

## 25245 - Soil and land evaluation

### Información del Plan Docente

Academic Year	2016/17
Academic center	201 - Escuela Politécnica Superior
Degree	277 - Degree in Environmental Sciences
ECTS	6.0
Course	
Period	Four-month period
Subject Type	Optional
Module	---

### 1.Basic info

#### 1.1.Recommendations to take this course

This subject is offered in the [English Friendly](#) form

#### 1.2.Activities and key dates for the course

### 2.Initiation

#### 2.1.Learning outcomes that define the subject

#### 2.2.Introduction

### 3.Context and competences

#### 3.1.Goals

#### 3.2.Context and meaning of the subject in the degree

#### 3.3.Competences

#### 3.4.Importance of learning outcomes

### 4.Evaluation

### 5.Activities and resources

#### 5.1.General methodological presentation

The learning process for this subject include lectures and participatory classes, practices in laboratory, field trips and on-line activities.

#### 5.2.Learning activities

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This subject emphasizes the importance of soil as natural resource, which provides many ecosystem services for environmental and food security and therefore the human well-being. This subject brings together some of the systems developed to classify and evaluate soils and lands. It is mainly addressed for the students interested in interpreting a soil survey and to compare soils according agricultural, range or woodland land-uses .

### 5.3.Program

#### Theory programme

Topic 1. Soil ecosystems services.

Topic 2. Soil description for soil classification and land evaluation.

Topic 3. Soil types and their formation: factors and processes.

Topic 4. World Reference Base (WRB) for soil resources: an international soil classification system.

Topic 5. Soils and land evaluation systems for land planning

Topic 6. Soil maps interpretation

Topic 7. Diagnosis of soil quality for rehabilitation projects

Topic 8. Soil conservation practices

Topic 9. Fire-affected soils and emergency measures in controlling post-fire degradation

#### Practical programme

Laboratory practicals:

1. Preparing soil samples: Drying, sieving, grinding and packing. Qualitative tests.

2. Physical properties: Particle size analysis, porosity, soil aggregate stability.

3. Chemical properties: pH, electrical conductivity, organic matter, carbonates, gypsum.

4. Biological properties: Soil respiration, enzymatic activities

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### 5. Final report

Field trips:

1. Soil and landscape relationships.
2. Management of soils

### 5.4.Planning and scheduling

Week	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	H
Lectures	T1	T2	T2	T3	T3	T4	T4	T5		T6	T7	T7	T8	T9	T9	
Hours	2	2	2	2	2	2	2	2		2	2	2	2	2	2	30
Prblems							T4	T5					T7	T8	T9	
Hours							2	2					2	2	2	10
Lab		P1	P2	P3	P4	P5										
Hours		2	2	2	2	2										10
Field trips							S1						S2			
Hours							5						5			10
Examination																5
Tutored work (H)		2		2	2	2	2	2		2		2	2	2	2	20

T: topics; H: hours

## **5.5. Bibliography and recommended resources**

### **Basic references ( Mainly available on-line ):**

FAO (1976). A framework for land evaluation. FAO Soils bulletin, 32. Rome. Available on-line: <http://www.fao.org/docrep/X5310E/X5310E00.htm>

FAO (2006). Guidelines for soil description. 4th ed. Rome. Available on-line: <http://www.fao.org/docrep/019/a0541e/a0541e.pdf>

IGN. 1992. Atlas Nacional de España. Sección II. Grupo 7. Edafología. Instituto Geográfico Nacional. M.O.P.T. Madrid.

IUSS Working Group WRB. 2015. World reference base for soil resources: International soil classification system for naming soils and creating legends for soil maps. (updated 2015). World Soil Resources Reports, 106. FAO-ISRIC-ISSS. Roma. Available on-line: <http://www.fao.org/3/a-i3794e.pdf>

PORTA, J., LÓPEZ-ACEVEDO, M.; ROQUERO, C. 2003. Edafología para la agricultura y el medio ambiente. Mundi-Prensa. 3ª edición. Madrid.

### **Additional bibliography**

#### **Specific references on soils of Aragón**

BADIA, D. (1989). Los suelos de Fraga. Cartografía y evaluación. Colección de Estudios Altoaragoneses, 30. Instituto de Estudios Altoaragoneses. Huesca.

BADÍA, D. Coord (2009). Itinerarios edáficos por el Alto Aragón. Cuadernos Altoaragoneses de Trabajo, nº 28. Ed. Instituto de Estudios Altoaragoneses. 189 pp. Huesca.

BADÍA, D.; MARTÍ, C. (1999). Suelos del Pirineo Central: Fragen. 190 pp. Publicación a cargo del Instituto Nacional de Investigación y Tecnología Agraria Universidad de Zaragoza, Consejo de Protección de la Naturaleza de Aragón e Instituto de Estudios Altoaragoneses. Huesca.

BADÍA, D.; MARTÍ, C.; CUCHÍ, J.A.; CASANOVA, J. (2006). Los suelos de los viñedos en la D. O. Somontano de Barbastro. 205 pp. Colección Ciencias, 8. Ed. Prensas Universitarias de Zaragoza.

BADÍA, D.; IBARRA, P.; MARTÍ, C.; LONGARES, L.A.; BELMONTE, A. (2008). El Aiguabarreig: suelos y paisajes. 193 pp. Serie Investigación, 53. Consejo de Protección de la Naturaleza de Aragón. Zaragoza.

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BADÍA, D., MARTÍ, C.; CHARTE, R. (2011). Soil Erosion and Conservations Measures in Semiarid Ecosystems Affected by Wildfires. Chapter 5, pp 87-110. In: Soil Erosion Studies. Godone, D. and Stanchi, S . (Eds). INTECH Open Access Publisher.

BADÍA-VILLAS, D. , DEL MORAL, F. (2016). Soils of Arid lands. In: The Soils of Spain (J.F. Gallardo Lancho, Coord.), Chapter 4, pp. 147-164. Springer International Publishing Switzerland. ISBN: 978-3-319-20540-3

GÓMEZ-MIGUEL, V.D.; BADÍA-VILLAS, D. (2016). Soil Distribution and Classification. In: The Soils of Spain (J.F. Gallardo Lancho, Coord.), Chapter 2, pp. 13-50. Springer International Publishing Switzerland

BADÍA, D., RUIZ, A., GIRONA, A., MARTÍ, C., CASANOVA, J., IBARRA, P., ZUFIAURRE, R. (2016) The influence of Elevation on Soil Properties and Forest Litter in the Siliceous Moncayo Massif, SW Europe. *Journal of Mountain Science* (in press).

### Soil Taxonomy (USDA):

#### Available on-line:

[http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/class/?cid=nrcs142p2\\_053580](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/class/?cid=nrcs142p2_053580)

SOIL SURVEY STAFF. 2014. Keys to Soil Taxonomy, 12th ed. USDA-Natural Resources Conservation Service, Washington, DC.

SOIL SURVEY STAFF. 2015. Illustrated guide to soil taxonomy. U.S. Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

**Spanish version of Keys to Soil Taxonomy:** Soil Survey Staff. 2014. Claves para la Taxonomía de Suelos, 12th ed. USDA-Natural Resources Conservation Service, Washington, DC.

#### Webs:

<http://www.cienciadelsuelo.es/> (with English version)

<http://www.suelosdearagon.com/>