Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Biologie der Mikroorganismen von Interesse in der Land- und Forstwirtschaft
Code der Lehrveranstaltung	40222
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	AGRI-08/A
Sprache	Italienisch
Studiengang	Bachelor in Nachhaltiger Land- und Forstwirtschaft in Berggebieten
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Dr. Lorenzo Brusetti, Lorenzo.Brusetti@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/27178
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
Studienjahr/e	2
KP	7
Vorlesungsstunden	42
Laboratoriumsstunden	28
Stunden für individuelles Studium	105
Vorgesehene Sprechzeiten	21
Inhaltsangabe	This course falls within the area of plant production disciplines and is classified as a characterising educational activity (attività formativa caratterizzante). The following topics will be covered during the course: Morphology and physiology of Prokaryotic cell Prokaryotic metabolisms

	Prokaryotic genomes and gene exchange Prokaryotic role in element cycles; geomicrobiology Biofilms and environmental factors affecting prokaryotes Symbiosis with plants and animals (One Health included) Methanogenesis and biodegradation Bacteriophages and their role in environments
Themen der Lehrveranstaltung	- Introduction to Microbiology - The bacterial and archaeal cell - Bacterial spores and cellular differentiation - Bacterial evolution and genetics - Bacterial metabolism - Bacterial behaviour - The role of microorganisms in biogeochemical cycles - Microbial ecology - Bacterial populations in extreme environments, the rumen and gastrointestinal tract, soil and the rhizosphere (mycorrhizae, etc.) - Plant Growth-Promoting Rhizobacteria - Biocontrol agents against insects and pathogens; Bacillus thuringiensis - Methanogenesis and an introduction to industrial microbiology - Wastewater treatment; bioremediation; the role of microorganisms in emerging forms of pollution: antibiotic resistance and microplastic degradation - Biodeterioration and biorestoration of materials - Viruses and environmental virology - Applied microbiology techniques
Stichwörter	Agricultural microbiology; forest microbiology; bacteria; archaea; fungi; microbial ecology; applied microbiology
Empfohlene Voraussetzungen	None
Propädeutische Lehrveranstaltungen	No
Unterrichtsform	The course consists of classroom-based lectures during which the Lecturer presents the various topics. The lectures will be recorded. Laboratory activities will also be provided and will be conducted by the Lecturer and Teaching Assistants. The topics covered in the lectures will be presented using PowerPoint presentations, which will be made available online by the Lecturer in digital format at the end of the treatment of each topic.

Anwesenheitspflicht	No
Spezifische Bildungsziele und erwartete Lernergebnisse	Knowledge and understanding The degree course provides advanced knowledge for the training of professionals capable of carrying out management and coordination activities in mountain and forestry agriculture, as well as effectively preparing students for possible further studies. All these skills will be transmitted to the graduates by means of face-to-face lecturing, technical and practical laboratory exercises, field exercises and educational-scientific excursions. The elaboration of the experimental thesis may be carried out both in the faculty's laboratories and in companies and local authorities. At the end of their studies, the three-year graduate at Sustainable agriculture and forest management in mountain environment possesses basic knowledge of mathematics, physics, chemistry, statistics, and the biology of plant and animal organisms and microorganisms. The expected learning outcomes can therefore be summarised as: knowledge of the atomic-molecular constitution of bodies and the role of chemical bonds and structure on the properties of materials; an understanding of the fundamental aspects of the biology, physiology and ecology of organisms with particular reference to those of agricultural and forestry interest, including their genetic improvement and relationships with beneficial or pathogenic organisms and micro-organisms; being able to read and understand advanced texts relating to the various aspects characterising the agrarian and agro-forestry environment in mountainous areas; being able to communicate and discuss issues relating to the training course in an appropriate manner in the three languages (Italian, English, German). The knowledge and comprehension skills listed above are achieved through participation in lectures, practical exercises, seminars, and through guided personal and individual study as envisaged by the training activities offered. Some courses in the syllabus may be offered in a dual mode (lectures face-to-face and in video-recorded form and made available on the university intranet platform). The assessment of the achievement of learning outcomes takes place mainly by means of exams and possible in -progress tests. The tests may be written and/or oral, and may also consist of

	reports and oral presentations of projects or seminars. Ability to apply knowledge and understanding In addition to acquiring a solid scientific-technological foundation, the ability to tackle new problems, both practical and real, is stimulated, with the aim of enabling the student to acquire a working method. The ability to apply knowledge is achieved through critical reflection on the texts proposed for individual study stimulated by classroom activities, the study of research and application cases shown by the lecturers, the performance of practical laboratory and field exercises, bibliographical research, individual and/or group projects as part of the fundamental and optional courses included in the teaching plan, as well as during the internship and preparation for the final examination. The tests carried out by means of written and/or oral examinations, reports and exercises include the performance of specific tasks in which the student demonstrates mastery of tools, methodologies and critical autonomy. In the internship activities, the verification takes place through the presentation of a report by the student to the teacher of reference. Making judgements Autonomy of judgement is developed and verified through the exercise activities, the organised seminars, the preparation of papers as part of the teaching, as well as during the internship activity and the activity assigned by the lecturer for the preparation of the final examination. Communication skills The graduate has the ability to use the most modern and effective means of communication to disseminate the research carried out and the analyses relating to the problems of agro-forestry and forest management; he/she is able to deal with the production realities in the agro-forestry sector and to interact with figures from the sector and related sectors. Communication skills are particularly developed during exercises, the organised seminars, as well as during training activities that also involve the preparation of reports and written documents and the oral presentation of the same. Since the course is trilingual, graduates are able to communicate

	correctly, in written and oral form, in Italian and in two other languages (German and English). In tutorial activities and seminars, students are encouraged to speak publicly in order to improve their ability to describe clearly and comprehensibly any doubts and/or requests for clarification on specific topics. The acquisition and evaluation/verification of the achievement of communication skills are also provided for during the internship and the final report, as well as when writing and discussing the final paper. Learning skills The degree course provides the basic cognitive tools indispensable for the continuous updating of knowledge, also with tools that make use of new communication and information technologies. The graduate is able to apply the developed learning methods and tools to update and deepen the studied contents, also in professional contexts and to undertake further studies.
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	Basic and advanced knowledge of the role of microorganisms in environmental, agricultural and forestry contexts, as well as in anthropogenic environments.
Art der Prüfung	Written examination consisting of four open-ended questions, two focusing on the biology of microorganisms and two on agricultural, environmental and forest microbiology.
Bewertungskriterien	The questions are equivalent in terms of difficulty. Assessment will focus on basic and advanced knowledge, the ability to explore microbiological topics in depth, and the appropriate use of the technical language acquired.
Pflichtliteratur	The Lecturer will provide the PowerPoint presentations, which are sufficient preparation for the examination.
Weiterführende Literatur	Madigan M.T. et al. Brock: biologia dei microrganismi. microbiologia generale, ambientale e industriale. Pearson Ed. Milano. 2022. ISBN-10: 8891906298 Biavati B., Sorlini C. "Microbiologia agroambientale", 2008, Casa Editrice Ambrosiana, Milano
Weitere Informationen	Participation in the laboratory activities is strongly recommended.
Ziele für nachhaltige	Gesundheit und Wohlergehen, Sauberes Wasser und Sanitär-

Entwicklung (SDGs)	Einrichtungen, Bezahlbare und saubere Energie, Leben an Land, Nachhaltiger Konsum und Produktion, Maßnahmen zum Klimaschutz, Nachhaltige Städte und Gemeinden