COURSE SYLLABUS 2019-20

Basic information on the course			
Course:	Soil Science		
Course code:	45092204	Plan:	2009
Academic Year:	2019-20	Undergraduate/Graduate:	Environmental Sciences
Degree Year:	2	Type:	Compulsory
Duration:	Second semester		

TIME DISTRIBUTION ACCORDING TO REGULATIONS	
Credits:	6
Total time:	150 hours
USE OF LEARNING PLATFORM:	Virtual support

TEACHERS			
Name	Soriano Rodríguez, Miguel		
Departement	Agronomía		
Building	Edificio Científico Técnico II – B (CITE II-B)		
Office	223		
Telephone	+34 950 015921	E-mail (institutional)	msoriano@ual.es
Website	http://cms.ual.es/UAL/personas/persona.htm?id=505450485254565471		
Name	Miralles Mellado, Isabel		
Departement	Agronomía		
Building	Edificio Científico Técnico II – B (CITE II-B)		
Office	228		
Telephone	+34 950 014068	E-mail (institutional)	imiralles@ual.es
Website	http://cms.ual.es/UAL/personas/persona.htm?id=555350515254515184		
Name	Ortiz González, Matilde		
Department	Agronomía		
Building	Edificio Científico Técnico II – B (CITE II-B)		
Office	230		
Telephone	652080949	E-mail (institutional)	mog042@ual.es
Website	http://cms.ual.es/UAL/personas/persona.htm?id=495353495549505274		
Name			
Department			
Building			
Office			
Telephone		E-mail (institutional)	

Website	

OTHER IMPORTANT INFORMATION
Content justification
Soil is formed as a result of the interaction of all environmental factors (rock, climate, organisms, relief and time), and it provides the student with knowledge regarding the interaction between rocks and the rest of environmental components. Therefore, soil properties summarize the information of all properties in the ecosystem. In order to understand the soil system it is necessary to know not only the functioning of the natural environment, but also the best way to handle it without degrading its properties so as to achieve a sustainable development.
Courses related in Study Plan
It is a brand new subject for the student. However, the soil properties are mainly of a physical physicochemical, chemical, and biological nature (dynamics of the liquid and gas phases, pH, ionic reactions, dynamics of the soluble elements in the liquid phase, nature of humic substances, soil microorganisms …). Therefore, it is related to other subjects such as physics, chemistry and biology. Likewise, if we consider that the soil-forming factors include organisms (plants), relief, climate and rock, subjects such as geology, or botany, also are closely related to soil science. On the other hand, the knowledge imparted in this subject would be essential for all those subjects related to the dynamics of ecosystems and their sustainable maintenance, such as the particular case of land management. Above all, it is crucial for other subjects of our Department, in which pollution, erosion and soil degradation are addressed.
Pre-required knowledge
The student should have background knowledge of geology and biology, as well as good training in physics, chemistry and physico-chemistry. However, we consider that the level acquired in pre-university studies is sufficient. In any case, for a better learning of the subject it would be advisable to have basic computer management skills, essential for the practical work, as well as an basic level of English, at least at the reading level, which facilitates the use of specific bibliography. Likewise, we consider necessary basic knowledge of Internet browsing because very often, relevant information is not available in other formats and we will need it for practical work. There are not prerequirements included in the memorandum of the Degree

COMPETENCES
Basic and general competences
Basic competences *Understand and possess knowledge* *Implementation of knowledge* *Ability to make judgments*
General competences
Key competences University of Almeria

Basic knowledge of the profession
Ability to solve problems
Teamwork

Specific competences

29. Qualitative and quantitative interpretation of soil properties.
33. Ability to qualitatively and quantitatively analyze data, as well as to interpret its meaning.
36. Ability to apply soil knowledge to the sustainable development of the natural environment.
42. Ability to consider an environmental problem in a multidisciplinary way.

LEARNING OUTCOMES

The past, present and future of natural ecosystems can be gathered from the properties of the soil system. The past implies the history of the soil: climate changes, and erosion and evolution processes that have affected it. The present implies its current properties, a reflection of its history, its production capacity and its capacity to face certain aggressions. The future implies the response of soils to inappropriate management. Therefore, the learning objectives are training students in the management of the soil system in order to achieve a sustainable development of the natural ecosystem in which it is located and other ecosystems (water-air) with which it interrelates.

PLANIFICATION

List of topics

BLOCK 1. INTRODUCTION

UNIT 1.- Edaphology (Soil Science) as a science. Soil concept.
UNIT 2.- Organization and study of the soil. Morphology and soil horizons.
UNIT 3.- Formation factors and pedogenic processes.

BLOCK 2. SOIL COMPONENTS

UNIT 4.- Inorganic solid phase.
UNIT 5.- Organic solid phase.
UNIT 6.- Water in the soil.
UNIT 7.- The atmosphere of the soil.

BLOCK 3. SOIL PROPERTIES

UNIT 8.- Physical properties of the soil: texture, structure, porosity, density, temperature and color.
UNIT 9.- Physicochemical and chemical properties of the soil: pH, CIC and Eh.

BLOCK 4. APPLIED EDAPHOLOGY

UNIT 10.- Biogeochemical Cycles: N, P, K and C: natural soil fertility.
UNIT 11.- Soil degradation: Biological, Physical and Chemical degradation.

PRACTICAL SESSIONS

LABORATORY WORK
Task 1.- Computer-assisted soil study.

Task 2.- Texture.
Task 3.- pH and electrical conductivity.
Task 4.- Carbonates.
Task 5.- Organic matter.
Task 6.- Grinding, sieving, color and structure determination.

CABINET WORK
Task 7.- Initiation to soil mapping.

FIELD WORK

Task 8.- Description of soil in the field and sample collection. Transversal activity.
Task 9.- Recognition of soil in the field.

NOTE: Practical sessions will only be carried out at the time established by the Faculty of Experimental Sciences.

Methodology and academic activities

The methodology will be based on: - Participatory master classes.- Discussion and sharing.- Practical exercises.- Laboratory tasks.- Field work.- Teamwork and defense in work groups. In the participatory master classes, at the end of each thematic block the students, supervised by the professor, will discuss the aspects addressed in each unit. When soil properties are studied, those most relevant will be determined in the laboratory, with the consequent interpretation of the results. To interpret the properties of soils, two types of field work will be arranged. In the first one, students will describe the soils of different ecosystems, with the aim of knowing their variability and distribution both in space and time. In the second one, known as transversal activity, students will study three natural ecosystems in which they will analyze soils, flora and fauna, trying to relate their respective properties in order to learn more about the behaviour of soils in the natural environment. A maximum of three-student work groups will be established, in which each group will carry out the expansion of some of the knowledge taught in the planification of contents, and must provide the bibliography used and expose the results

COMPETENCY ASSESSMENT

Criteria and assessment tools

The evaluation system will include the acquisition of theoretical knowledge, supervised activities, bibliographic tasks and the practical program. The participation in class and the presentation of the proposed topics and works, as well as the acquired knowledge and its understanding and interpretation will be valued. In the supervised activities the organization of ideas and their coherence will be valued. In the bibliographical tasks, the content and structure of the information will prevail, as well as the ability to synthesize it.
The acquisition of knowledge will account for 70% of the final score, provided that the student obtains a minimum of 3.6 points (Competencies B14, A1, A2, A3, E1, E2 and E3). Class attendance will account for 5% of the final mark (it aims to encourage student participation). The practice work will account for 25% of the final score, assessing both attendance and presentation of results (Competencies B6, B14, B8, A2, E2). In addition, specific voluntary work may be carried out, in which both the quality of the work and the effort used in its performance and its exposure will be assessed (Competencies B8, A1, E1).

The qualifications obtained in the practical work in June will only be kept until September of the same year.

Follow-Up Mechanisms

Tutoring Attendance
Attendance and participation in seminars
Registration and access to the virtual classroom
Participation in communication tools (discussion forums, emails)
Delivery of activities in class
Delivery of tutoring activities
Delivery of virtual classroom activities

Functional diversity / Functional disability.

Those students with disabilities or special educational needs can get in contact with the Delegation of the Rector for the Functional Diversity (http://www.ual.es/discapacidad) to receive the appropriate guidance and advice in order to facilitate their instructional, learning and training processes. Likewise, these students may request the implementation of the necessary and suitable adaptations of content, methodology and evaluation that guarantee equal opportunities in their academic development. The processing of any personal data or aggregated information regarding these aforementioned students, in fully compliance with the GDPR, is strictly confidential. Faculties and academic staff lecturing the course referenced by this guide/document will be in charge of applying the recommended adaptations approved by the Delegation of the Rector for the Functional Diversity, this fact will be, therefore, notified to the School or Faculty as well as to the coordinator of the academic course.

COURSE MATERIALS

Recommended course materials

Basic bibliography

Gregory J.Retallack. Soils of the past :an introduction to paleopedology. Blackwell Science. 2001.
J. J. Casas Jiménez; Mª J. López López; Mª J. Salinas Bonillo; J. Gisbert Gallego; E. Giménez Luque; F. García Barroso; S. Sánchez Gómez;
A. Lacalle Marcos; A. Cortés Montoya. F. J. Moyano López. Guía para la realización de un Estudio de Investigación Ambiental. El caso de la cuenca del río Adra. Universidad de Almería. 2017.
Jaime Porta Casanellas, Marta López-Acevedo Reguerín, Carlos Roquero de Laburu.. Edafología para la agricultura y el medio ambiente. Madrid :Mundi-Prensa. 2003.
Porta, J., López-Acevedo, M. y Poch, R.M. . Introducción a la Edafología: Uso y protección del suelo. Mundi Prensa. 2008.
Marañés, A.; Sánchez, J.A.; de Haro, S.; Sánchez, S.T.; del Moral, F.. Análisis de Suelos. Metodología e Interpretación. Universidad de
Almería. 1998.
Robert E. White. Principles and practice of soil science: the soil as a natural resource. Blackwell Science. 2006.
David L. Rowell. Soil Science: Methods & Applications. Essex: Longman. 1994.
Peter Birkeland. Soils and Geomorphology. OXFORD University Press. 1999.

Complementary

Nyle C. Brady, Ray R. Weil. . The nature and properties of soils . Upper Saddle River :Prentice Hall,cop. . 2002.

editor-in-chief Malcolm E. Sumner. . Handbook of soil science . Boca Ratón (Florida) [etc.] :CRC. 2000.
Michael J. Singer, Donald N. Munns. . Soils :an introduction . Upper Saddle River, N.J. :Prentice Hall. 2006.
Randall J. Schaetzl and Sharon Anderson. . Soils :genesis and geomorphology . New York :Cambridge University Press. 2005.
Hinrich L. Bohn, Brian L. McNeal, George A. O'Connor . Soil chemistry . New York :John Wiley . 2001.
Frederick R. Troeh, J. Arthur Hobbs, Roy L. Donahue. . Soil and water conservation :for productivity and environmental protection . Upper Saddle River, New Yersey, Prentice Hall. 2004.
Kim H. Tan. . Environmental soil science. New York :Marcel Dekker,cop. . 2000.
Rattan Lal, Manoj K. Shukla. . Principles of soil physics . New York :Marcel Dekker. 2004.
Daniel D. Richter, Jr., Daniel Markewitz. . Understanding soil change :soil sustainability over millennia, centuries, and decades . Cambridge:Cambridge University Press. 2002

Other materials

Couse materials available in UAL's library

Students can look for the bibliography currently available in the University Library Management System by consulting the following web address: http://almirez.ual.es/search/e?SEARCH=EDAFOLOGIA

WEBSITE

- http://www.edafologia.net
- http://edafología.ugr.es/
- http://www.sciencedirect.com/
- http://www.blackwellpublishing.com/
- http://www.secs.com.es
- http://jep.scijournal.org/
- http:///campus.usal.es/~delcien/doc/FS.PDF
- http://http://www.fao.org/soils-portal/es/