SYLLABUS

A. Course Description

Course Code	*Course Num.*	*Course Name*	*Credit Hours*	*Lec.*	*Lab.*	*Tut.*	*Private study*	*Pre-requisites*	*Course Level*	*Language*
CHM	**102**	**General Chemistry (2)**	**4**	**2**	**2**	**2**	6	**CHM 101**[1]	**2**	**English**

This introductory and general chemistry course covers fundamental observations, laws, and theories of chemistry at the basic level. Topics include atoms/molecules, stoichiometry, acids/bases, solutions, equilibrium, gases, solids, liquids, thermodynamics, the periodic table, and chemical bonding. The chemistry lab is taken in parallel with the course and covers the following basic experiments: density, mass-mass relationship, limiting reactant, acid-base titrations, solubility product, reactions in aqueous solution, Calorimetry and redox reactions. The module includes topics in experimental general chemistry relevant to the course.

At the end of this course the student will be able to:

1. To recognize the basic concepts of physical, inorganic and analytical chemistry.
2. To name ionic and covalent compound using bonding concept.
3. To write Lewis structure of covalent compounds.
4. To define chemical equilibrium and factors affecting it.
5. To describe chemical experiments related to heat transfer.

B. References: Required Textbook & Internal Website

I shall use ***Chemistry,*** Raymond CHANG, 10th Ed, 2010, The McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY 10020. ISBN 978–0–07–351109–2.

Students are required to purchase the textbook/materials (it is an obligation). The book contains the lecture notes as well as activities for the students to take part in; the book serves as a workbook.

Other references:

- **Chemistry,** Steven S. Zumdahl and Susan A. Zumdahl, 7th Ed (2007), Houghton Mifflin. ISBN-13: 978-0618528448
- **Laboratory Manual for Principles of General Chemistry,** J. A. Beran, (9th Ed.), 2011, John Wiley & Sons Inc. ISBN 9780470647899.
- **Chemistry: Principles and Reactions,** William L. Masterton, Cecile N. Hurley, 5th ed, 2003, Brooks Cole, ISBN-13: 978-0534217723

Google Classroom Webpage: http://www.imamm.org/

C. Topics Outline

Disclaimer: this is a very fast-paced course. There will be little time—if any—for review. What follows is an approximate outline of the pace of the course. We may go faster or slower, contingent on the class response. The tentative list of topics to cover:

1. **Thermochemistry:** First Law: State functions, change in enthalpy, work and heat, Enthalpy of chemical reactions, Calorimetry, Second Law: Entropy, Gibbs free energy, Free energy and chemical equilibrium.

[1] *Level 1 For the B.Sc. in Chemistry, B.Sc. in Applied Mathematics, B.Sc. in Physics, and B.Sc. in Biology*

2. **Entropy, free energy and equilibrium:** Spontaneous reactions, Entropy, State function, Entropy change of a system, Gibbs free energy, phase transition, Gibbs free energy and chemical equilibrium.
3. **Chemical equilibrium:** Chemical equilibrium, Law of mass action, Equilibrium constant, Equilibrium concentration, Le Chatelier's principal.
4. **Acid and Base:** Ion product of water, pH measurement, strong acid and base, weak acid and weak base, acid ionization constant, percent ionization, molecular structure and acid strength, acid-base properties of salts.
5. **Electrochemistry:** Redox reactions, Galvanic Cell, Standard reduction potential, spontaneities of Redox reactions, Cell Emf.
6. **Physical Properties of Solutions:** Type of solutions, A molecular view of the solution process, Concentration units, Effect of temperature on solubility, Effect of pressure on the solubility of gases.
7. **Chemical bonding:** Lewis Dot Symbols, The Ionic Bond, Lattice Energy of Ionic Compound, The Born-Haber Cycle for Determining Lattice Energies, The Covalent Bond, Electronegativity, Electronegativity and Oxidation Number, Writing Lewis Structures, Formal Charge and Lewis Structure, The Concept of Resonance, Exceptions to the Octet Rule, The Incomplete Octet, Odd-Electron Molecules, The Expanded Octet, Bond energy. Hybridization of Atomic Orbitals (sp3, sp2 & sp),
8. **Nuclear Chemistry:** Balancing nuclear equations, nuclear stability and radioactive decay.

D. Exams & Grading System

The semi-official dates and the workload of students for this course are:

- **Midterm 1: 1 exam**
- **Midterm 2: 1 exam**
- **Quizzes : 2 quizzes**
- **Homeworks: 4 homeworks**
- **Final Exam:** 16th week.

	Teaching/learning activities	Contact Hours	Frequency	Total Contact hours	Self-study hours (hrs)	Total self-study hours	Student Learning Time
1	Lecture	2	15	30	1.5	22.5	52.5
2	Tutorial	2	15	30	1.5	22.5	52.5
3	Lab\Practical	2	14	28	0	0	28
4	Lab report	0	14	0	1	14	14
5	Homework	0	4	0	2	8	8
6	Lab Exam	2	1	2	4	4	6
7	Quiz	0.25	2	0.5	1	2.5	2.5
8	Test (Midterm)	1.5	2	3	4	8	11
9	Final Exam	2	1	2	8	8	10
Total				**95**		**89**	**184.5**

Independent self-study = 87/15 ≅ 6 hrs per week (as average**)**

Your course grade will be based on Final Exam, Midterms, Homework, Quizzes, Participation, Attendance and Project.

Midterm 1: 10 %	**Midterm 2:** 10 %	**Final Exam:** 40 %
Laboratory: 30 %	**Quizzes; Homework & Attendance & Participation:** 10 %	

E. Grading distribution:

A^+: [95, 100], A: [90, 95), B^+: [85, 90), B: [80, 85), C^+: [75, 80), C: [70, 75), D^+: [65, 70), D: [60, 65), F: [0, 60).

F. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. ("Immediate family" is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

Executive Rules for Study Regulations and Exams
goo.gl/ykm7t3

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