

CHEM 030B/Y, 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

Monday: 11:00 AM – 11:50 AM
Tuesday: 12:00 noon – 12:50 PM
Wednesday: 11:00 AM – 11:50 AM & 3:00 PM – 3:50 PM
Thursday: 12:00 noon – 12:50 PM

Hours of Instruction

Monday: 8:00 AM – 9:50 AM CC237
Wednesday: 8:00 AM – 9:50 AM CC237
Friday: 8:00 AM – 9:50 AM CC237

Thursday Labs 2:00 – 3:50 pm Rm CC236 (lab dates noted on Calendar, page 4)

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:

1. use balanced chemical equations to indicate the quantitative relationships between reactants and products involved in chemical changes.
2. use stoichiometry in quantitative analysis.
3. communicate, calculate, and interpret energy changes in chemical reactions.
4. explore classes of organic compounds as a common form of matter.
5. describe chemical reactions involving organic compounds.
6. explain that there is a balance of opposing reactions in chemical equilibrium systems.
7. determine quantitative relationships in simple equilibrium systems.
8. describe acidic and basic solutions qualitatively and quantitatively.
9. explain the nature of oxidation-reduction reactions.
10. apply the principles of oxidation-reduction to electrochemical cells.
11. 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.
12. 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
	Minimum Prerequisite	1.7
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

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

Exp #3**MIDTERM EXAM (Units 1 – 3)****Acid-Base Equilibrium**

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 #4**Exp #5****Electrochemistry**

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

Demo Lab**Lab Exam****FINAL EXAM (Units 4-5)**

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	Jan 7 Intro / First day of Chemistry 30 class	8	9 Nomenclature	10 Lab Intro Room CC233	11 Chemical Reactions
2	14 Chemical Reactions	15	16 Simple Calculations	17 Exp #1	18 Stoichiometry
3	21 Percent Yield/Limiting Reactants	22	23 Organic Chemistry Intro - Alkanes	24	25 Alkenes/Alkynes
4	28 Aromatics	29	30 Hydrocarbon Derivatives / isomers	31 Exp #2	Feb 1 Hydrocarbon Derivatives/isomers
5	4 Organic Reactions	5	6 Thermo-Stoichiometry	7	8 Calorimetry
6	11 Calorimetry	12	13 Hess's Law	14 Exp #3	15 Hess's Law / Standard Enthalpies of Formation
7	18 Family Day Holiday College Closed	19 Reading Day— No Classes	20 Reading Day— No Classes	21 Reading Day— No Classes	22 Reading Day— No Classes
8	25 Standard Enthalpies of Formation / Review	26	27 MIDTERM EXAM	28	Mar 1 Acid / Base Intro and Titrations
9	4 Equilibrium	5	6 Le Chatelier's Principle	7 Exp #4	8 Le Chatelier's Principle / B-L Predicting
10	11 Bronsted-Lowry Predicting	12	13 Bronsted-Lowry indicators	14	15 pH Strong Acids/Base
11	18 pH Weak Acid/Base	19	20 Electrochemistry Intro	21 Exp #5	22 Balancing without Tables
12	25 Redox Tables/Prediction	26	27 Redox Predicting	28 Demo Lab	29 Half Reactions
13	Apr 1 Galvanic Cells	2	3 Galvanic Cells	4 LAB EXAM	5 Electrolytic Cells
14	8 Faradays Law	9	10 Redox Titrations/Review Last day of classes		12
15	15 Final Exams	16 Final Exams	17 Final Exams	18 Final Exams	19 Good Friday Holiday College Closed
16	22 Easter Monday Holiday College Closed	23 Final Exams	24 Final Exams	25 Final Exams	26

Please Note:

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

Final exams are scheduled by the College. Do not book travel until April 26, 2019.

Course Specific Policies

1. **Attendance Policy:** Chemistry 030 Section B is designed as a **face-to-face course**, so success is improved by being on time and regularly attending. Extended or frequent absences *for any reason cannot* be accommodated and can impact your overall mark. *Some suggestions for handling occasional lecture absences include:*
 - a. checking the Calendar of Events, [News Forum](#) and slide notes by logging into [ilearn.keyano.ca](#)
 - b. finding a “classroom buddy” whom you can contact for details regarding what you have missed. I do not use ilearn to post exact slides and daily homework, or worked solutions from the lectures.
 - c. **check your Keyano email frequently**; notices posted to the ilearn forum automatically go there.
2. **Electronic devices policy:**
 - a. Texting and personal web browsing is **NOT permitted** during class lecture time.
 - b. Some students find usage of tablets and laptops to follow slides very helpful during lectures, so you are welcomed to bring these to class **for instructional purposes only**.
 - c. Sounds on all cell phones should be turned off during class and if you need to take an important call please leave the room to avoid disrupting others. **Please note that using electronic devices to record the class in any way (audio, video, photos, etc.) is not permitted.**
3. **Late Work Policy:** assigned work must be received in hard copy and in person. It will receive
 - a. full marks when received in person on the due date.
 - b. the earned grade, minus 10%, for each day late.
 - c. a mark of zero if received after I have returned work, posted answer keys on Moodle, or reviewed answers during class. I do not accept work pushed under my office door.
 - d. No late work will be accepted once keys are posted or marked assignments returned.
4. **Laboratory Policy:** our laboratories have important safety protocols and procedures which you will learn about during our Laboratory Introduction Session and your WHMIS training. You will need to do the following to complete the lab portion of the course:
 - a. **complete your WHMIS training** through ilearn prior to your first lab. You must score at least 80% on the quiz to receive your certification, which is good for 2 years in Keyano’s science labs.
 - b. **arrive at every lab on time**. It is recommended that you be ready to go 10 minutes prior to the lab. For safety reasons, students who arrive late will NOT be permitted into the lab and *will receive a mark of zero* for all related lab work.
 - c. **be present for every laboratory period** for your lab section. Make-up time or switching lab dates/sections is not an option, due to limited facilities, safety concerns, and staff workloads.
 - d. **complete five labs plus the Lab Final Exam** to receive a course grade greater than 60%. Missing more than one lab for any reason means that you did not complete the lab portion of the course and did not obtain exposure to the prerequisite skills for the next level of chemistry.
5. **Other Course Policies and Procedures:**
 - a. **work submitted by non-attending students may not be marked.**
 - b. any work showing evidence of copying or plagiarism will receive a mark of zero. (see “Student Rights and Responsibilities” in the Credit Calendar).
 - c. in-class quizzes cannot usually be rewritten, as these are meant to give you immediate feedback on your progress.
 - d. a missed exam may be written at an alternate time **only under certain exceptional** circumstances, **at the instructor’s discretion**. The instructor must be contacted within 24 hours of the scheduled exam, and documentation (e.g. a doctor’s note) provided.
 - e. ***The final exam will be written on the date scheduled by the College; otherwise, the procedure for “Deferred Final Examination” in the Credit Calendar is to be followed.**

Should you have trouble logging into [ilearn.keyano.ca](#), please contact Keyano College Information and Technology Services (its.helpdesk@keyano.ca or 780-791-4965).

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 and therefore students must complete the *WHMIS for Students* online training course on Moodle (ilearn.keyano.ca) 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.

Before entering the lab, students are responsible reviewing the lab manual and relevant Safety Data Sheets for the purpose of evaluating risks associated to health. Some hazards used in the laboratory may have additional risks to those with pre-existing medical conditions.

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.

Specialized Supports

The Student Academic Support Services (SASS) department: Accessibility Services, Skill Centre and Wellness Services, work together to support student success at Keyano College.

Accessibility Services (CC167) supports student success through group and individualized instruction of learning, study and test taking strategies, and adaptive technologies. Students with documented disabilities, or who suspect a disability, can meet with the Learning Strategists to discuss accommodation of the learning barriers that they may be experiencing. Students who have accessed accommodations in the past are encouraged to visit our office at their earliest opportunity to discuss the availability of accommodations in their current courses. Individual appointments can be made by calling 780-791-8934

Skill Centre (CC119) provides a learning space where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff. Students visiting the centre have access to one-to-one or group tutoring, facilitated study groups, and assistance in academic writing. The Skill Centre's Peer Tutor program provides paid employment opportunities for students who have demonstrated academic success and want to share what they have learned. Tutoring is available free to any students registered at Keyano College on a drop in basis, from 9:00 am to 5:00 pm Monday through Friday. Additional evening hours are subject to tutor availability and are posted in the Skill Centre.

Wellness Services (CC260) offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators offer a safe and confidential environment to seek help with personal concerns. The Mindfulness Room in CC260 is available as a quiet space for students to relax during regular office hours. Wellness Service welcomes students to participate in any of the group sessions offered throughout the academic year addressing such topics as Mindfulness and Test Anxiety. Individual appointments can be made by calling 780-791-8934.

Please watch your Keyano email for workshop announcements from our Student Academic Support Services team.