



CHEMISTRY	
Enrollment year	2017/2018
Academic year	2017/2018
Regulations	DM270
Academic discipline	CHIM/03 (GENERAL AND INORGANIC CHEMISTRY)
Department	DEPARTMENT OF PHYSICS
Course	PHYSICS
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	1st semester (02/10/2017 - 19/01/2018)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	LICCHELLI MAURIZIO (titolare) - 6 ECTS
Prerequisites	Students are expected to have an appropriate starting knowledge of Mathematics, Physics, and Chemistry fundamentals (high school level)
Learning outcomes	<p>This course aims to provide to students the general principles of chemistry and its basic "language" (i.e. symbols, formulae, structures, reactions). In particular the course will deal with basic topics such as atomic structure of matter, periodic properties of elements, chemical bond in ionic and covalent compounds, intermolecular interactions and state of matter, chemical kinetics, equilibrium in chemical processes, acidic and basic substances, red-ox equilibria and electrochemical processes. Moreover the course will provide an introduction to inorganic and organic chemistry. At the completion of the course the students should be able to: (i) understand and comment some structure-property relationships; (ii) understand and comment kinetic and thermodynamic aspects of chemical reactions; (iii) apply the gained knowledge to the comprehension of common chemical processes; (iv) explain from a</p>

	chemical point of view the operating principles of some common devices (e.g. battery) or some common phenomena (e.g. corrosion, passivation).
Course contents	Atomic structure. Atomic orbitals in Hydrogen atom and in polyelectronic atoms. Periodic table and periodic properties. Atomic mass and definition of mol. Ionic bond, ionic lattice, and lattice energy. Covalent bond and structure of molecules. Molecular orbitals. Electronegativity and polarity of molecules. Intermolecular interactions and state of matter. Gas, solid, liquid, and solutions. Chemical reactions: reaction rate, activation energy, catalysis. Chemical equilibrium, equilibrium constants. Ionic equilibria in aqueous solution. Acids and bases according to Brønsted, pH. Acids and bases according to Lewis. Solubility of salts and precipitation reactions. Red-ox equilibria. Voltaic cells and electrode potentials. Nernst equation. Electrolysis. Introduction to inorganic chemistry: properties of the main compounds of carbon and silicon. Introduction to organic chemistry: hydrocarbons and main functional groups; polymers.
Teaching methods	Lectures mainly given by Power Point presentations projected on screen. Classroom exercises on the blackboard.
Reccomended or required readings	Detailed lecture notes of the teacher. Reference book: R. H. Petrucci, F. J. Herring, J. D. Madura, C. Bissonnette, Chimica Generale, Piccin W. L. Masterton, C. N. Hurley, Chimica – Principi e reazioni, Piccin R Chang, Fondamenti di Chimica Generale, McGraw-Hill K.W. Whitten, R.E Davis, M.L. Peck, G.G. Stanley, Chimica Generale, Piccin M. Schiavello, L. Palmisano, Fondamenti di chimica, Edises P. Atkins, L. Jones, Principi di Chimica, Zanichelli
Assessment methods	Oral exam aiming to verify the knowledge gained by the student on the main topics of the course. In particular the following abilities will be evaluated: (i) description of structural features concerning covalent or ionic compounds and prediction of their (selected) properties; (ii) clear comment of concepts concerning reaction rate and chemical equilibrium; (iii) explanation of chemical principles on which some common processes or devices are based.
Further information	
Sustainable development goals - Agenda 2030	\$Ibl legenda sviluppo sostenibile