

# *University College of the Cayman Islands*

## **ASSOCIATE DEGREE SYLLABUS**

**COURSE NAME: GENERAL CHEMISTRY I / LAB**

**COURSE #: CHE111**

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### **COURSE DESCRIPTION**

This course provides students with an introduction to the fundamental aspects of chemistry as a physical science. Beginning with principles of the structure of matter, students will be led through an exploration of the science of the elements, the development and organization of the periodic table, relationships in the periodic table, chemical bonding, and combinations of elements to form molecules.

**Credits: 4**

**Prerequisite: O LEVEL/CXC/IGCE PASS OR EQUIVALENT IN SCIENCE**

### **COURSE OBJECTIVES**

Upon successful completion of this course, students will be able to:

1. apply the Scientific Method to the solution of problems
2. demonstrate knowledge and understanding of basic principles and laws of matter
3. understand atomic theory and its historical development
4. recognize and describe number and behaviour of sub-atomic particles in atoms
5. calculate empirical and molecular formulae
6. interpret mass spectra and use them to determine relative atomic and molecular masses
7. apply a unit-dimensional analysis approach to solving chemical problems
8. demonstrate knowledge of the mole concept and apply it to chemical reactions in solution and gas phases
9. understand concentration as it applies to chemical reactions and convert between several concentration units
10. interpret the periodic table and its design, and understand periodic relationships as they relate to physical and chemical properties
11. distinguish several different types of chemical bonds and their properties
12. recognize and distinguish several different types of chemical reactions

## **COURSE CONTENT**

### **I INTRODUCTION TO CHEMISTRY AND MATTER**

Chemistry and The Scientific Method  
States of matter  
Physical and chemical properties of matter  
Dimensional analysis in problem solving

### **II INTRODUCTION TO ATOMIC THEORY**

Development of atomic theory  
Structure of the atom and line spectra  
Atomic number, mass number, isotopes  
Introduction to the periodic table  
Atoms, ions, and molecules  
Molecular mass and mass spectrometry  
Percent composition and empirical formula

### **III REACTION STOICHIOMETRY**

Avogadro's number and the mole concept  
Balancing simple chemical reactions  
Mass relationships in chemical reactions  
Aqueous solutions and measures of concentration  
Reactions in aqueous solution  
Limiting reagents

### **IV GASES**

Composition of gases in the atmosphere  
Pressure of a gas  
Pressure-Volume-Temperature relationships  
Ideal gas law  
Deviation from ideal behaviour  
Dalton's Law of Partial Pressures  
Stoichiometry of reactions involving gases

### **V PERIODIC RELATIONSHIPS**

Historical development of the Periodic Table  
Periodic classification of elements  
Periodic variation in physical properties  
Periodic variation in chemical properties

### **VI STRUCTURE AND BONDING**

Electrons and Lewis Dot symbols  
Ionic, covalent, dative, metallic, and hydrogen bonds  
Lattice energy  
Electronegativity  
The octet rule

## VII TYPES OF REACTIONS

Introduction to Redox reactions

Acid-base reactions

Precipitation reactions

Combustion reactions

## ASSESSMENT

Laboratory/Assignments	40%
Mid-Term Test	20%
Final Examination	<u>40%</u>
Total	100%

## REQUIRED TEXTBOOK(S)

The following textbook will be required for this course:

1. **Chang, Raymond** *Chemistry, 8<sup>th</sup> Edition* McGraw-Hill Higher Education, 2005