COURSE AND EVALUATION

	COURSE EVALUATION PROFILE & OUTLINE **DEPARTMENT: SCIENCE**	**2006/2007** **COURSE NAME: CHEMISTRY** **COURSE CODE: SCH3U**

Course Description/Rationale/Overview:
This chemistry course enables students to deepen their understanding of chemistry through the study of organic chemistry, energy changes and rates of reaction, chemical systems and equilibrium, electrochemistry, and atomic and molecular structure. The girls will advance further their problem-solving and laboratory skills as they investigate chemical processes, at the same time refining their ability to communicate scientific information. Emphasis will be placed on the importance of chemistry in daily life, and on evaluating the impact of chemical technology on the environment. The girls will also investigate different facets of the intersection of chemistry with the health sciences. The focus of the activities in this course is the knowledge and skills required for the success in similar university courses.

Prerequisite:
To enrol in this course the student must have taken SNC2D. It is recommended that a minimum mark of 70% was achieved in grade 10 academic program.

Learning Skills	**Evaluated on Report Card as:** **E (excellent); G (good); S (satisfactory); N (needs improvement)**
Works Independently	Work without constant supervision; work until tasks are complete
Teamwork	Listen to and work cooperatively with others; share ideas and tasks with classmates; respect the rules of classroom and show courtesy towards other
Organization	Fully prepared for class (text, notebook & writing materials); notebook is well organized
Work Habits	Complete homework and assignments on time and with care; prepared to start work at the beginning of class
Initiative	Respond positively to new challenges; listen carefully to instructions and seek clarification when needed

Achievement Categories for Course Work	**Description**	**Course Work Value (70%)**
Knowledge/understanding	- knowledge of facts & terms - understanding concepts, principles, and theories - understanding of relationships between concepts	**35%**
Thinking	- critical thinking skills (conducting analysis, detecting bias) - creative thinking (problem solving) - inquiry skills (formulating questions; conducting research; analysing, interpreting, and evaluating information; drawing conclusion)	**25%**
Communication	- communication of information and ideas - use of symbols and visuals (use of technology - multi media) - oral communication (debates, role-playing) - written communication (reviews, short essays) - application of concepts, skills, and procedures - transfer of concepts, skills, and procedures to new concepts	**20%**

Application	- making logical conclusions or generalizations - making predictions and planning courses of action - making connections	**20%**

Summative Evaluation (30%)
Summative 10 % 3 days a combination written lab and evaluative work including all units
Final Exam 20 %

Units of Study/Strands

STRAND 1: MATTER AND CHEMICAL BONDING - 24 HOURS

- Chapter 1: Nature of Matter
  - Elements and periodic table, periodic law, periodicity of properties, Ionisation energy, Electron affinity, Electro negativity, Atomic radius compounds, models of atom, understanding atomic mass units, atomic theory, atomic spectra, science of flame test and its applications, electronic configuration.

- Chapter 2: Chemical Bonding
  - Classification of compounds, Ionic compounds, Covalent compounds or Molecular compounds, Ionic and Covalent bonding, Polar bonds and Polar molecules, predict ionic character, draw Lewis structures, construct molecular models and give structural formulae for compounds containing single and double bonds, hydrogen bonds and its importance, Naming of compounds using the IUPAC system of naming compare common and systematic names. Predicting geometry based on polarity etc.

- Chapter 3: Chemical reactions
  - Reorganizing Physical and chemical changes, the different types of reactions like combustion, synthesis and decomposition, investigate the reactions of elements experimentally to produce the reactivity series, Recognize the need for safe use of chemicals in everyday life

STRAND 2: QUANTITIES IN CHEMICAL REACTION - 20 HOURS

- Chapter 4: Quantities in Chemical Formulas
  - Law of chemical combination (definite proportions Joseph Proust) Relative atomic mass and isotopic abundance, mole and molecular mass, stoichiometric calculations involving mass, number, % composition, empirical and molecular formulas and their determinations, instrumental methods of determination of molar mass using mass spectrometer.

- Chapter 5: Quantities in Chemical Equations
  - Quantitative analysis, excess reagent, limiting reagent, balancing of equations, balancing of nuclear equations, radioactive decay, alpha, beta and gamma decay, artificial transmutation, fusion and fission, gravimetery and calculation of mass of reactants and products, calculation of limiting and excess reagent, theoretical yield and practical yield, chemistry in technology, solvay process.

STRAND 3: SOLUTIONS AND SOLUBILITY - 23 HOURS

- Chapter 6: The nature and properties of solutions
  - Definitions of homogenous, heterogeneous solutions, solute, solvent, electrolytes, non electrolytes, intermolecular forces of attractions, intermolecular forces, hydrogen bonds, polarity, London's forces Vandervaals forces, factors affecting solubility of compounds in water and other solvents "universal solvent" concentration terms like percentage concentration, ppm, ppb molar concentration, W/V V/V W/W etc. drinking water, aquifers, water contamination, water treatment, agricultural run off. Preparation of standard solutions.

- Chapter 7: Solubility and Reactions
  - Saturated solution, dilute solution, solubility, solubility curves, miscible and immiscible solutions, crystallisation, low solubility, high solubility and insoluble solutes, precipitates, effect on solubility. Hard water treatment, water softening, reactions in solutions, total ionic equations, net ionic equations and spectator ions. Waste water treatment. Qualitative analysis, Quantitative analysis, solution stoichiometry using molar concentrations.

- Chapter 8: Acids and Bases
  - Acids and bases, dissociation and ionisation, percentage ionisation, strong acids and weak acids, pH and its calculation, Arrhenius, Bronsted-Lowry theory of acids, hydronium ion formation strong and weak bases, (Lewis acid base theory) Titration, titrant, standard solution,

STRAND 4: GASES AND ATMOSPHERIC CHEMISTRY - 12 HOURS 15

- Chapter 9: The gas state
  - States of matter, kinetic molecular theory, STP, SATP, Gas laws, Boyles law, Charles law, Gaylussacs law, Avogadros law, Combined gas law, ideal gas equation, Atmospheric pressure, Kelvin temperature scale, compressed gases, air quality, nitrogen cycle, ground level ozone,

- Chapter 10: Gas Mixtures and Reactions
  - Mixtures of gases, Daltons law of partial pressures, applications of partial pressures, reactions of gases, molar volume (GMV) The ozone layer, Montreal protocol, gas stoichiometry, application of gases.

STRAND 5: ORGANIC CHEMISTRY - 12 HOURS 23

- Hydrocarbons
  - Classification of organic compounds, sources of organic compounds, uses refining of petroleum, fractional distillation of crude oil, alkanes, alkenes, cycloalkanes, alkynes, cycloalkenes, saturation and unsaturation and its identification. Cracking and reforming of hydrocarbons, global warming, incomplete combustion of hydrocarbons. IUPAC naming of organic compounds, properties of alkanes, alkenes and cycloalkanes, structural diagrams of alkanes, alkenes and alkynes, geometric and structural isomerism, diversity in organic compounds different allotropes including fullerene. Polymers

- Energy from Hydrocarbons
  - Heat, chemical, nuclear, solar, and geothermal energy, endothermic and exothermic reactions, calorimetry, heat capacity, thermo chemical equations our use of fossil fuels, petrochemicals from fossil fuels,
- **Other expectations**
  - 45 - 50 minutes of homework per night average
  - Buy approved safety goggles or safety glasses
  - Keep steno pad or lab observation book for recording data
  - Record all you test and quiz marks for your record on a mark tracking sheet
  - Be present in class everyday
  - Do not be late for class

Textbook and Other Required Materials:
Nelson Chemistry 11
Course notes
Goggles