



PRINCIPLES OF CHEMISTRY	
Enrollment year	2021/2022
Academic year	2021/2022
Regulations	DM270
Academic discipline	CHIM/03 (GENERAL AND INORGANIC CHEMISTRY)
Department	DEPARTMENT OF ELECTRICAL, COMPUTER AND BIOMEDICAL ENGINEERING
Course	BIOENGINEERING
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	1st semester (27/09/2021 - 21/01/2022)
ECTS	3
Lesson hours	23 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	PALLAVICINI PIERSANDRO - 3 ECTS
Prerequisites	None
Learning outcomes	"Basic Chemistry" will introduce fundamentals of chemistry, in particular those preliminary to "Principles of Physiology", and provide students with appropriate language, formalisms, and tools needed for the study of physiology. Special attention is paid to ions behavior in solutions, redox processes chemistry, and basic stoichiometry. "Principles of Physiology" will provide students with basic knowledge about cell morphology and physiology, and physiology of organs and systems, in particular respiratory, cardio-vascular, and renal system. "Models in Physiology" will introduce principles of the quantitative study of living systems, in particular those described in "Principles of Physiology". The student will learn fundamentals of (i) compartmental models of metabolic systems, (ii) electrical models of bio-electric phenomena, and (iii) mechanical models of simple bio-mechanical systems.

Course contents	BASIC CHEMISTRY (3 credits) Introduction. Elements, compounds, substances. Atomic, molecular and isotopic mass. Concept of mole. Chemical reactions. The equivalent. Types of reactions. Redox reactions. The oxidation number. Stoichiometry, chemical names. Atomic structure. Hints about quantum mechanics. Atomic models. Atomic orbitals. Electronic configuration of the elements. Periodic table of the elements and periodic properties. The chemical bond. Ionic and covalent bonds. Lattice energy in ionic solids. Bonding energy. Lewis formulas. Hints to VSEPR theory. Gases. Hints to kinetic theory of gases. Properties and laws of ideal and real gases. Liquids. Vapour pressure and temperature. Solutions: properties, composition, concentration values. Raoult's law. Colligative properties. Solids. Hints to structures and features of ionic, covalent, molecular and metallic crystals. Chemical Equilibrium. The concept of dynamic equilibrium. Equilibrium in solutions. Nature of acids and bases. Acids and bases strength. Structure-features correlation in acids. Auto-ionisation in water. pH and its calculation. Buffer solutions. Hydrolysis. Electro-chemistry. Redox potentials. Nernst's law.
Teaching methods	Lectures (hours/year in lecture theatre): 26 Practical class (hours/year in lecture theatre): 0 Practicals / Workshops (hours/year in lecture theatre): 0
Reccomended or required readings	Lecture notes provided by the teachers and made available through the course website
Assessment methods	Written examination, including: numerical problems, closed questions and open-ended questions. A mid-term exam (optional) at the end of the first semester is scheduled.
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Sustainable development goals - Agenda 2030	\$lbl_legenda_sviluppo_sostenibile