UNIVERSITY COLLEGE of the FRASER VALLEY

PAC FORM #2

COURSE IMPLEMENTATION DATE:[Sept, 2003
COURSE REVISED IMPLEMENTATION DATE:[ ]
COURSE TO BE REVIEWED:[Sept. 2007]
(Four years after implementation date)

OFFICIAL COURSE OUTLINE INFORMATION

Students are advised to keep course outlines in personal files for future use.

Shaded headings are subject to change at the discretion of the department and material will vary - see course syllabus available from instructor

FACULTY/DEPARTMENT: Chemistry

CHEM110	N/A	4
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

Introductory Chemistry
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION: This course covers the principles of chemical kinetics and thermodynamics, redox processes, electrochemistry, and chemistry of solutions, including solubility and acid-base equilibria. It can be used as a prerequisite to Chem 113 for those missing secondary school Chem 12 and wishing to enroll in Chem 113/114.

PREREQUISITES: Chem 11 or Chem 083, and Principles of Math 11 or Math 084/085 or equivalent

COREQUISITES:

SYNONYMOUS COURSE(S)
(a) Replaces: _____
(Course #)
(b) Cannot take Chem 102 or Chem 112 for further credit
(Course #)

SERVICE COURSE TO:
_____
(Department / Program)
_____
(Department / Program)

TOTAL HOURS PER TERM: 84

STRUCTURE OF HOURS:

Lectures:	45	hrs
Seminar:		hrs
Laboratory:	39	hrs
Field Experience:		hrs
Student Directed Learning:		hrs
Other (Specify):		hrs

TRAINING DAY-BASED INSTRUCTION
LENGTH OF COURSE: _____
HOURS PER DAY: _____

MAXIMUM ENROLMENT: 36

EXPECTED FREQUENCY OF COURSE OFFERING: **once a year**

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only) **YES** ____ ____

WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department) ____ ____

TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE: ____ **NO** ____

AUTHORIZATION SIGNATURES:

Course designer(s): _____ Chairperson: _____
(Curriculum Committee)

Department Head: _____ Dean: _____

PAC Approval in Principle Date: _____ PAC Final Approval Date: December 4, 2002

CHEM 110

COURSE NAME / NUMBER

LEARNING OBJECTIVES / GOALS / OUTCOMES/ LEARNING OUTCOMES:

Students will become familiar with the basic concepts of chemical thermodynamics and the principles of aqueous equilibria. They will have the knowledge of chemistry sufficient to enroll in Chem 113.

METHODS:

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR YES ___X____ NO _____

METHODS OF OBTAINING PLAR:

Lectures, labs, group problem-solving sessions.

TEXTBOOKS, REFERENCES, MATERIALS:
[Textbook selection varies by instructor. An example of texts for this course might be:]

Raymond Cheng, General chemistry. The essential concepts, 3rd ed., , McGraw-Hill, 2000

SUPPLIES / MATERIALS:

STUDENT EVALUATION:
[An example of student evaluation for this course might be:]

Labs 20%
Assignments and tests 80%

COURSE CONTENT:
[Course content varies by instructor. An example of course content might be:]

Solutions (Ch. 4)
Concentration. Dilution. Electrolytes and Nonelectrolytes.
Arrhenius theory of electrolytic dissociation. Ionic equations. Solubility. Acids and Bases. Neutralization reaction. Solution Stoichiometry.

Gases (Ch5)
Units of pressure. Ideal Gas equation. Dalton's Law of partial pressures. Kinetic molecular theory of gases.

Thermodynamics (Ch 6 and 18)
Energy Changes in Chemical reactions. Exothermic and endothermic reactions.
Work and heat. First law of thermodynamics. Hess' Law. Thermochemical calculations.
Energy and Enthalpy. Enthalpy of chemical reaction. Standard enthalpy of formation and reaction.
Entropy. Second law of thermodynamics. Gibbs free energy. Spontaneous and nonspontaneous processes.

Chemical kinetics (Ch 14)

Rate of reaction. Concentration dependence. Rate laws. Rate constant. First- and second-order reactions. Principles of collision theory. Temperature dependence of the rate constant. Activation energy. Arrhenius equation (?) Multistep processes. Energy profiles for multistep processes. Intermediates. Limiting step.
Catalysis. Energy profiles for a catalyzed and an uncatalyzed reactions.

Chemical equilibria (Ch 15)
Reversible reactions. Chemical equilibrium. Equilibrium constant. Reaction quotient. Relationship between equilibrium constant and Gibbs free energy of reaction (?)
Net equilibrium constant of a multistep process (?)
Calculations of equilibrium concentrations.
Factors that affect chemical equilibrium. Le Chatelier's principle.

Solubility (Ch 13 and 17)
Molecular view of solution process. Enthalpy and entropy of dissolution. Solubility equilibrium. Solubility.
Effect of temperature on solubility of solids and gases. Effect of pressure on solubility of gases.
Solubility product. Solubility calculations. Common ion effect.

Acids and Bases (Ch 16 and 17)
Bronsted-Lowry theory. Conjugate acid-base pairs. Acid-base properties of water. The ion product of water. pH, pOH, and pKw. Strong and week acids and bases. Ionization constants Ka and Kb. Relationship between Ka and Kb.
Acid-base titration. Titration curves strong/weak acids/bases. Acid-base indicators.
Acid-base properties of salts. Hydrolysis.
Buffers. pH of a buffer solution. Henderson-Hasselbach equation (?)

Redox reactions and electrochemistry (Ch 4 and 19)
Oxidation number. Oxidation. Reduction. Half-reactions. Balancing redox reactions (half-reaction method; acid and basic solutions).
Galvanic cell. Standard reduction potential. Spontaneity of redox processes. Effect of concentration. Nernst equation (?)
Batteries. Corrosion. Electrolysis (aqueous solutions, molten salts, active and inactive electrodes). Quantitative aspects of electrolisis.