



DEPARTMENT OF SCIENCE

COURSE OUTLINE – FALL 2015

CH1010 INTRODUCTORY UNIVERSITY CHEMISTRY I – 3(3-1-3) 105 HOURS

INSTRUCTOR: A2 Som Pillay
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INSTRUCTOR: B2 Les Rawluk
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OFFICE HOURS: Monday 13:00 – 14:30; Tuesday to Friday 11:30 – 13:00

DELIVERY MODE(S): Lecture style presentation of material followed by practice problems/discussion in seminar. Laboratory provides hands-on experience.

PREREQUISITE(S)/COREQUISITE: Chemistry 30 or equivalent

REQUIRED TEXT/RESOURCE MATERIALS: Recommended textbook is Chemistry 9th Edition by Steven S. Zumdahl and Susan A. Zumdahl; required Lab manual is Introductory University Chemistry I (Chem 101 and 103), published by the University of Alberta, 2015/2016 edition.

CALENDAR DESCRIPTION: Lectures include stoichiometry, atomic structure and bonding, states of matter and intermolecular forces, chemistry of the elements.

COURSE OBJECTIVES: This course enables students to strengthen their understanding of chemistry through the study of the structure, bonding, and reactivity of chemical substances. Students will further develop their problem-solving and critical thinking skills as they investigate chemical processes, and will refine their ability to

communicate scientific information. Emphasis will be placed on understanding of basic principles and the ability to apply principles to solve problems.

LEARNING OUTCOMES: Students will use their introduction to quantum mechanics to describe the Hydrogen atom. They will extend this knowledge to a multi-electron atom, followed by predicting trends in atomic properties as related to atomic position on the periodic table. Students will identify valence electrons, and examine their role in ionic, covalent, and polar covalent bonding. Valence electron role in the 3-D shape of molecules will be explored, and students will be able to predict molecular properties such as melting and boiling point trends, polarity, and viscosity. Students will interpret intermolecular forces for a variety of molecules, and link these forces to the solid, liquid, and vapor states. Students will observe and describe trends in main group element chemistry throughout the course.

COURSE SCHEDULE/TENTATIVE TIMELINE:

Matter and Stoichiometry (Chapters 1, 2, 3, 4, and 20; Pages 1 – 188, and 926 – 971) *2 – 3 lectures*

- Units, dimensional analysis
- Periodic table
- Naming simple compounds
- The mole
- Empirical and molecular formula of a compound
- Calculations involving a limiting reagent
- Aqueous solutions and molarity
- Precipitation, acid/base, redox reactions

Atomic Structure (Chapters 2 and 7; Pages 47 – 59 and Pages 295 – 350) *6 – 8 lectures*

- Introduction to Atomic Structure
- Electromagnetic radiation
- Atomic spectra and the Bohr model
- Quantum mechanics and the atom
- Orbital shapes and energies
- Many-electron atoms
- Building of the periodic table
- Trends in atomic properties

Chemical Bonding (Chapters 8 and 9; Pages 351 – 452) *6 – 8 lectures*

- Types of chemical bonds and electronegativity
- Ionic bonding
- Lattice energy
- Covalent bonding
- Bond energies and chemical reactions
- Lewis structures; octet rule; resonance, formal charge, exceptions
- VSEPR theory and molecular shape
- Hybridization
- Molecular orbital theory

States of Matter (Chapters 5 and 10; Pages 189 – 244 and Pages 453 – 509) *4 – 6 lectures*

- Intermolecular forces
- Gases
- Liquids, solutions
- Solids
- Changes of state, phase diagrams

Chemistry of the Main Group Elements (Chapter 20; Pages 926 – 971) *1 – 2 lectures*

- Metals vs. Non-metals
- Acid base properties of oxides
- Oxidizing and reducing agents

EVALUATIONS: Two term exams will be held (one in October weighted at 15%, one in November weighted at 20%); a final exam is scheduled by Student Services in December and weighted at 38%; weekly quizzes/assignments are weighted at 5%; laboratory reports are weighted at 12%; laboratory exam is weighted at 10%. A student must pass the laboratory portion to receive a passing grade in this course. A “repeat” final exam is not available in this course.

Furthermore, assignments will be electronically distributed on a roughly weekly basis. Complete solutions will be available a short while later. Solutions to quizzes will be posted a few days after the quiz is completed.

Attendance to all lectures and seminars is strongly recommended. Laboratory attendance to each specific experiment is compulsory. A doctor’s medical note is required for all excused absences.

Students must maintain an overall average of 50% or better to pass this course. You are encouraged to participate in class discussions and ask questions. Help is available outside the classroom.

GRADING CRITERIA:

GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
Alpha Grade	4-point Equivalent	Percentage Guidelines	Designation
A ⁺	4.0	90 – 100	EXCELLENT
A	4.0	85 – 89	
A ⁻	3.7	80 – 84	FIRST CLASS STANDING
B ⁺	3.3	77 – 79	
B	3.0	73 – 76	GOOD
B ⁻	2.7	70 – 72	
C ⁺	2.3	67 – 69	SATISFACTORY
C	2.0	63 – 66	
C ⁻	1.7	60 – 62	
D ⁺	1.3	55 – 59	MINIMAL PASS
D	1.0	50 – 54	
F	0.0	0 – 49	FAIL
WF	0.0	0	FAIL, withdrawal after the deadline

RESPONSIBILITIES: Refer to the College Policy on Student Rights and Responsibilities at www.gprc.ab.ca/d/STUDENTRIGHTSRESPONSIBILITIES

STATEMENT ON PLAGIARISM AND CHEATING:

Refer to the College Student Misconduct: Academic and Non-Academic Policy at www.gprc.ab.ca/d/STUDENTMISCONDUCT

**Note: all Academic and Administrative policies are available at www.gprc.ab.ca/about/administration/policies/

UNIVERSITY TRANSFER (If applicable):

**** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability.**

Please refer to the Alberta Transfer guide for current transfer agreements: www.transferralberta.ca