



CHEMISTRY	
Enrollment year	2017/2018
Academic year	2019/2020
Regulations	DM270
Academic discipline	CHIM/07 (FOUNDATIONS OF CHEMISTRY FOR TECHNOLOGIES)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	
Curriculum	PERCORSO COMUNE
Year of study	3°
Period	1st semester (30/09/2019 - 20/01/2020)
ECTS	6
Lesson hours	54 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	CAPSONI DORETTA (titolare) - 3 ECTS BERBENNI VITTORIO - 3 ECTS
Prerequisites	Basic knowledge of Mathematics, differential calculus, integral calculus.
Learning outcomes	The course aims to provide the fundamentals of chemistry and chemical-physics useful for the comprehension of materials structure-activity relationship. It also discusses on the materials of specific interest to the Master of Science in Civil Engineering and Architecture.
Course contents	Hints to chemical formulae and to chemical reactions Qualitative and Quantitative aspects of the chemical formulae. Atomic number and mass number. Isotopes. Chemical Reactions: types and stoichiometry Bond Theory Electronic structure of the chemical elements. Periodic properties of the chemical elements. Ionic bond, pure covalent and polarized-covalent bond. Coordination bond. Metallic bond. Lewis Structures. Molecular Geometries. Molecular Interactions: hydrogen

	<p>bond, Van der Waals interactions. Ionic and covalent valences of elements of s, p block and first transition row. Oxides, hydrides, anions and cations, salts. Thermodynamics, Kinetics and Chemical equilibrium Thermodynamic Functions: internal energy, enthalpy, entropy. Standard formation enthalpy of the chemical compounds. Reaction Enthalpies and Hess law. The Gibbs reaction isotherm: the chemical equilibrium. Equilibrium constant, temperature and pressure effect. Electrochemistry. Electrolysis and Corrosion. Solutions The measuring units of concentration: molarity, molality, w/w and w/v percent. Solubility equilibrium (solubility product). Acid-base equilibrium, definition of pH, pH of strong and weak acids and basis. States of Matter Solid state: crystalline systems, Bravais' lattices, compact structures, reference structures for ionic salts. Covalent (diamonds, graphite, silicon, quartz), metallic and molecular crystals. Liquid state: surface tension, adhesion and cohesion forces, wettability, vapor tension. Phase Equilibria Phase state diagram of water. Thermal analysis of alloys. Eutectic diagrams and diagrams with total and partial solubility in the solid phase. Materials Polymeric materials and structure/property relationship. Metals and ferrous alloys: steel, cast iron, the Fe/C diagram. Thermal treatments. Ceramic materials. Building materials: lime, hydraulic lime, plaster, cements. Wood and derivatives.</p>
<b>Teaching methods</b>	<p>Lectures (hours/year in lecture theatre): 54  Practical class (hours/year in lecture theatre): 0  Practicals / Workshops (hours/year in lecture theatre): 0</p>
<b>Reccomended or required readings</b>	<p>R. Chang, K. Goldsby, Fondamenti di chimica generale, Seconda Edizione, Mc Graw Hill - Education</p>
<b>Assessment methods</b>	<p>Written exam.</p>
<b>Further information</b>	<p>Written exam.</p>
<b>Sustainable development goals - Agenda 2030</b>	<p><a href="#">\$Ibl legenda sviluppo sostenibile</a></p>