



King Saud University

Department of Chemistry



CHEM 101 & 103 General Chemistry

Second Semester 2013/2014

Credit Hours: 4 hours (1+3).

Time: Section 23406: Sun, Tue and Thu 02:00–02:50.

Section 46649: Sun, Tue and Thu 03:00–03:50.

Lecture Theater: Section 23291: building No. 31 (B 092).

Section 46649: building No. 5 (B 046).

Course Coordinator: Dr. Abdulaziz Ali Alghamdi.

Instructor: Dr. Ahmad Aqel.

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Office Hours: Sun, Tue and Thu: 9:00–11:00, Mon and Wed: 10:00–11:00.

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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