25237 - Waste application on soil and fertility

Información del Plan Docente

Academic Year	2018/19
Subject	25237 - Waste application on soil and fertility
Faculty / School	201 - Escuela Politécnica Superior
Degree	277 - Degree in Environmental Sciences
ECTS	6.0
Year	
Semester	Four-month period
Subject Type	Optional
Module	---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

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

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, laboratory sessions, seminars, fieldwork and tutorials.

4.2.Learning tasks

This course is organized as follows:

- **Lectures.** Sessions of 50 minutes each. They cover the foundations of the course and serve as a starting point.
- **Laboratory sessions.** Two hours a week.

- **Fieldwork and visits** (6 hours)
- **Seminars**
- **Tutorials.** One weekly hour.
- **Autonomous work and study**
- **Assessment tasks**: Includes tests of theoretical concepts and oral presentation of practical results.

4.3.Syllabus

This course will address the following topics:

- **Topic 1. Soil fertility and general aspects**
  1. Introduction: The problems with the creation of subproducts of human activity.
  2. The planning of applying sewage to soil. Limitations, advantages and adverse effects.
  3. Soil quality. Concepts, definitions and management.
  4. Soil fertility. M.O. and mineral nutrients.
- **Topic 2. Specific cycles, interests and waste considerations.**
  1. Generation of and destination of waste. General aspects and definitions.
  2. Cycle of secondary nutrients elements Ca, Mg, Na and K. The importance of soil. Needs and effects for the plants.
  3. Ciclo de los microelementos. Importancia en el suelo. Necesidad y efectos para las plantas. Microelement cycles. Importance of soil. Needs and effects for the plants
  4. Heavy metals in soil. Origin and accumulation. Effects on plants.
  5. The management of waste destined for agriculture. Gestión de residuos con destino a la agricultura. Applicable regulations.
  6. Interests and restrictions on the use of residual wastes from industrial activity or extractive. Main characteristics. Agricultural interests. Interests and restrictions.
  7. Interests and restrictions on the use of residual wastes from urban and leisure activities. Main characteristics. Agricultural interests.
  8. Interests and restrictions on the use of residual wastes from animal husbandry. Main characteristics. Agricultural interests.
  9. Interests and restrictions on the use of residual wastes from agricultural, forestal, and food and agricultural activities. Main characteristics. Agricultural interests
  10. Transport and distribution of wastes. Application techniques. Incorporation in soil.

Field trips are considered to be formative and supporting and 6 hours of mandatory attendance is required. They will involve a visit to a demonstration of the application of agricultural and livestock subproducts to fields and a visit to a RSU compost plant, each one with being 3 hours.

4.4.Course planning and calendar

Week	1	2	3	4	5	6*	7	SS	8	9	10	11*	1
Lectures	T1 T2	T2 T3	T3	T4	T4	T5 T6	T8		T9	T10	T11	T11	
Hours	2	2	1	2	1	2	2		2	2	1	2	
Problem based learning			T3		T4				T9				T

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Hours			1		1				2				2
Laboratory sessions/Seminars	T2	T3	T3 T4	T4	T4	T7	T8			T10		T12	T
Hours	2	2	2	2	2	2	2			2		2	2
Visits											S1		
Hours											3		
Assessment tasks													
Individual work	5	6	6	6	6	5	5	8	5	5	6	5	5

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences website and Moodle.

4.5.Bibliography and recommended resources

BB Compostaje / Joaquín Moreno Casco, Raúl Moral Herrero (editores científicos) . Madrid : Mundi Prensa, 2008

BB Fertilización nitrogenada : guía de actualización / [autores, Andreu, J. ... (et al.)] ; [coordinación, Fernando Orús Pueyo] . Zaragoza : Gobierno de Aragón, Departamento de Agricultura y Alimentación, 2006

BB Labrador Moreno, Juana. La materia orgánica en los agrosistemas : Aproximación al conocimiento de la dinámica, la gestión y la reutilización de la materia orgánica en los agrosistemas / Juana Labrador Moreno . 2ªed. corr. y amp. Madrid : Ministerio de Agricultura, Pesca y Alimentación : Mundi-Prensa, D.L.2002

BB Porta Casanellas, Jaime. Edafología para la agricultura y el medio ambiente / Jaime Porta Casanellas, Marta López-Acevedo

Universidad Zaragoza

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Reguerín, Carlos Roquero de Laburu . 3ª ed., rev. y amp. Madrid [etc.] : Mundi-Prensa, 2003

BB Saña Vilaseca, Josep. La gestión de la fertilidad de los suelos : fundamentos para la interpretación de los análisis de suelos y la recomendación de abonado / Josep Saña Vilaseca, Joan Carles Moré Ramos, Alfred Cohí Ramón . Madrid : Ministerio de Agricultura, Pesca y Alimentación, Secretaría General Técnica, D.L.1996

BB Tchobanoglous, George. Gestión integral de residuos solidos / George Tchobanoglous, Hilary Theisen, Samuel Vigil ; traducción y revisión técnica Juan Ignacio Tejero Monzón, José Luis Gil Diaz, Marcel Szanto Narea . [1a. ed. en español, reimpr.] Madrid [etc.] : McGraw-Hill, D.L.1996

BC Díaz, L.F., Ortiz, O., Bidlingmaier, W. (2007). Compost science and technology. Boston: Elsevier

BC Guerrero García, Andrés. El suelo, los abonos y la fertilización de los cultivos / Andrés Guerrero García . Madrid : Mundi-Prensa, 1990

BC Haug, Roger Tim. The practical handbook of compost engineering / Roger T. Haug. Boca Raton [etc.] : Lewis, cop. 1993

BC Laegreid, M.(Marit). Agriculture, Fertilizers and the Environment / M. Laegreid, O.C. Bockman and O. Kaarstad . Nueva York : Cabi Publishing, cop.1999

BC López Ritas, Julio. El diagnóstico de suelos y plantas : (métodos de campo y laboratorio) / por Julio López Ritas y Julio López Melida. 4ª ed., rev. y amp. Madrid : Mundi-Prensa, 1990

BC Plaster, Edward J. La ciencia del suelo y su manejo / Edward J. Plaster . Madrid : Paraninfo, 2000

BC Raman, Saroja.. Agricultural sustainability : principles, processes, and prospects / Saroja Raman. . New York : Food Products Press, 2006

BC Seoánez Calvo, Mariano. Ingeniería del medio ambiente : aplicada al medio natural continental : la contaminación del medio natural continental: aire, aguas, suelos, vegetación y fauna. Tecnologías de identificación, lucha y corrección : manual técnico para el empresario, el ingeniero, el gestor medioambiental y el enseñante / Mariano Seoánez Calvo ; con la colaboración especial de Irene Angulo Aguado y del equipo de expertos

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	coordinado por el Dr. Seoánez . 2ª ed. rev. Madrid [etc] : Mundi-Prensa, 1999
BC	Thompson, Louis M.. Los suelos y su fertilidad / Louis M. Thompson, Frederick R. Troeh ; [versión española por Juan Puigdefábregas Tomás] . 4a ed., [reimpr.] Barcelona [etc.] : Reverté, D.L.1988
BC	Utilización de compost en los sistemas de cultivo hortícola / editores científicos : Peter J. Stoffella, Brian A. Kahn ; traducción : J. M. Mateo Box, Rosario García Moreno . Madrid [etc.] : Mundi-Prensa, 2005
BC	Vázquez Piñeiro, Egeria. Actuaciones en infraestructuras para la gestión de residuos sólidos urbanos / [estudio elaborado por GEMATEC , S.A. por encargo de la Dirección General de Calidad y Evaluación Ambiental, equipo redactor, Egeria Vázquez Piñeiro, José María Josa García, Jorge Alcalá del Olmo] . Madrid : Centro de Publicaciones, Ministerio de Medio Ambiente, 1996

The updated recommended bibliography can be consulted in:
http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=2200