

GEOG3209 Sustainable Use and Management of Soils (6 credits)

Course Teacher: Prof 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 explores the approaches for sustainable soil management.

Course Synopsis

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

Lecture Topics

- Overview of soil-human interactions
- Soil 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

Laboratory sessions to analyze selected 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. (2002) *The Nature and Properties of Soils*, 13th edition. Prentice Hall: Upper Saddle River, New Jersey.
2. Gerrard, J. (2000) *Fundamentals of Soils*. London: Routledge.