25208 - Soil science

Información del Plan Docente

Academic Year	2017/18
Faculty / School	201 - Escuela Politécnica Superior
Degree	277 - Degree in Environmental Sciences 571 - Degree in Environmental Sciences
ECTS	6.0
Year	1
Semester	Second Four-month period
Subject Type	Basic Education
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

This subject is offered in the English Friendly form

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The preferred methodology in the theoretical and practical classes will be affirmative, combining an expositive and a demonstrative method. The expositive method, which is characterized by the communication of concepts, will be used when students do not have prior knowledge that allow participatory debate, or in the case of concepts or relationships

requiring a formal precision. The demonstrative method is marked by demonstrating a task or a procedure, and will be used in practice tasks.

For the students, it is recommended as learning methods the interrogative method, by asking the teacher or trying to find answers to his questions, and the active method, becoming the agent of his own formation through personal research, direct contact with reality and experience with the working group in which he is incorporated.

5.2.Learning tasks

1. Theoretical sessions. Expositive and participatory lectures that will be followed by exercises and discussion topics.

2. Seminars and laboratory practices. Demonstrative and interrogative activities essentially aimed to dominate laboratory and field procedures.

3. Field task. Field work carried out during the second half of the course, and focused to the consolidation and expansion of concepts.

4. Non contact activities. Study and application of the topics covered by the schedule, preparation of practices' reports, conduct of a group work, preparation of exams...

5.3.Syllabus

Theory programme

Block 1. Introduction

1. The concept of soil. Soil description: observed and inferred attributes. Soil morphology: genetic and diagnostic horizons. Methods for macromorphologic studies.

Block 2. Soil components

1. Mineral components. Soil minerals and their derived attributes.
2. Soil organic matter. The carbon cycle. Soil organic matter and fertility. Humus types in forest soils. Soil biomass.
3. Soil water and atmosphere. Water holding capacity. Water infiltration and redox processes.

Block 3. Soil formation

1. Soil forming factors: lithology, climate, relief, organisms and time. Soil-landscape relationships. Chronsequences and toposequences in Aragón.

2. Soil forming processes. Physical, chemical and biological weathering. Transformation and translocation. Additions and losses.

Block 4. Soil attributes and environmental quality

1. Physical attributes: structural stability, porosity, texture, plasticity, extensibility, etc. Impact on soil management.
2. Chemical attributes: pH, base saturation, main nutrients, organic matter, chelates, etc. Impact on soil management.
3. Biological properties: respiration, microbial biomass, qCO 2 , enzyme activities. Indicators of environmental quality.
4. Soil quality facing degradation processes. Autodepuration and recuperation. Case studies in Aragón.

Practice tasks programme

1. Field work. Description of soil forming factors and landscape.
2. Field work. Soil sampling strategies. Profile sampling. Surface sampling. Undisturbed samples.
3. Lab work. Sampling conditioning prior to analysis. Drying, sieving and shredding.
4. Lab work. Soil salinity. Qualitative assessment of carbonates, sulphates and chloride.
5. Lab work. Soil pH and carbonate measurement.
6. Lab work. Particle size and texture.
7. Lab work. Soil organic matter and Munsell color.
8. Computer lab work. Soil classification by WRB.
9. Computer lab work. Showing and discussing analytical and morphological data.
10. Field trip. Soils of Aragón.

5.4.Course planning and calendar

It is estimated that an average student should devote to this subject, 6 ECTS, a total of 150 hours. This time must include both classroom and non-attendance activities. The student must ensure that the dedication is distributed evenly throughout the quarter.

The basic pattern for classroom and laboratory activities is composed by four weekly hours. Nevertheless, this pattern should be modified by non school days, field trips or by other academic activities. These changes will be announced in classroom and also through the moodle e-learning campus.

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Type of activity / Week	1 5-11 feb	2 12-18 feb	3 19-25 feb	4 26 feb-4 mar	5 5-11 mar	6 12-18 mar	7 19-25 mar	8 26 mar-1 abr	9 2-8 abr	10 9-15 abr	11 16-22 abr*	12 23-29 abr	13 30 abr-7 may	14 7-13 may	15 14-20 may	16 21-27 may	17 28 may-3 jun	18 4-10 jun	19 11-17 jun	20 18-24 jun	21 25 jun-1 jul	Total
	Comienzo 2º sem 7 (mie)							Festivo UZ 28 mar (lun) Vacabr SS (dom) Comienzo 29 mar (jue)	Fin vac SS (mie)			Festivo 23 (lun)	No lectivo 30 abr (lun) (Festivo 1 (mar)				Fin periodo clases: 30 may (mie) Comienzo exam 1 jun (vie)				Fin exam 29 jun (vie)	
Onsite activity																						60
Theory	1 2	2	2	2	2	2	2	1		2	2	1	1	2	2	2	2					28
Problem-solving activities		2	2			1																5
Laboratory practice	2			2	2	1				2	2			2	2							15
Group working																						0
Field trip												5										5
Face-to-face tutorial																2						2
Assessment																1			4			5
Off-site activities																						90
Individual working	5 4	4	3	4	4	4	7	8	4	4	2	5	4	4	3	6	8	4				87
Group working			1										2									3
TOTAL	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8			150

5.5.Bibliography and recommended resources

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BB Brady, Nyle C.. The Nature and properties of soils / Nyle C. Brady, Ray R. Weil . - Rev. 14th ed. Upper Saddle River, N.J. : Pearson/Prentice Hall, cop. 2008

BB Porta Casanellas, Jaime. Agenda de campo de suelos : información de suelos para la agricultura y el medio ambiente / Jaume Porta Casanellas, Marta López-Acevedo Reguerín . Madrid : Mundi-Prensa, 2005

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BC Breemen, Nico van.. Soil formation / by Nico van Breemen and Peter Buurman. . 2nd ed. Dordrecht ; London : Kluwer Academic, cop. 2002

BC Buckman, Harry O.. Naturaleza y propiedades de los suelos : texto de edafología para enseñanza / Harry O. Buckman y Nyle c. Brady ; traduccido por R. Salord Barceló ; texto revisado por José Mª Vives de Quadras . Barcelona [etc.] : UTEHA, D.L. 1965

BC Cobertera Laguna, Eugenio. Edafología aplicada : Suelos, producción agraria, planificación territorial e impactos ambientales / Eugenio Cobertera Laguna . Madrid : Cátedra, 1993

BC Dingus, Del. Introductory soil science : laboratory manual / Del Dingus . Upper Saddle River : Prentice Hall, cop. 1999

BC Duchaufour, Philippe. Atlas ecológico de los suelos del mundo / por Philippe Duchaufour ; con la colaboración de Pierre Faivre, Michel Gury ; versión castellana de Ma. Tarsy Carballas Fernández. Barcelona : Toray-Masson, 1977

BC Duchaufour, Philippe. Edafología. Vol.1, Edafogénesis y clasificación / por Philippe Duchaufour; versión española de los doctores Mª Tarsy Carballas Fernández y Modesto Carballas Fernández . Barcelona : Masson, 1984

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	métodos de investigación / M. M. Kononova ; [traduccion castellana de Enriqueta Bordas de Muntan] . Barcelona : Oikos-Tau, D.L. 1981
BC	Kubiëna, Walter L.. Claves sistemáticas de suelos : diagnóstico y sistemática ilustrados de los suelos más importantes de Europa con sus sinónimos más usuales / por W. L. Kubiëna ; traducido al español por Ángel Hoyos de Castro . Madrid : Consejo Superior de Investigaciones Científicas, 1952
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BC	Robinson, Gilbert Wooding. Los suelos : su origen, constitución y clasificación, introducción a la edafología / Gilbert Wooding Robinson ; traducción de la tercera edición inglesa por José Luis Amorós . 2ª ed. Barcelona : Omega, 1967
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BC	Tan, Kim H.. Environmental soil science / Kim H. Tan . 3th. ed. Boca Raton : CRC press, cop. 2009
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Fotografías de perfiles de suelos
[http://jorgemataix.carbonmade.com/projects/47854#1]
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[http://www.iuss.org/]
Magdoff, F., Van Es, H. (2009): Building

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soils for better crops sustainable soil management. Sustainable Agriculture Research and Education (SARE) [http://www.sare.org/content/download/841/6675/Building_Soils_For_Better_Crops
Página de la USDA para usar y aprender su taxonomía (inglés) [http://soils.usda.gov/]
Páginas de la Universidad de Granada con conceptos muy claros y sencillos y buenas fotos que los ejemplifican y aclaran [http://edafologia.ugr.es/index.htm]
Reeuwijk, L.P. (2002). Procedures for soil analysis. International Soil Reference and Information Centre [http://www.isric.org/isric/webdocs/docs/ISRIC_TechPap09_2002.pdf]
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Se explican e ilustran suelos difíciles de encontrar en nuestro entorno [http://www.eweb.unex.es/eweb/edafo/]
Sociedad Española de la Ciencia del Suelo [http://www.secs.com.es/]
World Soil Information [http://www.isric.org/]

The updated recommended bibliography can be consulted in:
http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=10970