

UNIVERSITY COLLEGE OF THE FRASER VALLEY

COURSE INFORMATION

DISCIPLINE/DEPARTMENT: Chemistry **IMPLEMENTATION DATE:** May 1993

Revised: _____

<u>CHEM 322</u>	<u>Intermediate Physical Chemistry</u>	<u>4</u>
SUBJECT/NUMBER OF COURSE	DESCRIPTIVE TITLE	UCFV
CREDITS		

CALENDAR DESCRIPTION: This course is a continuation of CHEM 222. The first section consists of a study of electrolytes and non-electrolytes in solution; the second section is an introduction to quantum mechanics.

RATIONALE:

COURSE PREREQUISITES: CHEM 222, MATH 211, PHYS 111 and 112

COURSE COREQUISITES: None

HOURS PER TERM FOR EACH STUDENT	Lecture	56	hrs	Student Directed Learning		
	Laboratory	40	hrs	Other - specify:		
	Seminar		hrs	Extra lab time	16	hrs
	Field Experience		hrs	for exams/teaching		
				TOTAL	112	HRS

MAXIMUM ENROLMENT: 24

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

AUTHORIZATION SIGNATURES:

Course Designer(s): L. Martin Chairperson: T. Cooper
Curriculum Committee

Department Head: A. Last Dean: W. Welsh

PAC: Approval in Principle _____ PAC: Final Approval: _____
(Date) (Date)

CHEM 322
NAME & NUMBER OF COURSE

SYNONYMOUS COURSES:

(a) replaces _____
(course #)

(b) cannot take _____ for further credit
(course #)

SUPPLIES/MATERIALS:

TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)

Physical Chemistry, 2nd Ed., Bromberg, J.P. Allyn and Bacon

OBJECTIVES:

Students will understand current theories on the behaviour of substance in aqueous solutions. This will include experimental determination of activities, applications of the Gibbs-Duhem equation and Debye-Hückel theory.

In the second (and longer) section of the course students will come to understand the postulates of quantum mechanics and how they are applied to electrons, atom and molecules. By the end of the course students should understand the basics of molecular orbital theory. Students will be able to relate the information obtained in the laboratory experimentation to the theoretical presentations in lectures.

METHODS:

Lecture; laboratory sessions will be used partly for experimentation and partly for work and for midterm examinations.

STUDENT EVALUATION PROCEDURE:

Assignments	10%
Labs	25%
Midterms	30%
Final	35%

CHEM 322**NAME & NUMBER OF COURSE**

COURSE CONTENT:

The course will cover chapters 14-17 and 20-27 of Bromberg. Lab experiments will illustrate the principles of the lectures.

Activities of Nonelectrolyte Solutions

Ions in Solution

Activities of Ions. The Debye-Hückel Theory

Electrochemical Cells

Corpuscles, Waves and the Nuclear Atom

Preliminaries to Quantum Mechanics. Applications to Simple Systems.

Rotations and Vibrations of Molecules

The Hydrogen Atom

Approximate Methods, the Helium Atom and Selection Rules

Electron Spin and More Complicated Atoms

Molecules and Chemical Bonding

Laboratory Experiments

(Four of the following experiments would be chosen)

Conductance of Solutions

Activity coefficients from Cell Measurements

Temperature Dependence of EMF

The Spectrum of the Hydrogen Atom

The Spectrum of HCl and DCl

The Spectrum of Iodine

(Extra lab time would be used for lab write-ups, seminars, exams and group study sessions.)