



SGC101

Course:	Chemistry I : Foundations of Chemistry
Course Code:	SGC101
Times & Location:	Online Tutorial: Wednesdays 7:30 – 9:00 pm EST
Course Coordinator:	Dr. Melanie Facca, BSc, MS, ND
Instructors/Teaching Assistants:	
E-mail:	
Office Hours:	By appointment
Office Location:	Online

Evaluation:

	PERCENT	TEST DATE / DUE DATE
Tutorial Participation/ Attendance	5%	Weekly tutorial
Module Quizzes	10%	10 Self-Scheduled Quizzes
Assignments	5%	2 Assignments - Assignment #1 deadline: TBA - Assignment #2 deadline: TBA
Midterm Test	30%	TBA
Final Exam	50%	TBA

Plagiarism and cheating are academic offenses and will be treated seriously by the College. Students should refer to the college's policies on academic misconduct posted on the [Academic Calendar](#). Students may seek guidance from a number of style manuals located in the CCNM library.

Required Texts:

Timberlake. *Chemistry: An Introduction to General, Organic and Biological Chemistry*. Pearson, 2017, 13th Edition.). Published by Pearson.

Course Description:

Chemistry I (SGC101) is a three-credit, 8-week introductory course designed to introduce students to the fundamental concepts of chemistry. The course will emphasize the physical and chemical principles of chemistry relating to matter and its transformations including measurement, atoms and molecules, nuclear chemistry, ions, the mole, reaction stoichiometry, gases, solutions, and acids and bases.

The application of chemical fundamentals to naturopathic medicine is integrated throughout the course, providing students with a unique opportunity to learn chemistry within the context of naturopathic medicine. Incorporation of a virtual laboratory component enhances and re-enforces material covered in the course and allows the student to experience a practical application of chemistry while maintaining the convenience of an online chemistry course.

Prerequisites

There are no prerequisite requirements for Chemistry I.

Course Outcomes:

On completion of the course the student will be expected to:

- Demonstrate a basic understanding of chemistry.
- Perform the calculations required of introductory chemistry
- Demonstrate knowledge of the fundamental laws and vocabulary as they pertain to chemistry.
- Effectively read and communicate scientific information
- Apply knowledge of chemistry to a clinical setting
- Demonstrate knowledge of the principles and process of the chemical experiment.

Pedagogy:

The course is delivered in a blended learning style which combines online self-study modules with weekly live interactive online tutorial sessions from 7:30 - 9 p.m. EST (one evening per week) with the course instructor.

Evaluation:

The passing grade is 60%, and evaluations/assessments will consist of tutorial attendance/participation (5%), one quiz per module (10%), two assignments (5%), one midterm test (30%), and a final exam (50%) which can be completed online and will be proctored via remote invigilation.

SGC101 Chemistry I: Foundations of Chemistry

Lecture Schedule

Class	Date	Topic	Modules
1	TBA	Introduction to course	
2	TBA	Modules 1 & 2	Chemistry in Our Lives & Chemistry and Measurement
3	TBA	Modules 3 & 4	Matter and Energy & Atoms and Elements
4	TBA	Modules 5 & 6	Nuclear Chemistry & Ionic and Molecular Compounds
	TBA	Midterm Week	No Webinar (Includes Modules 1-5)
5	TBA	Modules 7 & 8	Chemical Quantities and Reactions & Gases
6	TBA	Modules 9 & 10	Solutions & Acids & Bases and Equilibrium
	TBA	Final Exam Week	Final Exam is cumulative

Tutorial 1

SGC101 Chemistry I: Foundations of Chemistry Session Learning Outcomes

SGC101

Introduction to SGC101 Chemistry I: Foundations of Chemistry

Course By the end of this session, the student will be able to:

- Navigate Moodle SGC101 course shell and GoToWebinar programs
- Understand course requirement, including textbook readings, evaluations and deadlines
- Begin completion of Modules 1 and 2

Deadline: Post a brief introduction on "Please introduce yourself" forum before the start of the tutorial.

Tutorial 2

Date: TBA

Chemistry in Our Lives & Chemistry and Measurement

By the end of this session, the student will be able to:

- Define chemistry
- Identify 3 ways in which we experience chemistry in our everyday lives
- Describe the 4 components of the scientific method: Observations
Hypothesis
Experiments
Conclusions
- Correctly perform the math concepts used in chemistry including (but not limited to); manipulation of positive and negative integers
solving algebraic equations
interpreting graphical data

- writing numbers in scientific notation
- Write the names and abbreviations for the metric or SI units used in measurements of length, volume, mass, temperature and time.
- Identify a number as measured or exact
- Determine the number of significant figures in a measured number
- Adjust calculated answers to give the correct number of significant digits
- Use the numerical value of prefixes to write a metric equity
- Write a conversion factor for 2 units that describe the same quantity
- Use conversion factors to change from one unit to another
- Calculate the density of a substance
- Use density to calculate the mass or volume of a substance

Deadline: Complete Modules 1 and 2 before the start of the tutorial.

Tutorial 3

Date: TBA

Matter and Energy & Atoms and Elements

By the end of this session, the student will be able to:

- classify examples of matter as pure substances or mixtures
- identify the states of matter
- identify the physical and chemical properties of matter

- identify physical and changes of matter
- calculate a temperature when given a temperature on another scale
- identify energy as being either kinetic or potential
- convert between units of energy
- use energy values to calculate the kilocalories or kilojoules for a food
- use specific heat to calculate heat loss or heat gain
- describe the changes of state between solids, liquids and gases
- calculate the energy during changes of state
- write the chemical symbol when given the name of an element
- write the name of an element when given the chemical symbol
- use the periodic table to identify the group and period of an element
- identify an element as a metal, nonmetal or metalloid
- describe the electrical charge and location in an atom for a proton, a neutron and an electron
- determine the number of protons, neutrons and electrons in an atom when given the atomic number and mass number
- determine the number of protons, neutrons and electrons in one or more isotopes of an element
- calculate the atomic mass of an element using percent abundance and mass of naturally occurring isotopes
- write the electron arrangement of the first 20 elements
- use the electron arrangement of the elements to explain trends in periodic properties

Deadline: Complete Modules 3 and 4 before the start of the tutorial.

Tutorial 4

Date: TBA

Nuclear Chemistry & Ionic and Molecular Compounds

By the end of this session, the student will be able to:

- explain alpha, beta, positron and gamma radiation
- write a balanced nuclear reaction showing mass numbers and atomic numbers
- calculate the amount of radioisotope remaining after one or more half-lives
- describe the use of radioisotopes in medicine
- write the symbol of the simple ions of the representative elements
- write the correct formula for an ionic compound
- write the chemical formula of an ionic compound if given its name
- write the name of an ionic compound if given its formula
- write the name and formula for an ionic compound containing a polyatomic ion
- write the name of a molecular compound from its formula
- write the formula of a molecular compound from its name
- use electronegativity to determine the polarity of a bond
- predict the 3 dimensional shape of a molecule
- classify a molecule as being polar or nonpolar
- describe the attractive forces between ions, polar covalent molecules and nonpolar covalent molecules

Deadline: Complete Modules 5 and 6 before the start of the tutorial.

Tutorial 5

Date: TBA

Chemical Quantities and Reactions & Gases

By the end of this session, the student will be able to:

- use Avogadro's number to determine the number of particles in a given number of moles
- calculate the molar mass of a substance given its chemical formula
- use molar mass to convert between grams and moles
- determine the number of atoms in the reactants and products in a chemical reaction
- write a balanced chemical reactions from the formulas of the reactants and products for a given reaction
- identify a reaction as a combination, decomposition, single displacement, double displacement or combustion.
- define the terms oxidation and reduction
- identify reactants as being oxidized and reduced
- given a quantity in moles of a reactant or product, use a mole-mole factor from the balanced chemical equation to calculate the number of moles of another substance in the reaction
- given the mass, in grams, of a substance in a reaction, calculate the mass, in grams of another substance in the reaction
- describe exothermic and endothermic chemical reactions
- describe the factors that affect the rate of a chemical reaction
- describe the molecular kinetic theory of gases
- describe the units of measurement used for gases
- understand the pressure-volume relationship (Boyle's Law) to determine final pressure or volume of a gas
- use the temperature-volume relationship (Charles' Law) to determine

- the final temperature or volume of a gas when pressure and the amount of gas is held constant
- use the temperature-pressure relationship (Gay-Lussac's Law) to determine the final temperature or pressure of a gas
 - use the combined gas law to calculate the final pressure, volume or temperature of a gas when changes in two of these properties are given
 - use Avogadro's law to calculate the amount or volume of a gas when the pressure and temperature are held constant
 - use Dalton's Law of partial pressures to calculate the total pressure of a mixture of gases

Deadline: Complete Modules 7 and 8 before the start of the tutorial.

Tutorial 6

Date: TBA

Solutions & Acids & Bases and Equilibrium

By the end of this session, the student will be able to:

- identify the solute and the solvent in a solution
- describe the formation of a solution
- identify electrolytes and nonelectrolytes
- define solubility
- distinguish between a saturated and an unsaturated solution
- identify a salt as soluble or insoluble
- calculate the concentration of solute in a solution
- use concentration units to calculate the amount of solute or solution
- describe the dilution of a solution
- calculate the final concentration or volume of a solution
- describe how the number of particles in a solution affects osmotic pressure
- identify a mixture as a solution, a colloid or a suspension
- describe and name acids and bases
- identify Bronsted-Lowry acids and bases
- write equations for the ionization of acids and bases
- explain acid-base equilibrium
- use Le Chatelier's principle to determine the effect on equilibrium concentrations when reaction conditions change
- use the ion product of water to calculate the $[H_3O^+]$ and the $[OH^-]$ in an aqueous solution
- calculate the pH of a solution given its $[H_3O^+]$
- calculate the $[H_3O^+]$ of a solution given its pH
- write balanced equations for the reactions of an acids and a bases
- calculate the molarity or volume of an acid from titration information
- describe the role of buffers in maintaining the pH of a solution

Deadline: Complete Modules 9 and 10 before the start of the tutorial.