

**CHEM 030A, Chemistry 30**

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 Bronsted-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.*

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

**Instructor**

Patricia Collins  
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780-791-8955  
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**Office Hours**

Monday – Friday 12:00 pm – 1:00 pm

**Hours of Instruction & Location**

Day	Time	Location
Monday, Tuesday, and Wednesday Lectures	9:00 am – 11:50 am	S216
Thursday Lab	9:00 am – 11:50 am	CC236 (Chemistry Lab)
Friday Lecture	9:00 am – 11:50 am	S216

**Required Resources**

- **Chemistry 030 Student Manual**, available in print from the Keyano Bookstore
- **Calculator**, scientific or graphing
- **Sharpie** fine point permanent marker, black
- **Lab Coat** (must be knee-length)
- **Safety goggles** (one of: Honeywell North VMAXX 112-508-10, **or** Honeywell UVEX Stealth S3970D **or** Honeywell UVEX Classic 360 S360)
- **Extra large Ziploc bag**
- **Computer** (laptop or desktop)—see page 7 for details

**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 and Quizzes	20%
Laboratory Reports	15%
Midterm Exam (first 3 units)	30%
Lab Exam	5%
Final Exam (last 2 units)	30%

*A grade of 60% (1.7, or C-) is required for progression. The minimum standard for passing this course is a grade of 50% (1.0, or D).*

**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>	60 – 64
Poor	1.3	55 – 59
Minimum Pass	1.0	50 – 54
Failure	0.0	0 – 49

**Proposed Schedule****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**

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**

**Calendar of Important Events:** shaded areas indicate no Chemistry 030 lectures.

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	<b>May 8</b> Course Intro. & Nomenclature Review	<b>9</b> Review of Balancing & Rxn Types	<b>10</b> Review of Simple Calculations	<b>11</b> <b>Lab Intro</b> <b>Experiment #1:</b> Net Ionic Equations	<b>12</b> Review of Stoichiometry
2	<b>15</b> Organic Intro. & Hydrocarbons	<b>16</b> Hydrocarbon Derivatives	<b>17</b> Organic Reactions	<b>18</b> <b>Experiment #2:</b> Esterification	<b>19</b> Thermo. Intro. & Stoichiometry
3	<b>22</b> VICTORIA DAY HOLIDAY	<b>23</b> Calorimetry & Molar Enthalpy	<b>24</b> Hess' Law & Enthalpies of Formation	<b>25</b> <b>Experiment #3:</b> Calorimetry & MT Exam Review	<b>26</b> <b>Midterm Exam</b>
4	<b>29</b> Acid-Base Intro. & Titrations	<b>30</b> pH Calculations for Strong Acids & Bases	<b>31</b> Equilibrium & Le Chatelier's Principle	<b>June 1</b> <b>Experiment #4:</b> Acid-Base Titration	<b>2</b> Bronsted-Lowry Acid-Base Predicting
5	<b>5</b> Bronsted-Lowry Acid-Base Systems; Intro to Weak Acids & Bases	<b>6</b> pH Calculations for Weak Acids & Bases	<b>7</b> Electrochem. Intro. & Oxidation Numbers	<b>8</b> <b>Experiment #5:</b> Bronsted Lowry Acids and Bases <b>Demo Lab:</b> Redox Tables	<b>9</b> Half-Reactions & Intro to Redox Tables
6	<b>12</b> Redox Predicting & Electro. Cells	<b>13</b> Galvanic & Electrolytic Cells	<b>14</b> Redox Stoichiometry	<b>15</b> <b>Lab Exam &amp;</b> Final Exam Review	<b>June 16</b> <b>Final Exam</b>

**Please Note:**

The date and time allotted to each topic are subject to change.

**Final exams are scheduled by the College. Do not book travel until June 17, 2023, for courses with final exams.** Deferred exams will NOT be approved for travel, even if the travel was booked prior to enrolling in the course.

**Course Specific Policies**

1. **Attendance:** Chemistry 030 is designed as a **face-to-face course**. Extended or frequent absences *for any reason* can impact your overall mark. Suggestions for handling occasional absences include:
  - a. **finding a “classroom buddy”** whom you can contact for details regarding what you have missed.
  - b. **using Moodle:** log into [ilearn.keyano.ca](http://ilearn.keyano.ca) to check the Calendar and see slide notes and pre-recorded audio PowerPoint lessons.
  - c. **using OneNote:** this is the class notebook where I record daily lesson outlines and homework. Search your Keyano email during the first week of classes for an invitation from SharePoint, or use your Keyano credentials to log into [onenote.com](http://onenote.com)
  - d. **using your Keyanomail** to get in touch with me. You will receive responses during office hours.
2. **Electronic devices:** some students find usage of tablets and laptops very helpful during lectures, so you are welcomed to bring these to class. Sounds on all devices should be turned off during class and if you need to take an important call, please leave the room to avoid disrupting others. *Please do not use electronic devices to record the class in any way (audio, video, photos, etc.).*
3. **Late Work:** for full marks, assigned work must be received in hard copy and in person, in class, on the due date. If you need extra time to get an assignment completed, it will receive
  - a. the earned grade, minus 5%, if received after class on the due date.
  - b. the earned grade, minus 20%, for each additional day late.
  - c. **a mark of zero if received after I have returned them, OR if pushed under my office door.**
4. **Laboratory:** our laboratories have important safety protocols and procedures which you will learn about during your WHMIS training. To complete the lab portion of the course:
  - a. ***complete your WHMIS training*** through Moodle prior to your first lab. Your certification is good for 2 years in Keyano’s science labs. Bring your certificate to the first lab session.
  - b. ***arrive at every lab on time and in correct apparel.*** It is recommended that you be ready to go 10 minutes prior to the lab. For safety reasons, students who arrive late or improperly dressed will NOT be permitted into the lab and *will receive a mark of zero* for all related lab work.
  - c. ***to receive marks for laboratory work, you need to arrive on time and complete the entire laboratory.*** There are no make-up labs or make-up reports.
5. **Other:**
  - a. Any work showing evidence of copying or plagiarism will receive a mark of zero. (see page 6)
  - b. Chemistry 030 includes several Moodle quizzes (see Moodle Calendar). Moodle quizzes are completed online, in one attempt, during a limited timeframe—**see Moodle for quiz opening and closing dates.** *Extensions and “make-ups” will not be granted for any quizzes..*
  - c. 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) must be provided.
  - d. 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.
  - e. There will be no alternative, “make-up”, or “extra credit” assignments provided for this course.

## Performance Requirements and Student Services

### Student Responsibilities

As a student, it is your responsibility to contact the Office of the Registrar to complete the required forms, including the [Withdrawal/Drop Form](#). All forms are available on the [College website](#). Please refer to the important dates listed in the Academic Schedule in the [Keyano College credit calendar](#) and/or on the [College website](#). It is the responsibility of each student to be aware of the guidelines outlined in the [Student and Academic Policies](#).

### Student Attendance

Class attendance is helpful for two reasons: First, class attendance maximizes a student's learning experience. Second, attending class is an excellent way to keep informed of matters relating to the course administration (e.g., the timing of assignments and exams). Ultimately, you are responsible for your learning and performance in this course. It is the responsibility of each student to be prepared for all classes. Absent students are responsible for the material covered in those classes, and students must ensure they are ready for their next class, including completing any missed assignments and notes.

### Course Evaluation

Midterm exams and term work is to be completed at the time/date indicated in your course syllabus. It is the expectation of the College that students make every reasonable effort to complete all course evaluation, including, quizzes, midterms, and exams, as scheduled. In the event of an emergency, rescheduling of exams and/or extensions are only provided at the discretion of the course instructor. Students should contact the instructor as soon as they are able, to notify them of missing an evaluative component. Instructors will use discretion in deciding whether circumstances justify granting a reschedule and/or extension.

Regular term quizzes, midterms, and exams are not eligible for deferral and/or date extension accommodations. Students with accommodations, please refer to Accessibility Services.

Final Exams are subject to deferral processes, please refer to the current [Keyano College Credit Calendar](#).

### Academic Integrity & Misconduct

Academic integrity requires commitment to the values of honesty, trust, fairness, respect, and responsibility. It is expected that students at Keyano College will adhere to these ethical values in all activities related to learning, teaching, research, and service. Any action that contravenes this standard, including misrepresentation, falsification, or deception, undermines the intention and worth of scholarly work and violates the fundamental academic rights of members of our community.

Academic dishonesty takes many forms:

- Plagiarism or the submission of another person's work as their own,
- The use of unauthorized aids in assignments or examinations (cheating),
- Using Artificial Intelligence (AI) to complete coursework (without instructor approval),
- 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,
- Submitting unchanged work for another assignment, and
- Breach of confidentiality.

In all academic work, the ideas and contributions of others must be appropriately acknowledged and work that is presented as original must be, in fact, original. Using an AI-content generator (such as ChatGPT)

to complete coursework without proper attribution or authorization is a form of academic dishonesty. If you are unsure about whether something may be plagiarism or academic dishonesty, please contact your instructor to discuss the issue.

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 & Academic Policies* 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, Academic Integrity, and Non-Academic Misconduct Policies.

To ensure your understanding of plagiarism, you may be required to complete the online [Understanding Plagiarism tutorial](#) and submit the certificate of completion.

### Online Learning

Technology and internet connectivity will impact your online learning experience. You may be required to watch online videos, take online quizzes, or participate in live online classes. Live/virtual courses will be hosted in Microsoft Teams or Zoom. For all course delivery types, you will access your course resources on Keyano's learning management system: Moodle (iLearn). Login in using your [Keyano username and password](#). Keyano College operates in a Windows-based environment and having access to the correct tools for online learning is essential.

### Internet Speed

Minimum download and upload speeds of 10 Mbps. Recommended download speeds of 25 Mbps and upload speeds of 10 Mbps (if you are sharing your internet at home). You can check your internet speed with [Speedtest by Ookla](#).

### Computer System Requirements

Keyano College software are Windows based.

Minimum Requirements and Recommended Upgrades for Windows (preferred system) and Apple devices
These minimum standards are required for a Windows computer/laptop (OS 10 or 11) and a Macintosh (OS 10.14 or above).
<ol style="list-style-type: none"><li>1. Windows 10 Operating System or above</li><li>2. 4GB of RAM. Recommended upgrade to 8GB of RAM.</li><li>3. 10GB+ available hard drive storage space. Note installing Microsoft Office 365 requires 3GB of available hard drive space.<ol style="list-style-type: none"><li>a. Install the Microsoft Office 365 suite (~3GB) *</li></ol></li><li>4. Microphone, webcam, and speakers (All modern laptops have these three accessories built-in. However, a headset or earbuds with a microphone is also recommended.</li><li>5. Windows has built-in anti-virus/malware software. It is essential to install system updates to keep your device secured regularly.</li></ol> <p>*<a href="#">Microsoft Office 365</a> is free to Keyano students.</p>
Tablets, iPads, and Chromebooks are <b>not</b> recommended: they may not be compatible with the testing lockdown browsers and Microsoft Office 365.

### Computer Software

Students have access to Microsoft Office 365 and Read & Write for free using Keyano credentials.



See [Recommended Technology](#) for more information.

## Recording of Lectures and Intellectual Property

Students may only record a lecture if explicit permission is provided by the instructor or Accessibility Services. Even if students have permission to record a lecture or lecture materials, students may not share, distribute, or publish any of the lectures or course materials; this includes any recordings, slides, instructor notes, etc., on any platform. Thus, no student is allowed to share, distribute, publish, or sell course-related content without permission. It is important to recognize that the Canadian Copyright Act contains provisions for intellectual property. The [Academic Integrity Policy](#) provides additional information on Keyano College's expectations from students as members of the intellectual community.

## ITS Helpdesk

If you have issues with your student account, you can contact the ITS Helpdesk by emailing [its.helpdesk@keyano.ca](mailto:its.helpdesk@keyano.ca) or calling 780-791-4965.

## Specialized Supports

Keyano College is committed to Keyano students and their academic success. There is a variety of student support available at Keyano. All student services are available during Keyano business hours: Monday to Friday, 8:30 a.m. to 4:30 p.m. The College is closed on statutory holidays. If you require support outside of regular business hours, please inform the support service team, and they will do their best to accommodate your needs.

**Accessibility Services** provides accommodations for students living with disabilities. Students with documented disabilities or who suspect a disability can meet with an Access Strategist to discuss their current learning barriers and possible accommodations. Students who have accessed accommodations in the past are encouraged to contact the department to request accommodations for the following semester. Please note that requesting accommodations is a process and requires time to arrange. Contact the department as soon as you know you may require accommodations. For accessibility supports and disability-based funding, please book an appointment by emailing us at: [accessibility.services@keyano.ca](mailto:accessibility.services@keyano.ca).

Accessibility Services also provides individual and group learning strategy instruction for all students and technology training and support to enhance learning. You can meet with an Access Strategist to learn studying and test-taking strategies. In addition, you can schedule an appointment with the Assistive Technology Specialist to explore technology tools for learning. Book an appointment today by emailing: [accessibility.services@keyano.ca](mailto:accessibility.services@keyano.ca)

**Wellness Services** 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 provide a safe and confidential environment for you to seek help with personal concerns. Our Wellness Navigator offers support with basic needs such as housing, financial and nutritional support, and outside referrals when needed. Wellness Services welcomes students to participate in group sessions that address topics including mindfulness and test anxiety throughout the academic year. Individual appointments can be made by emailing [wellness.services@keyano.ca](mailto:wellness.services@keyano.ca).

**Library Services** provides students with research, information, and educational technology supports as they engage in their studies. Library staff are available to help you online and in person throughout the semester. Librarians offer individual and small group consultations booked using the online [Book A Librarian calendar](#). The library also provides virtual research and subject guides to help you with your studies. Find the guide that supports your course-related research by viewing the complete list of online [Subject Guides](#). To start your research and access citation guides (APA, MLA, Chicago, or IEEE), visit the [Research Help page](#). The library's collections (including print and online materials) are searchable using [OneSearch](#). The library offers a Loanable Technology collection to support students accessing and using technology. For an up-to-date list of technology available for borrowing, visit the library's [Loanable](#)




[Technology webpage](#). For a detailed list of library resources and services, go to [www.keyano.ca/library](http://www.keyano.ca/library). For all inquiries, please email [askthelibrary@keyano.ca](mailto:askthelibrary@keyano.ca) or [chat with us online](#).

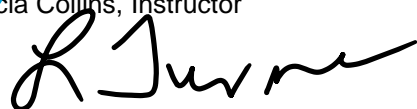
The **Academic Success Centre** at Keyano College (CC-119) provides free academic support services to registered students, such as tutoring, writing support, facilitated study groups, workshops, and study space. Academic Content Specialists are available in Mathematics, Science, Trades, Power Engineering, Upgrading/College Prep, Human Services, English, Humanities, and more. Students are encouraged to visit the Academic Success Centre to discuss study strategies and academic concerns.


Specialists in the Academic Success Centre also work with students to develop academic success plans, time management skills, study strategies, and homework plans. For additional information, please email [Academic.Success@keyano.ca](mailto:Academic.Success@keyano.ca).

**Authorization**

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

  
\_\_\_\_\_  
Patricia Collins, Instructor

  
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Lisa Turner, Chair

  
\_\_\_\_\_  
Date Authorized

\_\_\_\_\_  
Coert Erasmus, Dean

\_\_\_\_\_  
Date Authorized

**Signed copies to be delivered to:**  
Instructor