Minister for Higher Education **University of Tlemcen**

Syllabus Element Of Chemistry (Chemistry 1)

Semester: 1

Teaching unit: UEF1.4

Subject : Elements of Chemistry (Chemistry 1)

The hourly volume: 90h00 (Class: 1h30, Tutorial: 3h00, Practical: 1h30)

Credits: 7

Coefficient: 4

In charge of the course: Dr BENOMARA Amina

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Objective:

The teaching of this subject enables students to acquire the basic formalism in chemistry, particularly in the area covering the atom, chemical elements, and the periodic table with energy quantification. It aims to make students more capable of solving general chemistry problems.

Recommended prior knowledge:

Basic knowledge of mathematics and physics.

Content of the course:

Chapter 1: Fundamentals (3 weeks):

I. Definition of Matter

II. Changes in the state of matter

III. Classification of matter

IV. Notion of atoms, molecules, moles and avogadro number

V. Law of conservation of mass (Lavoisier), chemical reaction

VI. Qualitative and quantitative aspects of matter

Chapter 2: structure of the atom (3 weeks)

I. Electron: Demonstration: J.J. Thomson experiment, Properties of cathode rays.
II. Nucleus: Demonstration: Rutherford experiment, Constitution of the atomic nucleus.
III. Identification of the elements : Representation, Atomic mass, Relative atomic mass.
IV. Rutherford's Planetary Model.
V. Presentation and characteristics of the atom (Symbol, atomic number *Z*, mass number *A*, number of protons, neutrons, and electrons).
VI. Isotopy and relative abundance of different isotopes.

Chapter 3: Electronic structure of the atom (4 weeks)

I. Production of atomic emission spectra
II. Electromagnetic radiation.
III. The empirical photon theory of Balmer-Rydberg.
IV. Bohr's model.
V. Electron energy in a stationary orbit.

Chapter 4: Periodic classification of the elements (2 weeks) :

I. Description of Mendeleïev's periodic table: Characteristics of some families.
II. Evolution and periodicity of the physico-chemical properties of the elements.

Chapter 5: Chemical Bonds (3 Weeks)

I. Covalent bonding in Lewis theory
II. Polar covalent bonds
III. Dipole moment and partial ionic character of the bond
IV. Molecular geometry: Gillespie's theory or VSEPR
V. Chemical bonding in the quantum model

Chapter 6: Radioactivity (3 weeks) :

I. Natural radioactivity
II. Artificial radioactivity and nuclear reactions: Nuclear fission, Nuclear fusion, transmutation

III. Radioactive decay kinetics: Radioactive decay law: Activity of a radioactive nucleus, Radioactive period or half-life.

Practical works

I. Introduction to Chemistry Lab Work
II. Preparation of solutions
III. Acid-base dosage
IV. Titration of the acetic acid in vinegar

Assessment Method:

- Continuous assessment: 40% (20% PW+20% Test).
- Final exam: 60%.