

**Code: 1509 Geographical Information Systems**  
**Degree:** 2<sup>nd</sup> cycle – Natural Resources Management and Conservation  
**Curricular Year:** 1<sup>st</sup> **Semester Course:** 1<sup>st</sup>  
**Credits:** 6 ECTS **Compulsory**  
**Language:** Portuguese/English  
**Responsible:** Manuel Armando Valeriano Madeira  
**Other lecturer(s):** Fernando Manuel Girão Monteiro  
**Web Site:** <http://www.isa.utl.pt/home/node/3868>

**1. Contact hours:**  
**Lectures 14 Practicals/Laboratory 30 Practicals/Workfield 6 Others 1 Total 51**

**2. Objectives:**

To know the abiotic and biotic components of soils and its importance in the genesis and dynamics of soil. To understand the relationship between the soil and the other compartments of terrestrial ecosystems. To understand the forms of degradation of the soil under different human pressures, local or global. To know the principles and techniques used on soil conservation and soil restoration

**3. Programme:**

The importance of soil for terrestrial ecosystems. Functions of soil on resources management. The soil as the subsystem necessary to life and environmental regulation. General processes of soil genesis and evolution. Environmental and ecological framework for soil science, and its consequences for managing and conservation of terrestrial ecosystems. The soil, transformation of residuals and cycling of nutrients. Geochemical and biological nutrient cycles. Organisms and soil ecology. The soils and global changes. Mineral and organic elements of soil, nature and functions. Constitution and architecture of soil. Retention and flux of nutrients and substances, consequences for plant production. The soil and the hydrological cycle, interactions soil-plants. Soil and roots. Use and misuse of soils, degradation. Secondary acidification and alkalinity. Physical degradation of soils. Erosion and conservation measures. The soil and the chemical pollution, mineral and organic contaminants. The soil and extreme events, drought and fire. Restoration of soils and substrates.

**4. Bibliography:**

**Main Bibliography**

Aswathanarayana, U. (1999) - Soil Resources and the Environment. Science Publishers, Inc.. Enfield, NH,U.S.A.  
 Botelho da Costa, J.V. (1975) – Caracterização e Constituição do Solo. Fundação Calouste Gulbenkian.Lisboa.  
 Brady, N.C. & Weil, R.R. (1999) – The Nature and Properties of Soil. (12th Edition). Prentice Hall. New Jersey, USA.  
 Calvo, M.S.; Auge, A.J.C.; Ojesto, A.G. & Aguado, I.A. (1999) – Contaminación del Suelo: Estudios, Tratamiento y Gestión. Ediciones Mundi-Prensa. Madrid.  
 Lal, R. & Pierce, F.J. (Editors) (1991) – Soil Management for Sustainability. Soil and Water Conservation Society. Iowa, USA.  
 Rattan Lal (Edited by) (1999) - Soil quality and soil erosion. Soil and Water Conservation Society, CRC Press. Iowa, USA.  
 Troeh, F.R.; Hobbs, J.A. & Donahue, R.L. (1991) – Soil and Water Conservation. (Second Edition).Prentice Hall. Englewood Cliffs, New Jersey.

**5. Assessment:**

Theoretical classes and practical classes, in the laboratory.  
 Written exam (75%);  
 Practical classes - reports (25%)

**6. Estimated Workload:**

162	Hours
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**7. Last Update:**

9/8/2010
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