DEPARTMENT OF SCIENCE

COURSE OUTLINE – WINTER 2013

CH1020 INTRODUCTORY UNIVERSITY CHEMISTRY II – 3(3-1-3) 105 HOURS

INSTRUCTOR:	A3 Les Rawluk	**PHONE:**	780 539 2738
OFFICE:	J214	**E-MAIL:**	lrawluk@gprc.ab.ca

INSTRUCTOR:	B3 Som Pillay	**PHONE:**	780 539 2985
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OFFICE HOURS: Monday to Friday 13:00 – 14:30

PREREQUISITE(S): CH1010 or equivalent

TEXT/RESOURCE MATERIALS: Recommended textbook is Chemistry 8th Edition by Steven S. Zumdahl and Susan A. Zumdahl; required Lab manual is Introductory University Chemistry II (Chem 102 and 105), published by the University of Alberta, 2012/2013 edition.

CALENDAR DESCRIPTION: Lectures include chemical kinetics, thermochemistry, thermodynamics, equilibrium, acids and bases, electrochemistry, and coordination chemistry.

CREDIT/CONTACT HOURS: 3 credits; 3 hours lecture + 1 hour seminar + 3 hours laboratory per week; 105 hours in total

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

OBJECTIVES (OPTIONAL): Students are introduced to the basic principles which influence the spontaneity, rate, extent, and direction of chemical reactions. Logically applying these concepts to chemical problems should lead to an appreciation for the influence of chemistry in our lives while critically thinking about chemical issues.

TRANSFERABILITY: CH1020 to U of Alberta CHEM 102, 3 credits
CH1020 to U of Calgary CHEM 203, 3 credits
For other transfer agreements, go to http://www.acat.gov.ab.ca/
**** 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**

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

EVALUATIONS: Two term exams will be held (one in February weighted at 18%, one in March weighted at 18%); a final exam is scheduled by Student Services in April and weighted at 37%; 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.

STUDENT RESPONSIBILITIES: 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.

STATEMENT ON PLAGIARISM AND CHEATING:

Refer to the Student Conduct section of the College Admission Guide at http://www.gprc.ab.ca/programs/calendar/ or the College Policy on Student Misconduct: Academic and Non-Academic at www.gprc.ab.ca/about/administration/policies**

**Note: all Academic and Administrative policies are available on the same page.

COURSE SCHEDULE/TENTATIVE TIMELINE:

Chemical Kinetics (Chapter 12; Pages 539 – 592) *4 – 5 lectures*

- Reaction Rates
- Rate laws
- Determining rate law form
- Integrated rate law
- Arrhenius equation
- Reaction mechanisms
- Catalysis

Chemical Equilibrium (Chapter 13; Pages 593 – 637) *3 – 4 lectures*

- Equilibrium condition
- Mass-action expression and the equilibrium constant
- Heterogeneous equilibria
- Applications of the equilibrium constant
- LeChatelier's Principle

Acids and Bases (Chapters 14 and 15; Pages 638 – 737) *5 – 7 lectures*

- The nature of acids and bases
- Acid strength and the pH scale
- Calculating pH of strong/weak acids
- Bases
- Salts
- Mixtures of weak acids and bases
- Effect of structure upon acid strength
- Common ion effect
- Buffer systems
- Acid/base titrations
- Acid/base indicators

Solubility Equilibria (Chapter 16; Pages 743 – 771) *2 – 3 lectures*

- Slightly soluble salts
- Complex ion equilibria

Thermochemistry (Chapter 6; Pages 235 – 283) *2 – 3 lectures*

- Types of energy; work and heat
- First Law of Thermodynamics
- Enthalpy; endothermic and exothermic processes
- Calorimetry
- Hess's Law
- Standard enthalpy of formation

Thermodynamics (Chapter 17; Pages 772 – 815) *2 –3 lectures*

- Entropy and The Second Law of Thermodynamics
- Entropy of the system and the surroundings
- Free Energy and Equilibrium

Electrochemistry (Chapter 18; Pages 816 – 871) *2 – 3 lectures*

- Redox reactions and standard electrode potentials
- Galvanic cells and spontaneous redox reactions
- Cell potential, electrical work, and free energy
- Dependence on concentration – the Nernst Equation
- Batteries
- Electrolytic cells

Transition Elements and Coordination Compounds (Chapter 21; Pages 953 – 1004) *2 lectures*

- Properties of the transition metals
- Coordination compounds
- Structure of coordination compounds
- Crystal field theory