



**Pre-University Remedial program for the 2014 E.C.
ESSLCE Examinee**

Chemistry Module

Prepared by:

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Subject	Chemistry
Duration	6 months
Credit:	4 (3+1) hours per week
Target Group	The would be freshman students

COURSE CONTENT

1. Atomic Structure and Periodicity (12 hours)

- 1.1 The concept of the atom
- 1.2 Discoveries of subatomic particles
- 1.3 The Bohr Theory of the hydrogen atom
- 1.4 The quantum mechanical model of the atom
 - 1.4.1 The electromagnetic radiation and atomic spectra
 - 1.4.2 Electronic Configuration and Periodic Table

Unit summary

Review questions

2. Chemical Bonding and Structure (10 hours)

- 2.1. Introduction
- 2.2. Types of Chemical Bonding
 - 2.2.1 Ionic Bonding
 - 2.2.2 Covalent Bonding
 - 2.2.3 Metallic Bonding
- 2.3 Valence Shell Electron Pair Repulsion Theory and Molecular Geometry
- 2.4 Bonding Theories

Unit summary

Review questions

3. Physical States of Matter (10 hours)

- 3.1 Introduction
- 3.2. The Kinetic Theory of Matter
- 3.3. Properties of Matter
- 3.4 The Gaseous State

3.4.1 The Kinetic Molecular Theory of Gases

3.4.2 The Gas Laws

3.5 The Liquid State

3.5.1 Properties of liquids: Surface Tension and Viscosity

3.5.2 Intermolecular Forces; Explaining Liquid Properties

3.6 The Solid State

3.6.1. Classification of solids

3.7. Phase transitions

Unit summary

Review questions

4. Solutions (16 hours)

4.1. Introduction

4.2. Types of Solutions

4.3 The Solution Process

4.4 Solubility

4.5 Solubility as Equilibrium Process

4.6 Ways of Expressing Concentrations of Solutions

4.7 Preparation of solutions

Unit summary

Review questions

5. Chemical Reactions and Stoichiometry (12 hours)

5.1 Introduction

5.2 Laws of chemical Reactions

5.3. Energy changes in chemical reactions

5.4 Types of Chemical Reactions

5.5 Balancing Chemical Reactions

5.6 Calculations with Chemical Formulas and Equations

5.7 Rates of Chemical Reactions

Unit summary

Review questions

6. Chemical Equilibrium (10 hours)

6.1 Introduction (The equilibrium expressions and equilibrium constant)

6.2. Characteristics of Chemical Equilibrium

6.3 The **Le Chatelier's** Principle

6.4 Ionic Equilibrium

Unit summary

Review questions

7 Electrochemistry (10 hours)

7.1 Introduction

7.2 Electrical conductivity

7.3 Electrochemical Cells

7.3.1 Galvanic cells

7.3.2 Electrolytic cells

7.4 Quantitative aspects of electrolysis

7.5 Applications of Electrochemistry

Unit summary

Review questions

8. Introduction to organic chemistry (16 hours)

8.1 Introduction

8.2 Classification of organic compounds

8.3 Hydrocarbons (classification, Naming, uses, and general Properties)

8.4 Alcohols, Carboxylic Acids, and Esters

8.5 Uses of organic compounds

Unit summary

Review questions

Teaching Methods and Strategies:

The instructional methods and strategies to be used should encourage active learning, team work and collaboration so that students participate throughout the course to get the necessary knowledge and skills. Some of the instructional methods and strategies could be used include

gaped lecture, role playing, questing and answering, demonstration, individual or group assignments, discussion, collaborative learning.

Students' Activities:

Active participation in discussion and team works; active listening during all activities; taking notes on the lessons; asking questions and answering to questions; presentations; working and submitting group or- individual assignments on time; reading reference materials according to the course outline or tasks given by the instructor; attending classes regularly; and arriving classes on time.

Assessment Strategies and Techniques:

- Continuous assessments (quizzes, tests, assignments, project work and/or mid-examination) shall be given during the courses.
- Students shall sit for Model exam set by the University.
- The grade point of the continuous assessments and Model exam should not be included in the computation of status of student.

Reference

1. Ministry of Education (FDRE) Chemistry Text Books (Grade 9-12), Addis Ababa, Ethiopia, 2002.
2. Ebbing D.D, General Chemistry, Houghton Mifflin Company, USA, 2009, 9th ed.