# CE106 GEOTECHNICS

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**Structure:** 18 hours of lectures and tutorials, field course.

**Links:** see below

## Introduction

Geotechnical engineering methods are used in the design of virtually every 'structure' (using the term structure in the sense of any construction which requires to be designed) with which a civil engineer may become involved. Examples are: building and bridge foundations (which involve problems of both stability and settlement), road pavements, earth-retaining structures, the design of dams and their foundations, the stability of both natural and excavated slopes, and waste disposal schemes.

## Aims

To develop a familiarity with the different soil types, to understand the various processes and the physical basis of patterns of water flow and water pressures in soils, and to be aware of basic geology and geological terminology. Many of these ideas, together with demonstrations of the importance of geology in the design of engineering works, will be the subject of the Folkestone field course.

## Module Structure

The module provides a general introduction to soil mechanics and geology, two of the main components of geotechnical engineering. It consists of ten 1-hour lectures and two 1-hour tutorials on soil mechanics, 6 lectures on geology applied to engineering, and a one-day field course to Folkestone, Kent.

## Links with other Course Modules

This module forms an introduction to the Second Year Geotechnics (CE203) module, which in turn lead to the Third Year core module on Soil Mechanics (CE303), and the Third and Fourth Year Elective modules Engineering Geology (CE309), Rock Mechanics (CE310), Slope Stability (CE404) and Advanced Geotechnics (CE405).

## SYLLABUS

Soil mechanics (MRC): Soil description and index properties; compaction of soil; elementary seepage; geotechnics of the Folkestone area.

Geology (MCC): geological materials; geological stratigraphy; geological structures.

## Coursework and submission dates

Soil mechanics: a series of worked examples and a one-page review of the geotechnical aspects of an engineering structure (to be submitted in week 23).
Geology: a detailed report on some aspect of the Folkestone field course (to be submitted in week 30).

**Assessment**
One 2-hour written examination at the end of the session: Part1, containing 6 (4+2) questions in two sections. Rubric: "Answer four questions, at least 2 from Section A (which is Soil Mechanics) and at least 1 from Section B (which is Geology). Formulae sheets are not provided.

**Recommended Textbooks/Reading**
The module does not follow a particular text, but the following are recommended:
R.F.CRAIG 'Soil Mechanics' (*5th Ed., Chapman & Hall*)
G.N.SMITH 'Elements of Soil Mechanics for Civil and Mining Engineers' *(Granada*)
F.G.H.BLYTH and M.H.DE FREITAS 'Geology for Engineers' *(7th Ed., Arnold).*

These books will be of value throughout the four years of your course.

**Learning Outcomes**
By the end of the module students will be familiar with:

- the different soil types
- the concept of the coefficient of permeability, its measurement and practical application
- water pressures in soils
- the basics of geology.

Many of these ideas will have been demonstrated in the field at Folkestone, Kent.