UNIVERSITY OF THE FRASER VALLEY

OFFICIAL COURSE OUTLINE (page 1)

COURSE IMPLEMENTATION DATE:	September 2002
COURSE REVISED IMPLEMENTATION DATE:	September 2013
COURSE TO BE REVIEWED:	January 2011
(six years after UEC approval)	*(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 – see course syllabus available from instructor

CHEM 113	Chemistry	5
COURSE NAME/NUMBER	FACULTY/DEPARTMENT	UFV CREDITS

Principles of Chemistry I
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

An introduction to principles of chemistry with the emphasis on theory of atomic and molecular structure and bonding. Work performed in the laboratory complements lecture material. Along with CHEM 114, this course will satisfy requirements for students wishing to pursue an honours or majors program in science.

PREREQUISITES: **One of the following: CHEM 12, CHEM 093, or CHEM 110; and one of the following: Principles of Mathematics 12, Pre-calculus 12, MATH 094/095, or MATH 096.**

COREQUISITES: none
PRE or COREQUISITES:

SYNONYMOUS COURSE(S):
(a) Replaces: CHEM 111
(b) Cross-listed with:
(c) Cannot take: CHEM 111 for further credit.

SERVICE COURSE TO: *(department/program)*

TOTAL HOURS PER TERM: **99**

STRUCTURE OF HOURS:

Lectures:	**45**	Hrs
Seminar:	**15**	Hrs
Laboratory:	39	Hrs
Field experience:		Hrs
Student directed learning:		Hrs
Other (specify):		Hrs

TRAINING DAY-BASED INSTRUCTION:
Length of course:
Hours per day:

OTHER:
Maximum enrolment: **36**
Expected frequency of course offerings: annual
(every semester, annually, every other year, etc.)

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)	☒ Yes	☐ No
WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)	☐ Yes	☐ No
TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:	☐ Yes	☒ No

Course designer(s):	**Noham Weinberg**		
Department Head:	**David Fenske**	Date approved:	**April 13, 2012**
Supporting area consultation (Pre-UEC)		Date of meeting:	**April 27, 2012**
Curriculum Committee chair:	**David Fenske**	Date approved:	**May 18, 2012**
Dean/Associate VP:	**Ora Steyn**	Date approved:	**June 1, 2012**
Undergraduate Education Committee (UEC) approval		Date of meeting:	**June 22, 2012**

LEARNING OUTCOMES:

At the end of this course, students will have a basic understanding of atomic and molecular structure, of chemical bonding, and of the periodic properties of elements. In particular, successful students will be able to:

1. Discuss critically evidence for light having properties of both waves and particles.
2. Solve problems involving the frequency, wavelength, and energy of light.
3. Describe the Bohr model of the hydrogen atom.
4. Explain what happens to electrons in atoms when a photon of light is absorbed.
5. Explain the concept of atomic orbitals and describe the shapes of the s, p, and d orbitals.
6. Discuss critically the periodic table in terms of the electronic configuration of the elements
7. Explain several periodic properties of elements using the concepts of shielding and penetration.
8. Predict whether an individual chemical bond is covalent or polar,
9. Generate Lewis dot diagrams of molecules
10. Predict the three-dimensional shapes of simple molecules, and whether they are polar or not.
11. Describe the bonding in a simple molecule using hybridization of atomic orbitals,
12. Explain the concept of bonding and antibonding molecular orbitals, as applied to diatomic gases
13. Calculate the bond order of diatomic gases using molecular orbital theory
14. Describe the properties of gases using the ideal gas law.
15. Demonstrate an understanding of the structures and names of the common organic families (alkanes, alkenes, alkynes, alcohols, alkyl halides, ethers, aldehydes, ketones, carboxylic acids, esters, amines and amides).
16. Draw diagrams of the conformations of ethane and propane.
17. Identify and name different stereoisomers of alkanes and alkenes

METHODS: *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Lectures, labs, group problem-solving sessions.

METHODS OF OBTAINING PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

☐ Examination(s) ☐ Portfolio assessment ☐ Interview(s)

☒ Other (specify): Course Challenge

☐ PLAR cannot be awarded for this course for the following reason(s):

TEXTBOOKS, REFERENCES, MATERIALS:

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

Brown and LeMay, Chemistry

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:]

1. Atomic structure and atomic spectra.
2. Electronic structure of many-electron atoms, periodic trends.
3. Chemical bonding. Ionic and covalent bonds. Lewis diagrams.
4. Molecular structure. VSEPR model. Valence bond and MO theories.
5. Intermolecular interactions. Liquids, solids, gases. Gas stoichiometry.
6. Chemical kinetics.