GRANDE PRAIRIE REGIONAL COLLEGE
DEPARTMENT OF ACADEMIC DEVELOPMENT

CHEMISTRY 0120
COURSE OUTLINE - FALL 1992

INSTRUCTOR: DEVINDER S. SEKHON

OFFICE: C 417

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

LAB SUPPLIES: Lab Coat
Lab note book

ATTENDANCE
AND LATENESS: Regular attendance is expected from all students, and is crucial for 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.

EVALUATION:

Lab Reports	20%
Tests	30%
Midterm Exam	20%
Final Exam	30%
	100%

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COURSE OUTLINE
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COURSE GOALS:

To provide an understanding in 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

STANINE	PERCENTAGE EQUIVALENCE	DESIGNATION
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	

UNIT I REVIEW

A. MEASUREMENTS IN CHEMISTRY

    text reference: Chapters 2 and 3

    1. List and give the abbreviations for the base units in SI
        for length, mass, time, amount of substance and temperature

    2. Write the SI names, symbols and numerical values for the
        prefixes kilo, cent, milli, micro.

    3. Make conversions between units in the SI system.

    4. Compare the SI units and not SI units of volume and
        density.

    5. Determine the amount of uncertainty in a measured
        quantity.

    6. Differentiate between mass and weight and accuracy and
        precision.

    7. Determine the number of significant figures in a number.

    8. Do mathematical computations using the correct number of
        significant figures.

    9. Determine percent error of an experiment

    10. Perform calculations using scientific notation.

B. CHEMISTRY AND MATTER:

    text reference: CHAPTER 4

    1. Define matter and chemistry.

    2. Distinguish among pure substances, homogeneous mixtures,
        heterogeneous mixtures, and solutions, giving examples
        of each.

    3. Distinguish between elements and compounds.

    4. Write symbols for common elements.

    5. Distinguish between physical and chemical properties, and
        chemical and physical changes giving examples of each.

    6. Identify and distinguish between the three physical states
        of matter.

C. ATOMIC STRUCTURE

> (text reference Chapters 6 and 13)

1. Distinguish between electrons, protons and neutrons in terms of their charge, relative mass and location in the atom. (6-1). Define quark (6-17).

2. Describe Dalton's Atomic Theory. Show how it has been modernized. (6 - 4, 6 - 5)

3. Define atomic number and mass number. (6-18, 6-19)

4. Determine the number of electrons, protons, neutrons in an element given its atomic number and its mass number. (6 -19)

5. Define ion, anion, cation and determine the number of electrons and protons in a given ion.

6. Define isotope. (6-16)

7. Define and determine the amu of an element. (6-12)

8. Outline the Bohr model of the atom (6 - 10)

9. Compare the Bohr model of the atom to the charge-cloud model of the atom. (6-11)

10. Explain brightline and continuous spectrums using atomic theory. (6-14)

11. Define principal enery levels and give the maximum number of electrons in each. (13-3)

12. Define sublevels and orbitals, give the maximum number of electrons in each. (13-3, 13-4)

13. Give electron configurations for elements and their ions up to atomic number 20. (13 - 8, 13 - 9, 13 - 10)

14. Define valence elctrons. (13-11)

15. Write Lewis dot structures for elements up to atomic number 20.

D. PERIODIC TABLE

(text refernce: chapter 14)

1. State the Modern Periodic Law. (14-1)

2. Describe the nature of periods and groups in the periodic table. (14 - 2)

3. Relate electronic configuration to the periodic table. (14 - 2)

4. Locate metals, non-metals and semimetals on a periodic table. (14-12)

5. Locate the halogens, noble gases, alkali metals, alkaline earth metals on the periodic table. (14 - 4)

6. Locate the representative elements, the transition elements on the periodic table.

7. Explain the periodic trends- atomic size, ionization energy, and electronegativity. (14-5, -6,-7,-8,-9)

CHEMISTRY 120 COURSE OBJECTIVES CONTINUED

UNIT II CHEMICAL BONDING

text reference: Chapter 15

1. Define chemical bond (15 - 1)

2. Compare ionic bonding and covalent bonding. Give examples
    of each. (15 - 2, 15 - 3)

3. Use electronic configuration and dot diagrams to represent
    ionic and covalent bonds (15 - 2, 15 - 5)

4. Define electronegativity. (14 - 7) Identify bond types
    based on differences in electronegativity values. (15 - 8)

5. Use electron dot structures to determine the shapes
    of molecules (VSEPR Theory) and to determine net molecular
    polarity. (15-6,15-8)

6. Account for the nature and effects of hydrogen bonding,
    metallic bonding and Van der Waal's Forces. (15 - 9, 10, 11)

7. Compare four classes of solids - ionic, molecular, metallic,
    and network. (15 - 12, 15 - 13)

UNIT III PHASES OF MATTER

text reference Chapter 11

1. Define boiling, melting, water vapor, evaporation and
    condensation. (11 - 5, 11 - 6)

2. Compare and explain the characteristic properties for
    gases, liquids, and solids using the Kinetic Molecular Theory
    (11-8, 11- 14)

3. Relate Vapor pressure to boiling (11 - 10)

4. Explain how bond types and molecular mass can affect boiling
    points and vapor pressure. (11 - 10)

5. Use a change of state graph to show heat of vaporization, heat
    of condensation, heat of fusion, heat of crystallization, and
    sublimation. (11-7,-12,-15,-16)

6. Account for the unusual behavior of water (11-20).

UNIT IV SOLUTIONS

Text reference chapter 16

1. Define solute, solvent, and solution (16-2)

2. Classify solutions as being either gas, liquid, or
   solid solutions. (16 - 3)

3. Define solubility. Discuss the three main factors that
   affect solubility. (16-5, 16-7)

4. Define rate of solution. Discuss the four main factors that
   affect the rate of solution. (16 - 6)

5. Define saturated, unsaturated, and supersaturated solutions
   (16 - 10)

6. Differentiate between dilute and concentrated solutions.
   (16 - 11)

UNIT V STOICHIOMETRY AND CHEMICAL EQUATIONS

text reference: chapter 8, 9, 10

1. Define stoichiometry. (8 - 1)

2. Determine atomic masses, formula masses and molecular
   masses. (8 -2, 8-3)

3. Define mole, and Avogadro's number. (8 - 4)

4. Make gram to mole and mole to gram conversions (8-5, 8-6)

5. Given a compound, determine its % composition. (8-8)

6. Given % compositions and molar masses determine the
   empirical formula and the molecular formula for a compound.
   (8 - 9, 8 - 10)

7. Balance chemical equations.(9 - 4)

8. Using the balanced equation, perform
   a. mole to mole relationships
   b. mole to mass relationships
   c. mass to mole relationships
   d. mass to mass relationships
   (10 - 3)

9. Perform calculations using percent yield and percent error.

10. Define molar volume of gasses. Use molar gas volumes to
    determine mass, volume or molar mass of a gas at STP.

11. Perform calculations using the balanced equations and gasses at STP.

UNIT VI ORGANIC CHEMISTRY

text reference: Chapter 24

1. Compare inorganic and organic compounds. (24 - 1)

2. Compare structural formulas and isomers (24 - 4)

3. Define hydrocarbon. Differentiate between open chain, and cyclic hydrocarbons. Differentiate between saturated and unsaturated hydrocarbons (24 - 5)

4. Describe the structures of each of the following groups of organic compounds: alkanes, alkenes, alkynes, aliphatic and aromatic hydrocarbons.

5. Name and give the stuctural formulas for the first ten members of the alkane, alkene, and alkyne series using the IUPAC nomenclature system.

6. Name and identify the functional groups found in alcohols, aldehydes, ketones, and carboxylic acids.