

**CE309                    ENGINEERING GEOLOGY**

**Co-ordinator:** Mr. M.C. Callow (Room 3.44, RSM), [m.callow@imperial.ac.uk](mailto:m.callow@imperial.ac.uk)

**Status:** Elective half-module (must be taken with Rock Mechanics CE310)

**Lecturer:**        Mr M.C. Callow (MCC)

**Structure:**        25 hours of lectures and coursework.

**Links:**            CE106, CE310: Compulsory

**Introduction**

Engineering geology deals with the ways in which the ground impinges on engineering.

This module will build on the knowledge of basic geology, site investigation, soil mechanics and hydrogeology acquired during the first two years of the MEng course. It will develop those aspects of geology which are of the greatest importance to professional civil engineering, construction. The geological controls on geotechnical properties and their spatial distribution will be discussed in the context of case histories dealing with major engineering works including slopes, excavations, foundations and waste disposal.

The module is based on a good understanding of geology and its role in engineering. In the first two years of the MEng degree course students would have covered many aspects of geology and geotechnics in CE 106 Geotechnics and the second year modules in geology and geotechnics.

**Aims**

To provide a practical understanding of how geology affects civil engineering. At the end of the module students should have an appreciation of how geology is incorporated within the civil engineering design process and how it influences construction and excavation.

**SYLLABUS**

1. The framework for engineering and environmental engineering (1 hour)
2. Ground investigation (1 hour)
3. Material description (1 hour)
4. Importance of groundwater (1 hour)
5. Geological aspects of waste disposal (1 hour)
6. Geological aspects of excavations (1 hour)
7. Geological aspects of foundations (1 hour)
8. Geological aspects of the Quaternary and geomorphology (1 hour)
9. Geotechnical aspects of ground affected by cold environments (1 hour)
10. Geological aspects of ground affected by hot environments (1 hour)
11. End of module review and tutorial (2 hours).

### **Coursework**

There are three projects of 4 hours each. Students are expected to work individually but participate in small group discussions

Each project will incorporate several facets of engineering geology and might typically include a map interpretation, study of aerial photographs, analysis of soil, rock and groundwater conditions and presentation of engineering solutions.

Ground investigation - proposed aqueduct for the River Dee (week 4).

Materials assessment - widening of the Bodmin by-pass (week 6)

Site selection – proposed construction around Castleton (week 8)

### **Assessment**

The assessment for this module will be based on the above reports.

### **Recommended Textbooks/Reading:**

BLYTHE, F.G.H. AND DE FREITAS, M.H. A Geology for Engineers. (*ARNOLD*)

WALTHAM, A.C., 1994. Foundations of Engineering Geology. (*BLACKIE*)

### **Learning Outcomes**

- How the geology dictates the design of an engineering project
- The importance of a good site investigation
- An understanding of how variation of climate can influence the properties of the ground
- The factors that govern the selection of suitable sites for waste disposal.
- How groundwater can cause problems in excavations
- The selection of earth materials for construction purposes.