GRANDE PRAIRIE REGIONAL COLLEGE
ACADEMIC UPGRADING DEPARTMENT

CHEMISTRY 0120
COURSE OUTLINE

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COURSE GOALS: This course is designed to provide the student with an understanding of the following chemical concepts: Bonding, Chemical Equations, Stoichiometry, Solutions, and Organic Chemistry.

TEXT BOOK: Introductory Chemistry, Sevenaire & Burkett, WCB, 1997, 1st edition

EVALUATION: 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.
Laboratory attendance to each specific experiment is compulsory; a passing grade in the laboratory component is required to pass the course. There are NO 'make up' labs in this course.
Lab reports must be submitted on the required date and at the required time. Late reports will **NOT** be marked.

Penalties for late assignments are as follows:

1 day late – 20%, 1 days late – 50%, 3 days late – 0%

Marking Scheme:

Lab Reports:	15%
Assignments:	15%
Tests:	15%
Midterm:	15%
Final Exam:	40%
Total	100%

Unit I   REVIEW

		Pages
a.	Metric review	84 – 91
b.	Significant Figures	72 – 80
c.	Definition of : chemistry, matter, density, states of matter, classification of matter, properties of matter	30 – 33, 37 – 39, 47 – 48 91 – 96,
d.	Elements and their symbols.	
e.	Nomenclature*	222 – 250

* Nomenclature is one of the most important topics that you will learn at the secondary level. It will NOT be review at the post secondary level. If you are having trouble with this topic get help IMMEDIATELY!!! See me!

Unit VII   ORGANIC CHEMISTRY (Chapter 18)

On completing this section, you should be able to:

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

Unit VIII   BIOCHEMISTRY (Chapter 19)

On completing this section you should understand (at a basic level):

a)   Carbohydrates
b)   Lipids
c)   Proteins
d)   Biochemical reactions and enzymes
e)   Nucleic acids

Unit VI   STOICHIOMETRY (Chapter 9)

On completing this section, you should be able to:

a. Review balancing equations by inspection
b. Define formula(s) and molecular masses.
c. Define the mole and the Avogadro's number.   170
d. Convert masses of a substance in g into moles
   and vice-versa.
e. Determine the percentage composition of a compound
   if its formula is known.
f. Determine the empirical and the molecular formulas of
   compounds if their percentage compositions are known.
g. Define chemical equation.
h. Interpret a chemical equation in terms of the moles
   of various reactants and the products.
i. 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.
j. 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.
k. Perform calculations based on masses, volumes
   of gases or molarities of solutions.
l. Define concentration of solutions and give the units
   of molarity.
m. Work out problems involving moles, volumes and molarity.

MIDTERM

Unit II: ATOMIC STRUCTURE

(Some old stuff and a lot of new stuff)

(There will be some copies of Basic chemistry in the Learning Center and on reserve in the library)

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.   131

b. Describe Dalton's Atomic Theory   130
and explain how it has been modernized.

c. Describe Thomson's model of the atom   131
and its shortcomings.

d. Describe Rutherford 54 – 60 s's model of the   129 – 131
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.   134 – 136, 179

g. Solve problems involving the percents of various
isotopes of an element and its atomic mass.

h. Valence electrons   160

i. Define principal energy levels and give their
maximum capacity to hold electrons.

j. Distribute electrons in principal energy levels.   201 – 210

k. Define orbitals and explain different types of orbitals.

l. Distribute electrons in various orbitals.

Unit III CHEMICAL BONDING

On completing this section, you should be able to:

a. Write Lewis dot structures for elements if their
atomic numbers are given.

b. Define chemical bond and valence electrons.

c. Explain electronegativity and the polarity of molecules.   169

d. Explain ionic and covalent bonds giving examples   340 – 346
of each.

e. Predict the nature of bond(s) between two elements
from their Lewis dot structures or atomic numbers.

f. Explain double and triple bonds.

g. Discuss the nature of bonding between elements
of common compounds and ions.

h.	Discuss the shapes of molecules based on VSEPR theory.	347 – 363
i.	Explain hydrogen bonding and Van der Wall's forces.	434 – 437, 438 – 440
j.	Metallic bonding	345

Unit IV   PERIODIC TABLE

On completing this section, you should be able to:

a.	State the modern periodic law.	
b.	Explain groups and periods.	150 – 160
c.	Relate the electronic configuration of elements to groups and periods.	
d.	Locate the various groups of elements on the periodic table.	
e.	Describe the characteristics of representative and transition elements.	
f.	Discuss in detail the periodic trends, such as atomic size, metallic character, ionization energy and electronegativity.	

Unit V   PHASES OF MATTER (Not in this text) (as time permits)

On completing this section, you should be able to:

a.   Define boiling point, evaporation, and condensation

b.   Compare and explain the characteristic properties of gases, liquids, and solids using the kinetic molecular theory.

c.   Relate vapour pressure to boiling point.

d.   Explain how bonding types and molecular mass can affect boiling points and vapour pressure.

e.   Account for the unusual behavior of water.

Unit VI   SOLUTIONS

On completing this section, you should be able to:

a.	Define solute, solvent and solution.	456
b.	Discuss different types of solutions, such as gas, liquid, or solid solutions.	
c.	Define solubility and describe various factors that affect solubility.	461
d.	Define saturated, unsaturated and supersaturated solutions.	463