (75%).

LECTURER
Professor Hilary Downes
ADVANCED TOPICS IN PLANETARY SCIENCE (15 credits)
EASC072H6

MAIN OBJECTIVES
The module is designed to give students taking the B.Sc. Degree in Earth and Planetary Science an opportunity to learn about ‘cutting edge’ developments in contemporary planetary science through directed reading of the recent research literature. After completing the module, students will have a good understanding of the present state of planetary science, and where current research activities are focused. In addition, through completion of a 3000 word report, and associated presentation, on a contemporary planetary science topic students will gain experience in assimilating information from the literature and presenting it in an intelligible manner to non-specialists.

PREREQUISITES
Geology of the Solar System I and II; Introduction to Astrobiology (EASC064U)

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Knowledge of the focus of contemporary research activities in planetary science, in particular as gained by recent space missions and advances in analytical and computational techniques.

COGNITIVE SKILLS
The student will acquire knowledge and understanding of processes relevant to the astronomical, geological and geophysical evolution of planetary bodies and an ability to relate specific knowledge gained in particular research fields to a broader context of human knowledge.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
This is not a primarily practical module, although students will gain experience in online literature searching and presentation skills.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
The student will gain skills such as writing, comprehension of scientific concepts, independent study and experience in presenting knowledge gained to their peers and other interested individuals.

MODULE EXAMINATION
Written Examination (60%) One 3 hour written paper
Brief summaries (20%) Summaries of key points made in each of the assigned papers (no more than 500 words each)
Written mini-project Report (20%) 3000 words

LECTURER: PROF IAN CRAWFORD
COMETS, ASTEROIDS AND METEORITES (15 credits) SCES002H6

OBJECTIVES
To discuss the origin and evolution of minor bodies in the Solar System. To introduce students to the scientific literature on the nature and origin of comets, asteroids and meteorites.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Major concepts such as the structure and composition of comets and asteroids, missions to comets and asteroids, variations in meteorite compositions and mineralogy, the nature of the meteorite record.

COGNITIVE SKILLS
Analysing, evaluating and interpreting data; evidence-based reasoning; hypothesis testing.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Scientific literacy; ability to use data to construct arguments; interpreting data; integration of results from observation and experimentation.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Numeracy; ability to interpret data tables and graphs; report writing; synthesis of information.

PREREQUISITES
Pass in A-level Geology or Introduction to Geology; Pass in Introduction to Geochemistry.

CONTENT AND ORGANISATION
Architecture of the Solar System; Dust in the Solar System; Structure and composition of comets; Samples from comets; Asteroid compositions and missions to asteroids; undifferentiated meteorites; fossil meteorites; iron cores of differentiated asteroids; asteroidal basalts, cumulates and mantle rocks; rubble piles and regolith breccias; meteorites from Mars.

ASSESSED COURSEWORK
Students will produce a set of lecture notes on a topic of importance in the module. A list of important papers will be provided. Students will also hand in a portfolio of interpretations of results of analyses of meteorites etc, by different methodologies.

RECOMMENDED READING
Mainly journal articles available via Moodle.

MODULE EXAMINATION
One 3-hour theory paper (60%). Assessed lecture notes (20%). Practical material (20%).

LECTURER: Professor Hilary Downes
TECTONIC GEOMORPHOLOGY (15 credits) EASC066H6

MAIN OBJECTIVES
To understand the different processes (including heat flow, isostasy, tectonics, erosion, climate) that collectively defines the Earth’s landscape, past and present.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Learn how landscapes form and evolve over the short (<10^4 yrs), medium (10^5 yrs) and long-term (≥10^6 yrs). Understand the concepts of feedback systems between tectonics, surficial processes and climate. How to use landscape archives to determine the magnitude-frequency of future events, including seismicity and climate change.

COGNITIVE SKILLS

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Handling data from tables and graphs and web-based data archives including Google Earth and GeoMapApp. Synthesis of information from a range of sources. Ability to think in 3 dimensions.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Comprehension of scientific data and papers. Interpreting data. Use of graphs and tables. Written presentation skills.

PREREQUISITES
A pass in Introduction to Geology

CONTENT AND ORGANISATION
The lectures examine how interaction between tectonics, heat flow, climate change, erosion and local and regional isostasy control the Earth’s surface topography.

Lecture 1: Introduction to tectonic geomorphology
Lecture 2: Topographic change: Isostasy
Lecture 3: Tectonic geomorphology of rifts and passive margins
Lecture 4: Terrain mapping and analysis
Lecture 5: Active tectonics and rivers
Lecture 6: Topographic metrics
Lecture 7: Establishing timing in a landscape.
Lecture 8: Geomorphology and climate
Lecture 9: Mountain belt evolution over the long-term
Lecture 10: Mountain belt evolution over the medium to short term

RECOMMENDED READING


MODULE EXAMINATION
3 hour Theory examination (70%); Interpretative exercises (30%)

LECTURER Professor Andy Carter
FIELD CLASS AND PROJECT MODULES
ASSESSSED FIELD TECHNIQUES 4 x (15 credits). EASC053H5, EASC054H5, EASC056H6, EASC055H6

MAIN OBJECTIVES
To give students experience of techniques involved in geological fieldwork.

ORGANISATION AND CONTENT
The first three of these modules are compulsory for BSc Geology and BSc Environmental Geology students, and we strongly encourage students to attend all four fieldwork modules.

First year students who do not confirm attendance and pay the deposit for Assessed Field Techniques 1 module will be moved to the BSc Earth Science degree.

They are optional for students on the BSc Earth Science, and Planetary Science with Astronomy. They consist of the work done by students in each of three/four Easter field classes of a normal degree programme. Performance in the field (accuracy of observations and records) and quality of interpretation are assessed during and following each 10 day Easter field class by the field class leader in consultation with demonstrators (if any).

Techniques taught and assessed include geological mapping in a variety of terrains and at a variety of scales using base maps and aerial photographs; recording geological structures on maps and aerial photographs and on photographs of vertical sections; and the field description and logging of sedimentary, metamorphic and igneous rocks.

ASSESSMENT
One 15-credit module for each field class. After each field class the relevant notebooks/reports/maps etc are submitted for assessment. All assessed material from each of the four field classes must be retained by the student for presentation to the examiners in the student’s final year.

RECOMMENDED READING
The Geological Society of London Handbook series:

- Barnes: Basic geological mapping.
- McClay: The mapping of geological structures.
- Tucker: The field description of sedimentary rocks.
- Thorpe & Brown: The field description of igneous rocks.
- Fry: The field description of metamorphic rocks.

SPECIAL REQUIREMENTS
Hard hat, waterproof jackets/outwear, walking boots, hand lens, field notebooks, compass, clinometer, pencils, mapping pens, tape measure, geological hammers. A GPS instrument will be useful.

LECTURERS
All members of staff are involved.
FIELD CLASS FOR PLANETARY SCIENCE  SCES048H6 (15 credits)

MAIN OBJECTIVES
To give Planetary Science students experience of preparing for, planning, undertaking and reporting on a field excursion.

ORGANISATION AND CONTENT
This module is optional for students on the BSc Planetary Science with Astronomy degree. Other qualified students may attend with the agreement of the module organiser.

It consists of work done by students firstly using remote sensing techniques to produce an individual geological interpretation of a region of a planetary surface (e.g. the island of Lanzarote in the Canary Islands), and then by the group of students visiting different locations on the selected region. The group will hold a meeting prior to commencing the excursion, to decide which locations should be visited (subject to the advice of the module organiser).

Techniques taught and assessed include geological mapping at a variety of scales using base maps, aerial photographs and/or satellite images; recording geological structures on maps and aerial photographs; and the field description of outcrops and rocks.

ASSESSMENT
Each student will submit an individual illustrated interpretation of the geology of the selected region before the field class (40% of the marks). After the field class, the relevant individual notebooks/reports/maps etc will be submitted for assessment in the form of a final report (60% of marks).

PRE-REQUISITES
Students must have attended and passed Assessed Field Techniques 1. Students will also be expected to have attended SCES035H6 (Remote sensing and planetary surfaces).

SPECIAL REQUIREMENTS
Appropriate jackets/hats, walking boots, hand lens, field notebooks, compass, clinometer, pencils, mapping pens, GPS.

LECTURERS
All members of Planetary Science staff are involved.
MAIN OBJECTIVES
To give students experience of independent work on a topic of interest within the Earth Sciences and the preparation of a scientific report. Normally taken by students who are unable to undertake a map and thesis, or for whom a project would be more appropriate. Each student will be allocated a supervisor who will be responsible for advice on all aspects of the module.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT.
Knowledge and understanding of the basic tenets of the particular area of Earth Sciences for the project. Hypothesis development and testing skills through analysis of the data obtained for their project, theoretical understanding of relevant concepts, critical assessment of results and outcomes and experience of real situations during the project work.

SUBJECT SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Collect and analyse data relevant to the area of geology related to their project using a variety of research techniques. The student will be able to critically assess the quality of the scientific method, data, results, conclusions and implications of relevant studies.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Scientific writing, comprehension of scientific data and papers; manipulation of data using relevant software/research techniques; independent study; IT skills and confidence in their abilities to follow a problem through to its end.

CONTENT AND ORGANISATION
Students will be expected to choose a topic in consultation with a supervisor, who will also give instructions regarding field techniques and any laboratory work that is required for the project. Most of the work will be done independently. If field work/mapping is involved, two copies of 1:10 000 maps of the field area will be supplied by the Department of Earth and Planetary Sciences. If thin sections or laboratory analyses are necessary, these will be done in the Department after consultation with the supervisor. Students may be required to pay for the cost of other materials used in the project. Time spent on the project will normally be equivalent to that expected for the map and thesis.

Students will submit a 5000 word literature review, progress report and plan for year two of the project which is due at the end of the 2nd term of year 3 and worth 25% of the final mark. In addition, students will also deliver an oral presentation worth 15% of the total mark during year 4.

The project report will normally be up to 15,000 words and is worth 60% of the final mark.

RECOMMENDED READING
Students are expected to be familiar with the literature relating to their topic. A handbook with guidelines about undertaking projects and writing reports is available from the department.

MODULE EXAMINATION
The quality of the project and report is assessed by the examiners, supplemented by an oral examination by one of the external examiners.

TIMETABLE
Students will be allocated a project and a supervisor normally early in the second year and should begin their work on the project in the summer vacation, making their own arrangements.

LECTURER: Steve Hirons or Professor Gerald Roberts
PROJECT  BSc GEOLOGY (60 credits) SCES021D6

MAIN OBJECTIVES
To give students experience of independent work on a topic of geological interest, normally including at least 18 days of field mapping and 6 days of some other type of field work (e.g., sedimentary logging) and the preparation of a scientific report. Each student will be allocated a supervisor who will be responsible for advice on all aspects of the module.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT.
Knowledge and understanding of the basic tenets of the particular area of geology for the project. Hypothesis development and testing skills through analysis of the data obtained for their project, theoretical understanding of relevant concepts, critical assessment of results and outcomes and experience of real situations during the project work.

SUBJECT SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Collect and analyse data relevant to the area of geology related to their project using a variety of research techniques. The student will be able to critically assess the quality of the scientific method, data, results, conclusions and implications of relevant studies.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Scientific writing, comprehension of scientific data and papers; manipulation of data using relevant software/research techniques; independent study; IT skills and confidence in their abilities to follow a problem through to its end.

CONTENT AND ORGANISATION
Students will be expected to choose a topic in consultation with a supervisor, who will also give instructions regarding field techniques and any laboratory work that is required for the project. Most of the work will be done independently. If field work/mapping is involved, two copies of 1:10 000 maps of the field area will be supplied by the Department of Earth and Planetary Sciences. If thin sections or laboratory analyses are necessary, these will be done in the Department after consultation with the supervisor. Students may be required to pay for the cost of other materials used in the project. Time spent on the project will normally be equivalent to that expected for the map and thesis.

Students will submit a 5000 word literature review, progress report and plan for year two of the project which is due at the end of the 2nd term of year 3 and worth 25% of the final mark. In addition, students will also deliver an oral presentation worth 15% of the total mark during year 4.

The project report will normally be up to 15,000 words and is worth 60% of the final mark.

RECOMMENDED READING
Students are expected to be familiar with the literature relating to their topic. A handbook with guidelines about undertaking projects and writing reports is available from the Department.

MODULE EXAMINATION
The quality of the project and report is assessed by the examiners, supplemented by an oral examination by one of the external examiners.

TIMETABLE
Students will be allocated a project and a supervisor normally early in the second year and should begin their work on the project in the summer vacation, making their own arrangements.

LECTURER: Steve Hirons or Professor Gerald Roberts
PROJECT FOR BSc PLANETARY SCIENCE WITH ASTRONOMY (60 credits) SCES016D6

MAIN OBJECTIVES
To give students experience of independent work on a topic in Planetary Sciences and the preparation of a scientific report. Each student will be allocated a supervisor who will be responsible for advice on all aspects of the module.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT.
Knowledge and understanding of the basic tenets of the particular subject for the project. Hypothesis development and testing skills through analysis of the data obtained for their project, theoretical understanding of relevant concepts, critical assessment of results and outcomes and experience of real situations during the project work.

SUBJECT SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Collect and analyse data relevant to subject related to their project using a variety of research techniques. The student will be able to critically assess the quality of the scientific method, data, results, conclusions and implications of relevant studies.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
Scientific writing, comprehension of scientific data and papers; manipulation of data using relevant software/research techniques; independent study; IT skills and confidence in their abilities to follow a problem through to its end.

CONTENT AND ORGANISATION
Students will be expected to choose a topic in consultation with a supervisor, who will also give instructions regarding techniques and any laboratory work that is required for the project. Most of the work will be done independently. If thin sections or laboratory analyses are necessary, these will be done in the Department after consultation with the supervisor. Students may be required to pay for the cost of other materials used in the project. Time spent on the project will normally be equivalent to that expected for the map and thesis. Students will submit a 5000 word literature review, progress report and plan for year two of the project which is due at the end of the 2nd term of year 3 and worth 25% of the final mark. In addition, students will also deliver an oral presentation worth 15% of the total mark during year 4. The project report will normally be up to 15,000 words and is worth 60% of the final mark.

RECOMMENDED READING
Students are expected to be familiar with the literature relating to their topic. A handbook with guidelines about undertaking projects and writing reports is available from the department.

MODULE EXAMINATION
The quality of the project and report is assessed by the examiners, supplemented by an oral examination by one of the external examiners. Assessment will be based on a 5000 word literature review, progress report and plan for year two of the project (25% of the project); a 20 minute PowerPoint presentation (15% of the project); and a Final Report of up to 15,000 words (60% of the Project).

TIMETABLE
Students will be allocated a project and a supervisor normally early in the third year of their 4-year degree and should begin their work on the project during the first term of their third year.

LECTURER: Professor Ian Crawford; Professor Gerald Roberts, Professor Hilary Downes, Dr Peter Grindrod
ENVIRONMENTAL GEOLOGY PROJECT (60 credits) SCES020D6

MAIN OBJECTIVES
To give students experience of independent work on a topic of environmental geological interest, normally including some field work (e.g., sampling of environmental materials) and the preparation of a scientific report.

KNOWLEDGE AND UNDERSTANDING IN THE CONTEXT OF THE SUBJECT
Knowledge and understanding of the basic tenets of the particular area of environmental geology for the project.

COGNITIVE SKILLS
Hypothesis development and testing skills through analysis of the data obtained for their project, theoretical understanding of relevant concepts, critical assessment of results and outcomes and experience of real situations during the project work.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
Collection and analysis of data relevant to the area of environmental geology related to their project using a variety of research techniques. The student will be able to critically assess the quality of the scientific method, data, results, conclusions and implications of relevant studies.

GENERAL/TRANSFERABLE SKILLS (INCLUDING KEY SKILLS)
The student will gain skills such as writing, comprehension of scientific data and papers, manipulation of data using relevant software/research techniques, independent study, IT skills and confidence in their abilities to follow a problem through to its end.

CONTENT AND ORGANISATION
Students will be expected to choose a topic in consultation with a supervisor, who will also give instructions regarding field techniques and any laboratory work that is required for the project. Most of the work will be done independently. If field work/mapping is involved, two copies of 1:10 000 maps of the field area will be supplied by the Department of Earth and Planetary Sciences. If thin sections or laboratory analyses are necessary, these will be done in the Department after consultation with the supervisor. Students may be required to pay for the cost of other materials used in the project. Time spent on the project will normally be equivalent to that expected for the map and thesis.

Students will submit a 5000 word literature review, progress report and plan for year two of the project which is due at the end of the 2nd term of year 3 and worth 25% of the final mark. In addition, students will also deliver an oral presentation worth 15% of the total mark during year 4. The project report will normally be up to 15,000 words and is worth 60% of the final mark.

RECOMMENDED READING
Students are expected to be familiar with the literature relating to their topic. A handbook giving guidelines for this module is available from the department.

MODULE EXAMINATION
The quality of the project and report is assessed by the examiners, supplemented by an oral examination by one of the external examiners.

LECTURERS
Each student will be allocated a supervisor (normally Dr Karen Hudson-Edwards or Professor Charlie Bristow) who will be responsible for advice on all aspects of the module.
MAP & THESIS SCES015D6 (60 CREDITS)

MAIN OBJECTIVES
To give students experience of independent work on the geological mapping of an area and the preparation of a geological report. Students are expected to complete their Map and Thesis over two years and will start their Map and Thesis in their third year of study (second year for UCAS full-time students). Students are expected to spend a total of 6 weeks preparing a geological map of an area. The area will be chosen in consultation with a supervisor and the size of the area will depend on various factors such as topography and geological complexity.

Students will be allocated an area and a supervisor normally early in the second year and should begin mapping in the summer vacation, making their own arrangements while agreeing dates with their supervisor. In the final year a thesis (maximum length 8000 words) on the geology of the area is prepared. Most of the work is done independently, but students may be visited in the field by their supervisor who will also give advice on cartographic techniques, content of thesis, etc. Two copies of 1:10 000 maps of the area will be supplied by the Department. Each student will be allocated a supervisor who will be responsible for advice on all aspects of the module.

COGNITIVE SKILLS
The student will gain knowledge and understanding of the geology of the area they have studied, including the processes which have formed the rocks and the geological history. The student will develop knowledge and understanding of the 3-dimensional relationships between geological units in the field and the chronological and spatial sequence of geological events that have occurred. The student will gain knowledge of the petrology and structures of the rocks in order to develop an understanding of the processes that have formed them.

SUBJECT-SPECIFIC PRACTICAL/PROFESSIONAL SKILLS
The student will learn how to: (1) use geological equipment, to measure aspects of the geology, take structural measurements and navigate on a topographic map; (2) use and understand topographic maps; (3) keep a notebook of his/her method and findings; (4) produce a field map of their findings; (5) construct geological cross-sections; (6) produce a final map using pertinent drafting skills; (7) write a scientific report detailing methods and findings.

GENERAL/TRANSFERABLE SKILLS
The student will learn how to plan and execute an independent research project and produce a report detailing his/her study methods and results including a discussion of the implications of their findings and final conclusions. Although students are expected to work in pairs in the field, the scientific investigations should be carried out independently; students will therefore learn the how to motivate themselves during independent study and work with a partner in the field.

RECOMMENDED READING
Students are expected to be familiar with the literature relating to the geology of their area. A handbook outlining the nature of the module is available from the department and must be read and acted upon.

MODULE EXAMINATION
The map and thesis is assessed by the examiners, supplemented by an oral examination by one of the external examiners.

FIELDWORK COORDINATOR: Mr Steve Hirons
Submission of Map & Thesis, Project for Geology, Project for Earth Sciences, Environmental Geology Project, Project for Planetary Sciences & major assessed essays

The following statement must be inserted as part of the requirements for the submission of Project, Environmental Geology Project, Map & Thesis, and major assessed essays:

“This (essay*/report*/dissertation*) is submitted under University of London regulations as part of the examination requirements for the BSc degree in Geology/Environmental Geology/Earth Science/Planetary Science with Astronomy**. Any quotation or excerpt from the published or unpublished work of other persons is explicitly indicated and in each such instance a full reference to the source of such work is given. I have read and understood the requirements of the Birkbeck College Examinations Instructions to Candidates, including relevant University of London regulations on Examination Tests, and in accordance with those requirements submit this work as my own.

Signed.................................. “

*insert as appropriate; **delete as appropriate

Submission, Mitigating, Deferral or Withdrawal for Project or Map and Thesis Submission

The following refers to policy around the submission of The Final year Project or Map and Thesis.

Please note that if you are a final year student and are unable to submit your project or Map and Thesis by the designated deadline, you must submit a mitigating circumstances form with additional documentation to Phil Hopley and Steve Jenkins. Your mitigating circumstances will be considered at the Departmental Mitigating Circumstances Board and you will be informed of the decision.

1. If mitigating circumstances are accepted you will get a deferral, be charged the exam fee and be allowed to submit next year.

2. If mitigating circumstances are submitted but not accepted students work would be marked anyway, if their mark is between 35% to 39% the work can be re-assessed but will be subject to the capping rule of 40%. If the mark is under 35% students will be required to re-take the module again next year and will be charged the fee for the module. Any subsequent mark will not be capped.

3. If students do not submit anything nor provide mitigating circumstances, students can be offered re-assessment, a NS for non-submission will be recorded and the re-assessed work would usually be submitted in the current academic year which will be capped at 40%.

4. Students can withdraw two weeks before the published submission deadline and will be re-enrolled on the module next year and be charged the usual fee. Their work will not be subject to the capping rule as they would have withdrawn from the module.

5. Students who do not withdraw, submit mitigating circumstances, do not wish to be re-assessed in the current academic year (and therefore be capped at 40%) will be recorded a NS for non-submission of work and will simply be allowed to re-enroll next year and will be charged the usual fee for the module.