

# *Community College of the Cayman Islands*

## **ASSOCIATE DEGREE SYLLABUS**

**COURSE NAME: PHYSICAL AND ORGANIC CHEMISTRY COURSE #: CH 203**

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### **COURSE DESCRIPTION**

This course incorporates and builds on many of the concepts, theories and principles covered in earlier courses. An in-depth study of the first row of transition elements is used to introduce new ideas such as electrochemistry and complex formation. Further studies are also made on equilibria, reaction kinetics, energetics and organic chemistry.

**Credits: 4**

**Prerequisite: CH 201 and CH 202**

### **COURSE OBJECTIVES**

This course is intended to enable the student to:

1. Safely operate scientific instruments and perform basic laboratory techniques.
2. Use the vocabulary, terminology, conventions, symbols, quantities and units appropriately.
3. Analyze and evaluate numerical and other data and draw inferences.
4. Manipulate correctly equations, variables and constants related to a set of chemical reactions.
5. Familiarize themselves with the characteristic properties of the different homologous series of organic compounds.
6. Compare reactions within homologous series.
7. Critically assess and evaluate information concerning chemical reactions.
8. Apply knowledge to new situations.
9. Understand the role of chemistry in everyday life.

### **COURSE OUTLINE**

- I ENERGETICS**  
Enthalpy changes involving ionic compounds  
Disorder and entropy (quantitative)  
Second law of Thermodynamics
- II CHEMICAL and IONIC EQUILIBRIA**  
Reversible reactions and dynamic equilibrium

Le Chateliers's Principle  
The Haber Process  
Acid-base Process  
Solubility products

### **III REACTION KINETICS**

Rate equations  
Order of reactions: zero, pseudo-first, first and second  
Rate constants  
Effect of temperature on rate constants

### **IV TRANSITION ELEMENTS**

Steel making  
General physical and chemical properties of first row transition elements  
Electronic configuration (s,p,d)  
Variable oxidation states  
Redox systems and electrode potentials  
Complex formation  
Describe the formation and colour of complexes  
Ligand exchange reactions  
Examples of catalysis's by transition elements and/or their compounds  
Rusting

### **V ORGANIC CHEMISTRY**

Condensation polymers and proteins  
Carboxylic acids and acyl chlorides  
Esters, amines, amides and amino acids  
Geometric and optical isomerism  
Effect of intermolecular forces on shapes of molecules  
Molecular recognition

### **VI SPECTROSCOPIC AND OTHER INSTRUMENTAL ANALYTICAL TECHNIQUES**

NMR  
UV/ visible spectroscopy  
GLC

### **ASSESSMENT**

Laboratory/ Assignments	-	20%
Mid-Semester Examination	-	20%
Final Examination	-	60%
<b>Total</b>		<b>100%</b>

### **REQUIRED TEXT**

The following textbook(s) will be used for this course:

1. **Burton et al.**, *Salter's Advanced Chemical Ideas*, Heinemann

## References

Burton et al., *Salter's Advanced Chemical Storylines*, Heinemann