

Syllabus

Course Description

Course Title	General and inorganic Chemistry
Course Code	42102
Course Title Additional	
Scientific-Disciplinary Sector	CHIM/03
Language	German
Degree Course	Bachelor in Industrial and Mechanical Engineering
Other Degree Courses (Loaned)	
Lecturers	Dr. Mag. Michael Oberhuber, Michael.oberhuber2@unibz.it https://www.unibz.it/en/faculties/engineering/academic- staff/person/39871
Teaching Assistant	
Semester	First semester
Course Year/s	1
СР	6
Teaching Hours	36
Lab Hours	36
Individual Study Hours	78
Planned Office Hours	18
Contents Summary	The aim of the course is to provide students with an adequate command of general chemical principles. - Atomic theory, the chemical bond, and the periodic table - States of matter and phase transitions - Stoichiometry, reaction equations, basic thermodynamics and catalysis - Chemical reactions (solvation, acid-base, redox incl. electrochemistry) - The chemical equilibrium - Crystal structures
	- Macromolecular chemistry and nanotechnology



- Biomolecules
- Reaction kinetics
This course provides students with a foundational understanding of general chemical principles, aiming to build a comprehensive knowledge of matter and its transformations at the atomic and molecular levels.
The course begins with an introduction to atomic theory, chemical bonding, and the periodic table, laying the groundwork for the study of more complex topics. The physical states of matter and phase transitions are explored, along with the principles of stoichiometry and the formulation of balanced chemical equations. Students will gain insight into fundamental thermodynamics and the role of catalysis in chemical reactions.
Core types of chemical reactions—such as solvation, acid-base interactions, redox processes, and electrochemistry—are examined in detail. The concept of chemical equilibrium is addressed, highlighting its significance in both theoretical and applied contexts.
The structure and properties of crystalline solids are also covered, offering an introduction to crystallography. Additionally, the course delves into macromolecular chemistry. Reaction kinetics is discussed to provide a framework for understanding the rates and mechanisms of chemical processes.
Overall, the course equips students with essential tools and concepts to analyze chemical systems and processes across a broad range of scientific disciplines.
General and inorganic chemistry, stoichiometry, chemical reactions, thermodynamics, kinetics
None.
Frontal lectures, exercises, labs.
Not mandatory
The course is part of the courses in the area of basic sciences and specifically in the context of chemical sciences.
Ckr Test Ciller Toocr CoelCt-N - F-N-T

Outcomes (additional Assessment	Examination of the course is conducted via a written exam. The
Objectives and Learni	
Specific Educational	14. Laboratory experiments.
	quantum mechanics etc.)
	concepts without equivalent on the macroscale (molecules,
	13. Understanding invisible and intangible phenomena and
	Learning skills
	12. Writing reports on laboratory experiments
	11. Express chemical problems in writing
	Communication skills:
	10. On laboratory experiments and their outcomes.
	9. Chemical aspects of material science
	Making judgments:
	8. to material science relevant to engineering
	7. to laboratory experiments
	6. to chemical calculations
	Applying knowledge and understanding:
	5. Chemical properties of selected materials and metals
	4. Electrochemistry
	kinetics
	3. Chemical equilibrium, principles of thermodynamics and
	2. Chemical transformation of matter
	Structure-properties-relationship of matter
	Knowledge and understanding:
	Intended Learning Outcomes (ILO)
	production.
	be useful to understand topics from materials science and energy
	elements. In addition, the knowledge acquired in this course will
	molecules with relevance for the bio-geo-chemical cycles of the
	through the study of the structural and functional aspects of simple
	given to a molecular understanding of the properties of matter
	principles that regulate its transformation. Special attention will be
	The purpose of the course is to provide the basic knowledge on the structure of matter as well as the thermodynamic and kinetic

written exam is a multiple-choice test and consists of three parts:

	i) theory questions to assess the knowledge and understanding of the course topics and the theoretical aspects, ii) questions, where the ability to apply the theoretical knowledge to given problems, and iii) exercises with chemical calculations. - Summative assessment: 40% Written exam theory: 40 minutes; ILOs assessed: 1,2,3,4,5,8,9,10,11,13; 30% written exam problems: 40 minutes; ILOs assessed: 1,2,3,4,5,6,8,9,10,11,13; 30% written exam exercises: 40 minutes; ILOs assessed: 1,2,3,4,5,6,8,9,10,11,13. In class exercises (incl. laboratory): 6 x 240 minutes; ILOs assessed: 2,3,6,7,11,12,13,14.
Evaluation Criteria	Grading with a single final grade. Criteria for grading: comprehension, problem-solving skills, technical competence. Laboratory reports: the ability to summarize the experiment, describe essential steps, clarity and linguistic quality of the response, and correct calculation of results will be evaluated.
Required Readings	Guido Kickelbick "Chemie für Ingenieure", Pearson Verlag.
Supplementary Readings	Charles E. Mortimer und Ulrich Müller "Chemie: Das Basiswissen der Chemie", Themie Verlag.
Further Information	
Sustainable Development Goals (SDGs)	Affordable and clean energy