| General Information | |
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| Academic subject | Inorganic Chemistry |
| Degree course | Bachelor programme: Food Science and Technology |
| ECTS credits | 6 ECTS |
| Compulsory attendance | No |
| Teaching language | Italian |

| Subject teacher | Name Surname | Mail address | SSD |
|---|---|---|---|
| | **Roberto Terzano** | roberto.terzano@uniba.it | AGR/13 |

| ECTS credits details | | |
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| Basic teaching activities | 4 ECTS Lectures | 2 ECTS Laboratory classes |

| Class schedule | |
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| Period | I semester |
| Course year | First |
| Type of class | Lectures. Exercises. |

| Time management | |
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| Hours | 150 |
| In-class study hours | 60 |
| Out-of-class study hours | 90 |

| Academic calendar | |
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| Class begins | October 12$^{th}$, 2020 |
| Class ends | January 22$^{th}$, 2021 |

| Syllabus | |
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| Prerequisites/requirements | |
| Expected learning outcomes | *Knowledge and understanding*<br>○ Basic knowledge of the structure of atoms and molecules, and of the chemical and physico-chemical laws ruling the transformation processes of organic and inorganic substances<br>*Applying knowledge and understanding*<br>○ Ability to utilize basic chemistry notions to understand phenomena related to food transformation and conservation<br>*Making informed judgements and choices*<br>○ Awareness and autonomy of judgment to use the knowledge in the subsequent courses<br>*Communicating knowledge and understanding*<br>○ Ability to describe the constituents of matter and related chemical phenomena affecting their transformations<br>*Capacities to continue learning*<br>○ Ability to deepen and update the knowledge about chemical-physical and chemical processes<br><br>The expected learning outcomes, in terms of both knowledge and skills, are provided in Annex A of the Academic Regulations of the Degree in Food Science and Technology (expressed through the European Descriptors of the qualification) |
| Contents | General atomic architecture. Electronic structure of atoms. Atomic 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. |

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| | 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.<br>Chemical formulas and equations. Stoichiometry. Weight relations in chemical equations. Oxidation-Reduction reactions.<br>Gases, solids and liquids. Properties. Ideal gases and related equations. Kinetic theory. Partial pressure of gases. Structural concepts in solids. Types of solids: crystalline and amorphous solids. Vaporization of a liquid. Equilibrium diagram. Change of states for water.<br>Thermodynamics: 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.<br>Solutions, solvent and solute. Nature of solutions and determination of concentration. Colligative properties of solutions. Colloids.<br>Ionic equilibria in water solutions. Acids and bases according to Arrhenius, Bronsted and Lewis definitions. Weak acids and bases, ionization of water. pH and pOH. Basics of titration and indicators. Hydrolysis and neutralization. Solubility and slightly soluble salts.<br>Electrochemistry: Galvanic cells and electrolysis. Faraday's laws. Oxidation-reduction potentials. Nernst's equation. pH-meter.<br>Chemical kinetics: factor affecting the reaction rate. Kinetic order and reaction mechanism. Arrhenius equation. Activation energy and catalysis. |
| Course program | |
| Reference books | • Lecture notes and teaching material made available during the course<br>• A.M. Manotti Lanfredi, A. Tiripicchio, **Fondamenti di Chimica**, Casa Editrice Ambrosiana, Milano<br>• P.M. Lausarot, G.A. Vaglio**, Stechiometria per la Chimica Generale**, Piccin, Bologna<br>• P.W. Atkins, **General Chemistry**, Scientific American Books, U.S.A.<br>• K.W. Whitten et al., **General Chemistry**, 7th edition, Brooks/Cole Inc. |
| Notes | |
| Teaching methods | Course contents will be presented through PowerPoint, blackboard and multimedia tools. |
| Evaluation methods | The exam consists of a written test and an oral dissertation on the topics developed during the theoretical and theoretical-practical lectures in the classroom, as reported in the Academic Regulations for the Bachelor Degree in Food Science and Technology (article 9) and in the study plan (Annex A).<br>Students attending the lectures may have a middle-term preliminary exam, consisting of a written test, relative to the first part of the program, which will concur to the final evaluation and will be considered valid for one year.<br>The evaluation of the skills of the student occurs on the basis of established criteria, as detailed in Annex B of the Academic Regulations for the Bachelor Degree in Food Science and Technology.<br><br>Non-Italian students may be examined in English language, according to the aforesaid procedures. |

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| Evaluation criteria | *Knowledge and understanding*<br>○ Knowledge of the structure of atoms and molecules and the chemical and physico-chemical laws ruling the transformation processes of inorganic and organic substances<br>*Applying knowledge and understanding*<br>○ Applying chemical knowledge to understand the energetic and kinetics of matter transformations<br>*Making informed judgements and choices*<br>○ Ability to apply the chemical and physico-chemical laws to understand the transformation and conservation of food and choose the correct procedures<br>*Communicating knowledge and understanding*<br>○ Ability to describe the constituents of matter and related chemical phenomena<br>*Capacities to continue learning*<br>○ Ability to understand phenomena related to transformation and conservation of food |
| Receiving times | Every day on appointment to be defined by e-mail. |