

## SYLLABUS DEL CORSO

### Geopedologia

2021-3-E3201Q079

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#### Aims

- Know the soil and its main characteristics; understand factors and processes of soil formation.
- Be able to perform a simplified description of the soil in the field and accomplish some of the main analytical determinations in the laboratory.
- Understand the basic mechanisms of the most common pedological taxonomies and be able to perform the simplified classification of a soil profile.

#### Contents

- Soil as an environmental and productive resource; ecosystem services provided by the soil
- Soil description.
- Main physical and chemical soil parameters.
- Factors of soil formation.
- Pedogenetic processes.
- Main soil taxonomic classification systems.
- Soil laboratory analysis.
- Soil-landscape relationships.

#### Detailed program

##### Lessons

- Definition of soil; its environmental, agricultural and forestry importance; ecosystem services carried out by

soils.

- The soil profile and the horizons; morphological description of the soil and denomination of genetic horizons.
- Main physical (thickness, rock fragments, texture, density) and chemical (pH, organic carbon, carbonates, exchange complex, fertility elements) soil parameters.
- Factors of soil formation: climate and pedoclimate, living organisms (vegetation, pedofauna, anthropic action), terrestrial relief and geomorphology, parental material and lithology, time and length of processes.
- Pedogenetic processes: addition, subtraction, mixing, transfer, transformation. Main processes: brunification, leaching, calcification, salinization, podzolization, vertisolization, gleying. Characteristics of the most widespread soil taxonomic classification systems: World Reference Base for Soil Resources (FAO) and Soil Taxonomy (USDA). Diagnostic horizons and methods of classification of a soil profile.

### Laboratory

- Main laboratory determinations: sample preparation, pH, texture, carbonates, organic carbon, organic matter.

### Field activities

- Excursion for the description of natural soils and the study of soil-landscape relationships: the soils of the recent morainic.

## **Prerequisites**

- Prerequisites: basic knowledge of inorganic chemistry, lithology and mineralogy, geomorphology; this knowledge will be considered already acquired.

## **Teaching form**

- Lessons, 5 credits (40 hours)
- Laboratory, 0.5 credits (5 hours)
- Field activities, 0.5 credits (5 hours)

All lessons will be recorded and will take place in synchronous or asynchronous mode. Laboratory and field activities will be carried out regularly, but in small groups. The modalities may vary according to the evolution of the health situation.

## **Textbook and teaching resource**

Educational material distributed:

- Slides projected during the lessons: made available on the e-learning website.
- Laboratory analysis methods: made available on the e-learning website.
- Material for field activities: made available on the e-learning website.

Recommended texts for further information:

- FAO (2006). Guidelines for Soil Description, FAO, Rome (available online).
- Giordano A. (1999). Soil Science. UTET, Turin (available at the Bicocca Library of Sciences).
- IUSS Working Group WRB (2015). World Reference Base for Soil Resources 2014, update 2015. World Soil Resources Reports No. 106, FAO, Rome (available online).
- Previtalli F. (1999). Elements of Geopedology. Soil taxonomies. CUEM, Milan (available at the Bicocca Library of Sciences).
- Previtalli F. (2000). Elements of Geopedology. Genesis and geography of soils. CUEM, Milan (available at the Bicocca Library of Sciences).
- Weil R.R., Brady N.C. (2017). The Nature and Properties of Soils. Pearson, Harlow, England.
- White R.E. (2006). Principles and Practice of Soil Science. Blackwell Publishing, Malden, MA, USA.

## **Semester**

First semester

## **Assessment method**

Written exam with optional oral exam.

The written exam includes open-ended questions (very short essays or analysis of problems) and closed answer questions (multiple choice answers), related to all the topics covered in the course (lectures, laboratories, field activities); the text is evaluated in thirtieths (20/30 in total for open-ended questions; 10/30 in total for closed answer questions). Upon request of the student or teacher, the written exam can be supplemented by an oral exam (always related to all the topics covered in the course), carried out by means of verification questions. The outcome of the oral exam can lead to an increase or decrease of maximum 4 points of the grade of the written exam (therefore, it is possible to be admitted to the oral exam when the grade of the written exam is at least equal to 14/30). There are no intermediate tests.

If, due to the sanitary situation, it would not be possible to carry out examinations in presence, the written test will be replaced by an oral one, to be carried out remotely.

## **Office hours**

On appointment

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