

General information	
Academic subject	GENERAL AND INORGANIC CHEMISTRY
Degree course	Animal Science
Academic Year	2022-2023 – I year
European Credit Transfer and Accumulation System (ECTS)	6
Language	Italian
Academic calendar (starting and ending date)	I semester
Attendance	Compulsory

Professor/ Lecturer	
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Virtual headquarters	Microsoft teams
Tutoring (time and day)	To be agreed with students by appointment via mail

Syllabus	
Learning Objectives	An introduction to scientific language and methodology with regard to chemical phenomena, their role in biological systems and application aspects. An in-depth knowledge of the behavior of aqueous solutions and of chemical equilibria in solution in order to acquire the necessary bases to understand biochemical phenomena.
Course prerequisites	No prerequisites. It is helpful to have a good understanding of basic mathematics and physics. It is not necessary to have preliminary information on chemistry as the course starts from the elementary concepts of that subject
Contents	The atom: Generalities, quantum and wave theory, orbitals, periodic system of elements, principle of maximum multiplicity. Chemical bonds: bond forces, covalent bond, dative bond, ionic bond, hydrogen bond, metal bond, electronegativity, ionization potential, electron affinity. The mole: Atomic weight, molecular weight, equivalent weight. States of matter: the gaseous state, definition of ideal gas, state variables, laws of ideal gases, real gases. The liquid state, properties of liquids, viscosity, vapor pressure, boiling temperature. The solid state, covalent solids, ionic solids, molecular solids, metallic solids. State changes: Definition, water state diagram and comparison with that in the presence of a non-volatile solute. Solutions: Concentration, solubility, Raoult's law, colligative properties (cryoscopic lowering, ebullioscopic raising, osmotic pressure). Chemical reactions and energy: The energetic aspect of chemical reactions (Enthalpy and Entropy) Homogeneous chemical equilibria: law of masses, expression of the equilibrium constant. Heterogeneous equilibria: generalities, application of the law of the masses to heterogeneous equilibria. Equilibrium in solution: acids and bases, degree of dissociation, buffers, hydrolysis, pH indicators, acid-base titration. Solubility product. Acid-base titrations and solubility curves. Redox potential: cells, concentration cells, potentiometric determination of pH, Nernst equation. Introduction to inorganic chemistry. Exercise on the topics covered. Notes on the production of ammonia, sulfuric acid, notes on the soda-chlorine process and molten salts. Introduction to organic



	chemistry Saturated and unsaturated aliphatic hydrocarbons Aromatic hydrocarbons exercise Nomenclature and reactivity of amines, alcohols, alkyl chlorides Carboxylic acids, esters, aldehydes and ketones Acidity and basicity
Books and bibliography	Masterton - Hurley– Chimica (principi e reazioni) – Ed. Piccin G.I. Sackheim, D.D. Lehman - Chimica per le Scienze Biomediche - EdiSES - Napoli. Presentazioni powerpoint
Additional materials	

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
150	48	0	102
ECTS			
6	6		
Teaching strategy			
Frontal lessons, distance learning			
Expected learning outcomes			
Knowledge and understanding on:	Acquire general knowledge of the basic principles of chemistry for understanding and deepening the topics covered in subsequent courses		
Applying knowledge and understanding on:	At the end of the course the student will have developed the ability to understand some chemical and physical characteristics of substances, such as state of aggregation and volatility, hardness and fragility based on the knowledge of their structure. He will know how to make a spontaneity balance of chemical and electrochemical processes and quantify the mass and energy involved during these transformations and will be able to evaluate the pH of a solution		
Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> o Acquisition of conscious autonomy of judgment with reference to the evaluation and interpretation of experimental data • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> o At the end of the course, the student should have acquired sufficient language properties, as regards the specific scientific terminology of the teaching and will acquire the ability to interpret the properties and material transformations on the basis of the structure of atoms and molecules • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> o Acquisition of autonomous learning skills and self-assessment of one's own preparation, capable of interpreting subsequent studies with a high degree of autonomy 		

Assessment and feedback	
Methods of assessment	Verification of preparation consists of a written and an oral test
Evaluation criteria	<ul style="list-style-type: none"> • <i>Knowledge and understanding</i> <ul style="list-style-type: none"> o Verification of the basic principles of chemistry for understanding and deepening the topics that will be addressed in subsequent courses • <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> o Verification of the ability to understand the chemical and physical characteristics of substances, such as state of aggregation and volatility,



	<p>hardness and brittleness based on the knowledge of their structure. It shows how to balance a reaction, the spontaneity of chemical and electrochemical processes and how to quantify the mass and energy involved during these transformations and to evaluate the pH of a solution.</p> <ul style="list-style-type: none"> • <i>Autonomy of judgment</i> <ul style="list-style-type: none"> o evaluation and interpretation of experimental data • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> o Evaluation of an appropriate language, as regards the specific scientific terminology of teaching • <i>Communication skills</i> <ul style="list-style-type: none"> o evaluation the ability to interpret the properties and material transformations based on the structure of atoms and molecules • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> o verification of the autonomous ability to learn and self-assessment of one's own preparation, capable of interpreting subsequent studies with a high degree of autonomy
Criteria for assessment and attribution of the final mark	Verification of preparation consists of a written and an oral test. The active participation of the student in the lessons will be considered
Additional information	