

**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  
Office S209 C  
780-791-8955  
[patricia.collins@keyano.ca](mailto:patricia.collins@keyano.ca)

**Office Hours**

Monday	12:00 p.m. – 12:50 p.m.
Tuesday	2:00 p.m. – 2:50 p.m.
Wednesday	12:00 p.m. – 1:50 p.m.
Thursday	12:00 p.m. – 12:50 p.m.

**Hours of Instruction**

Tuesday	8:00 a.m. – 9:50 a.m.	Room S216
Wednesday Lab	9:00 a.m. – 10:50 a.m.	Room CC236 (dates noted on Calendar, page 4)
Thursday	10:00 a.m. – 11:50 a.m.	Room S110
Friday	8:00 a.m. – 9:50 a.m.	Room S218

**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**

Daily work and quizzes	40%
Lab Reports	15%
Lab Exam	5%
Midterm Exam (Units 1, 2, and 3)	20%
Final Exam (Units 4 and 5)	20%

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
	2.3	69 – 72
Satisfactory	2.0	65 – 68
<b>Minimum Prerequisite</b>	1.7	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

**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

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

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

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	Aug 29 Orientation Day	30 Orientation Day	31 First day of Chem 030 ROOM S216	Sept 1	2
2	5 Labour Day Holiday College closed	6	7	8	9
3	12	13	14 Experiment #1	15	16
4	19	20	21	22	23
5	26	27	28 Experiment #2	29	30 Truth and Reconciliation Day No classes
6	Oct 3	4	5	6	7
7	10 Thanksgiving Day Holiday College closed	11	12 Experiment #3	1	14
8	17	18 MIDTERM EXAM	19	20	21
9	24	25	26 Experiment #4	27	28
10	31	Nov 1	2	3	4
11	7	8	9 Reading Day No classes	10 Reading Day No classes	11 Remembrance Day Holiday College closed
12	14	15	16	17	18
13	21	22	23 LAB EXAM	24	25
14	28	29	30	Dec 1	2 Last day of Chem 030
15	5	6	7	8 EXAMS	9 EXAMS
16	12 EXAMS	13 EXAMS	14 EXAMS	15 EXAMS	16 EXAMS
17	19 EXAMS	20	21 End of Fall Semester	22	23

**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 December 20, 2022 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 has in-class quizzes and 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 Withdraw Course or Program or a Change of Registration form. Please refer to the important dates listed in the Academic Schedule in the [Keyano College credit calendar](#). The Keyano College credit calendar also has information about Student Rights and the Code of Conduct. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and the Code of Conduct 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.

### Laboratory Safety

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.

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.

### Academic Misconduct

Students are considered responsible adults and should adhere to the principles of intellectual integrity. Intellectual 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),
- 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.

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 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 Code of Conduct 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. Here's a list of recommended system requirements.

**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**

Microsoft Windows	Apple (Mac)
<p><b>Minimum Requirements:</b></p> <ol style="list-style-type: none"> <li>Windows 10 Operating System or above</li> <li>4GB of RAM</li> <li>10GB available hard drive storage space               <ol style="list-style-type: none"> <li>Install the Microsoft Office 365 suite (~3GB) *</li> </ol> </li> <li>Microphone, webcam, and speakers (All modern laptops have these three accessories built-in.)</li> <li>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>	<p><b>Minimum Requirements:</b></p> <ol style="list-style-type: none"> <li>Mac Operating System 10.14 (Monterey) or above</li> <li>4GB of RAM</li> <li>10GB available hard drive storage space               <ol style="list-style-type: none"> <li>Install the Microsoft Office 365 suite (~3GB) *</li> </ol> </li> <li>Microphone, webcam, and speakers (All modern laptops have these three accessories built-in.)</li> <li>Mac has built-in anti-virus/malware software. It is important 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>
<p><b>Recommended Upgrades</b></p> <ul style="list-style-type: none"> <li>8GB of RAM</li> <li>Regularly back up or synchronize your files, locally or with a cloud-based storage option.</li> </ul> <p>OneDrive is the cloud-based storage option free to students after the setup of KeyanoMail and Microsoft 365.</p>	<p><b>Recommended Upgrades</b></p> <ul style="list-style-type: none"> <li>8GB of RAM</li> <li>Regularly back up or synchronize your files locally or with a cloud-based storage option.</li> </ul> <p>OneDrive is the cloud-based storage option free to students after the setup of KeyanoMail and Microsoft 365.</p>
<p>Tablets, iPads, and Chromebooks are <b>not</b> recommended: they may not be compatible with the testing lockdown browsers and Microsoft Office 365.</p>	

**Computer Software**

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

**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.

**COVID-19** We are subject to provincial, and municipal bylaws, and policies. These decisions may change pending further direction from the Alberta Chief Medical Officer, Alberta Health Services, and other provincial guidelines. To protect yourself and others, get immunized, wash your hands, wear a mask, keep your distance (2m/6 ft) and remain home when feeling unwell. For the most recent COVID-19 information, please refer to [albertahealthservices.ca/COVID](http://albertahealthservices.ca/COVID).

**Specialized Supports** The Student Services Department 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 education 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 appointments booked using the online [Book A Librarian calendar](#). The Library also provides research and subject guides to help you with your studies. To view a subject or course-specific guide, check out 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](#).

**Academic Success Centre:** 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. For additional information, please email [Academic.Success@keyano.ca](mailto:Academic.Success@keyano.ca).

**Academic Success Coach:** The Academic Success Coach is located in the Academic Success Centre and works 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).