

## COURSE DESCRIPTION – ACADEMIC YEAR 2024/2025

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| <b>Course title</b>                    | <b>Allgemeine und Anorganische Chemie</b>   |
| <b>Course code</b>                     | 42102   |
| <b>Scientific sector</b>               | CHIM/03   |
| <b>Degree</b>                          | Bachelor in Industrial and Mechanical Engineering (L-9)   |
| <b>Semester</b>                        | 1   |
| <b>Year</b>                            | 1   |
| <b>Credits</b>                         | 6   |
| <b>Modular</b>                         | No  |
| <b>Total lecturing hours</b>           | 36  |
| <b>Total lab hours</b>                 | 36  |
| <b>Attendance</b>                      |   |
| <b>Prerequisites</b>                   | none  |
| <b>Course page</b>                     | Microsoft Teams (and <a href="https://ole.unibz.it/">https://ole.unibz.it/</a> )  |
| <b>Specific educational objectives</b> | <p>The course is part of the courses in the area of basic sciences and specifically in the context of chemical sciences. The aim of the course is to provide students with an adequate command of general chemical principles.</p> <p>The purpose of the course is to provide the basic knowledge on the structure of matter as well as the thermodynamic and kinetic principles that regulate its transformation. Special attention will be given to a molecular understanding of the properties of matter through the study of the structural and functional aspects of simple molecules with relevance for the bio-geo-chemical cycles of the elements. In addition, the knowledge acquired in this course will be useful to understand topics from materials science and energy production.</p> |
| <b>Lecturer</b>                        | Dr. Oberhuber Michael   |
| <b>Contact</b>                         | <a href="mailto:Michael.Oberhuber2@unibz.it">Michael.Oberhuber2@unibz.it</a>  |
| <b>Scientific sector of lecturer</b>   | CHIM/03   |
| <b>Teaching language</b>               | German  |
| <b>Office hours</b>                    | During the semester, see calendar   |
| <b>Lecturing Assistant (if any)</b>    |   |
| <b>Contact LA</b>                      |   |
| <b>Office hours LA</b>                 |   |
| <b>List of topics</b>                  | <ul style="list-style-type: none"> <li>• Atomic theory, the chemical bond, and the periodic table</li> <li>• States of matter and phase transitions</li> <li>• Stoichiometry, reaction equations, basic thermodynamics and catalysis.</li> <li>• Chemical reactions (solvation, acid-base, redox incl. electrochemistry)</li> <li>• The chemical equilibrium</li> <li>• Quantum mechanics</li> </ul>  |

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|                        | <ul style="list-style-type: none"> <li>• Crystal structures</li> <li>• Thermodynamics</li> <li>• Macromolecular chemistry and nanotechnology</li> <li>• Biomolecules</li> <li>• Reaction kinetics</li> </ul> |
| <b>Teaching format</b> | Frontal lectures, exercises, labs.   |

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| <b>Learning outcomes</b> | <p>Knowledge and understanding:</p> <ul style="list-style-type: none"> <li>• Structure-properties-relationship of matter</li> <li>• Chemical transformation of matter</li> <li>• Chemical equilibrium, principles of thermodynamics and kinetics</li> <li>• Electrochemistry</li> <li>• Chemical properties of selected materials and metals</li> </ul> <p>Applying knowledge and understanding:</p> <ul style="list-style-type: none"> <li>• to chemical calculations</li> <li>• to laboratory experiments</li> <li>• to material science relevant to engineering</li> </ul> <p>Making judgments:</p> <ul style="list-style-type: none"> <li>• Chemical aspects of material science</li> <li>• On laboratory experiments and their outcomes.</li> </ul> <p>Communication skills:</p> <ul style="list-style-type: none"> <li>• Express chemical problems in writing</li> <li>• Writing reports on laboratory experiments</li> </ul> <p>Learning skills</p> <ul style="list-style-type: none"> <li>• Understanding invisible and intangible phenomena and concepts without equivalent on the macroscale (molecules, quantum mechanics etc.)</li> <li>• Laboratory experiments</li> </ul> |
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| <b>Assessment</b>  | <p>In-class exercises<br/>         Laboratory experiments and reports.<br/>         Exam: Written multiple-choice exam with questions and problems covering all course topics. Non-attending students can learn from the course material.</p>           |
| <b>Assessment language</b>                                 | German  |
| <b>Assessment Typology</b>                                 | Monocratic  |
| <b>Evaluation criteria and criteria for awarding marks</b> | <p>Grading with a single final grade.<br/>         Criteria for grading: comprehension, problem-solving skills, technical competence. Laboratory reports: the ability to summarize the experiment, describe essential steps, clarity and linguistic</p> |

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|                               | quality of the response, and correct calculation of results will be evaluated.             |
| <b>Required readings</b>      | Guido Kickelbick „Chemie für Ingenieure“, Pearson Verlag.                                  |
| <b>Supplementary readings</b> | Charles E. Mortimer und Ulrich Müller „Chemie: Das Basiswissen der Chemie“, Themie Verlag. |
| <b>Software used</b>          |  |