

Code: 1384 Soil Formation and Management**Degree:** 2nd cycle – Landscape Architecture; Agriculture; Environmental Engineering; Forestry and Natural Resources; Viticulture and Oenology**Stream:** Agriculture and Environmental Engineering (all); Forestry and Natural Resources (Forestry; Natural Resources Management)**Curricular Year:** 1st (Agr; AP; VE) 2^o (EnvE; FNR)**Semester Course:** 1st**Credits:** 6 ECTS**Compulsory** (Agriculture)**Language:** Portuguese/English**Optional** (other courses)**Responsible:** Manuel Armando Valeriano Madeira**Other lecturer(s):** Adília Neves Pires de Oliveira, Amarilis Paula Alberti de Varennes e Mendonça and Fernando Manuel Girão Monteiro**Web Site:** <http://www.isa.utl.pt/home/node/3781>**1. Contact hours:****Lectures 35 Lecture/Practicals 35 Others 14 Total 84****2. Objectives:**

Acquisition of general understanding on:

(i) processes of pedogenesis and on the role of factors which determine soil diversity and distribution at different scales;

(ii) soil classification and analysis of mapping information;

(iii) functions of soil organisms and their influence on soil formation and evolution;

(iv) evaluation of land and soil quality.

3. Programme:

Soil functions, ecosystems and society. Factors of soil formation. Processes of soil genesis. Differentiation and distribution of soils at global and local scale. Soil taxonomy ("World Reference Base for Soil Resources"). Soil types which occur in Portugal and conditions which determine their characteristics and distribution. Soil mapping information in Portugal.

Soil organisms. Organism functions in the soil system. Organism groups. Diversity and abundance, biomass and metabolic activity. Nitrogen symbiotic fixation. Mycorrhizae systems.

Soil carbon and nutrient dynamics and ecosystem stability. Interactions between soil and plants; diversity of soil profile, land use system and soil quality. Evaluation of land soil quality. Modifications of soil functions. Degradation processes and soil resilience. Soil characteristics and principles for conservation and rehabilitation of soils.

4. Bibliography:**Main Bibliography**

Brady, N. C. & Weil, R.R. 1999. The Nature and Properties of Soil (12th edition). Prentice Hall, New Jersey. (Capítulos: 1, 2, 3, 11, 17, 18,19, 20)

Bul, S.W., Hole, F.D., Mc Cracken, R.J., Southard, R.J. 1997. Soil Genesis and Classification (4th ed). Iowa State University Press, Ames. (Capítulos 2 - 6).

FAO, 2006. World Reference Base for Soil Resources, 2006 edition. World Soil Resources Reports 103, FAO, Rome

FAO, 2001. Lecture Notes on the Major Soils of the World. World Soil Resources Reports 94, FAO, Rome

FAO, 1976. A framework for Land Evaluation. FAO Soils Bulletin 32, FAO, Rome

Fisher, R. & Binkley D. 2000. Ecology and Management of Forest Soils (3rd Edition). John Wiley & Sons, New York

Other Bibliography

European Environment Agency, 2003. Europe's environment: the third assessment. Environmental assessment report, 10. (Chap. 9: Soil Degradation)

EEA, 2000. Down to earth: Soil degradation and sustainable development in Europe - A challenge for the 21st century . Environmental issue report No 16

Soil Survey Staff 2006. Keys to Soil Taxonomy (10th Edition). USDA/NCRS, Washington, DC

Sanchez, P. 1976. Properties and Management of Soils in the Tropics. John Wiley & Sons, New York

5. Assessment:

Soil Genesis and Quality includes three modules:

- (a) Soil formation and classification,
- (b) Functions of soil organisms,
- (c) Evaluation of land and soil quality.

Discipline evaluation is obtained through:

Tests for each module. To exempt the Final Examination is needed an average mark ≥ 10 , but the minimum mark in each module is 8

Or a **Final Examination** (mark ≥ 10) encompassing the three modules (a minimum mark of 8 for each module).

6. Estimated Workload:

168	Hours
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7. Last Update:

14/7/2010
