



Further geology: more rocks, minerals and fossils

Start date 21 April 2017

End date 23 April 2017

Venue Madingley Hall
Madingley
Cambridge

Tutor Dr Peter Sheldon

Course code 1617NRX073

Director of Programmes Emma Jennings

For further information on this course, please contact Clare Kerr, Public Programmes Co-ordinator
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To book See: www.ice.cam.ac.uk or telephone 01223 746262

Tutor biography

Dr Peter Sheldon is an Honorary Associate in the School of Environment, Earth and Ecosystem Sciences at the Open University, where he was a Senior Lecturer in Earth Sciences until 2015. He has given over 75 residential courses in geology, palaeontology and evolution for the University of Cambridge Institute of Continuing Education since 1979. From 2008 to 2011 he was External Examiner for Scientific Studies at Oxford University's Department for Continuing Education, where he has given over 40 day-schools since 1993. His teaching style combines fieldwork, hands-on study of real specimens of rocks, minerals and fossils, and interactive lectures. He chaired the Open University course on *Geology* and has contributed to many other OU courses, including *Fossils and the History of Life*, *Evolution*, *Earth's Physical Resources*, *Discovering Science*, *The Geological History of the British Isles* and *Earth Science*.

Course Programme

Friday 21 April 2017

Please plan to arrive between 16:30 and 18:30. You can meet other course members in the bar which opens at 18:15. Tea and Coffee making facilities are available in the study bedrooms.

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| 19.00 | Dinner |
| 20.30 – 22.00 | How the Earth works - a review from pebbles to plate tectonics. |
| 22.00 | Terrace bar open for informal discussion |

Saturday 22 April 2017

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| 07.30 | Breakfast |
| 09.00 – c.09.40 | Short talk followed by field excursion to Needingworth gravel quarry.

<i>Please bring stout footwear (essential; preferably walking boots, or wellington boots), waterproof clothing in case of bad weather, and, if you wish, a thermos flask which can be filled at breakfast.
N.B. See also 'Equipment Required'.</i>

A packed lunch will be provided.

Return by 17.30 |
| 18.30 | Dinner |
| 20:00 – 21:30 | Unravelling geological events: dating techniques and geological structures. |
| 21:30 | Terrace bar open for informal discussion |

Sunday 23 April 2017

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| 07.30 | Breakfast |
| 09.00 – 10.30 | Practical session - yesterday's finds and other specimens. |
| 10.30 | Coffee |
| 11.00 – 12.30 | Further topics from the spectrum of geology. |
| 12.45 | Lunch |

The course will disperse after lunch

Course syllabus

Aims:

This course aims to:

1. Enable course members who have already taken one or more geology courses at Madingley (or elsewhere) to increase their understanding of the subject.
2. To develop the practical skills of identifying rocks, minerals and fossils, and of observing and interpreting a wide range of geological features.
3. Give course members sufficient working knowledge to enable them to continue to pursue their geological interests for themselves.

Content:

One of the most pleasing aspects of geology is the relevance of processes occurring over many different scales in space and time, from the split-second decay of radioactive atoms in a crystal to the very slow movement of the Earth's huge tectonic plates. From observations made with no more than the naked eye and a hand-lens, one can often make a surprising number of deductions about the geological history of an area. The emphasis in this course will be on developing the practical skills and working knowledge of the main types of rocks and minerals, their geological setting, and the associated geological features that enable us to interpret the sequence of events in the ancient past. A major part of the course is an excursion to gain further first-hand experience of rocks, minerals and fossils in the field.

Among the topics to be covered during the sessions at Madingley Hall will be:

- the formation of igneous, sedimentary and metamorphic rocks: how to identify them and their minerals, and deduce a story from them
- a review of plate tectonics and the rock cycle
- geological maps
- dating techniques
- geological features such as faults, folds and sedimentary structures

N.B. Level of fitness required Participants will at times need to be able to walk continuously for about 15-20 minutes within the quarry and over very rough and quite steep ground for short distances.

A little previous background in geology, such as attendance at one or more basic geology courses at Madingley Hall or elsewhere, is desirable.

Programme Please note that the field trip on Saturday may be subject to modification, depending on weather, state of the quarry and so on.

Presentation of the course:

The course will employ a wide variety of teaching and learning methods, including a field excursion, lectures with slides, and the opportunity to pick up and personally examine a large number of rocks, minerals and fossils put out on tables in the teaching room. On Sunday morning, participants are invited to put out their own specimens found on the excursion, so that everyone can examine, identify and learn from each other's finds.

Outcomes:

As a result of the course, within the constraints of the time available, students should be able to:

1. Identify some of the most common igneous, sedimentary and metamorphic rocks, and the minerals within them, and account for their formation.
2. Explain the difference between relative and absolute dating, and use geological information to unravel a sequence of events.
3. Identify and interpret a variety of common geological features, such as faults, folds, joints, unconformities, etc.
4. Identify some common types of fossils found locally, and, in a few cases, suggest the geological periods and environments they indicate.

Equipment Required:

Warm and waterproof clothing — **ESSENTIAL**. Please note that quarries stipulate that, for safety reasons, shorts or skirts should not be worn.

Walking boots (preferably) or wellington boots — **ESSENTIAL. N.B.** Ordinary walking shoes or trainers are *not* acceptable. Quarries are nearly always wet and muddy in places, and adequate foot protection is required within working areas, near machinery, etc. Bear in mind that wellington boots can be rather hot to wear if the weather is very warm and sunny (compared with walking boots).

Thermos flask — you might find this to be a good idea.

Notebook, pen, pencil, rubber.

Hand-lens (optional) — you'll find your enjoyment and understanding of rocks, minerals and fossils increases if you have a hand-lens. Some hand-lenses should be available for purchase from Peter Sheldon for only £2 during the course. Hand-lenses can be also bought from stamp shops (philatelists) and some hobby shops. Magnification x 10 is recommended.

Plastic bags (a few strong, medium-sized shopping bags); paper — to wrap specimens.

A geological hammer (optional) — if you have one, it could be useful; otherwise we will lend out a few to share for the trip. Much study can be done without one and there is **NO** need to obtain a geological hammer for the course. (Note that an ordinary hammer should *not* be used to break open rocks; the metal is too brittle and metal chips may fly off.)

N.B. In addition to suitable footwear (see above), visitors to quarries have to wear standard safety helmets and high-visibility waistcoats. We will supply these items on loan.

Reading:

No reading is required in advance and no books need to be bought (or consulted) for the course. Many useful books on general and specific aspects of geology will be available for people to look at during the weekend, and a detailed and extensive booklist will be provided.

There are so many fine books available on general aspects of geology, but here is just one that is highly recommended (though it is certainly *not* necessary for the course):

Understanding Earth. J. Grotzinger and T. Jordan. (2014, 7th Edition). An outstanding, clearly written, widely used introduction to Earth Sciences with many colour illustrations. A global perspective and probably the best overview of its kind. Freeman. 650 pp. ISBN 9781464138744. £53.99.

Website Addresses:

Among the many excellent websites you may wish to explore if you have access to the Internet are the following, which have links to a vast number of other relevant sites:

<http://www.geolsoc.org.uk> - The Geological Society of London.

<http://www.bgs.ac.uk> - British Geological Survey.

<http://www.nhm.ac.uk> - The Natural History Museum, London.

<http://www.ucmp.berkeley.edu> - Many exhibits and palaeontology/evolution links.

<http://www.si.edu> - The Smithsonian Institution.

<http://www.amnh.org> - The American Museum of Natural History.

Note Students of the Institute of Continuing Education are entitled to 20% discount on books published by Cambridge University Press (CUP) which are purchased at the Press bookshop, 1 Trinity Street, Cambridge (Mon-Sat 9am – 5:30pm, Sun 11am – 5pm). A letter or email confirming acceptance on to a current Institute course should be taken as evidence of enrolment.

Information correct as of October 2016