

**CHEM 030B, Chemistry 030**

5 Credits, 6 hours lecture + 2 hours lab

Chemistry 030 begins with a review of Chemistry 025, followed by a study of enthalpy changes and calorimetry; equilibrium Brønsted-Lowry acid-base theory and acid-base titrations; oxidation-reduction reactions and electrochemical cells, and organic chemistry, including organic reactions and nomenclature of hydrocarbons, aromatics and other functional groups. Alberta Education Course Equivalency: Chemistry 30.

Alberta Education Course Equivalency: Chemistry 30

Prerequisite: CHEM 025 or equivalent or permission from the Program Chair

**Instructor**

Linda Milette  
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**Office Hours**

Tuesday	11:00 – 11:50 AM
Tuesday	3:00 – 3:50 PM
Wednesday	3:00 – 3:50 PM
Thursday	10:00 – 10:50 AM
Friday	9:00 – 9:50 AM

**Hours of Instruction**

Monday lectures	3:00 – 4:50 PM	Rm CC233
Wednesday lectures	11:00 – 12:50 PM	Rm CC215
Friday lectures	1:00 – 2:50 PM	Rm CC219
<b>Thursday Labs</b>	2:00 – 3:50 PM	Rm CC236 ( <i>lab dates noted on Calendar, page 4</i> )

**Required Resources**

**Chemistry 030 Student Manual**, available in the Keyano Bookstore

**Other supplies:**

**Calculator**, scientific or graphing

**Lab Coat**—must be knee-length

**Lab Pants** – must completely cover the ankle

**Extra-Large Zip Lock Bag** (for lab, available at Keyano Bookstore)

**Course Outcomes**

Upon successful completion of the course, the student shall be able to:

- use balanced chemical equations to indicate the quantitative relationships between reactants and products involved in chemical changes.
- use stoichiometry in quantitative analysis.
- communicate, calculate, and interpret energy changes in chemical reactions.
- explore classes of organic compounds as a common form of matter.
- describe chemical reactions involving organic compounds.
- explain that there is a balance of opposing reactions in chemical equilibrium systems.
- determine quantitative relationships in simple equilibrium systems.
- describe acidic and basic solutions qualitatively and quantitatively.
- explain the nature of oxidation-reduction reactions.
- apply the principles of oxidation-reduction to electrochemical cells.
- show concern for safety in planning, carrying out and reviewing laboratory activities, referring to the Workplace Hazardous Materials Information System (WHMIS) and consumer product labels.
- work collaboratively in planning and carrying out laboratory investigations and in generating and evaluating scientific ideas.

### Evaluation

Assignments & Quizzes	20 %
Laboratory Reports	15 %
Lab Final Exam	5 %
Midterm Exam (first 3 units)	30 %
Final Exam (last 2 units)	30 %
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TOTAL	100 %

*The minimum pre-requisite for progression is 1.7 (refer to Grading System below)*

### Grading System

Descriptor	4.0 Scale	Percent
Excellent	4.0	96 – 100
	4.0	90 – 95
	3.7	85 – 89
Good	3.3	81 – 84
	3.0	77 – 80
	2.7	73 – 76
Satisfactory	2.3	69 – 72
	2.0	65 – 68
<b>Minimum Prerequisite</b>	<b>1.7</b>	<b>60 – 64</b>
Poor	1.3	55 – 59
Minimum Pass	1.0	50 – 54
Failure	0.0	0 – 49

**Proposed Schedule of Topics****Units of Study****Labs****Building Blocks of Chemistry (Review of Chemistry 025)****Exp #1**

1. Review of Inorganic Nomenclature
2. Review of Inorganic Reaction Types and Balancing Chemical Equations
3. Review of Simple Calculations and Significant Digits
4. Review of Stoichiometry

**Introduction to Organic Chemistry****Exp #2**

1. Hydrocarbons: Nomenclature and Structural Diagrams
2. Hydrocarbon Derivatives: Nomenclature and Structural Diagrams
3. Structural Isomers
4. Organic Reaction Types (including petroleum refining)

**Thermochemistry****Exp #3**

1. Thermochemical Terminology
2.  $\Delta H$  notation and Energy Diagrams
3. Thermochemical Stoichiometry
4. Measuring  $\Delta H$  using Calorimetry
5. Molar Enthalpy
6. Calculating  $\Delta H$  using Hess' Law
7. Calculating  $\Delta H$  using Enthalpies of Formation
8. Applications: Photosynthesis, Respiration, and Nuclear Energy

**MIDTERM EXAM****Acid-Base Equilibrium****Exp #4**

1. Review of Arrhenius Acid-Base Theory
2. Acid-Base Titrations: Stoichiometry and Titration Curves
3. The pH Scale and Calculations for Strong Acids and Bases
4. Introduction to Chemical Equilibrium
5. Equilibrium Disruption: Le Châtelier's Principle
6. Brønsted-Lowry Acid-Base Theory
7. Applications: Acid-Base Indicators and Buffers
8. Weak Acid-Base Calculations

**Exp #5****Electrochemistry****Demo Lab**

1. Review of Oxidation Number Rules
2. Reduction-Oxidation Terminology
3. Methods of Balancing Redox Equations
4. Predicting Redox Reactions using a Table of Reduction Strengths
5. Galvanic (Voltaic) Cells
6. Applications: Corrosion of Metals
7. Electrolytic Cells
8. Redox Stoichiometry: Faraday's Law and Redox Titration

**Lab Exam****FINAL EXAM**

## Calendar of Important Events

*Dates on the following calendar are tentative; shaded areas indicate no Chemistry 030 classes.*

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1			January 4 Winter Semester	5	6
2	9	10	11	12 LAB INTRO SESSION	13
3	16	17	18	19 EXP # 1	20
4	23	24	25	26	27
5	30	31	February 1	2 EXP # 2	3
6	6	7	8	9	10
7	13	14	15	16 EXP # 3	17
8	20 Family Day - College Closed	21	22 MIDTERM EXAM	23	24
9	27 Reading Week - No Class	28 Reading Week - No Class	March 1 Reading Week - No Class	2 Reading Week - No Class	3 Reading Week - No Class
10	6	7	8	9 EXP # 4	10
11	13	14	15	16	17
12	20	21	22	23 EXP # 5	24
13	27	28	29	30 DEMO LAB 3-3:50 PM	31
14	April 3	4	5	6	7
15	10	11	12	13 LAB EXAM	14 Good Friday - College Closed
16	17 Easter Monday - College Closed	18	19 Last Day of Class	20 Final Exams	21 Final Exams
17	24 Final Exams				

***Please Note:***

Date and time allotted to each topic is subject to change.

***\*Final exam dates are scheduled by the College.***

Do not book travel before April 25<sup>th</sup>, 2017.

## Performance Requirements

### Student Responsibilities

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the Keyano College credit calendar.

More specific details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

### Laboratory Safety

In the science laboratories, safety is important.

Students must complete the *WHMIS for Students* online training course on Moodle before entering the science laboratories.

Students must comply with the mandatory laboratory safety rules for this course as provided in the laboratory manual. Failure to do so will result in progressive discipline such as a verbal warning, refused entry into the laboratory, or suspension from the College.

### Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and / or notes that may be due.

### Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own
- The use of unauthorized aids in assignments or examinations (cheating)
- Collusion or the unauthorized collaboration with others in preparing work
- The deliberate misrepresentation of qualifications
- The willful distortion of results or data
- Substitution in an examination by another person
- Handing in the same unchanged work as submitted for another assignment
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on [ilearn.keyano.ca](http://ilearn.keyano.ca). Then print the certificate, sign it, and show it to each of your instructors. Your course work will not be graded until you show this signed certificate.

**Specialized Supports****Counselling and Accessibility Services**

Counselling Services provides a wide range of specialized counselling services to prospective and registered students, including personal, career and academic counselling.

**SKILL Centre**

The SKILL Centre is a learning space in the Clearwater Campus at Keyano College where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff.

The SKILL Centre, through a variety of delivery methods, provides assistance in skill development to Keyano students. Assistance is provided by instructors, staff and student tutors. Individuals wishing to improve their mathematics, writing, grammar, study, or other skills, can take advantage of this unique service.

**Authorization**

This course outline has been reviewed and approved by the Program Chair.

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Linda Milette, Instructor

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Lisa Turner, Chair

Date Authorized

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Vincella Thompson, Dean

Date Authorized

**Signed copies to be delivered to:**

Instructor

Registrar's Office