



Teaching Guide

Identifying Data					2014/15
Subject (*)	Edafoloxía		Code	610G02045	
Study programme	Grao en Bioloxía				
Descriptors					
Cycle	Period	Year	Type	Credits	
Graduate	2nd four-month period	Fourth	Optativa	6	
Language	SpanishGalicianEnglish				
Prerequisites					
Department	Ciencias da Navegación e da Terra				
Coordinador	Paz Gonzalez, Antonio	E-mail	antonio.paz.gonzalez@udc.es		
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Web					
General description					

Study programme competences

Code	Study programme competences
A1	Recoñecer distintos niveis de organización nos sistemas vivos.
A6	Catalogar, avaliar e xestionar recursos naturais.
A18	Levar a cabo estudos de produción e mellora animal e vexetal.
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.
A29	Impartir coñecementos de 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.
B4	Traballar de forma autónoma con iniciativa.
B5	Traballar en colaboración.
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.
B13	Comportarse con ética e responsabilidade social como cidadán e como profesional.
C1	Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma.
C2	Dominar a expresión e a comprensión de forma oral e escrita dun idioma estranxeiro.
C3	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.



C4	Desenvolverse para o exercicio dunha cidadanía aberta, culta, crítica, comprometida, democrática e solidaria, capaz de analizar a realidade, diagnosticar problemas, formular e implantar solucións baseadas no coñecemento e orientadas ao ben común.
C5	Entender a importancia da cultura emprendedora e coñecer os medios ao alcance das persoas emprendedoras.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C7	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.
C8	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

Learning outcomes			
Subject competencies (Learning outcomes)	Study programme competences		
	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.	A1 A6 A20 A21	B1 B3 B8 B11
The course of Soil science is designed to provide an overview of the fundamental concepts in soil science: 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 A23 A24 A29 A30	B2 B3 B10 B12	C2 C4 C7 C8
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.	A1 A18 A26 A27 A28 A31 A32	B4 B5 B6 B7 B13	C3 C4 C6 C8
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.	A6 A18 A21 A22 A23 A24 A31 A32	B2 B3 B6 B9 B12	C2 C3 C5 C6
The program includes environmental impact studies, taken into account soil diversity. Problems driven by soil contamination and soil restoration are also considered.	A6 A18 A20 A23 A26 A27 A28 A29	B2 B4 B6 B9 B13	C2 C3 C4 C7

Contents	
Topic	Sub-topic



<p>PRELIMINARY CONCEPTS</p> <p>Lesson 1.- History of Soil Science.</p> <p>Lesson 2.- Soil descripton in field conditions. Laboratory techniques for soil studies.</p>	<p>Origin and development of Soils Science. Main topics in Soil Science.</p> <p>Profile and horizons. Physical, Chemical and Bioñogical methods of soil analysis.</p>
<p>SOIL COMPOSITION</p> <p>Lesson 3.- Soil mineral composition. Soil clays.</p> <p>Lesson 4.- Soil organic matter.</p>	<p>Soil texture. Specific surface. Soil mineralogy. Soil clays. Structure and properties of most common soil clays. Oxyhydroxides.</p> <p>Soil organic compounds. Humus. Organo-mineral associations. Organic matter and ecosystems: biogeochemical cycles.</p>
<p>SOIL PROPERTIES</p> <p>Lesson 5.- Soil physical properties and soil structure.</p> <p>Lesson 6.- Soil water retention and water dynamics.</p> <p>Lesson 7.- Soil temperature and aeration.</p> <p>Lesson 8.- Soil pH and cation exchange capacity.</p> <p>Lesson 9.- Soil biology.</p> <p>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>FACTORS AND PROCESSES OF SOIL FORMATION</p> <p>Lesson 11.- Factors of soil fromation.</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>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>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>
<p>PRACTICAL ACTIVITIES</p> <p>Laboratory</p> <p>Field studies</p>	<p>Textural analysis</p> <p>Bulk density and solid density, Porosity.</p> <p>Aggregate stability</p> <p>Soil pH.</p> <p>Organic carbon and nitrogen</p> <p>Cation exchange capacity</p> <p>Soil extractable phosphorus</p> <p>Biological activity and dehydrogenase activity</p> <p>Case studies: Umbrisols, Cambisols, Fluvisols, and Gleysols</p>

Planning			
Methodologies / tests	Ordinary class hours	Student's personal work hours	Total hours
Guest lecture / keynote speech	20	40	60
Objective test	1	1	2
Laboratory practice	15	30	45
Supervised projects	4	20	24
Field trip	5	10	15
Introductory activities	1	2	3
Personalized attention	1	0	1

(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	The contents of soil science will be developed. The used audiovisual materials will be provided to students.



Objective test	short questions about keynote speech contents.
Laboratory practice	Analysis of basic soil physical, chemical and biological properties.
Supervised projects	These are guided and supervised academic activities
Field trip	The main soil types in Galicia will be observed.
Introductory activities	Presentation of the program, highlighting the main interesting issues for Biologists

Personalized attention

Methodologies	Description
Introductory activities	Personalized attention will be provided by individual meetings in dates previously selected.

Assessment

Methodologies	Description	Qualification
Supervised projects	Quality of the reports and presentations.	20
Laboratory practice	Continuous assessment and practical work.	10
Introductory activities	THis issue will be assessed together with keynote speech.	2
Guest lecture / keynote speech	Short questions and tests about the keynote speech. Final examination and also partial examinations, if requested.	60
Field trip	Assessment of field activities and reports of filed work.	8

Assessment comments

Soil Science global note can be assessed by continuous evaluation following Bolonia criteria.
Evaluations may be performed in Galician or Spanish languages if this is requested by students.

Sources of information

Basic	
Complementary	

Recommendations

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus

Xeoloxía/610G02004

Xeografía: Xeografía física/610G02006

Other comments

(*)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.