



SCOT GESC 210S Scotland's Geology, Landscapes and People

Duration: 4 weeks
Credit: 3 US Credits
Level: 200
Subject: Geology

Tutor: Angus D Miller, BSc, PhD

Course Description:

Edinburgh is a unique and beautiful city, built on a varied landscape of hills and a great location to appreciate the many interactions between the underlying bedrock, the landscape and people. This course will consider the fundamental geological processes that create different kinds of rock. It will explore the ways in which these rocks are later altered and eroded to create landscapes, and how people have used, and continue to use, both the rocks and landscapes: for shelter, energy and advancement of human knowledge. These topics will be illustrated with many local visits and case studies from central Scotland.

Rationale:

This course is being offered jointly as part of a Scottish studies program and as an elective for a heritage internship program. It will offer a broad introduction to the Geology of Scotland. Scotland's geodiversity and scenery are of world renown and this course gives an opportunity for students, mostly not from a scientific background, to learn about geology at a basic level while applying their learning to understand the links between geology, landscape and the human story of Scotland. The students will gain an appreciation of how the Earth works and how events in the past influence today's landscapes and peoples, and will be able to take this knowledge home to apply to their own areas.

Course Aim and Objectives:

Aim: Illustrate the broad concepts of geology with reference to examples from central Scotland that illustrate the links between geology, landscape and people.

Objectives:

1. learn about basic geological concepts such as rock formation and plate tectonics
2. understand how these concepts have operated over geological time to produce a variety of rock types and ages in Scotland
3. appreciate how bedrock creates landscape, and the various ways in which people have used this landscape and its natural resources.

Learning outcomes:

By the end of the course, the students should:

1. Have a broad understanding of geological processes and key rock types.
2. Understand how variations in bed rock and erosion are major factors in the landscape creation, with particular reference to central Scotland.
3. Appreciate how the use by humans of an area, both in the past and present, is intricately linked to the shape of the landscape, and the mineral resources that people have found.

Course requirements:

No prior knowledge or reading is required.

Assessment:

Course Participation: Assessed on the general level of participation and engagement in the course - asking

questions, responding in discussions, making links between different sections of the courses they are studying. 10%

Short Presentation: Research, prepare and deliver a short presentation (5-10 minutes) on a theme covered to the course. 30%

Essay (1000 words): Students will submit an essay for assessment by the end of the course. This will answer one of a selection of questions issued at the beginning of the course, and can be linked to the Short Presentation that they make. 60%

Course outline:

The course will be delivered over 4 weeks. In weeks 1-3 there will be two hour teaching blocks Monday-Thursday and full day excursions (joint with History / Curating, Interpretation and Heritage); week 4 is reserved for revision, presentations and essay submission.

Week one: foundations

Monday (classroom) Introduction to the course. What is geology, what do rocks tell us about the past, and how are rocks used by people? Explore rock specimens to appreciate the variety of rock types some of their basic properties.

Tuesday (classroom) How the world works: introduction to plate tectonics and formation of different kinds of rock. Use this knowledge to understand Scotland's story: an overview of the main events which have created Scotland's varied landscapes.

Wednesday (local excursion) Museum of Scotland and the city centre. Visit to the museum to view a variety of important rock and fossil samples. Short walking tour of the city centre including Castle Rock and the Royal Mile to appreciate how the variety of local rocks is reflected in Edinburgh's scenery.

Thursday (classroom) Sedimentary rocks and fossils of central Scotland. These are the most common rocks locally, and record changing environmental conditions as Scotland drifted from south to north across the equator between 400 and 300 million years ago.

Friday Joint Excursion: Fife. An opportunity to view some of the wider landscape features of central Scotland and appreciate how this landscape has been created. Including views of the Lomond Hills from Falkland, and a walking excursion along the coast to the south of St Andrews.

Week two: what rocks tell us about the past

Monday (classroom) Scotland's volcanoes. Explore the volcanic history of Scotland, to appreciate how different kinds of volcanic eruptions have created a range of rock types and landscapes.

Tuesday (local excursion) Holyrood Park. Arthur's Seat is a superb example of an eroded volcano, allowing us to walk through the centre of an ancient volcano cone and appreciate the messy processes that have created different igneous rocks and how these have contributed to the varied scenery of central Edinburgh.

Wednesday Geology/History Joint Excursion: South Queensferry and Inchcolm. Short walking excursion at South Queensferry to appreciate the importance of different rock types, in giving a narrow crossing point of the Forth estuary and contributing to the economic wealth of this area in historical times. Followed by a boat trip to the island of Inchcolm.

Thursday (classroom) Case Study. Arthur's Seat and the centre of Edinburgh: recreating past conditions. What does today's landscape tell us about past events, including volcanic eruptions and erosion?

Friday Joint Excursion: Stirling and the Trossachs. Further exploration of the landscape of central Scotland, including intrusive igneous rocks around Stirling and the impact of glaciation, sea level change and river processes in creating today's landscape. In the Trossachs we will explore the contrast between Highland and Lowland scenery and understand some of the processes over a long timescale which have helped to create the variety in Scotland's scenery.

Week three: sculpting the landscape, and the links between geology, landscape and people

Monday (classroom) Case Study. Oil, Coal and Building Stone: an exploration of how the rocks of central Scotland have been used by people in a wide variety of ways and how this has contributed to the local economy in historical times. Examples include the oil shale industry of West Lothian, extraction of coal and the use of local sandstone for building.

Tuesday (classroom) Sculpting the landscape: the work of water and ice in eroding bedrock over a long timescale to create today's landscape. The youngest rocks found in central Scotland are almost 300 million years old, and since they formed the story of this area has been of almost continuous erosion. This is an old, and slowly evolving, landscape.

Wednesday Geology/History Joint Excursion: Rosslyn Chapel and Roslin Glen. Visit to the chapel and a short walk in the picturesque Roslin Glen gorge, carved by meltwater at the end of the last ice age. The narrow valley is a good place to see some sedimentary rocks, appreciate the relatively recent changes which have created the gorge, and explore how people make use of water power and the shelter afforded by the valley.

Thursday (local excursion) Use of stone by people: examples from Edinburgh's buildings and graveyards. The city centre contains a rich mix of rocks used by people: for building, paving, gravestones and monuments. Many of these rocks are local, but some have also been transported from around the country and even from overseas.

Friday Joint Excursion: Angus. This excursion is designed principally to explore topics for the two joint courses, and will include opportunities for a final overview of the landscape and coastal scenery of east-central Scotland.

Week four: revision, presentations and essay submission

Monday Review of the course; questions and discussion; preparation for assessment.

Tuesday Student presentations - personal choice of one topic covered by the course.

Wednesday / Thursday / Friday Essay research and preparation. Course tutor will be available for consultation.

Reading list

Fortey, R (2010), *The Hidden Landscape*. Pimlico. ISBN: 0224036513; Cost: To Be Determined.

Gillen, C (2003), *Geology and landscapes of Scotland*, Harpenden, Terra Publishing. ISBN: 1903544092; Cost: To Be Determined.

McKirdy, A and Crofts, R (1999), *Scotland the creation of its natural landscape*. Scottish Natural Heritage. ISBN: 1853976717; Cost: To Be Determined.

Web sources

www.scottishgeology.com

Class handouts will be provided - key diagrams and summary notes.