



# Grande Prairie Regional College

Department: Academic Upgrading

## COURSE OUTLINE – FALL 2008 & WINTER 2009 CH 0120 5 (4 – 0 – 2) HS Chemistry Grade 11 Equivalent

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<b>Office Hours</b>	As posted on my office door.		

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**Prerequisite(s)/corequisite(s):** CH 0110 and MA 0110 or SC 0100/MA 0110

A minimum grade of 60 % in CH 0110 or SC 0110 and MA 0110 is recommended.

**Required Text/Resource Materials:** ☺☺☺ **Chemistry (Alberta 20 – 30) by Jenkins (2007)**

☺☺☺ **Chemistry 0110 Review** if you were not in CH 0110 last year.

- CH 0120 lab manual
- Lab coat
- Lab notebook (250 page coiled notebook is fine do not spend the money on a real lab notebook)
- Nonprogrammable calculator – this is the only electronic device allowed during tests or exams.
- 10 quad to 1 cm graph paper are also required.

**Supplementary texts:** *These textbooks are available in A-204 and on reserve in the library*

Chemistry 0110 Review by Fraser

Chemistry: A Study of Matter by Dorin

General Chemistry by Ebbing 8<sup>th</sup> Edition

Introductory Chemistry: Zumdahl

Basic Chemistry by Seese and Daub 7<sup>th</sup> Edition

Chemistry: A Basic Introduction by Miller 4<sup>th</sup> Edition

**Description:** This course is designed to provide the student with an understanding of the following chemical concepts: Bonding, Chemical Equations, Stoichiometry, Gas Laws, Solutions, Equilibrium, and pH.

**Delivery Mode(s):** Lecture will be the main method of delivery. There is also a large laboratory component in this course.

**Credit/Contact Hours:** This is a 5 credit course and meets 6 hours per week (4 hour lecture and 2 hours lab).

**Assumed Background Knowledge:** (These topics will NOT be reviewed in class)

Students should already:

1. be able to perform linear, quadratic, cubic, liquid-dry metric conversions.
2. know elementary atomic structure – what protons, electrons, and neutrons are and where they are in an atom.
3. be able to define atomic number, atomic mass number and how to use them to calculate the number of protons, neutrons, and electrons in an atom.
4. be able to classify of matter.
5. be able to distinguish between chemical and physical properties and changes.
6. be able to draw atomic structure diagram for the first 20 elements.
7. be able to define valence electrons and draw electron dot diagrams.

If you are unfamiliar with these topics see me. The Chemistry 0110 Review will explain these in detail. It is available in the bookstore. There is an

answer key in A-205 and on reserve in the library.

In addition to the above material: These will be briefly reviewed in class.

1. know nomenclature (naming compounds and writing formulae).  
\*\*\*Nomenclature is one of the most important topics that you will learn at the secondary level. It will NOT be reviewed at the post secondary level. If you are having trouble with this topic, get help IMMEDIATELY!!! See me!\*\*\*
2. be able to balancing equations by inspection.

Objectives:

Students should

1. be able to do nomenclature without the use of a periodic table.
2. be able to solve a variety of stoichiometry problems.
3. be able to calculate the % composition of each element in a compound.
4. be able to define and find empirical formulae given % composition by mass of each element.
3. understand the kinetic molecular theory of gases.
4. know and define gas laws (Boyle's Law, Charles' Law, combined gas laws, the ideal gas law.) Volume of gases under STP conditions and SATP if time permits.
5. be able to define temperature, pressure, vapour pressure, and boiling point.
6. be able to define solubility, and state factors affecting solubility and the rate of solution.
7. be able define unsaturated, saturated, supersaturated solutions and interpret solubility curves.
- 8 be able to solve stoichiometry problems from chemical equations including determining the limiting reagent.
8. understand equilibrium, write equilibrium equations for given reactions and understand the effect of changing concentration.

9. be able to write solubility product expression for given compounds.
10. understand and define  $K_w$  and pH and to able to perform related calculations.
11. be able to write the electronic and orbital box diagrams for any element.

12. be able to compare the reactivity and radius based on atomic and electronic structures, ionization energy and electronegativities.
13. be able recognizes trends in the periodic table.
14. be able to draw the structural diagrams for various molecules etc. using VSEPR.
15. be able to distinguish between polar, nonpolar covalent and ionic bonds by calculating. the difference in electronegativities and observing the shapes of molecules.
16. be able to recognize and define a coordinate covalent bond.
17. be able to recognize and define polar, and nonpolar molecules from the diagrams.
18. be able to recognize and define hydrogen bonding, and Van der Waal's force.

**Grading Criteria:**

Regular attendance is expected of all students, and is crucial to passing this course. Students who miss classes will soon find themselves falling behind and failing. Lateness will **not** be tolerated as it interrupts the instructor and fellow classmates. As per Department Policy, if you miss more than 10 per semester of classes in any course, you may be debarred from the final exam for that course.

A certificate (a doctor's or a note from the funeral home) will be required to make up the midterm or final exam. **You will receive a grade of F if you miss the final.** Call if you are going to miss a test. There may be a deduction of 10% for test rewrites.

**\*\*\*Very important:**

**Laboratory attendance to each specific experiment is compulsory; a passing grade in the laboratory component is required to pass the course.** There are **NO** 'make up' labs in this course. Being absent from an experiment will result in a grade of **ZERO** for that experiment.

Lab reports must be submitted on the required date and at the **required time**.

Assignments may not be accepted after the assignment has been returned to the class. I am usually a speedy marker and usually return papers the next day.

Penalties for late **assignments** are as follows: (Assuming that I have not returned the marked assignments)

1 day late – 20%, 2 days late – 50%, 3 days late – 100%

Penalties for late **lab reports** are as follows:

5 minutes – 10%, 24 hours – 20%, after that – 100%

### **Marking Scheme:**

Lab Reports:	15%
Assignments:	15%
Tests:	15%
Midterm:	15%
Final Exam:	<u>40%</u>
Total	100%

## Grades will be assigned on the Letter Grading System

### Academic Upgrading Department Grading Conversion Chart

Alpha Grade	4-point Equivalent	Percentage Guidelines	Designation
A <sup>+</sup>	4	90 – 100	EXCELLENT
A	4	85 – 89	
A <sup>-</sup>	3.7	80 – 84	FIRST CLASS STANDING
B <sup>+</sup>	3.3	76 – 79	
B	3.0	73 – 75	GOOD
B <sup>-</sup>	2.7	70 – 72	
C <sup>+</sup>	2.3	67 – 69	SATISFACTORY
C	2.0	64 – 66	
C <sup>-</sup>	1.7	60 – 63	
D <sup>+</sup>	1.3	55 – 59	MINIMAL PASS
D	1.0	50 – 54	
F	0	0 – 49	FAIL

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**It is recommended that you have a grade of 60 % or better to continue to CH 0130.**

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**Transferability:** This course is equivalent to Alberta grade 11 chemistry and is transferable to other post secondary institutions.

	Time	☺☺☺ (Defensive)	Chemistry (1110 Review)	Chemistry (1110 Review)	General Chemistry (1110 Review)	General Chemistry (1110 Review)	Basic Chemistry (1110 Review)	Basic Chemistry (1110 Review)
SI units	On your own time		19 – 30	16 – 22	20 – 22	18 – 22	16 – 18	19 – 23
Scientific Notation	On your own time		31 – 37	50 – 53		15 – 18	27 – 33	236 – 38
Understand and use Significant Figures	1 day		37 – 51	26 – 37 54 – 58	16 – 20	22 – 28	21 – 27	33 – 26 38 – 42
Chemical Definitions and Classification of matter	On your own time	<b>12</b>	14 – 18	63 – 77	9 – 13	56 – 64	52 – 61	79
WHMIS	On your own time	<b>4 – 5</b>	5 – 10					
Review Atomic Structure	On your own time		56 – 69	109 – 123 top of 764	42 – 53	214 – 216 91 – 97	80 – 89	60 – 72 90 – 102
Review Valence Electrons & Electron Dot Diagrams	On your own time		70 – 71				<b>89 – 90</b>	
Review Nomenclature	2 days		79 – 150	151 – 168	55 – 71	122 – 142	165 – 180	81– 82 188 – 183 197 – 206



	Time	☺☺☺	General Chemistry	Chemistry 0110 Review	Chemistry of Materials	General Chemistry Int (Zumdahl)	Basic Chemistry	Chemistry
*Review Balancing Equations by Inspection	On your own time	<b>58 – 63</b>	152 – 167	206 – 223	73 – 76 136 – 144 150 – 152	154 – 165	216 – 235	233 – 240
<b>Stoichiometry</b>								
Define & Calculate Molecular Mass, Gram Molecular Mass, Mole, Avogadro's Number Mole – Mass Relationship Mole – Molecule Relationship Mole-Volume of gas at STP Relationship	4 days	<b>55 51</b>		175 – 195 175 – 189 175 – 189	87 – 93 103 – 107	211 – 213 216 – 226 246 – 258	188 – 197	210 – 219
% Composition	1 day			190 – 191	93 – 94	226 – 228	199 – 205	219 – 223
**Empirical Formula	1 day			192 – 195	97 – 102	228 – 237		223 – 229
Kinetic Molecular Theory of Gases	1 day	<b>151 – 154 154 – 156 156 – 175</b>		271 – 283	201 – 204		277 – 278	280 – 281

	Time	☺☺☺ (Deficiency)	Chemistry	Chemistry 0110 Review	General Chemistry	General Chemistry	Basic Chemistry	Chemistry
Gas Laws: Boyle's Law, Charles' Law and Ideal Gas Law	2 days	<b>151 – 154</b> <b>154 – 156</b> <b>156 – 175</b>		297 – 313 326 – 328	176 – 190		279 – 288 285 – 297	285 – 302
***Volume of Gases under STP Conditions & (SATP Conditions If time permits)	1 day	<b>151 – 154</b> <b>154 – 156</b> <b>156 – 175</b>		297 – 313 326 – 328	176 – 190			303 – 308
Concentration (Molarity) (Molality)	1 day	<b>208 – 210</b> <b>216 – 217</b>		449 – 451 452 – 453	155 – 159 161 – 163 491 – 492		377 – 379 384 – 386	353 – 368 372 – 373
Equation Stoichiometry & Limiting Reagents	4 days	<b>284 – 298</b> <b>300 – 302</b> <b>320 – 323</b>		233 – 252	104 – 107	259 – 265	249 – 256 259 – 265	240 – 253
% Yield	if time	<b>292</b>			107 – 112	265 – 266	257 – 259	253 – 253
Solubility		<b>221</b>		437 – 438				
Solutions: Saturated. Unsaturated, Supersaturated Solution.	1 day	<b>221 – 225</b>		433 – 446	127 – 128		363 – 370 370 – 371	350 – 357

	Time	221 – 225	442 – 439	479 496	363 – 370	357 – 363	
Factor Affecting Rates of Solution		221 – 225	442 – 439	479 496	363 – 370	357 – 363	
Solutions: Concentrated and Dilute Solutions		221 – 225	446 – 447	157 – 159	379 – 381		
Equilibrium Constant	1 day	683 – 685	513 – 517 518 – 523	621 – 623	477 – 479	427 – 433	
Le Chatelier Principle		683 – 685	524 – 527	639 – 642	480	433 – 440	
Solubility Product ( $K_{sp}$ )			533 – 537	735 – 744	490 – 493	440 – 444	
Arrhenius Acids, Bases, pH, & pOH (Strong acids and bases only)	1 day	234 – 259	550 – 552 558 – 559 574 – 580	660 – 662 673 – 681	185 – 188	406 – 407 418 – 422	389 – 390 397 – 409
Indicators			581 – 583	680 – 681			
***Neutralization Reactions***	1 day	234 – 259	584 – 586	136 – 139 140 – 142 161 – 164	414 – 417		

	Time							
Atomic Structure Orbitals (s, p, d, f) Pauli Exclusion Principle & Hund's Rule	3 days			335 – 353	282 – 287 294 – 310		91 – 98	102 – 116
Ionization Energy & Electronegativity	2 days	<b>81</b>		369 – 373	316 – 318		119 130 – 132	136 – 139 140 – 142
****Trends in the Periodic Table	3 days			359 – 369 380 – 382	315 – 316 320 – 322			120 – 148
Ionic Bonding	0.5 days	<b>78, 83</b>		391 – 394	329 – 330		124 – 127	156 – 160
Covalent Bonding	0.5 days	<b>82, 85 – 87,</b>		396 – 402	341 – 347		128 – 135	161 – 164, 174
Hydrogen Bonding	0.5 days	<b>111 – 112</b>		416 – 419	440 – 442			
Van der Waal Force	0.5 days	<b>105 – 109</b>		421 – 422	438 – 440			
Metal-Metal Bonding (If time permits)	0.5 days	<b>83</b>		419 – 420	bottom 534			155 – 156
VSEPR Polar Molecules	5 days	<b>91 – 104</b>		402 – 409 412 – 416	347 – 350 373 – 380		135 – 147	164 – 180

	Time	☺☺☺ (2011)	☺☺☺ (2011)	☺☺☺ (2011)	☺☺☺ (2011)	☺☺☺ (2011)	☺☺☺ (2011)	☺☺☺ (2011)
Hydrogen Bonding	0.5 days	<b>111 – 112</b>		416 – 419	440 – 442			
Van der Waal Force	0.5 days	<b>105 – 109</b>		421 – 422	438 – 440			
Metal-Metal Bonding (If time permits)	0.5 days	<b>83</b>		419 – 420	bottom 534			155 – 156

- \* Test 1
- \*\*Test 2
- \*\*\*Test 3
- \*\*\*Midterm\*\*\*
- \*\*\*\*Test 4