



## GENERALE CHEMISTRY AND LAB (SURNAMES A-K)

Enrollment year	2021/2022
Academic year	2021/2022
Regulations	DM270
Academic discipline	CHIM/03 (GENERAL AND INORGANIC CHEMISTRY)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	BIOTECHNOLOGY
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	(01/10/2021 - 14/01/2022)
ECTS	9
Lesson hours	84 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	DELL'ACQUA SIMONE - 9 ECTS
Prerequisites	=
Learning outcomes	<p>General and Inorganic Chemistry Module. The main objective of the module is to provide the student a suitable background knowledge, both theoretical and practical, of General Chemistry to understand natural matter and its manifestations at the microscopical level. The properties of main group elements of the periodic system will also briefly described.</p> <p>Laboratory of General and Inorganic Chemistry Module. This module aims to illustrate basic chemical techniques with particular focus on those with more biotechnological interest.</p>
Course contents	<p>General and Inorganic Chemistry Module.</p> <p>Atomic structure. Properties of elements and compounds. The periodic system. Definition of mole and other chemical quantities. Chemical</p>

reactions. The chemical bond. Geometry of molecules and VSEPR theory. Hybrid orbitals. Intermolecular interactions and the aggregation of matter. Energy, heat, and enthalpy. Changes of physical states of matter. Solution properties and equilibria in solution. Acids and bases. Oxidation and reduction reactions. Basic thermodynamics: entropy and free energy. Chemical kinetics. Chemical catalysts. Electrochemistry. Chemistry of main group elements: Hydrogen and its compounds; Group VII: the halogens; Group VI: oxygen and sulfur; Group V: nitrogen and phosphorous; Group IV: carbon; Group III: boron.

Laboratory of General and Inorganic Chemistry Module.

The main topics covered are as follows: examples of redox reactions; stoichiometric calculations; acids and bases; pH calculation for acids, bases and buffer solutions; potentiometric techniques for the pH determination; measurement of pH; glass electrode; introduction to spectroscopy (UV/Vis and infrared).

The study of these issues will be explored through the following laboratory experiments: quantitative determination of substances by acid - base and redox titrations; potentiometric determination of  $K_a$  of a weak acid; determination of the rate reaction and order of reaction for various reagents in a chemical reaction. The laboratory practicals are mandatory.

#### Teaching methods

The course includes weekly seminars on stoichiometric calculations

#### Reccomended or required readings

- 1) Lecture notes
- 2) Kotz, Treichel, Townsend, Chimica, EdiSES
- 3) Atkins, Jones, Chimica Generale, Zanichelli

#### Assessment methods

The final exam will be a written test that will include questions on the theory, stoichiometry problems and issues covered in the laboratory module

#### Further information

The final exam will be a written test that will include questions on the theory, stoichiometry problems and issues covered in the laboratory module

#### Sustainable development goals - Agenda 2030

[\\$ibl legenda sviluppo sostenibile](#)