CHM102 General Chemistry II (3+0+0 3 Units)

(Gases, Liquids and Solids)

- Derivation of ideal gas equation leading to Boyle's Law and Avogadro's Hypothesis. The Avogadro Constant. A simplified treatment (e.g. particle in a box). The assumption for ideal behavior and their limitation for real gases at high pressure and low temperature. Boltzmann distribution and molecule speed. Boltzmann constant.
- Liquids: the kinetic concept of the liquid state and simple kinetic-molecular description of melting, vaporization and vapor pressure saturated and unsaturated vapors.
- Phase equilibra: Phase rule, equilibra involving one, two and three components.
- Solids: Lattice structure and spacing. NaCl as ionic lattice. Cu as a cubic close-packed metal lattice. Graphite and Diamond –their properties as macromolecular structures. Lattice energy and forces between the particles in atomic molecular and ionic lattice.
- Electrolysis: The factors affecting the mass of substance liberated during electrolysis. Relationship between Faraday and the Avogadro constant and the charge of the electron.
- Equilibria: Chemical equilibria: Reversible reactions and dynamic equilibrium, factors affecting chemical equilibria: Le Chatelier's principle. Equilibrium constraints: their definition and calculation in terms of concentrations. Effect of temperature of equilibrium constants.
- Ionic equilibria: Bronsted-lowry theory of acids and bases. Strong and weak acids in terms of conductivity. Strong and weak electrolytes. Degree of dissociation. The ionic product of water KW. pH and calculation, pH indicators, Buffer solutions.

Organic Chemistry

- Historical survey of the development and importance of Organic Chemistry; nomenclature and classes of organic compounds; homologous series; functional groups; isolation and Purification of organic compound;
- Qualitative and quantitative Organic Chemistry; stereochemistry; determination of structure of organic compounds; electronic theory in Organic Chemistry;
- Saturated hydrocarbons; unsaturated hydro-carbons, Periodic table and periodic properties; Valence forces; Structure of solids.
- The Chemistry of selected metals and non-metals and qualitative analysis.