SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: CHEMISTRY

Code No.: CHM 108-3

Program: GEOLOGICAL ENGINEERING TECHNICIAN

Semester: THREE

Date: JULY, 1985

Author: J. S. KORREY

New: _____ Revision: X

APPROVED: _____ July 19/85
Chairperson Date

CALENDAR DESCRIPTION

CHEMISTRY	CHM 108-3
Course Name	Course Number

PHILOSOPHY/GOALS:

This course provides the Geology student with a basic understanding of chemistry and the sciences. Topics discussed are the structure of matter, the nature of electrons in atoms, the periodic table, chemical bonding, nomenclature, equations, solution chemistry, solubility rules and chemical calculations. The related lab work being intended to teach basic techniques of weighing, decantation, filtration and extraction. The student is also required to write laboratory reports.

METHOD OF ASSESSMENT (GRADING METHOD):

			Weighting
A = 80 - 100%	Theory	38 hours	80% of Mark
B = 70 - 79%	Lab	10 hours	20% of Mark
C = 60 - 69%	Testing	3 hours	
I = 59 or less		51 hours	

(3 hours per week for 17 weeks = 51 hours)

TEXTBOOK(S):

MacQuarrie, D.A.; Rock, P.A., General Chemistry, W.H. Freeman & Co., 1984.

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TOPIC NO.	PERIODS	TOPIC DESCRIPTION
1	5	**ATOMS AND MOLECULES**
		1-1 Why Should a Geologist study Chemistry?
		1-2,3 Elements - The Simplest Substances
		1-4 Density of Metals
		1-5 Relative Amounts of Each Element in a Compound is Constant
		1-7 Molecules - groups of elements joined together
		1-8 Chemical Nomenclature
		1-9 Atomic and Molecular Mass
		1-11,13 The Structure of the Atom - Sub Atomic Particles
		1-12 The Nucleus
		1-13 Isotopes, Atomic No., Mass No.
		1-16,17 Significant Figures
		1-18 Metric Units in Chemistry
		Summary
		Problems on Unit 1
2	4	**CHEMICAL ELEMENTS & THE PERIODIC TABLE**
		2-1 Chemical Reactions
		2-2,3 Chemical Equations
		2-4 Properties of Elements
		2-5,10 Periodic Table
		- Periods
		- Groups
		- Metals, Non-Metals
		- Trends:
		2-11,13 Use of Table
		Summary
		Problems on Unit 2
3	3	**CHEMICAL CALCULATIONS**
		3-1,2 The Mole, Arogadro's No.
		3-3 Simplest or Empirical Formulas
		3-5 Molecular Formula
		3-6,7,8 Chemical Equations
		3-10 Molarity
		Summary
		Problems on Unit 3

TOPIC NO.	PERIODS	TOPIC DESCRIPTION
4	1	**INTERCHAPTER B - SEPARATION OF MIXTURES** (N.B. SOME OF THE TOPICS ARE RELATED TO LAB #3) Heterogeneous vs. Homogeneous Extraction with Solvents, Sublimation Filtration Distillution Chromatography
5	4	**CHEMICAL REACTIONS** 4-1 Combination Reactions 4-2 Stable Polyatomic Ions 4-3 Ions with More than One Possible Charge (Oxidation State) 4-4 Reactions of Oxides with Water 4-5 Decomposition Reactions 4-6 Single Replacement 4-7 Reactivity of Metals 4-8 Single Replacement Reactions with Solids (Metals) 4-9 Reactivity of the Halogens 4-10 Double Replacement Reactions 4-11 Neutralization 4-12 Titrations Summary Problems
6	4	**QUANTUM THEORY** Ionization Energy - Trends Wave Nature of EMR Energy Levels Quantum Numbers

TOPIC NO.	PERIOD	TOPIC DESCRIPTION
6	5	**ELECTRON STRUCTURE & PERIODIC PROPERTIES OF ATOMS**
		Memory Aid for Ordinary Orbital Energies of Atoms
		Pauli Exclusion Principle
		Hund's Rule to Predict Ground State Electronic Configurations
		Electron Configurations & The Periodic Table
		Atomic Radius -Trend
		Summary
		Problems
7	4	**CHEMICAL BONDING**
		9-1,2,3 Ionic Bonds
		9-4 Ionic Radii
		9-5,6 Ions & Conductivity
		9-7 Electron Affinity
		Summary
		Problems
7	8	**COVALENT BONDING**
		10-1 Definition - Sharing
		10-2 Lewis Formulas & Octet Rule
		10-3,4, 9,10 Exceptions, H_2, etc.
		10-5,6 Polyatomic Ions
		10-7 Resonance
		10-8 Use of Charges to Choose a Preferred Lewis Formula
		10-11 Electronegativities
		10-12 Polarity
		Summary
		Problems

CHM 108-3 LAB

(5 Weeks) 5 x 2 = 10 hours

The laboratory work is intended to teach techniques and to familiarize the student with the need to make accurate measurements. In order to accomplish this, the student will perform the following experiments:

1. Introduction to Laboratory Techniques
   a) Determine the mass of a metal slug.
   b) Determine the density of the metal slug.
2. Determination of the water of hydration.
3. The separation of the components of a mixture.