UNIVERSITY COLLEGE of the FRASER VALLEY

PAC FORM #2

COURSE IMPLEMENTATION DATE:[**September 1993**]
Revised: September 1999
COURSE TO BE REVIEWED DATE:[ ]
(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**

CHEM 093		**4**
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

COLLEGE PREPARATORY CHEMISTRY II
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

This course contains material similar to that covered in Chemistry 12, and involves inter-related theory and laboratory work. Topics covered are electrochemistry, thermodynamics, kinetics, equilibrium and acid-base behaviour.

PREREQUISITES: CHEM 083 or Chemistry 11

COREQUISITES: None

SYNONYMOUS COURSE(S)
(a) Replaces: N/A
(Course #)
(b) Cannot take N/A for further credit
(Course #)

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

TOTAL HOURS PER TERM: **90**

STRUCTURE OF HOURS:

Lectures:	45	hrs
Seminar:	15	hrs
Laboratory:	30	hrs
Field Experience:		hrs
Student Directed Learning:		hrs
Other (Specify):		hrs

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

MAXIMUM ENROLMENT: **24**

EXPECTED FREQUENCY OF COURSE OFFERING:

WILL TRANSFER CREDIT BE REQUESTED? **YES** **NO** **X**

TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE: **YES** **NO** **X**

AUTHORIZATION SIGNATURES:

Course designer(s): L. Spier/ N. Dance/ P. Slade
Chairperson: *(Curriculum Committee)*
Department Head: Noham Weinberg
Dean: J. Snodgrass
PAC Approval in Principle Date:
PAC Final Approval Date: September 1993

CHEM 093

COURSE NAME / NUMBER

LEARNING OBJECTIVES / GOALS / OUTCOMES/ LEARNING OUTCOMES:

The course is designed to enable students to build an understanding of scientific principles, chemistry and laboratory procedures gained in CHEM 083. This understanding will then ennable students to enter the higher level university-transfer chemistry courses. The course will highlight the use of the scientific method in both theory and laboratory aspects, as well as showing the relationships between different topics.

METHODS:

Presentation of the course will be by interrelated theory classes ("lectures"), discussion periods ("seminars") and laboratory sessions. Audio-visual aids will be used where appropriate, and students will be given instruction in the use of various instrumental techniques.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

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

METHODS OF OBTAINING PLAR:

TEXTBOOKS, REFERENCES, MATERIALS:

Chemistry, A Second Course, Rayner-Canham et al.
UCFV Laboratory Manual for Chemistry 093.

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

Evaluation will be based on the following system:

First in-term test	20%
Second in-term test	20%
Laboratory (reports and technique)	25%
Final exam	35%

COURSE CONTENT:

This is a brief summary of material covered. Unit outlines given before each section is started will provide more details.

Unit 1. Oxidation/reduction and Electrochemistry (Chapters 11 and 12)
Oxidation numbers, oxidation and reduction
Balancing redox equations
Voltaic and electrolytic cells
Chemical reactions involving redox
Applications of electrochemistry and corrosion

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COURSE CONTENT (contd.)

Unit 2. Thermodynamics (Chapter 5)
Definitions of system, surroundings, universe, exothermic and endothermic processes
H values, Law of Conservation of Energy and Hess' Law
Entrophy; the Second and Third Laws
Gibb's Free Energy and spontaneity of reactions

Unit 3. Kinetics and Equilibrium (Chapters 6 and 7)
Factors affecting rates of reactions
Collision theory
Relationship between kinetics and equilibrium
Le Catelier's principle

Unit 4. Ionic Equilibrium (Chapters 8 and 10)
Weak and strong electrolytes
K_a and K_b values and related calculations
pH and p0H
Buffers, pH titration curves and use of indicators
Solubility equilibria and K_{sp} values

Unit 5. Acids and Bases (Chapter 9)
Review of weak and strong acids and bases
Arrhenius, Bronsted-Lowry and Lewis definitions of acids and bases
Relationship between acidity and structure of various compounds

Unit 6. Nuclear Chemistry (Chapter 13)
An optional topic, to be covered if time permits
Review of atomic structure and subatomic particles
Nuclear fission and fusion
Applications of nuclear chemistry - geological dating and nuclear power

LABORATORY EXPERIMENTS: (8 or 9 labs will be chosen from the following:)

1. Oxidation-Reduction: Redox Titrations - Determination of the Formula of an Unknown Hydrate.
2. Oxidation-Reduction: Electrode Potentials and Chemical Reactivity
3. Electrochemistry: Electrochemical and Electrolytic Cells
4. Thermochemistry: Heats of Reaction
5. Thermodynamics: Determination of K_{sp} Values for PbI_2
6. Rates of Chemical Reactions: The Iodine Clock Reaction
7. Chemical Equilibrium
8. Buffers, Indicators and the Common Ion Effect
9. pH Titrations: Analysis of a Wine-Vinegar Sample
10. Spectrophotometric Study of an Unknown Copper Compound
11. Gases: Determination of the Molar Mass of a Volatile