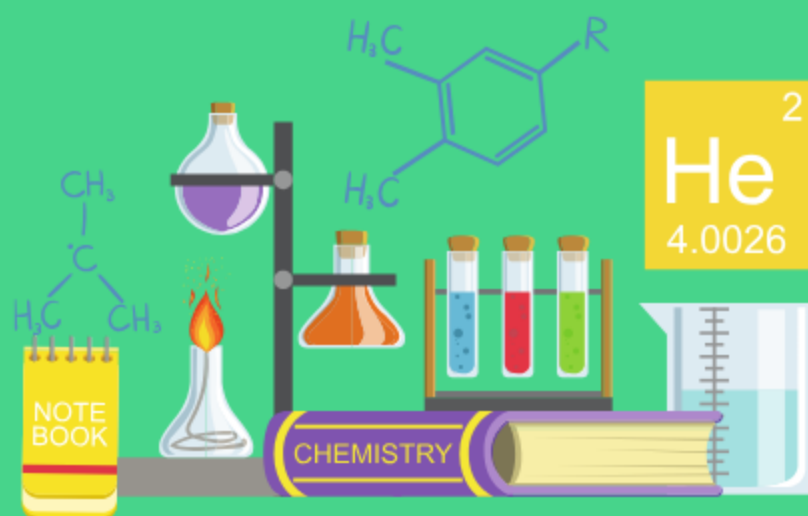


# CHEMISTRY



## Course

The aim of the course is to provide students with the knowledge of basic topics of chemistry in Italian language.

METHOD OF PRESENTATION:

Teachers will employ lectures to introduce, explain, and summarize the main ideas. Visual aids will often use to stimulate and focus student's attention. Instructor might ask students to answer questions during class to maintain their interest and to assess their understanding during each phase of the lesson.

## Content

- The states of matter and change of state, distinguishing between physical and chemical changes. Pure substances and mixtures
- The use of the Periodic Table to obtain the names, symbols, relative atomic masses and proton numbers of elements. The mole and the Avogadro constant, relative atomic masses, molar mass.
- The calculation of empirical and molecular formulae: Balancing of chemical equations, the stoichiometry of an equation: the use of a balanced equation to calculate masses of reactants or products, the effect of a limiting quantity of a reactant.
- Solutions: solubility, solution concentration and dilution.
- Atomic structure Particles in the atom, meaning of proton number and mass number, isotopes, Bohr model. atomic shells, subshells, orbitals and electron spin, Aufbau principle and electron configurations.
- The structure of the modern Periodic Table, trends in physical properties, classification of an element as a metal or nonmetal;
- Oxidation number and balancing oxidation- reduction reactions: Galvanic cells , Standard electrode potentials, electrolysis
- Ionization energies, electronegativity, atomic radius, electron affinity, and metallic character.: definition and trends in periodic properties across periods and groups. Lewis symbols
- Bonding and Structure : ionic bonding; covalent bonding; the shapes of simple molecules and ions; electronegativity and polarity; intermolecular forces, metallic bonding
- An introduction to Nomenclature of Inorganic Chemistry
- Chemical energetics: difference between the terms exothermic and endothermic;
- Chemical equilibrium: reversible reactions; dynamic equilibrium, expressions for equilibrium constants in terms of concentrations,  $K_c$  , Le Chatelier's principle
- Acids, Bases and Buffers: Acids and bases according Arrhenius definition, Brønsted-Lowry theory and Lewis theory, ionic product of water,  $K_w$ ; pH and  $[H^+(aq)]$  Strong and weak acids, acid dissociation constant,  $K_a$ , Buffer solutions, neutralization
- Basic Concepts of Organic chemistry: Nomenclature and formula representation; carbon hybridization, functional groups, and isomerism; basic organic chemistry reactions