

GEOG3209 Sustainable Use and Management of Soils (6 credits)

Course Teacher: Professor C Y Jim

Objectives

The course assesses the composition and properties of soils as an integral component of ecosystems, evaluates the causes of soil degradation due to extensive human misuse, and the practical approaches of sustainable soil management for agriculture and landscaping uses.

Course Synopsis

This course introduces students to soils as a keystone component of the environment and a pertinent natural resource. It furnishes basic concepts of soil as a natural body by assessing the mineral and organic composition as well as their properties. The physical organization of soils in the form of structure and its manipulation by humankind in the form of tillage are elucidated. The ability of soils to supply nutrients for plant growth, and the use of different forms of chemical and organic fertilizers is evaluated. The importance of managing soil moisture at an optimal state is explained in the context of drainage and irrigation. The common degradation of soils due to human-accelerated erosion and other unsustainable activities are evaluated together with the prospects for ecological rehabilitation and conservation. The course contents and presentation are designed for students with arts, social sciences or science backgrounds.

Lecture Topics

- Overview of soil-human interactions
- Soil profile, mineral constituents and properties
- Soil organic matter and amendments
- Soil fertility and fertilizers
- Soil structure and tillage
- Soil moisture, drainage and irrigation

Laboratory Practicals and Fieldwork

Five half-day sessions of laboratory analysis on physical and chemical soil properties. One field trip.

Assessment

Examination (two hours) 60%; Coursework 40% (consists of one report on field trip and laboratory practicals).

Learning Outcomes

Knowledge:

- Major composition and properties of soils as the fundamental natural resource for human survival
- Human use and abuse of soils and approaches to the conservation of the threatened resource
- Proper soil management to serve agriculture, landscape planting and other applications

Skills:

- Assessment of soil characteristics in the field
- Testing of essential soil properties using laboratory methods
- Writing an independent and critical report based on field and laboratory data

Recommended Reading List

1. Brady, N.C. & Weil, R.R. (2008) *The Nature and Properties of Soils*, 14th edition. Prentice Hall: Upper Saddle River, New Jersey.
2. Whalen, J.K. & Sampedro, L. (2010) *Soil Ecology and Management*. CABI, Wallingford, UK.