Module: Chemistry

Overview:

This module introduces the fundamental and basic concepts in chemistry. It emphasizes the theories and principles of atoms and also those related to topics in physical chemistry as well that can be applied into the study of the field in engineering.

Faculty / Programme Group:

- Civil
- Electrical and Biomedical
- Chemical and Energy
- Mechanical
- Science

Topics Covered:

- *Fundamentals of Chemistry and Principles of Stoichiometry*
  Units & measurements, Atoms and Molecules, Mole's concept, Reaction Stoichiometry, Concentration of solution.

- *Electronic Structure of Atoms*
  The Bohr atomic model, Introduction to Quantum mechanical model, Electronic configuration.

- *Periodic Table of Elements*
  Classification of the elements, Periodicity.

- Chemical Bonding
  Lewis structure, Intermolecular forces, Metallic bonding, VSEPR, VBT.

- *States of Matter*
  Properties of gas, Properties of liquid, Single component system.

- *Thermochemistry*
  Concepts of enthalpy, Hess's Law, Born-Haber cycle.

- *Chemical Kinetics*
  Reaction rate, Collision theory and transition state theory, Factors affecting reaction rate.

- *Chemical Equilibrium*
  Dynamic equilibrium, Equilibrium constant, Le Chatelier's principle.

- *Acids and Bases*

Definitions, Salt and hydrolysis, Buffer solution, Acid & Base titration, Solubility equilibria.

- *Electrochemistry*
  Redox reaction, Balancing redox reaction, Nernst equation, Concentration cell, Electrolytic cell, Electrolysis.

- *Organic Chemistry*
  IUPAC nomenclature of alkane, alkene, alkyne, aromatic, alcohol, amine, carbonyl compounds.

Module Test Contents:

Format:

- Subjective Questions (100 marks).
- All calculations and justification must be shown clearly.

Duration:
3 hours

References:

1. Chemistry, 10th Ed., Chang R. Mc. Grow Hill, 2010
2. Chemical Principles, 5th Ed., Zumdahl S.S Houghton Mifflin Company, 2005.
3. Introduction to Chemical Principles 8th Ed., Stoker H.S, Pearson Prentice Hall, 2005.
4. Chemistry, 3rd Ed., Mc Murry and Fay R.C, Prentice Hall, 2001.
5. Chemical Principles, 6th Ed., Masterton W.L, Slowinski E.J. and Stanitski C.L, Saunders College Publishing, 1985.
6. Chemistry, 8th Ed., Chang R. Mc. Grow Hill, 2005