



AL IMAM MOHAMMAD IBN SAUD ISLAMIC UNIVERSITY
COLLEGE OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING

Course Information	
Course Code & Name	CHEM103 General Chemistry Total Credits: 4 (Theory hours: 3, Lab hours: 2)
Prerequisite/s	Nil

Course Description
The course covers fundamental observations, laws, and theories of chemistry at the introductory level. Topics include Atoms/Molecules, Stoichiometry, Acids/Bases, Solutions, Equilibria, Gases, Solids, Liquids, Thermodynamics, Kinetics, Quantum Theory, The periodic table, and Chemical bonding.

Textbook	
Title	CHEMISTRY
Author(s)	T. Brown, H. Lemay Jr., B. Bursten and C. Murphy
Publisher	Pearson

Course Contents (Theory)
Topics to be Covered
1. Matter and Measurement 1.1 The study of chemistry 1.2 Classifications of matters 1.3 Properties of matters 1.4 Units of measurements 1.5 Uncertainty in measurements
2. Atoms, Molecules, and Ions 2.1 The atomic theory 2.2 The discovery of atomic structure 2.3 Atomic structure 2.4 Atomic weight 2.5 The periodic table 2.6 & 2.7 Molecules and Ionic compounds
3. Stoichiometry: Calculations with Chemical Formulas and Equations 3.1 Chemical Equations 3.2 Chemical reactivity 3.3 Formula weight 3.4 Avogadro's number and the mole 3.5 Empirical formula 3.6 Stoichiometry 3.7 Limiting reactants
4. Aqueous Reactions and Solution Stoichiometry 4.1 Aqueous solution 4.2 Precipitation reactions 4.3 Acid-Base reactions 4.4 Oxidation – reduction reactions 4.5&6 Solutions; chemical analysis
16. Acid-Base Equilibria 16.2 Brønsted-Lowry Acids & Bases 16.3 The Autoionization of Water

16.4 The pH – Scale
16.5 Strength of Acids & Bases
16.6 Weak Acids
16.7 Weak Bases

5. Thermochemistry
5.1 Nature of Energy
5.2 First law of thermodynamics
5.3 Enthalpy
5.4 Enthalpies of reactions
5.5 Calorimetry
5.6 Hess's law
5.7 Enthalpies of formation

8. Basic Concepts of Chemical Bonding
8.1 Chemical Bonds, Lewis Symbols, and the Octet Rule
8.2 Ionic Bonding
8.3 Covalent Bonding
8.4 Bond Polarity and Electronegativity

Course Contents (Laboratory)

Lab 1: Basic laboratory techniques
Lab 2: Density of liquids
Lab 3: Density of regular and irregular solids
Lab 4: Stoichiometry: Mass-mass relationship
Lab 5: The chemical composition by mass percentage
Lab 6: Preparation of primary standard and dilution rule & titration
Lab 7: Determination of the empirical formula
Lab 8: Strong acid-strong base titration
Lab 9: Vinegar Analysis, Mass %
Lab 10: Reactions in Aqueous Solutions
Lab 11: Precipitation reaction & Limiting reactant
Lab 12: Redox titration of Fe²⁺
Lab 13: Determination of the specific heat of metal.

Academic Coordinator

Official Stamp