**CHEM 103 SYLLABUS**

COURSE NAME: Introductory University Chemistry I – CHEM 103
DETAILS: 3 hour lectures, 1 hour seminar, and 3/2 lab section.
TERM: Fall

COURSE DESCRIPTION

This is the first course of the introductory chemistry courses. The course pre-requires a basic knowledge of chemistry equivalent to the Alberta Chemistry 30 high school curriculum. You will learn about the structure, bonding, and reactivity of chemical substances, focusing in particular on the main-group elements. You will learn how to draw and name 3-D molecules and based on the structure, geometry and forces will be able to predict their reactivity and properties in the gaseous, liquid and solid phases.

REQUIRED MATERIAL

1. "Chemistry" by Silberberg & Amateis, 7th Ed., McGraw Hill, (Connect code is recommended).

2. "Introductory University Chemistry I Laboratory Manual (Chem 101/103)" (2017 – 2018 edition).

3. Safety glasses, long pants, covered footwear and a lab coat are mandatory for the laboratory.

LECTURE CONTENT

This schedule is tentative and subject to changes and modifications. Numbers in parentheses (e.g., 5.3) refer to sections of the textbook.

**1. Atomic Structure - Chapters 1, 2, 7, and 8 (~ 9 hours)**

* Chapter 1 should have been covered in high school – please review
* Early models of the atom and fundamental laws. Elements, isotopes and the periodic table ( 2.1 –2.6)
* Nature of light, atomic spectra, Bohr model (7.1 – 7.2)
* Nature of matter, quantum mechanics (7.3 – 7.4)
* Hydrogen atom, shapes and energies of orbitals (7.4)
* Many–electron atoms, shielding, electron spin, electron configurations (8.1 – 8.2)
* Periodic trends and properties (8.3 – 8.4)

**2. Bonding - Chapters 2, 3, 9, 10 and 11 (~12 hours)**

* Most of chapters 2, and should have been covered in high school – please review
* Compounds: types of bonding, bond energy and nomenclature (2.7, 2.8, 9.1 – 9.4)
* Review: moles, molar masses, formulas, stoichiometry (3.1 – 3.5)
* Electronegativity, bond polarity (9.5)
* Lewis structures (10.1)
* 3D structures (VSEPR) (10.2 – 10.3)
* Valence bond theory, hybridization (11.1 –11.2)
* Multiple bonding, bond strength (11.2, 9.4)
* Molecular orbital theory (11.3)

**3. States of Matter - Chapters 5, 12 and 13 (~12 hours)**

* Ideal and real gases, kinetic molecular theory (5.1 – 5.6)
* Atmospheric chemistry
* Intermolecular forces (12.3)
* Liquids (12.4, 12.5)
* Solids (12.6, 12.7)
* Changes of state (12.1, 12.2)
* Intermolecular forces in solutions (13.1)

**4. Chemistry of the Elements - (~2 hours)**

* Metals vs. nonmetals, acids and bases, oxidizing and reducing agents.
* Properties and reactions of various elements will be incorporated as examples in the preceding 3 units

LAB CONTENT

No content found in syllabus.