

Syllabus

Course description

Course title	Soil Ecology
Course code	47060
Scientific sector	AGR/13
Degree	Master in Environmental Management of Mountain Areas (EMMA)
Semester	1
Year	2
Academic year	2022/23
Credits	5
Modular	No

Total lecturing hours	30
Total lab hours	20
Attendance	Highly recommended
Prerequisites	
Course page	Course Offering - enrolled from 2021 / Free University of Bozen-Bolzano (unibz.it)
Lecturer	Luigimaria Borruso, BZ K1.05, luigimaria.borruso@unibz.it, +39 0471 017610

Scientific sector of the lecturer	AGR/13
Teaching language	English
Office hours	Monday to Friday, upon appointment to be agreed through email
Teaching assistant	
List of topics covered	
Teaching format	Frontal lectures and labs.
Targeted learning outcomes:	The students will get a comprehensive overview of different aspects on soil fertility and quality, with particular interest to mountain environments. In particular, students will be able to interpret and explain the concept of biological, chemical and physical soil quality and their interrelations, give examples of soil quality indicators, understand and apply the concept of nutrient and contaminant (bio-)availability and mobility. Students will gather knowledge of the intimate correlation between the biotic and abiotic factors driving soil fertility. Practical applications will also be considered. Knowledge and understanding of chemical and microbiological processes involved in pedogenetic processes such as soil formation and in carbon and mineral nutrient cycling will be gathered. Both qualitative and quantitative aspects will be presented. In addition, students will acquire capabilities in the presentation of the skills acquired with an appropriate language and use of technical and specific terms.

List of topics covered	<ul style="list-style-type: none"> - Factors affecting soil formation - Biological, chemical and physical aspects of soil and their interactions - The concept of soil quality - Soil quality indicators - Soil functionality and biodiversity - Next-generation biomonitoring of soils diversity - Soil degradation: environmental protection and strategies for sustainable development - Nutrient cycles - Nutrient dynamics in the soil-plant-microorganism system - Bioavailability and mobility of nutrients and contaminants - Rhizosphere soil and nutrient availability - Plant growth promotion - Sustainable approaches for improving soil properties - Soil formation: Microbial role and plant growth from glaciers to the forest: case studies on the Alps and other cold environments - Permafrost and his role in global climate and environmental systems
Teaching format	<p>Theoretical and hands-on lessons highlighting the interdisciplinarity of soil science, and to foster critical thinking rather than to provide answers and resolve problems. Practical lessons and laboratory activities are also foreseen. Specialized review papers on the topic will be presented through the entire course fostering discussions among the students.</p>
Assessment	<p>Oral</p>
Assessment language	<p>English</p>