

UNIVERSITY COLLEGE OF THE FRASER VALLEY

COURSE INFORMATION

DISCIPLINE/DEPARTMENT: Chemistry **IMPLEMENTATION DATE:** June 1994

Revised: Jan. 1998

<u>Chemistry 101</u>	<u>General Chemistry I</u>	<u>4</u>
SUBJECT/NUMBER OF COURSE CREDITS	DESCRIPTIVE TITLE	UCFV

CALENDAR DESCRIPTION: With Chem 102, this course will satisfy first-year science requirements for students pursuing careers in non-science or non-engineering areas (e.g., agriculture, home economics, teacher education, pre-medical). Prospective science or engineering students lacking the prerequisites for Chem 111 should take Chem 101 (and possibly Chem 102).

RATIONALE:

COURSE PREREQUISITES: Chemistry 11 and Math 11 or equivalent

COURSE COREQUISITES: None

HOURS PER TERM FOR EACH STUDENT	Lecture	60	hrs	Student Directed	
	Laboratory	30	hrs	Learning	hrs
	Seminar	15	hrs	Other - specify:	
	Field Experience		hrs	<u>Exams</u>	hrs
				TOTAL	105 HRS

MAXIMUM ENROLMENT: 35

Is transfer credit requested? : Yes **9** No

AUTHORIZATION SIGNATURES:

Course Designer(s): N.S. Dance, P.W. Slade, Lillian Martin

Chairperson: (N. Weinberg)
Curriculum Committee

Department Head: N. Weinberg

Dean: K. Wayne Welsh

PAC: Approval in Principle _____

PAC: Final Approval: November 25, 1998

(Date)

Chemistry 101
NAME & NUMBER OF COURSE

SYNONYMOUS COURSES:

(a) replaces N/A
 (course #)

(b) cannot take CHEM 111 for further credit
 (course #)

SUPPLIES/MATERIALS:

Laboratory supplies required.

TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)

TEXTS:

Chemistry, 2nd ed., Staanely R. Radel and Marjorie H. Navidi (West)

UCFV Laboratory Manual for Chemistry 101 and 102.

REFERENCES:

General Chemistry, Brady and Humiston (John Wiley & Sons)

Chemistry: A Conceptual Approach, 6th ed., Mortimer Wadsworth

Chemistry, Bailar et al (Academic Press)

METHODS:

Presentation of the course will be by interrelated class (theory), seminar, and laboratory sessions. Class sessions will promote active student participation to ensure continual mutual feedback in order to reinforce the learning process. Films and audio-visual aids will be used where appropriate.

Problem assignments will be continually given. Some selected problems will be collected and marked.

STUDENT EVALUATION PROCEDURE:

This will be flexible, yet will be based on the following:

Laboratory (reports and techniques)	25-30%
Midterm examinations (2 or 3)	30-40%
Problem assignments and class participation*	5-10%
Final examination	25-35%

* Less vocal students will be positively encouraged to express opinions.

Chemistry 101

NAME & NUMBER OF COURSE

COURSE CONTENT:

Note: The detail in which the topics from "Mathematical Review" to "Stoichiometry" are covered will depend on the background of the students.

Introduction: Relationship of lectures, seminars, assignments, laboratory, and private study. Course outline and method of evaluation.

Nature of Matter: Chapter 1 - Classification and subdivision of matter. Physical/chemical properties and changes.

Mathematical Review: Chapter 1 and Appendix A. See also Hein text: Accuracy of measurement, exponential notation, significant figures. Problem solving by dimensional analysis (conversion factor method). SI units (used throughout course).

Components of the Atom: Chapter 2 - Avogadro's number, the mole, Molar mass. (SI: kilogram molecular mass). Empirical, molecular formulae, and chemical composition of compounds. Chemical formulae, nomenclature, solutions and concentrations; all associated calculations.

Stoichiometry: Chapters 3 and 4 - Writing and balancing chemical equations. Mass - mass and mass volume calculations by dimensional analysis. Theoretical and actual yields.

Electronic Structure of the Atom: Chapters 7 and 8 - Electromagnetic radiation, atomic spectra. Rutherford, Planck, Einstein (photoelectric effect), and Bohr theories. Orbitals, quantum numbers, and electron configurations of the elements. Connection of latter with periodic classification of elements. Atomic radius, ionization energy, electronegativity trends in periodic table.

Chemical Bonding and Molecular Geometry: Chapters 9 and 10 - Ionic and covalent bonding: Lewis-Langmuir electron dot diagrams and Lewis structures. Oxidation numbers and use in writing formulae. Failure of octet rule, VSEPR rules, valence bond theory, and hybrid orbitals.

Gases: Chapter 5 - General properties and aspects of kinetic theory; ideal gas laws, ideal gas equation, partial pressures, all with calculations. STP and molar mass determinations. Brief mention of deviations from ideality.

Liquids and Solids: Chapter 12 - Surface tension, vaporization, vapour pressure and boiling point, freezing point and phase diagrams, van der Waals forces and hydrogen bonding, crystal **structures**.

Chemistry 101

NAME & NUMBER OF COURSE

LABORATORY EXPERIMENTS

To be selected from:

1. Measurement and Meaning
2. Heat Effects and Calorimetry
3. Chemical Properties and Stoichiometry: Water of Hydration
4. Qualitative Analysis of Anions
5. Gravimetric Analysis: Determination of Nickel as the Dimethylglyoximate
6. Percentage of Iron in Iron (III) Oxide
7. Determination of the Molar Mass of an Unknown Acid
8. The Percentage of Carbonate of an Antacid by Backtitration
9. The Molar Mass of a Volatile Compound
10. Determination of a Universal Gas Constant
11. Periodic Properties
12. Spectrophotometric Study of Chromium (III) Ions