



## **I. COURSE DESCRIPTION:**

An introductory course in Chemistry, which deals with the structure of matter, electronic structure of atoms, periodic nature of the elements, bonding, Lewis Structures, nomenclature, chemical reactions, solubility and stoichiometry of reactions.

A comprehensive Workshop on lab techniques and lab safety and on report writing will be held during the early weeks of the semester.

## **II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

Upon successful completion of this course the student will demonstrate the ability to:

1. Perform calculations and conversions in both the SI metric and lb, Imperial unit systems.
2. Define key terms used in chemical experiments.
3. Classify matter based on physical and chemical properties.
4. State the basic concepts of the atomic structure of matter.
5. Explain the basis of the classification of elements and the structure of the periodic table.
6. Distinguish between atomic, molecular and ionic substances
7. Name chemical substances by common name and IUPAC name.
8. Write and balance chemical equations and identify the different types of reactions.
9. Describe the theory of ions in solution, recognize precipitation, acid-base and gas forming reactions and write ionic and non-ionic equations.
10. Explain the mole concept and quantify substances in terms of mass and moles.
11. Complete calculations to determine chemical formulas and to determine quantities of substances involved in chemical reactions.
12. Use quantum numbers to describe electrons in an atom.
13. Write and use electron configurations to predict trends in properties of the main group elements in the periodic table.
14. Define the terms and distinguish between ionic and covalent bonding.
15. Draw Lewis structures for atoms, molecules and ions.

## **III. TOPICS**

1. Chemistry and Measurement
2. Atoms, Molecules and Ions
3. Chemical Reactions

4. Calculations with Chemical Formulas and Equations

5. Atomic Structure

6. Ionic and Covalent Bonding

**LABORATORY WORK**

In a laboratory setting, the student will be able to:

1. Determine the density of an unknown solid and liquid using gravimetric (weighing) techniques.
2. Separate an unknown in nature into its components based on differences in physical properties.
3. Determine the mass percentage of water in a hydrate and calculate the formula of an unknown hydrate.
4. Conduct chemical reactions and identify the products formed from the given reactants.
5. Determine the chemical formula of a compound formed in a chemical reaction based on mass and moles.
6. Recover a mass of a substance which has been subjected to a sequence of chemical reactions.

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

TEXT:

General, Organic, and Biochemistry by Blei and Odian, W.H. Freeman, 2000

LAB MANUAL:

Lab Experiments for CHM 104 - Sault College, 2nd Ed.

**V. EVALUATION PROCESS/GRADING SYSTEM**

GRADING:

Grades:	90-100% - A+	80-89% - A	70-79% - B
	60-69% - C	59% or below – R (Repeat)	

The final grade is calculated by adding the theory marks (50%) and the lab marks (50%).

The lab mark is the sum of all marks awarded for the analysis plus the written report for each of the five experiments. The analysis is graded on accuracy and precision. The report is graded on format, content, and neatness.

The theory mark is the sum of all tests, assignments, mid-term and final examinations.

Term Test/Quizzes/Assignments/Final Exam	50 marks
Lab Work	50 marks
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	100

Assignments are due on the date specified at the beginning of the class. Late assignments will not be accepted so it is critical that you submit as much of the assignment as possible on the due date. Lab reports are due one week from completion of the lab. Late labs will be downgraded 10% per week.

#### ATTENDANCE:

Your grade will be greatly affected by attendance at scheduled classes and labs. 85% is required at all theory classes while 100% is needed for all labs. Serious illness (doctor's care) is the only valid excuse.

#### VI. SPECIAL NOTES:

- Special Needs  
If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717, 491 so that support services can be arranged for you.
- Retention of Course Outlines  
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other post-secondary institutions.
- While every attempt will be made to accommodate all special learning needs, the college should be contacted to discuss these needs before enrolling in any program.
- Substitute Course Information is available at the Registrar's Office.

#### VII. PRIOR LEARNING ASSESSMENT

Principles of Chemistry  
COURSE NAME

5

CHM104  
COURSE CODE

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning may be given if it can be established that all learning outcomes have been met.