DOC.# 494

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: DEVELOPMENTAL CHEMISTRY

CODE NO.: CHM099-3 SEMESTER: 1 OR 2

PROGRAM: GENERAL ARTS & SCIENCE/WATER RESOURCES/PULP & PAPER

AUTHOR: MANFRED ENGEL

DATE: JULY 1991 PREVIOUS OUTLINE DATED: JANUARY 1988

APPROVED: _____ _____
DEAN DATE July 9/91

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TOTAL CREDIT HOURS: 48

PREREQUISITE(S): None

I. PHILOSOPHY/GOALS:

The course is designed to provide an introduction to general chemistry for students with little or no secondary school chemistry. Upon successful completion, the student will have the necessary entrance qualifications to pursue studies in Nursing, Water Resources, Environmental Engineering and Pulp and Paper.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will:

1. Have a general understanding of the Atomic Structure and the Periodic Table.
2. Able to write formulas of compounds and write equations of chemical reactions.
3. Perform simple chem. calculations based on the Mole Concept.
4. Do calculations based on the Ideal Gas Law and calculate solution concentrations.

III. TOPICS TO BE COVERED:

1. Chemistry, Matter and Energy.
2. Structure of Matter.
3. Electron Configuration and the Periodic Nature of Elements.
4. Bonding and Naming of Compounds.
5. Chemical Reactions and quantitative relationships. (the Mole)
6. States of Matter.
7. The Gas Laws.
8. Solutions.

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IV. LEARNING ACTIVITIES:

1. Matter

The student will be able to:

1. Explain what matter is.
2. Describe physical and chemical properties of matter.
3. Give a classification of Matter.

REQUIRED RESOURCES

Text: Chemistry - an Introduction

Study Chapter 1 - Matter pp. 1-18
Complete teacher assigned questions from:

page 18 What is Matter Q 1.1-1.4
page 18 Properties Q 1.5-1.7
page 19 Model Q 1.8-1.16
page 19 Classification Q 1.17-1.22

2. Atoms and Molecules

1. Use chemical element symbols to write formulas for compounds.
2. Calculate molecular weights of compounds.
3. Determine the No. of Protons, Neutrons & Electrons in Atoms.
4. Calculate the masses of isotopes.
5. Use the mole concept to determine relationships between number of moles, number of grams and number of atoms for elements and compounds.

Study Chapter 3 - pp. 53-74
Complete assigned questions.

page 75 Symbols and Formulas Q 3.1-3.3
page 75 Masses Q 3.4-3.9
page 76 Isotopes Q 3.10-3.15
page 76 The Mole Q 3.16-3.34

or complete "Worksheets 1 and 2".

3. Electronic Structure

1. Locate elements on the Periodic Table from period and group designations.
2. Determine the arrangements of electrons in shells, subshells and orbitals of elements.
3. Relate electronic structure to the location of the elements on the Periodic Table.
4. Classify elements into metal, nonmetal, metalloid, noble gas and transition element.

Study Chapter 4 pp. 79-99
Complete assigned questions.

page 100 The Periodic Table Q 4.1-4.3
page 100 Atomic Structure Q 4.4-4.13
page 100 Electron Configurations Q 4.14-4.22

or complete "Worksheets".

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IV. LEARNING ACTIVITIES: (cont'd) | REQUIRED RESOURCES:

4. Forces between particles (Bonding) | Study Chapter 5 pp. 104-129
Complete assigned questions

1. Define ionic and covalent bonding.
2. Use the octet rule predict the ions formed during the formation of ionic compounds.
3. Represent simple covalent molecules and polyatomic ions by electron dot formulas.
4. Name and write formulas of binary and polyatomic compounds.
5. Use electronegativities to determine the type of bonding that is likely to occur.

page 130 Electron Arrangements Q 5.1-5.12
Ionic bonding Q 5.4-5.12
page 131 Covalent Bonding Q 5.13-5.20
page 132 Polyatomic Ions Q 5.21-5.24

and complete worksheet on Naming of compounds.

5. Chemical Reactions and Stoichiometry | Study Chapter 6 pp. 133-157
Complete assigned questions.

1. Identify reactants and products in written equations.
2. Balance simple reactions.
3. Assign oxidation numbers to elements in chemical formulas.
4. Classify reactions as redox, non redox, decomposition, combination or replacement types.
5. Use the Mole concept to do simple calculation based on chemical reactions.

page 157 Chemical Equations Q 6.1-6.4
page 158 Oxidation Numbers Q 6.5-6.11
page 159 Types of Reactions Q 6.12-6.18
page 160 Mole Concept Q 6.25-6.36

6. States of Matter | Study Chapter 7 pp.163-181
Complete assigned questions.

1. Explain properties of matter such as density compressibility, thermal expansion.
2. Explain relationship between states of matter and energy.

page 181 Change in State Q 7.18-7.19

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IV. LEARNING ACTIVITIES: (cont'd)	REQUIRED RESOURCES:
7. The Gas Laws	Study Chapter 8 pp. 185-197 Complete assigned questions.
1. Do calculations based on Boyles' Law, Charles' Law and the Comnbined Gas Law.	page 206 Gas Laws Q 8.1-8.23 Complete "Worksheet" on Gas Laws.
8. Solutions	Study Chapter 9 pp. 210-231. Complete assigned questions.
1. Be able to identify solutes and solvents in solutions.	page 234 Solutions Q 9.1-9.6 page 235 Solution Concentrations Q 9.12-9.19
2. Write definition of the term: soluble and insoluble substances, immiscible, saturated and super saturated solution.	
3. Calculate solution concentrations in units of molarity, weight/weight percent, weight/Vol percent and Volume/volume percent.	

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V. EVALUATION METHODS:

The students final mark for this course will be based on the following:

Topic tests 100%

Grades reported on your transcript are based on a weighted average of test scores on the following basis:

90 - 100%	A+
80 - 89%	A
65 - 79%	B
55 - 64%	C
0 - 54%	R or X

The method of calculating a weighted average is described in your student handbook.

All tests are scheduled in advance. Hence attendance for tests is mandatory. Unexcused absence from a test will result in a mark of zero for that test. A student may be prevented from attending a test by illness or bereavement. Upon return to classes, the student must see the instructor at the end of the first class attended to arrange a time and place for a make up test. In addition, if the absence is do to illness the student must present a note from the student's doctor or from the College nurse.

VI. REQUIRED STUDENT RESOURCES:

Chemistry - An Introduction by Michael R. Slabaugh & Spencer L. Saeger, West Publishing Company.

VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY BOOK SECTION:

Books with Titles such as: Introduction to Chemistry or General Chemistry; especially "In Preparation for College Chemistry", W. S. Seese, G. W. Daub.

Computer programs on Chemistry in the Learning Assistance Centre.

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VIII. SPECIAL NOTES:

Students with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.