

# *University College of the Cayman Islands*

## ASSOCIATE DEGREE SYLLABUS

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

**COURSE #: CHE 112**

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### **COURSE DESCRIPTION**

This course provides is a continuation of General Chemistry I / Lab. As well as building on concepts developed earlier, new topics such as electrochemistry, chemical equilibrium, kinetics and organic reaction mechanisms are introduced.

**Credits: 4**

**Prerequisite: CHE 111**

### **COURSE OBJECTIVES**

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

1. familiarize themselves with the terminology, conventions, symbols, quantities and units used for respective topics
2. demonstrate knowledge and understanding of areas of physical chemistry associated with energy changes, phase changes, and reactivity
3. analyze and evaluate numerical and other data and draw inferences
4. understand the definitions of acids and bases, the pH scale, and empirical determination of acid strength
5. explain the physical properties associated with solids and liquids, and relate properties to kinetic molecular theory
6. understand oxidation and reduction processes, recognize redox reactions, and balance redox reactions
7. apply chemical principles to the operation of a typical battery
8. understand and interpret organic structural information and skeletal structures
9. understand organic functional groups, and simple addition and condensation reactions of organic molecules

## **COURSE CONTENT**

### **I INTERMOLECULAR FORCES, SOLIDS AND LIQUIDS**

Kinetic molecular theory of liquids and solids  
Intermolecular forces and properties of liquids and solids  
Crystal structure, types of crystals, amorphous solids  
Phase changes

### **II THERMOCHEMISTRY**

Nature of energy and energy changes in chemical reactions  
Introduction to thermodynamics  
Calorimetry  
Standard enthalpy of formation and reaction

### **III CHEMICAL KINETICS**

Rates of reaction  
The rate law  
Relationship of concentration and time  
Reaction mechanisms and catalysis

### **IV CHEMICAL EQUILIBRIUM**

Reversible reactions and the concept of equilibrium  
Equilibrium constant and the equilibrium constant expression  
Factors affecting equilibrium constant  
The Haber process

### **V ACIDS AND BASES**

Definition of Brønsted acids and bases  
Acid-base properties of water  
The pH scale and strength of acids and bases  
Ionisation constants of acids  
Diprotic and polyprotic acids

### **VI ELECTROCHEMISTRY**

Oxidation numbers and redox reactions  
Balancing redox reactions  
Galvanic cells  
Standard reduction potentials and spontaneous reactions  
Batteries

### **VII INTRODUCTION TO ORGANIC CHEMISTRY**

Hydrocarbons including alkanes, alkenes, alkynes, and arenes  
Nomenclature of organic compounds  
Other organic functional groups  
Isomers – structural, geometric, optical  
Condensation 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