GL1104 Natural Resources and the Environment

Academic Year: 2020/1
Module Level: Year 1
Scheme: UG
Department: Geology
Credits: 15

Student Workload (hours)
- Lectures 10
- Seminars
- Practical Classes & Workshops 37
- Tutorials
- Fieldwork
- Project Supervision
- Guided Independent Study 97
- Demonstration
- Supervised time in studio/workshop 6
- Work Based Learning
- Placement
- Year Abroad
- Total Module Hours 150

Period: Semester 2
Occurrence: E
Coordinator: Eva Marquis

Intended Learning Outcomes
On completion of this module, successful students should be able to:
- Demonstrate a broad knowledge of natural resource types including metalliferous, energy, water and renewable resources.
- Recall key definitions relating to natural resources and formulae of common ore minerals/hydrocarbons.
- Illustrate formation processes of natural resources using diagrams.
- Evaluate the economic, environmental and social sustainability of natural resource exploitation using case studies.
- Integrate a range of geological data to determine sub-surface structures and potential resource distribution.
- Demonstrate use of equations in determining common properties of natural resources.
- Work in pairs or small groups to synthesis geological, social, economic and environmental information using appropriate computer software to produce a presentation.
- Use computer software to geospatially analyse data to map geological, environmental and social data relating to natural resources.

Teaching and Learning Methods
Lectures, practical classes, small group work, independent research

Assessment Methods
Exam, Group Practical, Formative

Pre-Requisites

Co-Requisites

Excluded Combinations

- Guided Independent Study: Indicative Activities

Last Published: 5 July 2020
## GL1105 Geological Maps and Structures

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### Period:

- Semester 2

### Occurrence:

- E

### Coordinator:

- Sarah Lee

### Mark Scheme:

- UG Module Mark Scheme

### Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Outline and understand basic stratigraphic relationships
- Define the major classes of geological structure and be able to recognise and classify these on geological maps
- Extrapolate 3D geology from a 2D map
- Construct geological cross-sections
- Define the geological history of a map
- Use computer software to design your own 3D geological block models
- Locate yourself on a map and understand how to use compass bearings and pacings in order to mark features on a base map

### Teaching and Learning Methods

- Workshops and field exercise

### Assessment Methods

- Exam, Practical, Formative (within practicals and fieldwork training)

### Pre-Requisites

- 

### Co-Requisites

- 

### Excluded Combinations

- 

### Guided Independent Study: Indicative Activities
Module Specification

GL2101 Earth and Ocean Systems

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Geology
Credits: 15

Student Workload (hours)

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Mark Scheme: UG Module Mark Scheme

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Intended Learning Outcomes

On successful completion of the module, a typical student should be able to:

- Demonstrate knowledge and understanding of key aspects of chemical and physical interactions between the mantle, crust, sediment reservoir, seawater and atmosphere, and how these ‘reservoirs’ might have changed over geological time.
- Describe how the origin and evolution of life is linked to the evolution of the Earth’s ocean system.
- Discuss trends in the evolution of the Earth’s mantle and ocean, assessing the factors involved.
- Undertake simple calculations and base arguments on the results that are obtained.

Work with (manipulate, analyse, synthesize, discuss) a range of geochemical data used as proxies for key Earth and ocean processes.

Work independently and in teams to analyse and present information on selected Earth System processes, within a report.

Teaching and Learning Methods

A combination of lectures and three hour practical classes, plus independent reading and group work. Each lecture will be typically accompanied by guided reading as well as the expectation of independent reading. A range of literature styles will be explored, making students more familiar with a range of writing (and reading) styles used in Earth science.

Practicals will provide a range of skills and learning opportunities to reinforce material in the module and elsewhere in the degree.

Assessment Methods

Examination, Report

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Module Specification

GL2102 Structure and Tectonics

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Geology
Credits: 15

Period: Semester 2
Occurrence: E
Coordinator: Stewart Fishwick
Mark Scheme: UG Module Mark Scheme

Student Workload (hours)

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Intended Learning Outcomes

On successful completion of the module, students should be able to:

- Identify and describe, quantitatively, common geological structures
- Explain deformation processes that create major rock structures
- Discuss and quantify principles of stress and strain
- Plot and interpret structural datasets
- Discuss theories, paradigms, concepts, and principles concerned with tectonics
- Synthesise multidisciplinary datasets to build deformation histories

Teaching and Learning Methods

Interactive lecture-practical sessions will introduce concepts of stress and strain, quantitative description of tectonic structures, and methods of structural data plotting, reduction, and interpretation. Structural plotting and display will be combined with GIS techniques, to develop data visualization techniques.

Assessment Methods

Short format exam questions, practical format exam questions, group presentation

Pre-Requisites

Co-Requisites

Excluded Combinations

- Guided Independent Study: Indicative Activities

Last Published: 5 July 2020
Module Specification

GL2104 Interpreting Geological Maps and Stratigraphy

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Geology
Credits: 15

Period: Semester 2
Occurrence: A
Coordinator: Michael Branney
Mark Scheme: UG Module Mark Scheme

Student Workload (hours)
- Synchronous Lectures 9
- Synchronous Small Group Teaching
- Synchronous Practical Classes/Workshops/Professional Placements 45
- Synchronous Other
- Asynchronous Lectures/Presentations
- Asynchronous Other
Guided Independent Study 96
Total Module Hours 150

Intended Learning Outcomes
On successful completion of the module, students should be able to:

• analyse, describe and interpret geological maps,
• describe and discuss the major types and uses of modern stratigraphical analysis (including litho-/bio-/chrono-/magneto-/astro-/event/isotope/seismic/sequence stratigraphies and radiometric age-dating)
• recognise rock types and fossil groups and discuss their stratigraphic context; and devise lithostratigraphies from rock successions and be able place them within a bio- and chronostratigraphical framework.
• discuss the record of key structural and stratigraphic events in the geological evolution of the UK

Teaching and Learning Methods
Practical classes with formative feedback
Practical classes to introduce rock/fossil/mineral/map displays (directed study)
lectures

Assessment Methods
Coursework, Exam

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Module Specification

GL3106  Planetary Science

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Geology
Credits: 15

Student Workload (hours)

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Period: Semester 2
Occurrence: E
Coordinator: Stewart Fishwick
Mark Scheme: UG Module Mark Scheme

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Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Discuss, describe & have knowledge of planetary exploration, structures, geochemical evolution, and thermodynamic processes.
- Describe how geophysical techniques are used to investigate planetary bodies within the solar system
- Use and manipulate equations in assessing & describing planets
- Construct, a professional written presentation that describes cutting edge scientific research in a form suitable for a lay audience
- Establish good small group working practices in order to provide background scientific information

Teaching and Learning Methods

Lectures and guided workshops, which may involve further discussions / seminars, or practical work

Assessment Methods

Coursework

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Reading of scientific literature, practical / computational work on datasets, preparation of individual written reports

Last Published: 5 July 2020
GL3107 Reflection Seismology

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Geology
Credits: 15

Student Workload (hours)
- Lectures: 12
- Seminars: 0
- Practical Classes & Workshops: 24
- Tutorials: 0
- Fieldwork: 0
- Project Supervision: 0
- Guided Independent Study: 114
- Demonstration: 0
- Supervised time in studio/workshop: 0
- Work Based Learning: 0
- Placement: 0
- Year Abroad: 0
- Total Module Hours: 150

Period: Semester 2
Occurrence: E
Coordinator: Richard England

Mark Scheme: UG Module Mark Scheme

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Intended Learning Outcomes
On successful completion of the module, students should be able to:
- List, describe use and assess the effectiveness of the techniques used in 2D seismic reflection data processing
- Design and small-scale seismic survey
- Demonstrate a knowledge of and apply the range of mathematical techniques available for analysis and filtering of digital time series data
- Process seismic data to produce a stacked section
- Prepare a technical report to a high standard (i.e. with correct spelling, grammar, sentence and paragraph construction and illustrated clearly).

Teaching and Learning Methods
Students follow a course of lectures and practical work covering the theory and practice of seismic reflection methods, averaging 2 x 1-hour lectures and 3 hours practical per week. During this they will be trained to process seismic data using a commercial standard seismic reflection data processing system (Landmark Promax or equivalent). Using this they will process example data. Private study time should be spent reinforcing the knowledge and skills being delivered. They will be advised on the production of a processing report and have an opportunity to examine an actual example of commercial practice.

Assessment Methods
Coursework

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Revision of mathematical techniques, processing seismic data, report writing.
GL3108  Geology Application of Microfossils

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Geology
Credits: 15

Student Workload (hours)

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Period: Semester 2
Occurrence: E
Coordinator: Mark Williams
Mark Scheme: UG Module Mark Scheme

Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Identify and describe a range of different microfossils
- Identify the biostratigraphy of a microfossil assemblage
- Determine the palaeoecology of a microfossil assemblage
- Critically appraise microfossil data used to establish past environment
- Write a concise, industry-style report on a bespoke microfossil sample

Teaching and Learning Methods

Lectures, demonstrations, guided laboratory work, technical report writing

Assessment Methods

Examination
Coursework - report

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Reading research papers and external websites as supplied via Blackboard. Guided laboratory work.
Module Specification

GL3109  Mineral Exploration and Evaluation

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Geology
Credits: 15

Student Workload (hours)
- Lectures 6
- Seminars 0
- Practical Classes & Workshops 8
- Tutorials 0
- Fieldwork 0
- Project Supervision 10
- Guided Independent Study 120
- Demonstration 6
- Supervised time in studio/workshop 0
- Work Based Learning 0
- Placement 0
- Year Abroad 0
- Total Module Hours 150

Period: Semester 2
Occurence: E
Coordinator: David Holwell
Mark Scheme: UG Module Mark Scheme

Intended Learning Outcomes
On successful completion of the module, students should be able to:
- Be aware of the major techniques used in mineral exploration
- Recognize and identify the presence and nature of orebodies on the basis of geochemical and geophysical data
- Review and analyse large datasets using relevant software programs
- Calculate economic metrics applicable to mineral resources, such as net present value, internal rate of return and payback period.
- Rank and critically evaluate different projects or project scenarios in terms of financial risk
- Critically evaluate data quality
- Summarise their work within a concise, professional style report

Teaching and Learning Methods
Lectures, laboratory practical classes (including software demonstrations and workshops), independent project work, project based workshops and surgeries.

Assessment Methods
Coursework project – exploration
Coursework project - evaluation

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
- Analysis of data provided to students weekly in independent time.
- Browsing financial (commodities) news for contemporary information on industry.
- Software familiarization activities
GL3115 Archaeological Geophysics Field Course

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Geology
Credits: 15

Student Workload (hours)
- Lectures
- Seminars
- Practical Classes & Workshops
- Tutorials
- Fieldwork
- Project Supervision
- Guided Independent Study
- Demonstration
- Supervised time in studio/workshop
- Work Based Learning
- Placement
- Year Abroad
- Total Module Hours

Period: Semester 2
Occurrence: E
Coordinator: Richard England
Mark Scheme: UG Module Mark Scheme

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Intended Learning Outcomes
On successful completion of the module, students should be able to:
- Understanding of capabilities of different geophysical methods
- Ability to plan geophysical fieldwork
- Ability to measure geophysical data and perform quality control
- Relate geophysical measurements to structures within the Earth
- Use computer based analysis methods on geophysical data

Teaching and Learning Methods
Field demonstration of geophysical equipment and measurement procedures, guided acquisition of new geophysical data, workshop on modern geophysical analysis methods and guided computer based analysis of field data

Assessment Methods
Pre-survey Planning Document and Final Report

Pre-Requisites
GL2108

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Preparation of pre-survey report and final report, analysis of geophysical data, revision of previous lectures
Module Specification

GL3116  Physical Volcanology - Tenerife

<table>
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<tr>
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<td>Examination</td>
<td>33</td>
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Intended Learning Outcomes

On successful completion of the module, students should be able to:
- demonstrate knowledge of the physical behaviour of magmas in the uppermost crust, hydrosphere and atmosphere
- demonstrate knowledge of a range of eruption styles and related surface processes
- evaluate the potential hazards and environmental effects
- critically interpret lavas and pyroclastic successions in terms of eruption, transport, and deposition processes; infer an eruption history from a volcanic succession
- develop and test hypotheses, present and justify opinions verbally, and in scientific reports
- produce a scientific report to a given deadline

Teaching and Learning Methods

Residential field workshop. Lectures. Practical and discussion seminars.

Assessment Methods

1. coursework - field assessment
2. coursework - project
3. examination

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Project work, and directed reading.