

# Syllabus

## *Course Description*

<b>Course Title</b>	Soil Chemistry and Fertility
<b>Course Code</b>	40190
<b>Course Title Additional</b>	
<b>Scientific-Disciplinary Sector</b>	AGRI-06/B
<b>Language</b>	German
<b>Degree Course</b>	Bachelor in Agricultural, Food and Mountain Environmental Sciences
<b>Other Degree Courses (Loaned)</b>	
<b>Lecturers</b>	Prof. Tanja Mimmo, Tanja.Mimmo@unibz.it <a href="https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/26968">https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/26968</a>
<b>Teaching Assistant</b>	
<b>Semester</b>	First semester
<b>Course Year/s</b>	2
<b>CP</b>	6
<b>Teaching Hours</b>	40
<b>Lab Hours</b>	20
<b>Individual Study Hours</b>	90
<b>Planned Office Hours</b>	18
<b>Contents Summary</b>	The course provides an introduction to the fundamentals of soil chemistry. Topics include soils as natural bodies and soil formation, inorganic and organic components, weathering processes, as well as the properties of soil water, soil air, and the soil solution. Key chemical processes such as sorption, ion exchange, buffering, and redox reactions are discussed. The course also covers soil fertility, nutrients, fertilizers, and soil amendments, alongside methods of soil sampling and analysis. Finally, attention is given to the rhizosphere as the interface between soil and plants.

<b>Course Topics</b>	<p>The course covers the following topics:</p> <ul style="list-style-type: none"> <li>• Introduction to the soil environment including soil formation processes</li> <li>• Soil minerals and rocks</li> <li>• Weathering processes in soil (chemical, physical and biological weathering)</li> <li>• Soil air and water</li> <li>• Soil organic matter</li> <li>• Soil solution – chemical properties and processes within soils: Sorption, Ion exchange, cation exchange capacity, anion exchange capacity; soil pH, buffer systems, redox – potential.</li> <li>• Soil fertility – the soil as a plant nutrient medium</li> <li>• Fertilizers and soil amendments</li> <li>• Macronutrients</li> <li>• Micronutrients</li> <li>• Soil sampling and interpretation of soil tests</li> <li>• The Rhizosphere – properties and methods applied in rhizosphere research</li> </ul>
<b>Keywords</b>	Soil formation, soil degradation, minerals, weathering, soil water, soil air, organic matter, sorption, ion exchange, buffering, redox processes, soil fertility, nutrients, fertilization, rhizosphere.
<b>Recommended Prerequisites</b>	
<b>Propaedeutic Courses</b>	no
<b>Teaching Format</b>	lectures, laboratory and field activities
<b>Mandatory Attendance</b>	no
<b>Specific Educational Objectives and Learning Outcomes</b>	<p>Knowledge and understanding of chemical, physical and biochemical processes within the soil-plant system related to the development and maintenance of soil fertility.</p> <p>Capability in applying knowledge by developing practical laboratory skills and the ability to draw information out of practical laboratory activities in support/integration to the theoretical lessons</p> <p>Making judgments based on the choice of analytical protocols, writing a report</p> <p>Capability in presentation of the skills acquired with an appropriate language and use of technical and specific terms by preparing a short seminar on a selected topic</p> <p>Acquisition of learning strategies based on the use of technical information, knowledge updating and selection of scientific</p>

	literature.
<b>Specific Educational Objectives and Learning Outcomes (additional info.)</b>	
<b>Assessment</b>	The examination will be conducted as an oral individual exam. The focus will be on comprehension questions as well as the ability to explain key concepts and demonstrate connections between different topics.
<b>Evaluation Criteria</b>	<p>Subject knowledge: accurate and differentiated presentation of the content</p> <p>Understanding: ability to identify and explain interrelationships between topics</p> <p>Argumentation skills: clear and logically structured reasoning</p> <p>Language precision: appropriate use of technical terminology</p>
<b>Required Readings</b>	No compulsory literature is specified for this course
<b>Supplementary Readings</b>	Scheffer, F., & Schachtschabel, P. (2018). <i>Lehrbuch der Bodenkunde</i> (17. Aufl.). Springer Spektrum.
<b>Further Information</b>	
<b>Sustainable Development Goals (SDGs)</b>	Zero hunger, Good health and well-being, Life on land, Sustainable cities and communities, Climate action, Clean water and sanitation