SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	**GENERAL CHEMISTRY I**		
CODE NO. :	**CHM102**	**SEMESTER:**	**I**
PROGRAM:	**PRE-HEALTH SCIENCES, GENERAL ARTS AND SCIENCE**		
AUTHOR:	**LISE ST. HILAIRE**		
DATE:	**JAN 2015**	**PREVIOUS OUTLINE DATED:**	**MAY 2014**
APPROVED:	"Colin Kirkwood"		Dec. 11/14
	_____ **DEAN**		_____ **DATE**
TOTAL CREDITS:	**4**		
PREREQUISITE(S):	**GRADE TEN SCIENCE OR EQUIVALENT**		
HOURS/WEEK:	**3 HOURS LECTURE, 2 HOURS LAB (alternate weeks)**		

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I. COURSE DESCRIPTION:

This introductory chemistry course provides students with the scientific knowledge required to understand the structure, properties, and changes of matter, as well as the mathematical knowledge and skills required to perform quantitative calculations for chemical reactions, solutions, and gases.

This course includes topics in physical and chemical properties of matter, atomic structure, chemical bonding, chemical nomenclature, shape and polarity of molecules, chemical reactions, the mole concept, stoichiometry of chemical reactions, states of matter, interactions between molecules, the gas laws, and solubility and solutions.

The theory will be supported by laboratory experiments where students will be required to carry out common lab procedures and calculations. The purpose of the lab work is to develop practical skills while gaining a better understanding of the theoretical concepts.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE

Upon successful completion of this course the student will demonstrate the ability to:

1) Define the general terms commonly found in chemistry and perform related calculations.

Potential Elements of Performance:

- Utilize the S.I.system of units and describe and apply the scientific rules of rounding and the rules of significant digits.
- Define matter, mass, weight, volume, density, specific gravity, and temperature.
- Calculate density, volume, or mass in theoretical applications and through lab procedures.
- Describe three commonly used temperature scales and perform conversions from one to the other.

2) Describe matter.

Potential Elements of Performance:

- Describe and distinguish between physical and chemical properties and changes of matter.
- Describe the classification of matter.
- Describe atomic structure and determine numbers of subatomic particles and the identity of elements given incomplete data.
- Differentiate between Dalton's Atomic Theory and the Modern Atomic Theory.
- Describe the organization and trends in the periodic table.
- Identify and compare the properties of metals, nonmetals, and metalloids.

3) Explain chemical bonding.

Potential Elements of Performance:

- Use Lewis structures to demonstrate an understanding of ionic and covalent bonding.
- Compare ionic and covalent bonding and the properties of ionic and covalent compounds.
- Describe and predict the polarity and molecular shape of molecules and their effects on the properties of compounds.

4) Identify compounds by formula and by name.

Potential Elements of Performance:

- Predict chemical formulae based on oxidation states.
- Count atoms in a chemical formula.
- Use the IUPAC system of nomenclature to name inorganic compounds.

5) Describe chemical reaction types and perform quantitative calculations for chemical reactions.

Potential Elements of Performance:

- Describe synthesis, decomposition, combustion, and single and double replacement reactions.
- Identify these reaction types given chemical equations.
- Apply knowledge of reactions to determine products given reactants.
- Balance chemical equations.
- Define mole, molar mass, percent composition, empirical and molecular formula, limiting reagent, and percent yield.
- Calculate moles, mass, and number of particles in theoretical applications.
- Calculate the percent composition of a compound.
- Determine empirical and molecular formulae of compounds using percent composition or experimental data.
- Use stoichiometry to determine limiting reagents and to calculate chemical quantities and percent yield.

6) Describe solutions and perform quantitative analysis of solutions.

Potential Elements of Performance:

- Describe the components and types of solutions.
- Explain the factors affecting solubility and the rate of dissolving.
- Compare the types of intermolecular forces and how these forces affect the properties of compounds.
- Describe and differentiate between diffusion and osmosis.
- Calculate the percent concentration and molar concentration of solutions.
- Determine quantities needed to dilute solutions to specific concentrations.
- Perform stoichiometric calculations for ions and compounds in solutions.

7) Apply the gas laws.

Potential Elements of Performance:

- Use the particle theory of matter to compare solids, liquids, and gases.
- Describe the assumptions made when describing an ideal gas.
- Describe and apply the gas laws theoretically and quantitatively.
- Perform stoichiometric calculations for chemical reactions involving gases.

IV. TOPICS

1. Measurement and Measurement Systems
2. Properties of Matter
3. Atoms, Molecules and Ions
4. Ionic and Covalent Bonding
5. Chemical Nomenclature
6. Chemical Calculations and Reactions
7. Solutions and Solubility
8. Properties of Gases

LABORATORY WORK

In a laboratory setting, the student will conduct experimental procedures to support the theoretical concepts. The laboratory topics will include:

1) Reading instruments and recording measurements using correct precision.
2) Determine the density of an unknown solid and liquid using gravimetric (weighing) technique.
3) Separation of an unknown into its components based on differences in physical properties.
4) Chromatography to separate compounds based on polarity.
5) Determine the mass percentage of water in a hydrate and calculate the formula of an unknown hydrate.
6) Conduct chemical reactions and identify the products formed from the given reactants.

V. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. Textbook: Corwin, Charles H. (2014). *Introductory Chemistry: Concepts and Critical Thinking,* 7th Edition. Pearson Education, Inc.

2. Lab Materials: Lab Coat, Safety Glasses

VI. EVALUATION PROCESS/GRADING SYSTEM

Evaluation methods:

Unit Tests (5 units at 10% each)	50%
Lab Work	30%
Final Exam	20%

Notes:

1. ***Students must achieve an average of at least 50% on test and exam material, independent from the lab work, to obtain a passing grade in the course.***
2. ***Students must achieve a minimum grade of 50% on lab material, independent from the test/exam grade, to obtain a passing grade in the course.***
3. ***Missed tests, labs, or exam will be given a grade of 0 unless notification of a legitimate reason is given PRIOR to test/lab time. Regardless of the circumstances, please discuss the situation and available options with your professor upon return to class.***

The following semester grades will be assigned to students in postsecondary courses:

Grade	Definition	Grade Point Equivalent
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI. SPECIAL NOTES:

Attendance:
Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

VII. COURSE OUTLINE ADDENDUM:

1. Course Outline Amendments:
   The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

2. Retention of Course Outlines:
   It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

3. Prior Learning Assessment**:**
   Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

   Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

   Substitute course information is available in the Registrar's office.

4. Accessibility Services:
   If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Accessibility Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

5. Communication:
   The College considers ***Desire2Learn (D2L)*** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of this Learning Management System (LMS) communication tool.

6. Academic Dishonesty:
   Students should refer to the definition of "academic dishonesty" in *Student Code of Conduct*. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

7. Tuition Default:
   Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of November (fall semester courses), first week of March (winter semester courses), or first week of June (summer semester courses) will be removed from placement and clinical activities due to liability issues. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.

8. Student Portal:
   The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to https://my.saultcollege.ca.

9. Recording Devices in the Classroom:
Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.