Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Grundlagen der Chemie
Code der Lehrveranstaltung	40213
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	CHEM-05/A
Sprache	Italienisch
Studiengang	Bachelor in Nachhaltiger Land- und Forstwirtschaft in Berggebieten
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Dr. Stefano Benini, Stefano.Benini@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/27433
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Erstes Semester
Studienjahr/e	1
KP	5
Vorlesungsstunden	30
Laboratoriumsstunden	20
Stunden für individuelles Studium	75
Vorgesehene Sprechzeiten	
Inhaltsangabe	Atomic structure, periodic table chemical bonds, intermolecular interactions, mole, molarity, solutions Propriety of gas, Thermodynamics Chemical reactions, equilibrium, kinetics, catalysers Acids and bases, pH, buffers Electrochemistry Organic chemistry: carbon hybridization, structure, nomenclature

	and properties of organic compounds Stereochemistry and chirality
Themen der Lehrveranstaltung	Atomic structure, uncertainty principle, wave functions, energy levels, atomic models, quantum numbers, electron configuration, periodic table. Chemical bond, valence bond theory, covalent bond, Lewis formalism, binding and non-binding electron pairs, octet rule, radicals, molecular electric dipole, polar covalent bond, electronegativity, VSEPR model, atomic hybridization. Ionic bond and crystal lattices. Intermolecular forces and their electrostatic nature, properties of solids and liquids, hydrogen bonding and water structure. Properties of ideal and real gases. Thermochemistry, reaction enthalpy, entropy, Gibbs free energy. Chemical equilibrium, equilibrium constant, state diagrams, solubility, colligative properties. Acids and bases. Redox reactions. Chemical kinetics, reaction rate, kinetic law, order of reactions, activation energy. Catalysts Properties and nomenclature of Alkanes, Alkenes, Alkynes. Stereochemistry. Electrophilic addition to alkenes. Nucleophilic substitutions: SN1 and SN2. Radicalic reactions. Aldehydes and ketones esters, carboxylic acids and derivatives, amides, amines. Benzene, aromatic electrophilic substitution, aromatic compounds and heterocyclic compounds. Safety in the laboratory. Laboratory exercise will deal with practical aspects of the topics covered during the lectures.
Stichwörter	general and inorganic chemistry, organic chemistry
Empfohlene Voraussetzungen	
Propädeutische Lehrveranstaltungen	no
Unterrichtsform	Lectures given using power point presentations, videos and laboratory practice. The teaching material will be available in the University website Open Learning Environment (OLE https://ole.unibz.it/).
Anwesenheitspflicht	no
Spezifische Bildungsziele und erwartete Lernergebnisse	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 - understanding of the main chemical and biochemical reactions in plants and soils - 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. 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. 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. 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 studie
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	
Art der Prüfung	written exam
Bewertungskriterien	The exam is written and includes: 30 multiple choice questions (4 answers to choose from, of which only one is correct). The score for each correct answer is 1. Failure to respond will correspond to

	a score of 0. Each incorrect answer will result in the subtraction of 1 point. This corrective serves to avoid randomly chosen answers. 18 correct answers are the minimum to pass the exam and therefore correspond to the minimum grade of 18 (not recommended!). The maximum mark of 30 is obtained if the correct answers are 30. 2 more questions are asked to obtain honors and if the correct answers are equal to 32, honors is assigned and the final score becomes 30 cum laude. The exam includes questions both on the topics of the lessons and on the exercises carried out
Pflichtliteratur	Atkins, Jones "PRINCIPI DI CHIMICA", Zanichelli John McMurry “FONDAMENTI DI CHIMICA ORGANICA”, Zanichelli
Weiterführende Literatur	Peter Atkins, Loretta Jones, Leroy Laverman “FONDAMENTI DI CHIMICA GENERALE”, Zanichelli Solomons T.W.G. “FONDAMENTI DI CHIMICA ORGANICA”, Zanichelli
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Nachhaltiger Konsum und Produktion