

Course Unit	Pedology	Field of study	Earth Sciences
Bachelor in	Environmental Engineering	School	School of Agriculture
Academic Year	2022/2023	Year of study	2
Type	Semestral	Semester	1
Level	1-2	ECTS credits	6.0
Code	9099-309-2104-00-22		
Workload (hours)	162	Contact hours	T 30 TP - PL 30 TC - S - E - OT 20 O -

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Felícia Maria Silva Fonseca

#### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Identify the factors of soil formation
2. Identify the components and soil properties
3. Interpret soil maps in order to assess the main potential and limitations of the soil in a region
4. Recognize the importance of soil on ecosystems and on vegetation development
5. Developing the criticism capacity towards the decision-making within the soil conservation and the environment

#### Prerequisites

Before the course unit the learner is expected to be able to:  
Basics of mathematics, physics, chemistry and biology.

#### Course contents

Genesis and soil development Soil components (mineral matter, organic matter, pore volume) Physical and chemical soil properties (description and evaluation, relationship with soil components) Soil morphological properties (soil profile, characteristics of main horizons) Interpretation of soil maps The soil as base of production agricultural, forestry and agroforestry systems

#### Course contents (extended version)

1. Soil functions and composition. Factors, processes and stages of soil formation. Soil profile.
2. Soil mineral matter. Main groups of clays. Soil texture.
3. Soil organic matter (SOM). Importance of SOM in soil properties, fertility, and carbon reserve.
4. Soil organisms. Main types of organisms. Interactions between organisms and soil.
5. Soil colloids. Consequences on soil properties. Exchangeable capacity and plant nutrition.
6. Soil reaction. Relationship with plant nutrition. Origin of soil acidity and buffering power.
7. Soil structure. Formation of aggregates. Degradation and conservation of aggregation/structure.
8. Real density, bulk density, and soil porosity. Importance for agronomic land use.
9. Soil atmosphere. Importance of oxygen in the soil. Gas exchange.
10. Practical Classes Program. Observation of soil monoliths.
11. Use of soil maps, land aptitude, and current land use.
12. Definition of the main potentialities and limitations of soils in a given region.
13. Determination of soil texture by manual method.
14. Soil color. Color assessment of different soil samples using the Munsell color chart.
15. Calculations related to organic matter content and soil exchange complex.
16. Relation of the exchange complex with the content and type of clay and the humus content of soil.
17. Soil structure characterization methods.
18. Evaluation of bulk density and porosity in soil samples. Associated calculations.
19. Evaluation of soil water content. Methods. Calculations. Moisture stress curves.

#### Recommended reading

1. Agroconsultores e Coba 1991. Carta dos solos, do uso actual da terra e da aptidão da terra do nordeste de Portugal. UTAD/PDRITM, Vila Real.
2. Weil, R. and Brady, N. 2016. The nature and properties of soils. 15ª ed. , Pearson, New York.
3. Costa, J. B. 2004. Caracterização e constituição do solo. 7ª ed. FCG, Lisboa.
4. Porta, J. , López Acevedo, M. e Roquero, C. 2003. Edafologia para la agricultura y el medio ambiente. 3ª ed. Ediciones Mundi-Prensa. Madrid.
5. Apontamentos elaborados, pela docente, especificamente para a unidade curricular Pedologia.

#### Teaching and learning methods

Lecture classes are essentially expository. The practical classes in each block of matter have a brief expository period at the beginning, and the practical exercises are supervised. Tutorial support for students during semester, including exams period

#### Assessment methods

1. With practical component - (Regular, Student Worker) (Final, Supplementary)
  - Practical Work - 42% (Corresponds to 2. 5 ECTS)
  - Final Written Exam - 58% (Corresponds to 3. 5 ECTS The exam includes only the theoretical component of the subject)
2. No practical component - (Regular, Student Worker) (Final, Supplementary, Special)
  - Final Written Exam - 100% (The exam includes theoretical and practical component of the subject)

#### Language of instruction

Portuguese, with additional English support for foreign students.

## Electronic validation

Felícia Maria Silva Fonseca	Tomás de Aquino Freitas Rosa Figueiredo	Artur Jorge de Jesus Gonçalves	Maria Sameiro Ferreira Patrício
06-12-2022	06-12-2022	08-12-2022	19-12-2022