



DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE FALL 2016

CH 0120(A2, B2): CHEMISTRY GRADE 11 EQUIVALENT 5(4 – 0 – 2) 90 HOURS FOR 15 WEEKS

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Office Hours	AS POSTED ON MY OFFICE DOOR.		

CALENDAR

DESCRIPTION: Major concepts include: inorganic nomenclature; atomic structure, orbitals; ionic and covalent bonding, hydrogen bonding, metallic bonding, Van der Waal forces, ionization, electronegativity, VSEPR; solutions, stoichiometry, empirical formulas, percent composition, pH, molarity, equilibrium, Arrhenius acids and bases.

PREQUISITES/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 MATERIAL:

- *** **General Chemistry by Ebbing 11th Edition or 10th Edition.**
- *** **Chemistry 0110 Review** if you were not in SC 0110 last semester.
- **CH 0120 lab manual**
- Lab coat

- Lab notebook (250 page coiled notebook is fine do not spend the money on a real lab notebook)
- **Non-programmable** 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 the reference section of the library.*

Chemistry 0110 Review by Fraser

Chemistry: A Study of Matter by Dorin

Introductory Chemistry: Zumdahl

Basic Chemistry by Seese and Daub 7th Edition

Chemistry: A Basic Introduction by Miller 4th Edition

DELIVERY MODE(S): Lecture will be the main method of delivery. There is also a large laboratory component in this course.

OBJECTIVES:

The following are the topics that I be covering in this course:

1. nomenclature as a review from previous course.
2. solutions, including the related terminology. (For example saturated solutions)
3. how to interpret solubility graphs.
4. stoichiometry and various related problems.
5. gas laws and related graphs and problems.
6. equilibrium, pH.
7. modern atomic structure and orbitals
8. bonding and VSEPR.
9. the proper way to conduct oneself in a laboratory situation.
10. how to write up a formal lab report.

OUTCOMES:

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 in the reference section of 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.

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, London forces and Van der Waal's force.

TRANSFERABILITY: ** 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: 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 at 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.**

Late **partial assignments** are not accepted.

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

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

Marking Scheme:

Lab Reports	20%
Tests:	15%
Major test:	25%
Final Exam:	<u>40%</u>
Total	100%

GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
Alpha Grade	4-point Equivalent	Percentage Guidelines	Designation
A⁺	4	90 – 100	EXCELLENT
A	4	85 – 89	
A⁻	3.7	80 – 84	FIRST CLASS STANDING
B⁺	3.3	77 – 79	
B	3	73 – 76	GOOD
B⁻	2.7	70 – 72	
C⁺	2.3	67 – 69	SATISFACTORY
C	2	63 – 66	
C⁻	1.7	60 – 62	
D⁺	1.3	55 – 59	MINIMAL PASS
D	1	50 – 54	
F	0	0 – 49	FAIL
WF	0	0	FAIL, withdrawal after the deadline

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

STUDENT RESPONSIBILITIES:

Students will:

- review material that is prerequisite to this course quickly so it does not slow you down. (See Assumed Background Knowledge on pages 2 & 3. Especially the section on nomenclature.)
- be at class regularly and on time. (If you miss more than 10 per semester of classes in any course, you may be debarred from the final exam for that course.)
- complete all pre class and pre-lab assignments before arriving in class.
- keep up with course material.
- if experiencing difficulties with course get help immediately.
- catch up on missed material before the next class.
- provide documentation for missed midterms or finals.
- be aware of penalty for failing the lab component and not writing the final.

STATEMENT ON PLAGIARISM AND CHEATING:

Refer to the College Policy on Student Misconduct: Plagiarism and Cheating at www.gprc.ab.ca/about/administration/policies/fetch.php?ID=69

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

	Time	Chemistry 0110 Review (Fraser)	Chemistry: A Study of Matter (Dorin) 4 th Edition	General Chemistry (Ebbing) 11th Edition	Introductory Chemistry (Zumdahl) 5 th Edition	Basic Chemistry (Seese and Daub) 7 th Edition	Chemistry: A Basic Introduction Miller 4 th Edition
SI units	On your own time	19 – 30	16 – 22	15 – 27	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	15 – 18	22 – 28	21 – 27	33 – 26 38 – 42
Chemical Definitions and Classification of matter	On your own time	14 – 18	63 – 77	6 – 12	56 – 64	52 – 61	79
WHMIS	On your own time	5 – 10					
Review: Atomic Structure, atomic mass, amu	On your own time	56 – 69	109 – 123 top of 764	32 – 40 40 – 42	214 – 216 91 – 97	80 – 89	60 – 72 90 – 102
Review Valence Electrons & Electron Dot Diagrams	On your own time	70 – 71				89 – 90	

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Review Nomenclature	2 days	79 – 150	151 – 168	48 – 61	122 – 142	165 – 180	81 – 82 188 – 183 197 – 206
*Review Balancing Equations by Inspection	On your own time	152 – 167	206 – 223	64 – 67	154 – 165	216 – 235	233 – 240
Solubility			437 – 438	402 – 412			
Solutions: Saturated. Unsaturated, Supersaturated Solution.	1 day		433 – 446	404		363 – 370 370 – 371	350 – 357
Factor Affecting Rates of Solution			442 – 439	405 – 411		363 – 370	357 – 363
Solutions: Concentrated and Dilute Solutions			446 – 447	156		379 – 381	

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Stoichiometry							
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		175 – 195 175 – 189 175 – 189	71 – 74 88 – 93 153	211 – 213 216 – 226 246 – 258	188 – 197	210 – 219
% Composition	1 day		190 – 191	78 – 81	226 – 228	199 – 205	219 – 223
**Empirical Formula	1 day		192 – 195	82 – 88	228 – 237		223 – 229
Kinetic Molecular Theory of Gases	1 day		201 – 202	167 – 168		277 – 278	280 – 281
Gas Laws: Boyle's Law, Charles' Law and Ideal Gas Law	2 days		297 – 313 326 – 328	145 – 155		279 – 288 285 – 297	285 – 302
Volume of Gases under SATP Conditions (If time permits)	1 day		297 – 313 326 – 328	Not in text			303 – 308

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Concentration (Molarity) (Molality)	1 day		449 – 451 452 – 453	413, 418 415		377 – 379 384 – 386	353 – 368 372 – 373
Equation Stoichiometry & Limiting Reagents	4 days		233 – 252	88 – 98	259 – 265	249 – 256 259 – 265	240 – 253
% Yield	if time			98 – 99	265 – 266	257 – 259	253 – 253
Equilibrium Constant	1 day		513 – 517 518 – 523	478 – 491		477 – 479	427 – 433
Le Chatelier Principle			524 – 527	507 – 508		480	433 – 440
Solubility Product (K_{sp})			533 – 537	583 – 588		490 – 493	440 – 444
Arrhenius Acids, Bases, K_w , pH, & pOH (Strong acids and bases only) Neutralization Reactions Indicators	2 day		550 – 552 558 – 559 574 – 580 581 – 583	115, 521 – 522 534 – 538 114 – 115 539 – 540	185 – 188	406 – 407 418 – 422	389 – 390 397 – 409

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Atomic Structure, Orbitals (s, p, d, f) Pauli Exclusion Principle & Hund's Rule	3 days		335 – 353	231 – 236 240 – 254		91 – 98	102 – 116
Ionization Energy & Electronegativity	2 days		369 – 373	260 – 263		119 130 – 132	136 – 139 140 – 142
Electronegativity	0.5 day			284 – 287			
***Trends in the Periodic Table	3 days		359 – 369 380 – 382	43 – 56 249 – top 263 265 – 267			120 – 148
Ionic Bonding	0.5 days		391 – 394	270 – 271, 281		124 – 127	156 – 160
Covalent Bonding Polar and nonpolar covalent bond Coordinate covalent	0.5 days		396 – 402	281 283 – top 286 284		128 – 135	161 – 164, 174
VSEPR Polar Molecules				bottom 287 – 290 310 – 316			

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Hydrogen Bonding	0.5 days		416 – 419	448 – 440 443			
London Forces Van der Waal Force	0.5 days		421 – 422	369 367, 369			
Metal-Metal Bonding Sea of Electrons (If time permits)	0.5 days		419 – 420	270			155 – 156

* Test 1

**Test 2

Major test

***Test 3