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GRANDE PRAIRIE REGIONAL COLLEGE  
ACADEMIC UPGRADING DEPARTMENT

CHEMISTRY 0120  
COURSE OUTLINE

INSTRUCTOR - DEVINDER S. SEKHON Ph.D.

OFFICE - C417

PHONE - 539-2991

TEXTBOOK - Dorin, Demmin & Gabel. Chemistry: The Study of Matter. Prentice Hall, Inc. c. 1989

ATTENDANCE AND LATENESS - Regular attendance is expected of all students, and is crucial to passing the course. Students who miss classes will soon find themselves falling behind and failing. Lateness will not be tolerated as it interrupts the instructor and fellow classmates.

LABS - Attendance is compulsory for all labs. A passing grade must be obtained in the lab section in order to pass the course. A student who fails the lab component **WILL FAIL** the course. A missed lab will result in a mark of 0 for that lab. Make-up labs cannot be guaranteed, and are up to the discretion of the instructor and the lab technologist.

<u>EVALUATION</u> -	Lab Reports	20%
	Tests	30%
	Midterm Exam	20%
	Final Exam	<u>30%</u>
		100%

All tests and exams **MUST** be written at scheduled times unless **PRIOR** arrangements have been made with the instructor. A missed test (exam) will result in a score of zero. Penalty for late lab reports will be 25% for one day and 50% for two days. Lab reports will **NOT** be graded if they are late by more than two days unless prior arrangements have been made with the instructor.

**CHEMISTRY 0120  
COURSE OUTLINE**

**COURSE GOALS** - To provide an understanding of the chemical concepts of bonding, chemical equations, stoichiometry, solutions, and organic chemistry.

It is also hoped that the student will leave this course with an appreciation of chemistry, science and nature.

**GRANDE PRAIRIE REGIONAL COLLEGE GRADING PROCEDURES**

<b>STANINE</b>	<b>PERCENTAGE EQUIVALENCE</b>	<b>DESIGNATION</b>
9	90 - 100	
8	80 - 89	Excellent
7	72 - 79	
6	65 - 71	Good
5	57 - 64	
4	50 - 56	Pass
3	45 - 49	Fail
2	26 - 44	
1	0 - 25	

**COURSE OUTLINE AND OBJECTIVES****I. REVIEW****A. MEASUREMENTS (Chapters 2 & 3)**

On completing this section you should be able to:

- a. Describe the base units for length, mass, time and temperature in SI system.
- b. Give the symbols and numerical values for the prefixes mega, kilo, hecto, deca, deci, centi, milli and micro.
- c. Make interconversions between units.
- d. Define significant digits and be able to determine the number of significant digits (S.D.) in a given number.
- e. Round off a number to given number of S.D.
- f. Perform mathematical operations and report the results to the appropriate number of S.D.
- g. Express numbers in scientific notation, and perform mathematical operations in that notation.

**B. ATOMIC STRUCTURE (Chapter 6)**

On completing this section you should be able to:

- a. Define the subatomic particles - electrons, protons and neutrons - and give their relative masses and charges.
- b. Describe Daltons Atomic Theory and explain how it has been modernized.
- c. Describe Thomson's model of the atom and its shortcomings.
- d. Describe Rutherford's model of the atom and explain how it was improved by Bohr.
- e. Express the relation between protons, neutrons, atomic number and mass number.
- f. Explain isotopes and average atomic masses.
- g. Solve problems involving the percents of various isotopes of an element and its atomic mass.
- h. Define principal energy levels and give their maximum capacity to hold electrons.
- i. Distribute electrons in principal energy levels.
- j. Define orbitals and explain different types of orbitals.
- k. Distribute electrons in various orbitals.

WRITE THE FIRST TEST

## II. CHEMICAL BONDING

On completing this section, you should be able to:

- Write Lewis dot structures for elements if their atomic numbers are given.
- Define chemical bond and valence electrons.
- Explain ionic and covalent bonds giving examples of each.
- Predict the nature of bond(s) between two elements from their Lewis dot structures or atomic numbers.
- Explain double and triple bonds.
- Discuss the nature of bonding between elements of common compounds and ions.
- Discuss the shapes of molecules based on VSEPR theory.
- Explain electronegativity and the polarity of molecules.
- Explain hydrogen bonding, metallic bonding, and intermolecular forces.

## III. PERIODIC TABLE (Chapter 14)

On completing this section, you should be able to:

- State the modern periodic law.
- Explain groups and periods.
- Relate the electronic configuration of elements to groups and periods.
- Locate the various groups of elements on the periodic table.
- Describe the characteristics of representative and transition elements.
- Discuss in detail the periodic trends, such as atomic size, metallic character, ionization energy and electronegativity.

## SECOND EXAM AND MIDTERM

## IV. SOLUTIONS (Chapter 16)

On completing this section, you should be able to:

- Define solute, solvent and solution.
- Discuss different types of solutions, such as gas, liquid, or solid solutions.
- Define solubility and describe various factors that affect solubility.
- Define saturated, unsaturated and supersaturated solutions.
- Define concentration of solutions and give the units of molarity.
- Work out problems involving moles, volumes and molarity.

V. CHEMICAL FORMULAS AND EQUATIONS (Chapters 8 & 9)

On completing this section, you should be able to:

- Define formula(s) and molecular masses.
- Define the mole and the Avogadro's number.
- Convert masses of a substance in g into moles and vice-versa.
- Determine the percentage composition of a compound if its formula is known.
- Determine the empirical and the molecular formulas of compounds if their percentage compositions are known.
- Define chemical equation.
- Write chemical equations for simple reactions.
- Balance a given chemical equation.

## THIRD EXAM

VI. STOICHIOMETRY (Chapter 10)

On completing this section, you should be able to:

- Interpret a chemical equation in terms of the moles of various reactants and the products.
- Given the balanced equation for a reaction and the number of moles of one of the reactants or a product, be able to calculate the number of moles of all other species.
- Given the mass of one of the reactants and the products, be able to calculate the masses or the moles of all the other species.
- Perform calculations based on masses, volumes of gases or molarities of solutions.

VII. ORGANIC CHEMISTRY (Chapter 24)

On completing this section, you should be able to:

- Define organic compounds and organic chemistry.
- Name the first ten alkanes using IUPAC System. Write the general formula of alkanes.
- Explain structural formula and isomerism.
- Name the first ten alkenes and alkynes and write their general formulas.
- Define functional groups. Identify the functional groups of halides, alcohols, aldehydes, ketones, amines and carboxylic acids.
- Write structural formula(s) for a compound with given molecular formula.

## FOURTH EXAM AND THE FINAL EXAM