



CHEM 0012B Introductory Chemistry II

Course Outline Winter 2020

General Information

Course #: CHEM 0012B

Section #:

Term: Winter

Year: 2020

Course Day and Time: MON Class 2:30-4:30, tutorial 4:30-5:30

Course Location: BR 202

Labs (5 per term): Wednesday 2:30-4:30

Instructor Information (Repeat as necessary for multiple instructors)

Name: Dr. Stephanie Newman

E-mail: snewman5@uwo.ca

Telephone number for office appointments: 519 685 8500 x 71568

Office hours for students: On appointment

Office location: BR 331

Course Description

Chemistry 0012 is an interactive course, exploring the thermodynamics, kinetics and equilibrium of chemical reactions. The behaviour of ideal gases and interpretation of redox reactions will also be explored. Students will engage in problem solving and apply laws and theories to analyze chemical reactions that support our society with heat, batteries, buffers, and important materials. This course examines many Ontario Grade 12 U chemistry topics, and in combination with Chemistry 0011, provides the equivalency to the Ontario Grade 12 U level chemistry.

Required Course Materials

Text book and student activity book as well as lab manual all available at UWO Bookstore. Also, will require mobile phone or I Clicker remote.

Learning Outcomes

By the end of this course, students will be able to:

- Explain the rationale for the chemistry theories discussed during the course through Critical Thinking & Analysis Questions, Online Discussions and Tests/Exam
- Apply appropriate laws and theories to solve chemical problems through Lab Reports, Critical Thinking & Analysis Questions, and Tests/Exam
- Discuss how the chemical laws and theories in this course apply to the world around us in the Chemistry in the News Assignment
- Reflect on their learning progress in the Learning Reflection assignments and make appropriate adjustments to master the problems presented
- Demonstrate appropriate lab skills and safety procedures during laboratories

Topic Specific Learning Outcomes

By the end of this course, students will be able to:

Topic 1: Organic Chemistry

- Identify organic functional and family groups and their properties
- Name simple compounds using the IUPAC and common system
- Identify conformers, structural isomers and geometric isomers
- Identify and complete several common types of organic reactions through drawing and naming

Topic 2: Gases

- Use the Combined Gas Law and the Ideal Gas Law to carry out calculations involving one gas or a mixture of non-reacting gases
- Interpret the behaviour of ideal gases using the Kinetic Molecular Theory
- Identify the forces that account for differences between an ideal and real gas

Topic 3: Thermodynamics

- Calculate the energy changes involved in various processes such as heating, cooling, changes of state and chemical reactions
- Use Hess's Law to determine the enthalpy change for a reaction
- Write formation reactions and use these standard heats of formations to predict the enthalpy change for a new reaction
- Use calorimetry to determine the heat of a reaction
- Describe entropy and Gibb's Free Energy and use these values to predict if a reaction is spontaneous

Topic 4: Kinetics

- Explain the factors affecting the rate of a reaction using Collision theory
- Determine the rate law for a specific reaction given appropriate data and identify the order of that reaction, the intermediates and any catalysts

- Calculate the half life time or concentrations involved in first order reactions
- Interpret and apply the Arrhenius equation to appropriate problems

Topic 5: Chemical Equilibrium

- Determine the equilibrium constant and equilibrium expression based on experimental data
- Predict the direction in which a reaction will proceed using Le Chatelier's Principle and the reaction quotient
- Write the equilibrium expression and calculate the amounts of each species present in an equilibrium using equilibrium constants for situations involving low solubility salts, weak acids, weak bases, salts or buffer solutions
- Identify various titration curves and select an appropriate indicator for a titration
- Identify acids, weak acids, bases, weak bases and salts, including conjugate species, write equilibrium equations for these species, and predict the relative pH for a solution of this substance
- Identify the components and value of a buffer solution, and perform calculations to determine the pH and amounts of components in this solution

Topic 6: Redox Reactions

- Determine the oxidation state of an element
- Interpret a redox reaction by identifying the species being oxidized and reduced
- Balance redox reactions
- Identify and describe the importance of each part of an electrochemical cell and write cell notations
- Predict the spontaneity of a reaction based on its cell potential (given, or calculated)
- Calculate current, time or the amount of product in an electrolytic process using Faraday's Law
- Describe the types and chemical processes in primary and secondary batteries
- Explain the issue and chemical process of corrosion

Laboratories

- Correctly use lab equipment such as burettes, mass balances, and pipettes
- Accurately record pertinent observations while following written instructions in a lab setting
- Use experimental data to complete calculations using the correct number of significant figures
- Compare their data to 'real' data and make constructive suggestions as to why there may be differences
- Identify and use appropriate lab safety equipment and procedures

Copyright and Intellectual Property

PowerPoint lecture slides and notes, lists of readings, in-class activities, assignment guidelines, and other components of the course materials are typically the intellectual property of the instructor. Unauthorized reproduction through audio-recording, video-recording, photographing, sharing on social media, or posting on course-sharing websites is an infringement of copyright and is prohibited. Such action may be considered a Code of Conduct violation and lead to sanctions.

Evaluation

Lab Reports (4 Reports x 3.75 %) 15.0 %

Critical Thinking & Analysis Questions (In-Class, weekly) 10.0 %

Chemistry in the News Online Discussion Assignment 5.0 %

Learning Reflection (2 Reflections x 2.0 %) 4.0 %

Test #1 (Monday, February 3rd , first hour in class) 15.0 %

Test #2 (Monday, March 9th , first hour in class) 16.0 %

Final Exam (3 h, scheduled by the Registrar) 35.0 %

Bonus – Online Problem Discussion 1.0 %

You must pass the laboratory portion of the course to pass the course (mark $\geq 7.5 / 15$).

All the labs count toward the lab mark. None are 'dropped'.

Lab Reports

A pre-lab assignment must be handed in at the beginning of the lab session and will count towards the lab report grade for that lab.

It is required that the pre-lab is completed and submitted for you to be able to perform the lab.

Data for the lab report will be collected during the lab session and recorded on the lab report during the lab session.

Analysis, calculations and conclusions can be completed during the lab, or after the lab session. It is expected that the data for lab partners will be the same. However, the analysis, calculations, and conclusions must be completed in each student's own words.

Direct copying of your lab partner's report or pre-lab exercise is considered plagiarism and will be followed up according to Brescia University College plagiarism policy.

Lab reports are due in class the following Monday after the lab session, except for Experiment #4, which will be due at the end of the lab.

- Experiment #1 – Thermochemistry – Calorimetry and Hess's Law
- Experiment #2 – Kinetics – A Study of Reaction Rates
- Experiment #3 – Examining Equilibrium Systems
- Experiment #4 – Redox Reactions

Critical Thinking & Analysis Questions The iClicker software, accessible through the OWL course page, will be used to collect your responses to critical thinking, analysis, and discussion questions which will be posed throughout most of the lectures.

This is a free (to you) software that is supported by the institution. Thus, rest assured your personal information and privacy will be protected. Also know that data gathered using this software will not be used for research purposes without the express written permission of the student. Physical clicker devices will not be used. Instead, any WiFi-enabled device (phone, tablet, computer) can be used to submit responses and will act as your "Personal Response System".

You must set up an account (link through the OWL course page) in order to access the questions, and you will use this same account throughout the year. We will discuss how to set up this account during the first week of class.

Please note that Brescia has WiFi access in the classrooms, so you will not need to use up your personal data package to respond to questions. If you do not have an electronic device you can still participate in the Critical Thinking & Analysis Questions and earn a grade for this evaluation component!

A pdf response sheet can be printed off the OWL course page and brought to class.

You can record your responses in pen on this sheet during the lecture and submit this to me at the conclusion of the class.

Please note – these paper forms will only be accepted immediately following the class in which the questions were asked and must be written on the official printout from the course OWL site. If you have any questions on how to meet these requirements, I am happy to discuss them with you.

The purpose of this evaluation component is to encourage you to engage your mind in the material we discuss during class. This will also prompt conversations amongst the class to discuss the concepts and problems proposed during lecture. It is all too easy to nod along while someone demonstrates how to solve a problem. Learning improves when you challenge yourself to think during class, for example, by predicting the next step of a problem-solving strategy, analyzing why an answer is correct or incorrect, or identifying a rational response based on the theory discussed.

In order to assign a grade for this component, 2 points will be given for a correct answer, 1 point will be given for an incorrect answer (as attempts and learning from errors IS valuable!), and 0 points will be given for no response.

If you are absent from class, your non-responses will fit in the "no response" category for those questions and earn a grade of 0. It is understandable that sickness and other commitments may keep you from the occasional class, and thus, the grading scheme below has built-in accommodation for the occasional absence, as well as any technical difficulties you may encounter during the term. **Thus, additional accommodation will not be granted to make-up this grade.** There will be many questions posed throughout the year, so you will have ample opportunity to demonstrate your analysis and critical thinking.

Grades will be posted on a regular bases for you to monitor your progress. At the conclusion of the course, the final 10% evaluation component will be calculated as follows: Percentage of Possible Points (%) ≥ 80 ≥ 75 ≥ 70 ≥ 60 ≥ 50 ≥ 40 ≥ 30 ≥ 20 ≥ 10 ≥ 5 0

Grade Achieved 10 9 8 7 6 5 4 3 2 1 0

Chemistry in the News Online Discussion Assignment

The purpose of this assignment is to have you discover how chemistry is integrated into the day-to-day world around us. As well, this assignment gives you an opportunity to apply your chemistry knowledge to a current issue, find and reference scholarly sources, and even evaluate the findings of an article.

Your task will be to find a current news article that is somehow related to a topic we discuss in Chem 0012 and prepare a 300-word review of this article following the expectations and guiding questions provided.

You will then post your discussion on the OWL course page and reply to your classmate's posts during the term. NOTE when you upload this you must click the option- visible to others.

Guidelines for your post and replies, as well as due dates and grading will be posted on OWL.

Learning Reflection

Following each test, you will submit a brief reflection on your learning process, study habits, and goals for the course. You will also analyze your performance on the test. The purpose of this assignment is to identify your strengths and weaknesses in this course, assess yourself on your progress, and discuss any changes you want to implement to succeed in the course. This reflective process is part of one of the Brescia competencies. These assignments will be submitted via OWL ONY.

Tests and Exams

Two tests and one final exam will be given to examine your understanding and application of the course content.

Tests and the final exam will consist of multiple choice and short answer questions. Tests will be held in class for one hour, while the final exam will be scheduled by the Registrar for 3 hours.

These tests/exams are closed book, but you are permitted a scientific, non-programmable calculator.

A reference sheet with formulas will be provided as needed, and you will be informed of this reference sheet prior to the test/exam.

The content range covered on the test will be announced in class and on the OWL course page a week prior to the test.

The final exam will be cumulative.

Bonus – Online Problem Discussion You may select one of the designated "Problem Discussion" problems in the course notes and post a video or audio recording with an image describing how to solve the problem on VoiceThread (through our course OWL site). One post that meets the expectations posted on OWL is worth a bonus 1% of your course grade! Note, only the first post on a given problem will receive credit.

Academic Accommodation

For course components worth 10% or more of the total course grade, please see the Academic Policies and Regulations section at the end of this course outline or consult the Academic Calendar. **Self-reported absence will not be accepted for midterms or final examinations.**

It is important to note that the Academic Dean may **refuse permission** to write the final examination in a course if the student has failed to maintain satisfactory academic standing throughout the year or for too frequent absence from the class or laboratory

http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=5&SelectedCalendar=Live&ArchiveID=#SubHeading_68



2019-20 BRESCIA UNIVERSITY COLLEGE ACADEMIC POLICIES AND REGULATIONS

1. POLICY REGARDING ACADEMIC ACCOMMODATION

The complete policy regarding [Accommodation for Illness - Undergraduate Students](http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_12) can be found at http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_12.

Students who have long-term or chronic medical conditions which may impede their ability to complete academic responsibilities should seek Academic Accommodation through Student Accessibility Services (http://www.westerncalendar.uwo.ca/PolicyPages.cfm?PolicyCategoryID=1&Command=showCategory&SelectedCalendar=Live&ArchiveID=#Page_10).

Personal commitments (e.g., vacation flight bookings, work schedule) which conflict with a scheduled test, exam or course requirement are **not** grounds for academic accommodation.

Students who experience an illness or extenuating circumstance sufficiently severe to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

1. Submitting a **Self-Reported Absence** form provided that the conditions for submission are met;
2. For medical absences, submitting a **Student Medical Certificate (SMC)** signed by a licensed medical or mental health practitioner;
3. For non-medical absences, submitting **appropriate documentation** (e.g., obituary, police report, accident report, court order, etc.) to their Academic Advisor. Students are encouraged to contact their Academic Advisor to clarify what documentation is acceptable.

Requests for Academic Consideration Using the Self-Reported Absence Portal

Students who experience an unexpected illness or injury or an extenuating circumstance of 48 hours or less that is sufficiently severe to render them unable to meet academic requirements should self-declare using the online Self-Reported Absence portal. This option should be used in situations where the student expects to resume academic responsibilities within 48 hours. Note that the excused absence includes all courses and academic requirements within the up to 48 hours, it is not intended to provide an excused absence from a single course while students fulfill their academic responsibilities in other courses during that time.

The following conditions are in place for self-reporting of medical or extenuating circumstances:

1. Students will be allowed **a maximum of two self-reported absences** between September and April and one self-reported absence between May and August;
2. The duration of the absence will be for a maximum of 48 hours from the time the Self-Reported Absence form is completed through the online portal, or from 8:30 am the following morning if the form is submitted after 4:30 pm;
3. The excused absence will terminate prior to the end of the 48 hour period if the student undertakes significant academic responsibilities (writes a test, submits a paper) during that time;
4. Self-reported absences will **not** be allowed for scheduled final examinations; midterm examinations scheduled during the December examination period; or for final lab examinations scheduled during the final week of term;
5. Self-report absences may **not** be used for assessments worth more than 30% of any course;
6. Any absences in excess of 48 hours will require students to present a Student Medical Certificate (SMC), or appropriate documentation;
7. Students **must** communicate with their instructors **no later than 24** hours after the end of the period covered by the Self-Reported Absence form to clarify how they will fulfil the academic expectations they may have missed during the absence.

Request for Academic Consideration for a Medical Absence

When a student requests academic accommodation (e.g., extension of a deadline, a makeup exam) for work representing 10% or more of the student's overall grade in the course, it is the responsibility of the student to provide acceptable documentation to support a medical or compassionate claim. All such

requests for academic accommodation **must** be made through an Academic Advisor and include supporting documentation.

Academic accommodation for illness will be granted only if the documentation indicates that the onset, duration and severity of the illness are such that the student could not reasonably be expected to complete their academic responsibilities. Minor ailments typically treated by over-the-counter medications will not normally be accommodated.

The following conditions apply for students seeking academic accommodation on medical grounds:

1. Students must submit their Student Medical Certificate (SMC) along with a request for relief specifying the nature of the accommodation being requested no later than two business days after the date specified for resuming responsibilities. An SMC can be downloaded from http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf ;
2. In cases where there might be an extended absence or serious issue, students should submit their documentation promptly and consult their Academic Advisor for advice during their recovery period;
3. Whenever possible, students who require academic accommodation should provide notification and documentation in advance of due dates, scheduled tests or examinations, and other academic requirements;
4. Students **must** communicate with their instructors **no later than 24 hours** after the end of the period covered by the SMC to clarify how they will fulfil the academic expectations they may have missed during the absence;
5. Appropriate academic accommodation will be determined by the Dean's Office/Academic Advisor in consultation with the course instructor(s). Academic accommodation may include extension of deadlines, waiver of attendance requirements, arranging Special Exams (make-ups), re-weighting course requirements, or granting late withdrawal without academic penalty.

The [full policy on requesting accommodation due to illness](#) can be viewed at:

http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_12

2. ACADEMIC CONCERNS

If you feel that you have a medical or personal challenge that is interfering with your work, contact your instructor and Academic Advisor as soon as possible. Problems may then be documented and possible arrangements to assist you can be discussed at the time of occurrence rather than on a retroactive basis. Retroactive requests for academic accommodation on medical or compassionate grounds are not normally considered.

If you think that you are too far behind to catch up or that your work load is not manageable, you should consult your Academic Advisor. If you consider reducing your workload by dropping one or more courses, this must be done by the appropriate deadlines; please refer to the [Registrar's website](#), <http://brescia.uwo.ca/academics/registrar-services/> or the list of official sessional dates in the Academic Calendar (<http://www.westerncalendar.uwo.ca/SessionalDates.cfm?SelectedCalendar=Live&ArchiveID=>).

You should consult with the course instructor and the Academic Advisor who can help you consider alternatives to dropping one or more courses. *Note that dropping a course may affect OSAP eligibility and/or Entrance Scholarship eligibility.*

3. ABSENCES

Short Absences: If you miss a class due to a minor illness or other problems, check your course outline for information regarding attendance requirements and make sure you are not missing a test or assignment. Cover any readings and arrange to borrow notes from a classmate. Contact the course instructor if you have any questions.

Extended Absences: If you have an extended absence, you should contact the course instructor and an Academic Advisor. Your course instructor and Academic Advisor can discuss ways for you to catch up on missed work, and arrange academic accommodations if appropriate and warranted.

It is important to note that the Academic Dean may refuse permission to write the final examination in a course if the student has failed to maintain satisfactory academic standing throughout the year or for too frequent absence from the class or laboratory (http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=5&SelectedCalendar=Live&ArchiveID=#SubHeading_68).

4. SCHOLASTIC OFFENCES

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence at: http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_20.

Students are responsible for understanding the nature of and avoiding the occurrence of plagiarism and other academic offences. Note that such offences include plagiarism, cheating on an examination, submitting false or fraudulent assignments or credentials, impersonating a candidate, or submitting for credit in any course without the knowledge and approval of the instructor to whom it is submitted, any academic work for which credit has previously been obtained or is being sought in another course in the University or elsewhere. Students are advised to consult the section on Scholastic Discipline for Undergraduate Students in the Academic Calendar.

If you are in doubt about whether what you are doing is inappropriate or not, consult your instructor, the Academic Dean's Office, or the Registrar. A claim that "you didn't know it was wrong" is not accepted as an excuse.

The penalties for a student guilty of a scholastic offence (including plagiarism) include refusal of a passing grade in the assignment, refusal of a passing grade in the course, suspension from the University, and expulsion from the University.

Plagiarism:

Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Computer-marked Tests/exams:

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating. Software currently in use to score computer-marked multiple-choice tests and exams performs a similarity review as part of standard exam analysis.

5. PROCEDURES FOR APPEALING ACADEMIC EVALUATIONS

All appeals of a grade must be directed first to the course instructor. If the student is not satisfied with the decision of the course instructor, a written appeal is to be sent to the School Chair. If the response of the Chair is considered unsatisfactory to the student, they may then submit a written appeal to the Office of the Dean. If the student is not satisfied with the decision of the Dean, they may appeal to the Senate Review Board Academic (SRBA), if there are sufficient grounds for the appeal and if the matter falls within the jurisdiction of the SRBA. For information on academic appeals consult your Academic Advisor or see the Student Academic Appeals – Undergraduate in the Academic Calendar http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_14.

Note that final course marks are not official until the Academic Dean has reviewed and signed the final grade report for the course. If course marks deviate from acceptable and appropriate standards, the Academic Dean may require grades to be adjusted to align them with accepted grading practices.

6. PREREQUISITES

Unless you have either the prerequisites for a course or written special permission from the Dean to enroll in it, you will be removed from the course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisite(s).

7. SUPPORT

Support Services

The Brescia University College Registrar's website, with a link to Academic Advisors, is at <http://brescia.uwo.ca/academics/registrar-services/>. Students can access supports through Brescia's Student Life Centre (<http://brescia.uwo.ca/life/student-life/>) and Learning Skills Services at Western (<https://www.uwo.ca/sdc/learning/>)

Mental Health and Wellness

Students may experience a range of issues that can cause barriers to your learning, such as increased anxiety, feeling overwhelmed, feeling down or lost, difficulty concentrating and/or lack of motivation. Services are available to assist you with addressing these and other concerns you may be experiencing. You can obtain information about how to obtain help for yourself or others through **Mental Health & Wellness at Brescia** (<http://brescia.uwo.ca/life/mental-health-wellness/>) and **Health and Wellness at Western**, http://uwo.ca/health/mental_wellbeing/index.html.

Sexual Violence

All members of the Brescia University College community have a right to work and study in an environment that is free from any form of sexual violence. Brescia University College recognizes that the prevention of, and response to, Sexual Violence is of particular importance in the university environment. Sexual Violence is strictly prohibited and unacceptable and will not be tolerated. Brescia is committed to preventing Sexual Violence and creating a safe space for anyone in the Brescia community who has experienced Sexual Violence.

If you or someone you know has experienced any form of Sexual Violence, you may access resources at <http://brescia.uwo.ca/life/sexual-violence/>.

Portions of this document were taken from the Academic Calendar, the Handbook of Academic and Scholarship Policy and the Academic Handbook of Senate Regulations. This document is a summary of relevant regulations and does not supersede the academic policies and regulations of the Senate of the University of Western Ontario.
