King Saud University

Department of Chemistry

CHEM 101 & 103

General Chemistry

First Semester 2016/2017

Credit Hours: 4 hours (1+3)

Time: Section 24133: Sun, Tue & Thu 13:00–13:50

Section 23275: Sun, Tue & Thu 14:00–14:50

Lecture Theater: Section 24133: building No. 5 (B 013)

Section 23275: building No. 5 (A 078)

Course Coordinator: Dr. Abdullah Alarifi

Instructor: Dr. Ahmad Aqel

Web Site: fac.ksu.edu.sa/aifseisi

Office No.: 1A7 & AA53

Office Hours: Sun, Tue & Thu: 10:00–11:00, Mon & Wed: 10:00–12:00

E-mail: aifseisi@ksu.edu.sa

Textbook: Chemistry, The Central Science, 11th Ed., By T. Brown, H. LeMay, B. Bursten and C. Murphy.

Course contents

I. Introduction
(7 Lectures)
1.4 Units of measurement

II. Stoichiometry
3.1 Chemical equations
3.2 Some simple patterns of chemical reactivity
3.3 Formula weights
3.4 Avogadro's number and the mole
3.5 Empirical formulas from analyses
3.6 Quantitative information from balanced equations
3.7 Limiting reactants and theoretical yields
4.5 Concentrations of solutions
13.4 Ways of expressing concentration

III. Gases
(6 Lectures)
10.1 Characteristics of gases
10.2 Pressure
10.3 The gas laws
10.4 The ideal gas equation
10.5 Further applications of the ideal gas equation
10.6 Gas mixtures and partial pressures
10.7 Kinetics molecular theory
10.8 Molecular effusion and diffusion
10.9 Real gases deviations from ideal behavior

First Exam (15%)

IV. Thermochemistry
(6 Lectures)
5.1 The nature of energy
5.2 The first law of thermodynamics
5.3 Enthalpy
5.4 Enthalpies of reaction
5.5 Calorimetry (heat capacity, specific heat)
5.6 Hess's law
5.7 Enthalpies of formation

V. Properties of Solutions
(6 Lectures)
13.1 The solution process
13.3 Factors affecting solubility (pressure, temp)
13.5 Colligative properties (van't Hoff factor)

VI. Chemical Kinetics
(5 Lectures)
14.1 Factors that affect reaction rates
14.2 Reaction rates
14.3 The rate law: the effect of concentration on rate
14.4 The change of concentration with time, the half-life (first order reactions only)
14.5 Temperature and rate

Second Exam (15%)

VII. Chemical Equilibrium
(5 Lectures)
15.1 The concept of equilibrium
15.2 The equilibrium constant
15.3 Interpreting and working with equilibrium constants
15.4 Heterogeneous equilibria
15.5 Calculating equilibrium constants
15.6 Applications of equilibrium constants
15.7 Le Chatelier's principle and its applications on equilibria

VIII. Acid Base Equilibria
(7 Lectures)
16.1 Acids and bases
16.2 Bronsted-Lory acids and bases
16.3 The auto-ionization of water
16.4 The pH scale
16.5 Strong acids and bases
16.6 Weak acids
16.7 Weak bases
16.8 Relationship between K_a and K_b
16.9 Acid-base properties of salt solutions
17.1 The common ion effect
17.2 Buffered solutions
17.4 Solubility equilibria, the solubility product K_{sp}

Final Exam (40%)
All contents