General information		
Academic subject	General and Inorganic Chemistry	
Degree course	Environmental Sciences	
Academic Year	First Year	
European Credit Transfer and Accumulation System (ECTS)		8
Language	Italian	
Academic calendar (starting and ending date)	1st semester	
Attendance	Strongly recommended	

Professor/ Lecturer	
Name and Surname	Eugenio Quaranta
E-mail	eugenio.quaranta@uniba.it
Telephone	0039 080 5442093
Department and address	Scienze Ambientali- via A. De Gasperi- Taranto
Virtual headquarters	TEAMS code: sxkcybn
Tutoring (time and day)	Monday, Ore 12-12.50; Friday 12.00-12.50; 15.20-16.10 (by appointment)

Syllabus	
Learning Objectives	The course aims at providing basic knowledges of general and inorganic chemistry with particular attention to interdisciplinary and environmental aspects. The course includes laboratory activities.
Course prerequisites	Fundamentals of Physics, Mathematics, Algebra
Contents	**Physical quantities and units of measurement.** Conversion of measurement units. Numerical exercises **Homogeneous and heterogeneous systems**, phases of system. **Atomic mass and molecular mass** (absolute, relative; uma). Mole, Avogadro number, molar mass). Numerical exercises. **Chemical formulae.**. Numerical exercises. **Oxidation number.** Nomenclature of inorganic compounds. Red-ox and acid-base reactions. Balancing chemical equations. Stoichiometric calculations. Numerical exercises **The gaseous state.** The gas laws. Gas mixtures. Numerical exercises. **The solid state**. Ionic, covalent, molecular, and metallic solids. **The liquid state.** Vapour-liquid and vapour-solid equilibria, vapour pressure. Solid-liquid equilibrium. Phase diagrams. Supercritical fluids (short account). Umid gases. Numerical exercises **The solutions.** Ways of expressing the concentration of solutions. Numerical exercises. Saturated solutions and solubility. Raoult's Law. Henry's Law. Electrolytic solutions. Colligative properties of solutions. Numerical exercises. **The electronic structure of atoms.** Atomic spectra. Wave-particle duality and uncertainty principle. The quantum mechamical model of hydrogen atom. Wave functions for H atom. Quantum numbers. Electronic spin. Electronic configurations of polyelectronic atoms. The Periodic Table, periodic properties of the elements.

	The chemical bond. The covalent bond. Molecular geometry. Lewis acids and bases. Polarity of bonds and molecules. Introduction to ionic bonding and metallic bond. **The chemical equilibrium.** Homogeneous and heterogeneous equilibrium reactions. Ways of expressing Keq (Kp, Kc, Kn, Kχ). Factors affecting the position of equilibrium. Numerical exercises. **Bronsted acids and bases.** Ka and Kb, Kw, pH. The dissociation degree of weak acids and bases. Calculation of pH of aqueous solutions of acids or bases. Hydrolysis of salts and pH. Polyprotic acids. pH indicators. Titrations (acid-base; red-ox). Buffer solutions. Numerical exercises. **Solubility equilibria** of salts poorly soluble in water. The solubility product. The common ion effect and solubility. Numerical exercises. **Electrochemistry.** Galvanic cells and electrodes. Cell potentials, electrode potentials and their applications. pH measurements. Numerical exercises. **Laboratory activities:** Preparation of solutions; titrations; potentiometric titrations; determination of yield of a redox reaction
Books and bibliography	" Fondamenti di Chimica", second edition, 2006 - A.M. Manotti Lanfredi, A. Tiripicchio - CEA (Casa Editrice Ambrosiana)
Additional materials	Web site: • https://www.zanichelli.it/universita/in-primo-piano Additional material: slides in Power Point available to the students in pdf format.

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
200	45	45	110
ECTS			
8	5	3	

Teaching strategy	The course consists of frontal lectures, numerical excersises and laboratory activities.
	The course will not be delivered in e-learning mode.
Expected learning outcomes	
Knowledge and understanding on:	Acquisition of sound rigorous knowledge of fundamentals of General and Inorganic Chemistry. This goal will be achieved by means of frontal lectures, numerical exercises, and laboratory activities. The level of knowledge will be ascertained through reports on the laboratory activities, written tests during the course and by means of written/oral examination.
Applying knowledge and understanding on:	Correct interpretation of chemical phenomena and right utilization of the laws governing the chemical phenomena in solving problems and numerical exercises on the topics treated during the course. The acquisition of the above abilities will be ascertained through written tests during the course and by means of written/oral examination.

Soft skills	• *Making informed judgments and choices* Acquiring aptitude to scientific reasoning and competence in critical analysis of chemical phenomena as well as in solving problems and exercises. The achievement of this goal will be ascertained through written tests during the course and by means of written/oral examination. • *Communicating knowledge and understanding* Acquiring expository clarity and propriety of language in discussing the contents of the course. The achievement of this goal will be ascertained during the oral examination. • *Capacities to continue learning* Acquiring competence in deepening autonomously theoretical concepts and topics developed during the course and in identifying relations with other disciplines.

Assessment and feedback	
Methods of assessment	The assessment of student will be based on a preliminary written test followed by an oral examination. The student must pass the written test to be admitted to the oral examination. The first-year students, who, on the whole, will have achieved a non-negative marking in the written partial tests taken during the course, are exempted from the preliminary written test and directly admitted to the oral examination if this is done within the month of February.
Evaluation criteria	The assessment of student will take into account the following elements: 1) the acquired degree of knowledge; 2) the ability in correctly applying theories and laws governing the chemical phenomena; 3) the competence in critical analysis of chemical phenomena as well as in solving problems and exercises. 4) expository clarity and propriety of language; 5) the competence in deepening autonomously theoretical concepts and topics developed during the course. Other factors that will be assessed in a positive way are the active presence of student during lectures and exercises as well as the individual work (for instance, reports of laboratory practices).
Criteria for assessment and attribution of the final mark	Final score: out of thirty, eventually cum laude.
Additional information	

Bari, 1_9_2021

Signature

(Prof. Eugenio Quaranta)

Corso di Laurea Triennale in Scienze Ambientali L32
Coordinatore: Prof. Massimo Moretti
Campus Universitario, via E. Orabona 4, 70126 Bari (Italy)
Tel: +39 0805442563 Fax: +39 0805442625
email: massimo.moretti@uniba.it