



DEPARTMENT OF ACADEMIC UPGRADING

COURSE OUTLINE WINTER 2016

CH 0120 (A2): Chemistry Grade 11

Equivalent 5(4 – 0 – 2)

Instructor	NANCY FRASER	Phone	539 – 2980
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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.

PREREQUISITES:

SC0110 (Science 10); MA0110 (Math 10C) or MA0120 placement. See also Academic Upgrading Science Requirements

REQUIRED TEXT/RESOURCE MATERIAL:

- *** General Chemistry by Ebbing 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 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 **full 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%

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	15%
Full Assignments:	5%
Partial Assignments:	5%

Tests:	15%
Major test:	20%
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

https://www.gprc.ab.ca/files/forms_documents/Student_Misconduct.pdf

**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) 10th 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	18 – 28	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	On your own time	56 – 69	109 – 123 top of 764	41 – 52	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	57 – 59 62 – 70	122 – 142	165 – 180	81 – 82 188 – 183 197 – 206
*Review Balancing Equations by Inspection	On your own time	152 – 167	206 – 223	72 – 76	154 – 165	216 – 235	233 – 240
Solubility			437 – 438	488 – 490			
Solutions: Saturated. Unsaturated, Supersaturated Solution.	1 day		433 – 446	496 – 498 505, 509		363 – 370 370 – 371	350 – 357
Factor Affecting Rates of Solution			442 – 439	478 – 488		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	89 – 95 104 – 114 188	211 – 213 216 – 226 246 – 258	188 – 197	210 – 219
% Composition	1 day		190 – 191	95 – 96	226 – 228	199 – 205	219 – 223
**Empirical Formula	1 day		192 – 195	99 – 104	228 – 237		223 – 229

Kinetic Molecular Theory of Gases	1 day		201 – 202	201 – 202		277 – 278	280 – 281
Gas Laws: Boyle's Law, Charles' Law and Ideal Gas Law	2 days		297 – 313 326 – 328	179 – 193		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	156 – 164 501		377 – 379 384 – 386	353 – 368 372 – 373
Equation Stoichiometry & Limiting Reagents	4 days		233 – 252	103 – 112	259 – 265	249 – 256 259 – 265	240 – 253
% Yield	if time			111 – 112	265 – 266	257 – 259	253 – 253
Equilibrium Constant	1 day		513 – 517 518 – 523	585 – 586		477 – 479	427 – 433
Le Chatelier Principle			524 – 527	591 – 596		480	433 – 440
Solubility Product (K_{sp})			533 – 537	710 – 715		490 – 493	440 – 444
K_w				647 – 648			

***Arrhenius Acids, Bases, pH, & pOH (Strong acids and bases only)			550 – 552	138 – 146			
Neutralization Reactions			558 – 559	635 – 636		406 – 407	389 – 390
Indicators***	2 day		574 – 580	671		418 – 422	397 – 409
			581 – 583	652 – 653	185 – 188		

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Atomic Structure, Orbitals (s, p, d, f) Pauli Exclusion Principle & Hund's Rule	3 days		335 – 353	285 – 290 300 – 315		91 – 98	102 – 116
Ionization Energy & Electronegativity	2 days		369 – 373	320 – 323		119 130 – 132	136 – 139 140 – 142
Electronegativity	0.5 day			351, 352			

***Trends in the Periodic Table	3 days		359 – 369 380 – 382	51 – 53 311 – 316 318 – 321			120 – 148
Ionic Bonding	0.5 days		391 – 394	335, 346		124 – 127	156 – 160
Covalent Bonding	0.5 days		396 – 402	346 – 349		128 – 135	161 – 164, 174
VSEPR Polar Molecules				351 – 358 383 – 385			
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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	445 – 447 453			

Metal-Metal Bonding Sea of Electrons (If time permits)	0.5 days		419 – 420	454			155 – 156
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* Test 1

**Test 2

Major test

***Test 3