

# **Chemistry 12 - 2021** Course Outline & Learning Objectives Overview

---

**Instructor:** Paul Lockwood

Email contact: [plockwood@sd43.bc.ca](mailto:plockwood@sd43.bc.ca)

**Availability:** Wednesday 5:00pm-9:00pm  
Thursday 5:00pm-9:00pm

## **Introduction**

Welcome to Chemistry 12 at **Coquitlam Learning Opportunity Centre**. This is a self-paced, self-directed interactive course that provides an introductory insight into an understanding of our physical world by examining the scope, nature, relevance and limitations of Chemistry. The topics in this course cover the intended learning outcomes for Chemistry 12 in BC.

## **Expectations**

You will be expected to work independently through the online materials in Moodle – taking proper notes, working through the practice problems, Practice Assignments, and Self-Check Assignments. Individual help is available from your instructor at the Learning Centre. No laboratory work is included in this course.

## **Evaluation**

Your course mark is based on 5 unit tests, one midterm, and the final exam:

<b>TEST</b>	<b>CONTENT</b>	<b>PERCENT</b>
Unit 1	Kinetics	10
Unit 2	Equilibrium	10
Unit 3	Solubility	10
Midterm	Units 1 – 3	15
Unit 4	Acid – Base	15
Unit 5	Oxidation – Reduction	15
Final Exam	Units 1 – 5	25
<b>TOTAL</b>		<b>100</b>

# Chemistry 12 - 2021 Course Outline & Learning Objectives Overview

## Important to Remember

1. All tests **MUST** be written in person at CLOC during Learning Centre hours.
2. **\*\*You need to write the first unit test within 6 weeks of registering for this course\*\*.**
3. You are allowed **ONE** rewrite for each unit test in Chemistry 12.
4. You will **NOT** be allowed to rewrite the midterm test or final exam.
5. If you choose to rewrite a test, you must complete the rewrite **BEFORE** proceeding further in the course.
6. If you choose to rewrite a test, the **AVERAGE** of the two test scores will be used in your course mark calculation.
7. Please note, rewrite privileges may be revoked at any time if a teacher determines that you are abusing the rewrite policy.
8. **\*\*The expectation is that the course is completed within ten months of registration.**

\*\*Text reference is Hebden A Workbook for Students

### **Kinetics: At the end of this unit students should be able to:**

A1 demonstrate awareness that reactions occur at differing rates	Unit 1
A2 experimentally determine rate of a reaction	
A3 demonstrate knowledge of collision theory	
A4 describe the energies associated with reactants becoming products	
A5 apply collision theory to explain how reaction rates can be changed	
A6 analyse the reaction mechanism for a reacting system	
A7 represent graphically the energy changes associated with catalyzed and uncatalyzed reactions	
A8 describe the uses of specific catalysts in a variety of situations	

### **Equilibrium: At the end of this unit students should be able to:**

B1 explain the concept of chemical equilibrium with reference to reacting systems	Unit II
B2 predict, with reference to entropy and enthalpy whether reacting system will reach equilibrium	
B3 apply Le Chatelier's principle to the shifting of equilibrium	
B4 apply the concept of equilibrium to a commercial or industrial process	
B5 draw conclusions from the equilibrium constant expression	
B6 perform calculations to evaluate the changes in the value of $K_{eq}$ and in concentrations of substances within an equilibrium system	

### **Solubility: At the end of this unit students should be able to:**

C1 determine the solubility of a compound in aqueous solution	Unit III
C2 describe a saturated solution as an equilibrium system	
C3 determine the concentration of ions in a solution	
C4 determine the relative solubility of a substance, given solubility tables	
C5 apply solubility rules to analyse the composition of solutions	
C6 formulate equilibrium constant expressions for various saturated solutions	
C7 perform calculations involving solubility equilibrium concepts	
C8 devise a method for determining the concentration of a specific ion	

# Chemistry 12 - 2021 Course Outline & Learning Objectives Overview

## Acid-Base: At the end of this unit students should be able to:

D1 identify acids and bases through experimentation	Unit IV
D2 identify various models for representing acids and bases	
D3 analyse balanced equations representing the reaction of acids and bases with water	
D4 classify an acid or base in solution as either weak or strong, with reference to its electrical conductivity	
D5 analyse the equilibria that exist in weak acid or weak base system	
D6 identify chemical species that are amphiprotic	
E1 analyse the equilibrium that exists in water	
E2 perform calculations relating pH, pOH, $[H_3O^+]$ and $[OH^-]$	
E3 explain the significance of $K_a$ and $K_b$ equilibrium expressions	
E4 perform calculations involving $K_a$ and $K_b$	
F1 demonstrate an ability to design, perform, and analyse a titration experiment involving the following: – primary standards – standardized solutions – titration curves – appropriate indicators	
F2 describe an indicator as an equilibrium system	
F3 perform and interpret calculations involving the pH in a solution and $K_a$ for an indicator	
F4 describe the hydrolysis of ions in solutions	
F5 analyse the extent of hydrolysis in salt solutions	
F6 describe buffers as equilibrium systems	
F7 describe the preparation of buffer systems	
F8 predict what will happen when oxides dissolve in rain water	

## Oxidation – Reduction: At the end of this unit students should be able to:

G1 describe oxidation and reduction processes	Unit V
G2 analyse the relative strengths of reducing and oxidizing agents	
G3 balance equations for redox reactions	
G4 determine the concentration of a species by performing a redox titration	
H1 analyse an electrochemical cell in terms of its components and their functions	
H2 describe how electrochemical concepts can be used in various practical applications	
H3 analyse the process of metal corrosion in electrochemical terms	
H4 analyse an electrolytic cell in terms of its components and their functions	
H5 describe how electrolytic concepts can be used in various practical applications	