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CURRICULUM GUIDE: OFFICIAL COURSE OUTLINE

Course Code	CHEM 100	Course Title	Introductory Chemistry			
Credit Value	4	Department	Mathematics and Science			
No. of weeks	14	Hrs. per week	*Lecture*	*Tutorial*	*Laboratory*	*Total*
			3	0	3	6
Course Description	The course begins with a review of core concepts, then covers gases, thermochemistry, chemical equilibria, acids and bases, properties of solutions including freezing point depression and boiling point elevation, and oxidation and reduction. The course consists of lectures, tutorials and integrated laboratory experiments. It can be used as a prerequisite for Chemistry 101 by students without Chemistry 12.					
Prerequisite(s)	ENGL 098; MATH 100 is strongly recommended					

Initial Articulation Targets	*UBC*	*SFU*	*UVic*	*UNBC*	*TRU*
	CHEM_V 1st (3), Not for credit in Science or Applied Science. No credit with CHEM 12 or any prior or concurrent CHEM credits	CHEM 111 (4), Q/B-Sci	CHEM 091 (0)	CHEM 1XX (4)	CHEM 1XXX (3), Not for credit in BSc
	For updated information on the transferability of this course, please consult the BC Transfer Guide, www.bctransferguide.ca				

Learning Outcomes

Upon successful completion of this course, the student will be able to:

- Classify matter and critically assess the nature of the scientific method.
- Perform calculations using correct significant figures and units.
- Evaluate the structure of the atom and the periodicity of the elements.
- Name ionic (binary, polyatomic, acids, bases, hydrates) and molecular compounds, and (conversely) determine the formula of these kinds of compounds given the name.
- Solve short answer problems relating to gravimetric, volumetric, and empirical formula analyses that include the concept of a mole.
- Understand oxidation and reduction reactions and calculate oxidation numbers
- Perform stoichiometric calculations to determine empirical and molecular formulas.
- Describe an ideal gas and make calculations using the ideal gas law.
- Classify chemical reactions and understand the heat transfer during chemical change.
- Evaluate dynamic chemical equilibria.

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	• Assess acid and base reactions and their properties. • Apply the concept of acid and bases to titrations
Content	**Core** topics – all of the following will be covered: Introduction and Review • Measurements, scientific notation and calculations with significant figures • Classification of matter • Formulas and nomenclature of ionic and molecular compounds • Chemical formula calculations using percent composition, empirical and molecular formulas • Stoichiometry, including molarity of solutions, limiting reagents and percent yields • Structure of the atom and fundamental particles, isotopes and atomic mass Gases • Kinetic Theory of Gases and properties of gases • Calculations with the Ideal Gas Law, Combined Gas Law and Dalton's Law of Partial Pressures • Gas Stoichiometry Thermochemistry • Exothermic and endothermic reactions • Enthalpy changes, heats of formation and Hess' Law • Specific heat and calorimetry Solutions • Electrolytic and non-electrolytic solutions • Solution composition (molarity, molality, mass percent) • Calculations of freezing and boiling points of solutions using molality Chemical Equilibria in Gaseous Systems • Calculation of equilibrium constants and concentrations • Le Chatelier's Principle Acids, Bases and Ionic Equilibria • Arrhenius and Brönsted-Lowry definitions of acids and bases, including salt solutions • Acid-base reactions and titrations, equivalence points • Calculation of equilibrium constants and concentrations applied to weak acids and bases and salt solutions • pH calculations applied to strong and weak acids and bases, salt solutions, and buffers Redox Reactions • Determination of oxidation numbers (states) • Balancing equations for redox reactions Additional topics may also be covered, at the discretion of the instructor.

	Labs: • Mass measurement • Volumetric techniques • Gravimetric analysis • Confirmation of Boyle's Law and determination of absolute zero • Determination of the ideal gas constant • Acid-base titration • Oxidation-reduction titration • Calorimetric determination of heat of reaction and solution • Demonstration of equilibria • Dissociation constant determination
Methods of Instruction	Lectures, group discussions, problem solving, hands-on labs, quizzes, assignments, labs, simulations
Required Textbook(s)	The following textbook(s) is/are required, or approved equivalent(s). Ball, David W and Jessie A. Key. Introductory Chemistry – 1st Canadian Ed. Open Textbook Library, 2014. Flowers, Paul, et al. Chemistry. 2nd Ed. OpenStax, 2022.
Required Equipment and Technology	Students are required to have a computer with internet access. The following resources are provided by the College: • Office 365 • Student email
Homework Hours	At minimum, students can expect one hour of homework for every hour of instructional time.

Evaluation	*Component*	*% Value*
	Quizzes and assignments	10-15%
	Laboratory experiments and activities • Weight divided over 8 labs	15-20%
	Midterm exam (2)	30-40%
	Comprehensive final exam	30-35%

Completion Requirements	The minimum grade to pass this course is D (50%). Unless otherwise stated, a minimum grade of C- (55%) is required for this course to fulfil a prerequisite.		
Course Designer(s)	Lesley Spier, Ph.D., and Nigel S. Dance, Ph.D., Department of Chemistry, University of the Fraser Valley	Consultant(s), *if applicable*	Laura Forni, Ph.D., Alexander College
Dean's Approval	Barbara Moon, Ph.D., Dean of Arts and Sciences, Alexander College	Dean's Approval Date	September 29, 2010
Curriculum Committee Approval Date	September 29, 2010	First Term Offered	Fall 2011
Last Review Date	September 1, 2024	Next Review Date	September 1, 2029

Revision History	January 1, 2012-English prerequisite lowered to ENGL 098 by SASC/Barbara Moon May 29, 2016. The original Chemistry 100 course, designed by Dr. Lesley Spier & Dr Nigel S. Dance, (Department of Chemistry, UFV), has been substantially revised to serve as a preparatory course for majors chemistry courses, Chemistry 101 and 102. September 1, 2024. Lab assignments and assessments detailed by Kelly Cheung.