

## 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 equilibria: Phase rule, equilibria 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  $K_w$ . 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.