

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
Credits	2024/25
Modular	No

Total lecturing hours	30
Total lab/exursion hours	20
Attendance	Highly recommended
Course page	https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/master-environmental-management-mountain-areas/course-offering/
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
Targeted learning outcomes	This course offers a comprehensive exploration of soil ecology, focusing on mountain environments. It focuses on the fundamentals of soil formation to advanced techniques for studying soil biodiversity, the vital role of rhizosphere ecology, and the impact of permafrost ecosystems on global systems. After completing this course, students will profoundly understand soil ecology. This knowledge empowers them to proficiently communicate their newfound expertise, which is vital for effectively tackling the multifaceted ecological challenges inherent in soil.
List of topics covered	Introduction to soil ecology <ul style="list-style-type: none"> • Overview of soil ecosystems • Importance of soil quality and soil health • Soil quality indicators

	<p>Soil formation and classification</p> <ul style="list-style-type: none"> • Soil formation processes • Soil horizons and profiles • Soil classification systems <p>Biological, chemical, and physical aspects of soil</p> <ul style="list-style-type: none"> • Interactions between biological, chemical, and physical characteristics • Soil fertility and its components <p>Soil micro-diversity and soil fauna</p> <ul style="list-style-type: none"> • Importance of soil biodiversity in soil health • Mycorrhizal diversity: Unveiling the enigmatic symbioses belowground • Tiny titans: role and diversity of soil fauna <p>Methods to study the past climate and soil biodiversity</p> <ul style="list-style-type: none"> • The use of biological archives for paleo-reconstruction <p>Next-generation biomonitoring of soil biodiversity</p> <ul style="list-style-type: none"> • Modern techniques for monitoring soil diversity • Evaluating species-species interactions through ecological networks • Practical applications and case studies <p>Biological Soil Crusts</p> <ul style="list-style-type: none"> • Formation and ecological significance of BSC • BSC restoration and conservation <p>Rhizosphere ecology</p> <ul style="list-style-type: none"> • Plant-microbe interactions in the rhizosphere • Role of plant growth-promoting fungi and bacteria <p>Permafrost ecosystems</p> <ul style="list-style-type: none"> • Permafrost ecosystems and their importance • Permafrost's role in global climate and environmental systems
<p>Teaching format</p>	<p>Theoretical and hands-on lessons highlight the interdisciplinarity of soil ecology and foster critical thinking. Practical lessons, excursions and laboratory activities are also foreseen. Specialized review papers on the topic will be presented throughout the course, fostering student discussions.</p>
<p>Assesment</p>	<p>Oral</p>