UNIVERSITY COLLEGE of the FRASER VALLEY

PAC FORM #2

COURSE IMPLEMENTATION DATE: { Sep-2003 }
COURSE REVISED IMPLEMENTATION DATE: { Sep-2005 }
COURSE TO BE REVIEWED: { Sep-2007 }
(FOUR (4) YEARS AFTER IMPLEMENTATION DATE) MONTH / YEAR

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 105	Replaces CHEM 101/102	4
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

INTRODUCTORY CHEMISTRY FOR THE HEALTH AND ENVIRONMENTAL SCIENCES
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:
CHEM 105 is intended for students who require a lab science course to fulfil the requirements for other UCFV programs. It is an introductory lab course for students with a high school science background, and relates important scientific principles to the chemistry of the environment and the body. CHEM 105 will satisfy part of the science requirements for a BA degree, but the course may not be used for credit by science or engineering majors. CHEM 105 provides important background material for students intending to enter a variety of health sciences programs, and other programs requiring general chemistry. The course will provide students with information on the origins, scientific background, and significance of many aspects of chemistry that are met in the work-place and in every-day life.

Note: CHEM 105 is not open for students with CHEM 110 or above

PREREQUISITES: CHEMISTRY 11 or CHEM 083

COREQUISITES: NONE

SYNONYMOUS COURSE(S)

(a) Replaces: CHEM 101 & 102 (Course #)

(b) Cannot take: _____ (Course #) for further credit

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.

Combination of Lecture and Lab Hours: YES/NO

TRAINING DAY-BASED INSTRUCTION

LENGTH OF COURSE: N/A

HOURS PER DAY: N/A

MAXIMUM ENROLMENT: 36

EXPECTED FREQUENCY OF COURSE OFFERING: at least once every year

WILL TRANSFER CREDIT BE REQUESTED?: (Lower-level courses only) YES X NO

WILL TRANSFER CREDIT BE REQUESTED?: (Upper-level requested by department) YES NO

TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE: YES NO X

AUTHORIZATION SIGNATURES:

Course designer(s): Nigel S. Dance

Chairperson: (type name in this field)
(Curriculum Committee)

Course reviewed by: (type name in this field)

Department Head: Noham Weinberg

Dean: Jackalyn Snodgrass

PAC Approval in Principle Date: (type date in this field)

PAC Final Approval Date: 04-Dec-02

CHEM 105

COURSE NAME / NUMBER

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

The course is designed to provide students entering the areas of health and environmental sciences with knowledge and understanding of the principles o chemistry. Specific objectives are for students to:

(1) Carry out laboratory experiments and interpret results using scientific methodology.

(2) Understand the origins, scientific background, significance and implementation of the many aspects of chemistry that are met in the work-place and in everyday life.

METHODS:

Presentation of the course will be by inter-related theory class ("lectures"), discussion periods ("tutorials") and weekly laboratory sessions. Students will also be involved in preparing and participating in seminars. Audio-visual aids will be used where appropriate.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

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

METHODS OF OBTAINING PLAR:

Not applicable

TEXTBOOKS, REFERENCES, MATERIALS:

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

The Extraordinary Chemistry of Ordinary Things, 3rd Edn. Carl H. Snyder (Wiley)

UCFV Laboratory Manual for CHEM 105.

SUPPLIES / MATERIALS:

All lab supplies are provided.

STUDENT EVALUATION:

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

Evaluation will be based on the following system, but some variation can be expected for individual instructors.

Laboratory Work	20%
Tests and Assignments	80%

CHEM 105
COURSE NAME / NUMBER

COURSE CONTENT:

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

The course will be based on the required text (Snyder), and on selected reprint materials from the current literature.

Unit 1. Introduction to Chemistry.

Course outline. Scientific mathematics - a review of basic math. Measurement of mass, volume, density and temperature. Units and significant figures. SI system. Uncertainties, accuracy and precision in measurements and calculations.

Unit 2. Atoms and Molecules.

Names and symbols of elements. Compounds, their composition and formulae. Metals and non-metals. Simple naming and chemical equations.

Unit 3. Atomic Theory and Nuclear Chemistry.

Components of the atom, isotopes, fission and fusion processes. Radio-carbon dating. Nuclear power and nuclear medicine.

Unit 4. Stoichiometry and the Mole.

The mole. Mole-mole, mole-mass and mass-mass calculations using stoichiometric equations. Limiting reagent calculations. Molarity calculations and titrations.

Unit 5. Electronic Structure of the Atom.

The Bohr atom , Wave-particle duality. Atomic electron energy levels and orbitals (size and shapes) Electron spin, the Aufbau principle and electron configurations of atoms.

Unit 6. Periodic Properties.

Effective nuclear charge. Classification of elements in the Periodic Table and the relationship between position in the table/electron configuration/physical and chemical properties, such as: atomic and ionic radii, ionization energy, electron affinity and electronegativity.

Unit 7. Chemical Bonding and Molecular Geometry.

Ionic and covalent bonding. Lewis electron dot representations for atoms and molecules. VSEPR Theory. Multiple bonds and hybrid orbitals.

Unit 8. Intermolecular Interactions.

Bond polarity and polarity of molecules. Dipole-dipole interactions, hydrogen bonding and London forces.

Solubility effects. Soaps and synthetic detergents. Hardness of water and water pollution.

Unit 9. The Gaseous State. Atmospheric Chemistry, **Pollution and the Environment**.

Ideal gas laws, Kinetic Molecular Theory. Deviation from ideality. Air pollution and chemistry of ozone in the atmosphere.

Unit 10. Organic Chemistry and Biochemistry.

Bonding and shapes of simple organic molecules. Functional groups and homologous series. Classification and naming of compounds. Isomerism. Structure and function of DNA. Structures and properties of carbohydrates, fats and proteins.

LABORATORY EXPERIMENTS

Nine or ten labs will be chosen. The following are typical examples:

1. Measurements, Units and Uncertainties.
2. Alcohol Analysis Lab. Spectrophotometry and the Breathalyser.
3. Toxicology: Wet Chemical Analysis of Poisons.
4. Synthesis and Properties of Aspirin.
5. Preparation and Properties of Polymers.
6. Identification of an Unknown Amino Acid by Titration.
7. Glucose Concentrations in Blood.
8. Cholesterol Levels in Blood.
9. Analysis of Antacid tablets by Titration.