



| Teaching Guide | | | | |
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| Identifying Data | | | | 2023/24 |
| Subject (*) | Edaphology | Code | 610G02045 | |
| Study programme | Grao en Bioloxía | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Graduate | 2nd four-month period | Fourth | Optional | 6 |
| Language | English | | | |
| Teaching method | Face-to-face | | | |
| Prerequisites | | | | |
| Department | Física e Ciencias da Terra | | | |
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| Lecturers | Lado Liñares, Marcos Vidal Vázquez, Eva | E-mail | marcos.lado@udc.es eva.vidal.vazquez@udc.es | |
| Web | | | | |
| General description | The program of Soil Science focuses on: a) the study of the organic and mineral soil composition, b) soil physical and chemical and biological properties, c) ecological relevance of soil functions. | | | |

| Study programme competences | |
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| Code | Study programme competences |
| A6 | Catalogar, avaliar e xestionar recursos naturais. |
| A20 | Muestrear, caracterizar e manexar poboacións e comunidades. |
| A21 | Deseñar modelos de procesos biolóxicos. |
| A22 | Descibir, analizar, avaliar e planificar o medio físico. |
| A23 | Avaliar o impacto ambiental. Diagnosticar e solucionar problemas ambientais. |
| A24 | Xestionar, conservar e restaurar poboacións e ecosistemas. |
| A26 | Deseñar experimentos, obter información e interpretar os resultados. |
| A27 | Dirixir, redactar e executar proxectos en Bioloxía. |
| A28 | Desenvolver e implantar sistemas de xestión relacionados coa Bioloxía. |
| A30 | Manexar adecuadamente instrumentación científica. |
| A31 | Desenvolverse con seguridade nun laboratorio. |
| A32 | Desenvolverse con seguridade no traballo de campo. |
| B1 | Aprender a aprender. |
| B2 | Resolver problemas de forma efectiva. |
| B3 | Aplicar un pensamento crítico, lóxico e creativo. |
| B6 | Organizar e planificar o traballo. |
| B7 | Comunicarse de maneira efectiva nunha contorna de traballo. |
| B8 | Sintetizar a información. |
| B9 | Formarse unha opinión propia. |
| B10 | Exercer a crítica científica. |
| B11 | Debater en público. |
| B12 | Adaptarse a novas situacións. |

| Learning outcomes | | | |
|---|--|--|-----------------------------|
| Learning outcomes | | | Study programme competences |
| The scientific study of the soil is important for Biologists, mainly from an ecological perspective. Soil is essential in environmental studies and soil science contributes to understand important processes such as biogeochemical cycles, the structure ecosystems and factors from which primary production depends. | | | A21 |
| | | | A22 |
| | | | A30 |



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| Assessment of environmental impact taken into account soil diversity. Evaluation of soil contamination and techniques for soil restoration. | A6 A21 A26 | B1 B3 | |
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| The course of Soil Science is designed to provide an overview of the fundamental: Physical processes, Chemical processes, Fertility, Biology, and Land Use. Both theoretical and practical contents in Soil Science should contribute to enhance the skills of Biology students at the UDC in the use of several instrumental techniques. | A22 A24 A28 A30 A32 | B11 | |
| The course of Soil Science is designed to provide an overview of the fundamental: Physical processes, Chemical processes, Fertility, Biology, and Land Use. Both theoretical and practical contents in Soil Science should contribute to enhance the skills of Biology students at the UDC in the use of several instrumental techniques. | A23 | B1 B2 B7 B12 | |
| Soils act as substrates for vegetal communities and also as adsorbent and absorbent for nutritive, and allow life of many animal and vegetal organisms. Therefore our program pays particular attention to the ?edaphosphere? as a complex dynamic and organised site, located in the interface between biosphere, lithosphere, hydrosphere and atmosphere. Soil is also the support of man-made spaces or sites influenced by man activity, such as urban-industrial areas and transport infrastructures. | A27 A30 A31 | B8 B10 | |
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| Because of the role of the soil for terrestrial ecosystems, Edaphology has a particular interest in Environmental Biology. The soil food chain describes a complex living system and how it interacts with the environment, plants, and animals. The nature of soil makes direct observation of food webs difficult. Soil microbial communities are characterized in many different ways. The activity of microbes can be measured by their respiration and carbon dioxide release. The cellular components of microbes can be extracted from soil and genetically profiled, or microbial biomass can be calculated by weighing the soil before and after fumigation. | A24 A28 A31 | B1 | |
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| Contents | |
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| Topic | Sub-topic |
| I PRELIMINARY CONCEPTS | |
| Lesson 1.- History of Soil Science. | Origin and development of Soils Science. Main topics in Soil Science. |
| Lesson 2.- Soil descripton in field conditions. Laboratory techniques for soil studies. | Profile and horizons. Physical, Chemical and Bioñogical methods of soil analysis. |
| II SOIL COMPOSITION | |
| Lesson 3.- Soil mineral composition. Soil clays. | Soil texture. Specific surface. Soil mineralogy. Soil clays. Structure and properties of most common soil clays. Oxyhydroxides. |
| Lesson 4.- Soil organic matter. | Soil organic compounds. Humus. Organo-mineral associations. Organic matter and ecosystems: biogeochemical cycles. |



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| <p>III SOIL PROPERTIES</p> <p>Lesson 5.- Soil physical properties and soil structure. Lesson 6.- Soil water retention and water dynamics. Lesson 7.- Soil temperature and aeration. Lesson 8.- Soil pH and cation exchange capacity. Lesson 9.- Soil biology. Lesson 10. Soil fertility</p> | <p>Bulk density and solid density. Soil porosity. Pore-size distribution. Aggregate dynamics in soils. Structural stability.</p> <p>Soil moisture content and soil potential. Soil water measurement. Soil moisture characteristic curve. Soil water retention and soil water dynamics. Soil water and water requirements of vegetation.</p> <p>Soil thermal properties. Soil temperature management. Composition of the soil atmosphere. Soil and gases of greenhouse effect.</p> <p>Soil pH and soil acidity. Soil acidity effects. Acidity amendment. Exchange complex of soils. Cation exchange capacity.</p> <p>Soil organisms. Soil enzymatic activity. Nucleic acids in soil. Soil organism and soil properties as indicators of soil quality.</p> <p>Macronutrients and micronutrients. Nitrogen , phosphorus and potassium cycles. Calcium and magnesium. Iron, copper, zinc, boron and molybdenum. Other oligoelements</p> |
| <p>IV FACTORS AND PROCESSES OF SOIL FORMATION</p> <p>Lesson 11.- Factors of soil formation.</p> <p>Lesson 12.- Processes of soil formation.</p> | <p>Parent material. Climate. Topography. Times Vegetations and organisms. Anthropogenic factors.</p> <p>Soil profile differentiation. Clay accumulation. Podzolization. Salinization. Calcification. Hydromorphic processes. Ferralitic alteration.</p> |
| <p>V SOIL SYSTEMATICS AND CLASSIFICATION</p> <p>Lesson 13.- Soil Systematics.</p> <p>Lesson 14.- Introduction to Soil Taxonomy.</p> <p>Lesson 15.- World Reference Base for Soil Resources.</p> <p>Lesson 16.- Spanish and Galician Soils.</p> | <p>Genetic and diagnostic horizons. Soil profile. Horizon nomenclature. Modern Soil Classifications. Soil Taxonomy. World Reference Base for Soil Resources.</p> <p>Characteristics for soil diagnosis. Moisture and temperature regimes. Orders, suborders, great groups, subgroups, families, and series.</p> <p>Organic soil. Soil with anthropic influences. Soils conditioned by topography and by time. Soils conditioned by cold, temperate, steppe, arid or semiarid and tropical or subtropical climates.</p> <p>Soil under Atlantic climate. Soils under Mediterranean climate. Galician soils: parent material, climate, topography and vegetation effects.</p> |
| <p>VI APPLIED SOIL SCIENCE</p> <p>Lesson 17.- Applications of Soil Science.</p> | <p>Soil cartography.</p> <p>Interactions soil-landscape.</p> <p>Soil functions and society.</p> <p>Soil and environment.</p> <p>Soil contamination.</p> <p>Recovery of contaminated soils.</p> <p>Soil Use and Management.</p> |



Assessment

| Methodologies | Competencies | Description | Qualification |
|-----------------------------------|--|--|---------------|
| Laboratory practice | A6 A20 A21 A30 B8 B10 B12 | Continuous assessment and practical work. | 15 |
| Field trip | A20 A23 A32 B3 B6 | Assessment of field activities and reports of filed work. | 5 |
| Guest lecture / keynote speech | A6 A21 A22 A23 A24 A27 A28 A31 B2 B7 B8 B9 B11 | Short questions and tests about the keynote speech. Final examination and also partial examinations, if requested. | 65 |
| Problem solving | A26 B1 B2 B3 B8 B11 | Attendance at small group classes is positively valued, as well as the delivery of newsletters/activities requested by the teachers. | 15 |

Assessment comments

Soil Science global grade can be assessed by continuous evaluation following the Bologna criteria. Evaluations may be performed not only in English, but also in Galician or Spanish, if requested by the students.

Sources of information

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| Basic | LAL, R. 2002. Encyclopedia of Soil Science. Marcel Dekker. PORTACASANELLAS, J. LÓPEZ AVEVEDO, M y ROQUERO, C. 2003. Edafología para la agricultura y el medio ambiente. Ediciones Mundi-Prensa. 960 pp. PORTACASANELLAS, J. LÓPEZ AVEVEDO, M y POCH, R.M. 2008. Introducción a la Edafología: uso y protección del suelo. Ediciones Mundi-Prensa. 451 pp. WRB. 2006. World Referente Base for Soil Resources. Wageningen/Roma. |
| Complementary | Recursos web: www.iuss.org www.edafologia.ugr.es www.soilerosion.net Mapas de suelos de las cuatro provincias de Galicia y diversas provincias de España |

Recommendations

Subjects that it is recommended to have taken before

Geology/610G02004

Physical Geography/610G02006

Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus

Other comments

Gender perspective As stated in the transversal skills of the degree (C4), the development of a critical, open and respectful citizenship with diversity in our society will be encouraged, emphasizing the equal rights of students without discrimination based on gender or sexual status. An inclusive language will be used in the material and in the development of the sessions. Work will be done to identify and modify prejudices and sexist attitudes and influence the environment to modify them and promote values of respect and equality.

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.