

General Information	
Academic subject	Chemistry
Degree course	Agricultural Science and Technology
Curriculum	
ECTS credits	9
Compulsory attendance	No
Language	Italiano

Subject teacher	Name Surname	Mail address	SSD
	Maria Rosaria Provenzano	mariarosaria.provenzano@uniba.it	Agr13

ECTS credits details			
Basic teaching activities			

Class schedule	
Period	
Year	2017/2018
Type of class	Lecture- workshops

Time management	
Hours	
In-class study hours	87
Out-of-class study hours	

Academic calendar	
Class begins	09/10/2017
Class ends	26/01/2018

Syllabus	
Prerequisites/requirements	Knowledge of basic concepts of matematics and fisics
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	<p><i>Knowledge and understanding</i></p> <p><u>Basic knowledge of atomic and molecular structure and of chemical and physico-chemical laws ruling transformation processes of materials in inorganic and organic field</u></p> <p><i>Applying knowledge and understanding</i></p> <p>Capacity to utilizing basic chemistry notions to understand phenomena related to soil and environment</p> <p><i>Making informed judgements and choices</i></p> <p>Awareness and autonomy of judgment in order to use the acquired knowledge in the following classes</p> <p><i>Communicating knowledge and understanding</i></p> <p>Ability to describing the constituents of matter and chemical phenomena</p>

	<p><i>Capacities to continue learning</i></p> <p>Ability to better understanding and improving knowledge of chemical and phisico-chemical processes</p>
<p>Contents</p>	<p>General atomic architecture. Electronic structure of atoms. Atomic models: Bohrn and wave-mechanical models. Orbital symbolism. Periodic table and periodic properties. Atomic sizes. Ionization energy, electron affinity and electronegativity. Atomic weight and related quantities. Formula and molecular weight. Avogadro number and mole concept.</p> <p>Chemical bonding: electrovalent, covalent and donor-acceptor covalent bonding. Lewis, VB and MO theory. Hybridization. Molecular orbitals. The structure of molecules. Dipole bonding and van der Waals Forces. Hydrogen bond.</p> <p>Chemical formulas and equations. Stoichiometry. Weight relations in chemical equations. Oxidation-Reduction reactions.</p> <p>Gases, solids, liquids and solutions. Properties. Ideal gases and related equations. Partial pressures of gases. Structural concepts in solids. Types of solids: crystalline and amorphous solids. Vaporization of a liquid equilibrium diagram. Change of states for water.</p> <p>Thermodynamic: state functions and form of energy and their equivalence. Thermochemistry. The concept of equilibrium and LeChatelier principle. The driving force in chemical reactions. Thermodynamics and chemical changes.</p> <p>Nature of solutions and determination of concentration. Colligative properties of solutions.</p> <p>Ionic equilibrium: solution of ions. Acids and bases following Arrhenius, Bronsted e Lewis definitions. Weak acids and bases, ionisation of water. pH and pOH. Indicators. Hydrolysis and neutralization. Solubility and slightly soluble salts.</p> <p>Electrochemistry: Galvanic cells and electrolysis. Faraday's laws. Oxidation-reduction potentials. Nernst's equation. pH-meter.</p> <p>Chemical kinetics: Arrenius equation. Activation energy and catalysis.</p> <p><i>The chemistry of carbon</i></p> <p><i>Different kind of carbon Isomerism. Stereochemistry. Chirality and enantiomers. R, S convention. Optical activity.</i></p>

	<p><i>The IUPAC nomenclature system. Nomenclature, properties and reactivity of alkanes, alkenes, alcohols, phenols, ethers, haloalkanes, aldehydes and ketones, carboxylic acids and functional derivatives, amines.</i></p> <p><i>Aromatic compounds. Benzene: structure, aromaticity and resonance energy. Nomenclature of substituted benzenes .</i></p> <p><i>Main monosaccharide.</i></p> <p><i>Aminoacids: main aspects, classification, properties. Nucleotide bases.</i></p>
Course program	
Bibliography	<ul style="list-style-type: none"> • A.M. Manotti Lanfredi e A. Tiripicchio Fondamenti di Chimica, Ambrosiana, Milano • I. Bertini, C. Luchinat, F. Mani Chimica, Ambrosiana, Milano • S. Schiavello, L.Palmisano. Fondamenti di Chimica, Edises, Napoli • Lausarot, Vaglio, Stechiometria per la Chimica Generale, Piccin, Bologna • A.Caselli, S.Rizzato, F. Tessore. Stechiometria del testo di Freni e Sacco. Edises, Napoli • P.W. Atkins, General Chemistry, United State By Scientific American Book. • K.W. Whitten et al. General Chemistry, seventh edition, Brooks/Cole Inc.
Notes	
Teaching methods	Class contents will be presented with the aid of PC assisted tools (PowerPoint) Slides are available on the website.
Assessment methods (indicate at least the type written, oral, other)	Students of the current academic year will deal with two written partial exams related to topics carried out up to the exam time. Students who pass both partial exams do not make an oral exam. Final grade will be the average of both partial exams. Students who will pass the first and will not pass the second partial exam will make the second partial exam within a year. Students who will not pass the first partial exam cannot make the second partial. Exam will be composed of a written and an oral part.
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are.	<u>Students must acquire the basic knowledge of atoms and molecules structures and of chemical and physico-chemical laws ruling transformation processes of materials in inorganic and organic field</u>
Visiting hours	All week previous telephonic or e-mail appointment