



Philadelphia University
Department of Basic Sciences
First Semester 2012/2013

Faculty of Science

Syllabus, General Chemistry II, CHEM 0212103

Academic Staff Specifics

Instructor: Dr. Nader Robin Al Bujug

Academic rank: Assistant Professor

Office: Faculty of Science (1018)

My office hours and schedule: **09.00-10.00, Su, Tu, Thu** and **11:30-12:30 Mo, Wed**

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Course Syllabus

Course Title: General Chemistry II

Course code: 0212103

Course Level: 2

Course prerequisite (s) and/or corequisite (s): pass general chemistry I (0212101)

Credit hours: 3

Lecture Time: **08:10- 09:00** (Su, Tue, Thu)

The required text book

Title: *General Chemistry, The essential concepts*, 6th edition

Author : **Raymond Chang**

Publisher: Mc Graw Hill 2011

ISBN: 978-007-131368-1

Course module description:

Introduces the fundamental theories of chemistry, types of intramolecular and intermolecular forces, energy and thermochemistry, thermodynamics, equilibrium, chemical kinetics, and solution properties

Course module objectives:

This module presents a basic introduction to chemical concepts and the development of stoichiometric principles. It also provides the student with a fundamental store of chemical information and an understanding of the need for theory, then the theme centers on the development of theoretical explanations of observed facts by introducing the student to the concept energy relationships un chemical reactions, intermolecular forces and liquids and solids, physical properties of solutions, chemical kinetics, chemical equilibrium and thermodynamics)

Support material (s) (Handouts, models).

Teaching methods:

Lectures, discussion groups, tutorials, problem solving, debates, display lectures using power point slides supported by data show projector etc.

Learning outcomes:

- Knowledge and understanding
- Have an understanding of chemical calculations (energy relationships un chemical reactions, intermolecular forces and liquids and solids, physical properties of solutions, chemical kinetics, chemical equilibrium, solubility equilibrium and thermodynamics)
- Communication skills (personal and academic).
- Encourage the students to be self starters (creativity, decisiveness, initiative) and to finish the chemical problems properly (flexibility, adaptability). Also to improve general performance of students through the interaction with each other in solving different chemical problems.

Assessment instruments

Quizzes.
Home works
Final examination

<u>Allocation of Marks</u>	
Mark	Assessment Instruments
20	First examination
20	Second examination
40	Final examination: 40 marks
20	3 short Quizzes and Home works, Reports
100	Total

Course/module academic calendar

Basic and support material to be covered	week
Ch.10 Relation of intramolecular and intermolecular forces types of bonds polar bonds dipole moment of compounds	(1), (2)
Ch. 12 Intermolecular forces and liquids 12.1 The Kinetic Molecular Theory of Liquids and Solids 12.2 Intermolecular Forces 12.3 Properties of Liquids 12.4 Crystal Structure 12.5 Bonding in Solids	(3), (4)

12.6 Phase Changes	
Ch. 13 Physical Properties of Solutions 13.1 Types of Solutions 13.2 A Molecular View of the Solution Process 13.3 Concentration Units 13.4 Effect of Temperature on Solubility 13.6 Colligative Properties	(5)
Ch. 6 Energy Relationships in Chemical Reactions 6.1 The Nature of Energy and Types of Energy 6.2 Energy Changes in Chemical Reactions 6.3 Introduction to Thermodynamics The First Law of Thermodynamics • Work and Heat 6.4 Enthalpy of Chemical Reactions Enthalpy • Enthalpy of Reactions • Thermochemical Equations 6.5 Calorimetry Specific Heat and Heat Capacity • Constant-Volume Calorimetry • Constant-Pressure Calorimetry 6.6 Standard Enthalpy of Formation and Reaction The Direct Method • The Indirect Method	First Exam (6), (7)
Ch. 14 Chemical Kinetics 14.1 The rate of a reaction 14.2 The rate laws 14.3 Relation between reactant concentrations and time 14.4 Activation energy and temperature dependence of rate constants 14.5 Reaction Mechanisms 14.6 Catalysis	(8), (9)
Ch. 15 Chemical Equilibrium 15.1 The Concept of equilibrium 15.2 Ways of expressing equilibrium constants 15.3 What does the equilibrium constant tell us 15.4 Factors that affect chemical equilibrium	(10), (11)
Acid-Base Equilibria and Solubility Equilibria 17.1 Homogeneous Versus Heterogeneous Solution Equilibria 17.2 Buffer Solutions Preparing a Buffer Solution with a Specific pH 17.3 A Closer Look at Acid-Base Titrations 17.4 Acid-Base Indicators 17.5 Solubility Equilibria Solubility Product • Molar Solubility and Solubility Predicting Precipitation Reactions 17.6 The Common Ion Effect and Solubility 17.7 Complex Ion Equilibria and Solubility 17.8 Application of the Solubility Product Principle to Qualitative Analysis	Second Exam (12), (13)
Energy and Thermodynamics of chemical reactions 18.1 The Three Laws of Thermodynamics	(14), (15)

18.2 Spontaneous Processes 18.3 Entropy 18.4 The Second Law of Thermodynamics 18.5 Gibbs Free Energy 18.6 Free Energy and Chemical Equilibrium 18.7 Thermodynamics in Living Systems	
	(16) Final Exam

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

References

Title: *Chemistry: The Molecular Nature of Matter and Change* , 5th edition

Author : **Martin Silberberg**

Publisher: Mc Graw Hill 2009

ISBN: 978-0-07-1283540