Syllabus

Course Description

Course Title	Soil Chemistry and Fertility
Course Code	40190
Course Title Additional	
Scientific-Disciplinary Sector	AGR/13
Language	German
Degree Course	Bachelor in Agricultural, Food and Mountain Environmental Sciences
Other Degree Courses (Loaned)	
Lecturers	Prof. Tanja Mimmo, Tanja.Mimmo@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/26968
Teaching Assistant	
Semester	First semester
Course Year/s	2
CP	6
Teaching Hours	40
Lab Hours	20
Individual Study Hours	90
Planned Office Hours	18
Contents Summary	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.

Course Topics	The course covers the following topics: • Introduction to the soil environment including soil formation processes • Soil minerals and rocks • Weathering processes in soil (chemical, physical and biological weathering) • Soil air and water • Soil organic matter • Soil solution – chemical properties and processes within soils: Sorption, Ion exchange, cation exchange capacity, anion exchange capacity; soil pH, buffer systems, redox – potential. • Soil fertility – the soil as a plant nutrient medium • Fertilizers and soil amendments • Macronutrients • Micronutrients • Soil sampling and interpretation of soil tests • The Rhizosphere – properties and methods applied in rhizosphere research
Keywords	Soil formation, soil degradation, minerals, weathering, soil water, soil air, organic matter, sorption, ion exchange, buffering, redox processes, soil fertility, nutrients, fertilization, rhizosphere.
Recommended Prerequisites	
Propaedeutic Courses	no
Teaching Format	lectures, laboratory and field activities
Mandatory Attendance	no
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding of chemical, physical and biochemical processes within the soil-plant system related to the development and maintenance of soil fertility. 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 Making judgments based on the choice of analytical protocols, writing a report 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 Acquisition of learning strategies based on the use of technical information, knowledge updating and selection of scientific

	literature.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	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.
Evaluation Criteria	Subject knowledge: accurate and differentiated presentation of the content Understanding: ability to identify and explain interrelationships between topics Argumentation skills: clear and logically structured reasoning Language precision: appropriate use of technical terminology
Required Readings	No compulsory literature is specified for this course
Supplementary Readings	Scheffer, F., & Schachtschabel, P. (2018). *Lehrbuch der Bodenkunde* (17. Aufl.). Springer Spektrum.
Further Information	
Sustainable Development Goals (SDGs)	Zero hunger, Good health and well-being, Life on land, Sustainable cities and communities, Climate action, Clean water and sanitation