COURSE SYLLABUS 2019-20

Basic information on the course			
Course:	Geology and Soil science		
Course code:	25151109	Plan:	Degree in Agronomy engineering (2015)
Academic Year:	2019-20	Undergraduate/Graduate:	Bachelor´s degree
Degree Year:	1	Type:	Basic
Duration:	Second term		

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

TEACHERS			
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OTHER IMPORTANT INFORMATION

Content justification

This course will provide the students with theoretical and practical knowledge of **geological materials and Earth dynamics, geomorphology and terrestrial processes**. These concepts are fundamental for the basic academic formation of the students and will permit them to improve their understating and comprehension of knowledge acquired in subsequent academic courses.

The Soils science part of the course is focused on the basic concepts of terrain morphologies and application to real problems related to engineering. The course comprises **basis concept of soils science, as well as application to soil management, problems and potentiality**.

Courses related in Study Plan

Foundations and Agrarian constructions, Works in Engineering, Agrarian Constructions, Soil management, Topography and Geographical Information Systems.

Pre-required knowledge

Basic knowledge of Physics, Chemistry, Geology and Climatology. Basic knowledge of informatics, searching of information on the Internet and use of bibliographic databases.

COMPETENCES

Basic and general competences

Basic competences

According to the Academic program of the Degree in Agronomy engineering, there are no academic requirements to take this course.

Key competences University of Almeria

- Basic skill of the profession
- Ability to solve problems

Specific competences

- E-CB06- Basic knowledge of Geology, Soil sciences and application to solve engineering problems.

LEARNING OUTCOMES

The Geology part of the course deals with theoretical and practical concepts of geological materials and internal and external processes of our planet. The students will gain knowledge about the materials that conform the Earth and most external geological processes that model the terrestrial surface, which is the substrate for agricultural activities. These skills will be essential to address specific subjects in subsequent academic years and will help the students to address real problems related to the interactions of the physical and the sociocultural media. This will allow the student to better understand the geological risks involved in agronomical engineering, in order to address with guarantee the construction of structures and adequate environmental management. The program of practical demonstrations of the geology part of the course includes session of mineral and rock reconnaissance.

Soils are an important economic and ecological resource and are extremely important as a part of the landscape and are the substrate for ecosystems and agriculture. The course will introduce the students in soil sciences, a relatively recent field that has gained importance during the last decade. Soil is generally a non-renewable resource that has great capability to generate goods and services and is an important features of the ecosystems; however, soils are fragile and highly susceptible to degradation. For an adequate management and preservation of soils it is important to know their physicochemical and textural characteristics. The practical demonstrations of the soils science part of the course includes session on taxonomy of soils and their horizons and analysis of the main physiochemical properties of soils.

PLANIFICATION

List of topics

- UNIT I. GEOLOGY
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- SECTION I (GEOLOGY): INTRODUCCTION.
- Lecture I. Geology. History of Geology. Properties, structures and composition of the Earth.
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- SECTION II (GEOLOGY): GEOLOGICAL MATERIALS.
- Lecture II. Minerals and rocks
- Lecture III. Magmatism and magmatic rocks
- Lecture IV. Sediments and sedimentary rocks
- Lecture V. Metamorphism and metamorphic rocks.
- Practical demonstration sessions 1, 2 and 3.

- SECTION III (GEOLOGY): TERRESTIAL DYNAMICS
- Lecture VI. Earth dynamics. Deformation of rocks. Large scale deformations. Behavior of rocks under efforts.

- SECTION IV(GEOLOGY): TERRESTIAL MORPHOLOGIES AND SURFACE PROCESSES. Lecture VII. Weathering
- Lecture VIII. Fluvial and littoral morphologies
- Lecture IX. Lithological morphologies, structures and climate.

- SECTION V (GEOLOGY): GEOLOGY APPLIED TO ENGINEERING.
- Lecture X. Geological resources. Hydrological resources. Groundwater problems and pollution. Gravitational processes. Geology and constructions. Geological maps and field investigations.

- Field excursion

- UNIT II. SOIL SCIENCE
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- SECTION I (SOIL SCIENCE): INTRODUCTION TO SOIL SCIENCE
- Lecture 1: Concept of soil: historical evolution. Soil as a natural body: organization.

- SECTION II (SOIL SCIENCE): Soil components.
- Lecture 2. Inorganic components of soils.
- Lecture 3. Organic components of soils
- Practical demonstration session 1

- SECTION III (SOIL SCIENCE): SOIL PROPERTIES
- Lecture 4. Texture of soils.
- Lecture 5. Structure of soils and related properties.
- Lecture 6. Soil water. Hydrological properties.
- Lecture 7. Soil atmosphere.
- Practical demonstration sessions 2 and 3.

- SECTION IV (SOIL SCIENCE): PHYSICOCHEMICAL PROPERTIES AND FORMATION MECHANISMS OF SOILS
- Lecture 8. Heat fluxes and temperature of soils. Surface reactions: adsorption and ionic Exchange. pH and soil reactions.
- Lecture 9. Factors of soils formation: parent material and climate. Degradation of soils

- Field excursion.

Methodology and academic activities

- Participative Master classes - Problems solving - Laboratory activities.

COMPETENCY ASSESSMENT

Criteria and assessment tools

The final course of the course will derive from:

1. The final theoretical-practical exam of the course (75% of the final score) will address the lectures and practical sessions. The clarity of concepts and adequate use of technical vocabulary will be evaluated, as well as the ability of understanding and reasoning the methods to study the Earth materials and soils. Competences CB1, UAL1, UAL3 and E-CB06 will be evaluated.
2. The continuous work of the student (25% of the final score) will be evaluated by the accomplishment and delivery of homework and activities in the practical sessions. The score obtained in this part will be valid for the exam calls of June and September of the current year. These activities will evaluate the competences CB1, UAL1, UAL3 and E-CB06.

To certificate the skills acquired during the course, the students will necessarily pass the following sections: (i) questions related to UNIT I in the final exam, (ii) questions on UNIT II in the final exam, (iii) continuous evaluation of UNIT I, (iv) continuous evaluation of UNIT II.

Follow-Up Mechanisms

- Attendance to tutorial
- Attendance and participation in practical sessions
- Participation in virtual tools (debate forum, mails)
- Delivery of assignments and exercises.

- Others:

  During the theoretical and practical classes, the professor will make questions to the students about previous lessons and will give them some homework and problems to be solved. These activities will be susceptible to be marked.

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

- Tarbuck, E. J. y Lutgens, F. K.. Ciencias de la Tierra. Pearson. 2013.
- Marañés, A.; Sánchez, J.A.; De Haro, S.; Sánchez, S. y Del Moral, F. Análisis de suelos. Metodología e interpretación. Ser. Publ. Universidad de Almería. 184 pp. 1998.
- Porta, J.; López-Acevedo, M. y Roquero, C.. Edafología para la agricultura y el medio ambiente. Ed. Mundi-Prensa. Madrid.. 2003.
- Porta, J; López-Acevedo, M y Poch, R.M. Introducción a la Edafología: Uso y Protección del Suelo. Ed.Mundi Prensa.Madrid. 2008.
- Klein, Cornelis; Hurlburt, Cornelius S. Jr. Manual de Mineralogía Vol. 1. Reverté. 2008.
- Klein, Cornelis; Hurlburt, Cornelius S. Jr. Manual de Mineralogía Vol. 2. Reverté. 2008.

Complementary

- Agueda, J.; Anguita, F.; Araña, V.; López-Ruiz, J. y Sánchez. Geología. Editorial Rueda. 1980.
- Gutiérrez Elorza, M.. Geomorfología. Pearson - Prentice Hall. 2008.
- González, J. y Pozo, M.. Geología Práctica. Pearson. 2003.
- Alexander, M.. Introducción a la Microbiología del Suelo. AGT Editor. 1980.
- Barry, R. C. y Chorley, R. J.. Atmósfera, tiempo y clima. Ed. Omega. 1985.
- Besoain, E. . Mineralogía de arcillas de suelos. IICA. 1985.
- Boardman, J.; Foster, I. D. L. y Dearing, J. A. Soil Erosion and Agricultural Land. John Wiley & Sons. 1990.
- Boulaine, J. . Histoire des pédologues et de las sciences des sols. INRA. 1989.
- Buol, S. W., Hole, F. D. & McRacken, R. J.. Soil Genesis and Classification. Iowa Univ. Press. 1997.
- Capel, J. J. . Los climas de España. Oikos-Tau. 1981.
- Duchaufour, Ph.. Edafología I. Edafogénesis y clasificación. Masson. 1984.
- FAO-UNESCO. Digital Soil map of the world. World Soil Resources Report, 60. FAO. 2007.
- FAO. Guía de descripción de perfiles de suelos. Ed. Digital. FAO. . 2009.
- Fassbender, H. W.. Química de suelos. Inst. Interamericano Ciencias Agrícolas de la OEA. Turrialba. 1987.
- Foth, H. D.. Fundamentos de la Ciencia del Suelo. CECSA. México D.F.. 1986.
- Gaucher, G.. El suelo y sus características agronómicas. Omega. Barcelona. 1971.
- Hénin, S.; Gras, R. y Monnier, G.. El perfil cultural. Ed. Mundi Prensa. Madrid. 1972.
- MAGRAMA. Interpretación de Análisis de suelos. Mº de Agr., Alim y Medio Ambiente. Madrid. 1993.
- NRCS-USDA. Keys to Soil Taxonomy. NRCS. Lincoln. Nebraska. U.S.A.. 2010.
- Russell, J.. Las condiciones del suelo y el crecimiento de las plantas. Mundi-Prensa. Madrid. 1992.
- SOIL SURVEY STAFF. Soil Taxonomy. A basic system of soil classification for making and interpreting soil surveys. U.S.D.A. Agr. Handbook. 1975.
- Souchier, B. y Bonneau, M.. Edafología II. Constituyentes y propiedades del suelo. Masson. Barcelona. 1987.
- Thompson, L. M. Y Troeh, F. R.. Los suelos y su fertilidad. Reverté. Barcelona. 1988.
- Wild, A.. Condiciones del suelo y desarrollo de las plantas, según Russell. Mundi-Prensa. Madrid. 1992.
- WRB-FAO. World Reference Base for Soil Resources.World Soil Resources. ISSS-ISRIC-FAO. 2006.

- Bloom, A. L.. Geomorphology: a systematic analysis of late Cenozoic landforms. Prentice Hall. 1998.
- Pedraza Gilsanz, J.. Geomorfología: Principios, Métodos y Aplicaciones. Rueda. Madrid. 1996.
- Gutiérrez Elorza, M.. Geomorfología de España. Rueda. Madrid.. 1994.
- Gutiérrez Elorza, M.. Geomorfología Climática. Omega. Barcelona. 2001.
- Skinner, B. J., Porter, S. C., Park, J.. The Dynamic Earth: An Introduction to Physical Geology. Wiley. 2012.
- RODRÍGUEZ, REED WICANDER, JAMES S. MONROE. Geología. Dinámica y evolución de la tierra . Paraninfo Autor: MANUEL POZO . 2013.

Couse materials available in UAL's library

The bibliographic resources can be found in the following link:

http://almirez.ual.es/search/x?SEARCH=25151109

WEBSITE

- http://edafologia.ugr.es/index.htm
  Soil science in Spanish