Faculty of Science, Department of Chemistry

CHEM 1300: Structure and Modelling in Chemistry, Fall 2020
Sections A01 – A07

General Information

Course coordinator: Dr. Olesya Fedoryak
Email**:** Olesya.Fedoryak@umanitoba.ca
Lab Instructor: Dr. Angela Kuchison
Email: Angela.Kuchison@umanitoba.ca

All Course Sections	Lecturers
A01 Mon., Wed., & Fri.: 1:30 – 2:20pm	**Dr. James Xidos** (James.Xidos@umanitoba.ca)
A02 Tues. & Thurs.: 11:30 – 12:45pm	**Dr. Carl Bartels** (Carl.Bartels@umanitoba.ca)
A03 Mon., Wed., & Fri.: 10:30 – 11:20am	**Dr. James Xidos** (James.Xidos@umanitoba.ca)
A04 Tues. & Thurs.: 8:30 – 9:45am	**Dr. Carl Bartels** (Carl.Bartels@umanitoba.ca)
A05 Tues. & Thurs.: 1:00 – 2:15pm	**Dr. Olesya Fedoryak** (Olesya.Fedoryak@umanitoba.ca)
A06 Mon. & Wed.: 2:30 – 3:45pm	**Dr. Olesya Fedoryak** (Olesya.Fedoryak@umanitoba.ca)
A07 Tues. & Thurs.: 2:30 – 3:45pm	**Dr. H. Georg Schreckenbach** (Georg.Schreckenbach@umanitoba.ca)

The CHEM1300 Fall 2020 term is being offered remotely. Due to the present situation, this edition of the course was rapidly converted to an online/digital format over a few months. We hope for your understanding if there are some bumps along the road and we welcome your suggestions any time. We are trying to make the most of a difficult situation.

Note: Most of our communication will be by **University of Manitoba e-mail** and via the course site on UM Learn (http://umlearn.ca). Please check the course website and your UofM e-mail account **DAILY** for announcements, alterations to the class or office hour schedules, and grade postings.

Information posted on the UM Learn site includes: the full course syllabus, links for Mastering Chemistry registration and iClicker course page, lecture notes, videos, quizzes/tests, and exam. Laboratory information and prelab exercises will be posted on the course laboratory website.

In all e-mail correspondence, include "CHEM 1300 lecture" or "CHEM 1300 lab" in the subject line.

→ For general questions about the course material contact your lecturer.
→ For questions involving the administration of the lecture component contact the course coordinator, Dr. Olesya Fedoryak (Olesya.Fedoryak@umanitoba.ca)
→ For questions involving the administration of the lab component contact the lab coordinator: Dr. Angela Kuchison (Angela.Kuchison@umanitoba.ca)
→ For registration and technical questions for Mastering Chemistry: For search, chat, or phone, visit**:** https://support.pearson.com/getsupport/s/

Virtual Office Hours

- The information about office hours will be announced later on UM Learn.
- During office hours, you can come ask questions (through the video or chat) or simply listen to your classmates' questions.
- Individual assistance (via Zoom/WebEx) is always available by appointment. Please email your instructor to arrange the meeting.

Role of CHEM 1300

CHEM 1300 is the basic chemistry course on which all further chemistry courses are built. Most students taking it will also take CHEM 1310. Together, these two courses constitute the basic chemistry requirements for a Chemistry or Biochemistry major. They also form the basis of many non-chemistry programs (Microbiology, Dentistry, Medicine, Pharmacy, and Civil, Biosystems and Mechanical Engineering). Some programs require only CHEM 1300 (Computer, and Electrical Engineering) or the CHEM 1300/1320 combination (Human Nutritional Sciences, Agriculture, Agroecology, Food Science).

Course Description

In this class you will learn essential skills in chemistry. Your efforts in this class will help you understand some of the significant challenges we face in the fields of energy, environment and medicine. Core to this course is an understanding of the *energetics* of reactions and processes. From an understanding of energy, we can explain and probe a variety of bonds, molecular shapes, electronic structures and properties. Finally, we will discuss chemical equilibrium which allows us to predict the direction of the reaction and to shift it the way we want.

Course Objectives

At the end of the course, you should be able to:

- Describe the energy conversions that occur in chemical reactions, relate heat of reaction to thermodynamic properties such as enthalpy and internal energy, and apply these principles to measure and calculate energy changes in reaction;
- Explain the structure of atoms and ions in terms of subatomic particles;
- Understand the factors affecting periodic trends in atomic and ionic radii, ionization energy, electron affinity, metallic character, and electronegativity;
- Using different bonding models (Lewis, VSEPR, valence bond, and molecular orbitals) explain formation of ionic and covalent compounds, and apply knowledge of electronic structure to predict molecular shapes and polarity;
- Describe the dynamic nature of chemical equilibrium and apply Le Châtelier's Principle to predict the effect of physical changes (concentration, pressure and temperature) on equilibrium mixtures as well as calculate equilibrium constants from equilibrium concentrations and vice versa.

Prerequisites

All students entering CHEM 1300 should have a minimum of two years of previous high-school chemistry study (CHEM 40S or its equivalent, such as CSKL 0100).

Course Materials

Required:

- **Chemistry: A Molecular Approach,** Third Canadian Edition by N. Tro, T.D. Fridgen, L.E. Shaw. You can use a previous edition of the book if you have one.

- **Mastering Chemistry (online learning platform)**

There are **three options to choose from:**

1) A binder-ready copy of the textbook + Mastering Chemistry access code + E-text (electronic version of the textbook available through the Mastering chemistry interface): ISBN: 9780136524175, price: $149.99. Available in the Bookstore.
2) Mastering Chemistry access code + E-text: ISBN: 9780134894881, price: $115.50. Available in the Bookstore or online at: http://bookstore.umanitoba.ca/SiteText.aspx?id=8773
3) Access to Mastering Chemistry without the e-text: ISBN: 9780134994086, price: $50.50. Available in the Bookstore or online at: http://bookstore.umanitoba.ca/SiteText.aspx?id=8773

Optional:

A Survival Kit for Stoichiometry, Ratios, and Proportions by E. Smirnova, N.R. Hunter; ISBN 9780100015296. Bookstore price: $6.95. You can also buy the digital copy of this book for $5.95.

Mastering Chemistry

Mastering Chemistry is the online learning system in which you will complete seven assignments. Detailed instructions for the setup of your Mastering Chemistry account are provided on the course website through the "Mastering Chemistry" section. Registration is completed **ONLY** by using the link **"Pearson MyLab & Mastering Links launch"** provided in Content / Mastering Chemistry. Please, use only **your university email address** while registering. After registering, you can continue to access your Mastering Chemistry account by clicking on the link in UM Learn.

Notes:

- You can use a temporary access to Mastering Chemistry without payment for 14 days.
- Students who purchased Mastering Chemistry during previous academic years should update their account. If you have not received an email from Pearson with the instructions how to access the third edition, please immediately contact Dennis Guevarra at Dennis.Guevarra@pearsoned.com.

Methods of Instruction and Course Delivery

Course Technological Requirements

- A computing device where one can create and edit documents;
- An internet connection capable of streaming videos and downloading software;
- Access to a web-cam and microphone.

Course Format

The course will be taught remotely and involves watching videos, readings, quizzes, problem sets, discussion groups, and classes. There will be synchronous and asynchronous activities.

How can you best succeed in this course?

Online learning is student-centered which means you are in charge of your learning.

- **You are required to complete a pre-class assignment** (watch pre-recorded lectures and videos, read the textbook chapter, answer pre-lecture questions) posted on UM Learn at the beginning of each week. Beyond videos, we will post lecture slides and also problem sets in the Discussion section. Your understanding of each lecture will be best if you have done the reading BEFORE the lecture. The Course Schedule is provided as a guide and will be revised if needed. Before starting each new chapter, detailed learning outcomes will be posted. The pre-recorded lectures will emphasize the most important parts of

the required material. **You are responsible for all material in the sections of the chapter, whether covered in video or not.**

- **Class time (via Webex/Zoom).** We will spend in-class time discussing new topics and focussing on problem solving. The "live" tutorial will be recorded and posted on UM Learn as soon as possible after the class, in your section folder with the class notes. You can re-watch it as many times as you want, it can help you better prepare for the quizzes and exams. Please note that no student will be penalized for not being able to attend a synchronous time slot.

  We will be using Webex/Zoom (depending on sections) to connect synchronously. As an essential aspect of academic integrity, do not share any of the details (i.e., link, sign-in information) with anyone outside your section of the course. If any issues with sharing such information arises (e.g., "zoombombing"), we will manage the issue, terminating our session if necessary. We hope not to do this, as these synchronous sessions are an essential part of building knowledge and skills in the course and help you prepare for the final exam.

  Your instructor will be sharing any connection information through the UM Learn course website or by email. Please try to join the videoconferences a few minutes early.

- **iClickers.** Your instructors will be using **iClicker** software to conduct polls in class. This will help us to analyze your understanding of particular topics throughout the course. You can use the iClicker app (Reef) through a smartphone, tablet or laptop. Questions will be stored on your device (along with the answer). This is a great additional tool for exam reviews, etc. Registration instructions for the setup of your iClicker account are provided on the course website through the "iClicker" section. **Please, use only <u>your university email address</u> while registering.** Regardless of which device you use in class, you must create an iClicker account (or use your existing account if you already have one) using the link provided in IM Learn. **<u>You do not need to purchase an iClicker subscription!</u>**

<u>Grading</u>

A final letter grade will be assigned based on your final percentage grade as follows:

≥ 92.0%	A+	66.0 – 74.9%	B	50.0 – 54.9%	D
82.0 – 91.9%	A	60.0 – 65.9%	C+	< 50.0%	F
75.0 – 81.9%	B+	55.0 – 59.9%	C		

- The student performance across <u>ALL</u> course components is considered. **There is NO rounding and NO curving in this course.** We do not accept or offer any other options for improving grades after the final exam. Questions about grades should be raised **as soon as possible.**
- You must earn a passing grade of at least 70% in the laboratory program to pass the course independent of your performance in other aspects of the course.
- A grade of **C** or better is required in CHEM 1300 before a student is permitted to proceed to CHEM 1310 or CHEM 1320.
- Your final grade will be determined based on the following breakdown:

Activity	% Grade
Mastering Chemistry Assignments (7)	9
Pre-quiz	1
Quizzes (6)	15
Midterm Exam	15
Final Exam	37
iClicker	3
Laboratory Program	20

- **Online assignments (Mastering Chemistry).** You are expected to complete seven Mastering Chemistry assignments before the respective deadlines (see Assignment schedule). **Please note**, these assignments do not provide sufficient practice to ensure success in this course. *Dynamic study modules* are a great supplement to your other mastering assignments. They can help prepare for quizzes and exams.

  Before attempting any assignments, we encourage you to at least review the first three practice exercises:
  - "Introduction to Mastering Chemistry" provides you with an overview of how different types of answers are entered in Mastering Chemistry. ***It is strongly recommended that all students complete this exercise before attempting for-credit work.*** No concessions will be made for incorrect input of answers in for-credit exercises.
  - "Math Basics" reviews the math skills you will require to succeed in CHEM 1300
  - "Chemistry Basics" covers the most basic of the Chemistry fundamentals, and can serve as a tutorial before you attempt more challenging high school review material.

  Assignment questions are graded individually: you receive your mark for a question as soon as you submit it. The penalty for most assignment questions is 5% per incorrect answer. Incorrect answers for multiple choice, multiple select, and matching questions have larger penalties. If you score below 85% on an assignment, an adaptive follow up assignment will be made available after you complete your assignment. This adaptive follow up assignment is due within two days of the due date of the assignment and can add up to 15% bonus to your assignment grade. If you score 85% or better on an assignment, **you will not need** to do the adaptive follow up assignment and you will receive enough bonus marks that will give you 100% for that assignment.

Assignments Schedule

Assignment	Released	Deadline
1 (High School Chemistry)	Wed, Sep 9	Fr, Sept 18
2 (Chapter 6)	Mon, Sep 14	Fr, Oct 2
3 (Chapter 7)	Mon, Sep 28	Thurs, Oct 15
4 (Chapter 8)	Mon, Oct 12	Mon, Oct 26
5 (Chapter 9)	Wed, Oct 21	Mon, Nov 16
6 (Chapter 10)	Mon, Nov 16	Mon, Nov 30
7 (Chapter 14)	Mon, Nov 23	Fr, Dec 11

- **Examinations.** Exams are designed to assess your mastery of core concepts covered in lecture, and assignments. Quizzes, midterm test and final exam will be held **online**.
  - *Pre-quiz*. You are required to take a pre-quiz, for which you get full credit, regardless of how you do on it. Its purpose is to evaluate your chemistry knowledge and to help you familiarize with the online quiz format.
  - *Quizzes*. Seven quizzes will be given through UM Learn or Crowdmark at the end of each unit (see Assessment Schedule).
    - The quizzes aim to review key points of the unit and evaluate learning progress.
    - The quiz with the lowest mark will be dropped.
    - Please note: **There are no makeup quizzes! A missed quiz for any reason will be counted as the dropped quiz.**
  - *Midterm test*. There will be one online midterm test to be completed on November 2nd at 6:00pm. You will have 2h to write the test. The midterm will reflect the intended learning outcomes to date. The format of the test will be posted on UM Learn before the test date.
  - *Final Exam*. The final exam will be 3 hours long; the date of the final exam will be posted by the Registrar's Office. Detailed instructions will be posted on UM Learn before the end of classes. The final exam will cover all course material in a balanced manner and will include questions on review material. Writing of the final exam is mandatory. If you miss the final exam *you must contact your*

academic advisor and your instructor within 48 hours. Final examination and grades policies can be found at: http://umanitoba.ca/admin/governance/governing_documents/academic/1299.html

Assessments Schedule

Assessment	Platform	Date	Duration	Time
0 Pre-quiz	UM Learn	Open on Sep 9	15 min	First week of the term (anytime)
1 (High School Chemistry)	UM Learn	Wed, Sep 16 – A01, A03, A06 Thurs, Sep 17 – A02, A04, A05, A07	20 min	Class time
2 (Chapter 6)	UM Learn	Tue, Sep 29 – A02, A04, A05, A07 Wed, Sep 30 – A01, A03, A06	20 min	Class time
3 (Chapter 7)	UM Learn	Wed, Oct 14 – A01, A03, A06 Thurs, Oct 15 – A02, A04, A05, A07	20 min	Class time
4 (Chapter 8)	UM Learn	Tue, Oct 27 – A02, A04, A05, A07 Wed, Oct 28 – A01, A03, A06	20 min	Class time
MIDTERM	UM Learn	Mon, Nov 2	2 h	6:00pm – 8:00pm
5 (Chapter 9)	Crowdmark	Mon, Nov 16	During day	8:00am – 8:00pm
6 (Chapter 10)	Crowdmark	Mon, Nov 30	During day	8:00am – 8:00pm
7 (Chapter 14)	UM Learn	Wed, Dec 9 – A01, A03, A06 Thurs, Dec 10 – A02, A04, A05, A07	20 min	Class time
FINAL EXAM	UM Learn	TBA	3 h	TBA

- **Participation, in-class activity.** Your participation involves contributions during synchronous classes by answering iClicker questions. Please note: you cannot earn the participation credit when attending classes from a different section! Only your section instructor can evaluate your activity throughout the term. How many questions and when they will be asked will vary from one instructor to another.
  - You must use your Reef account to answer these questions; no other type of input will be accepted.
  - You will earn 1 point for every question that you answer. If you answer correctly, you will earn an additional 1 point. The point total for a class will be the sum of all points that could be earned throughout the term. This total will be different for each lecture section.
  - Your final participation grade will depend on what fraction of the total number of points you earn during the term:

Earn ≥ 75% of the total points:	3 marks
Earn < 75% of the total points:	$\frac{\text{earned points}}{0.75\,(\text{total points})} \times 3$ marks

  - An alternative evaluation method will be considered for students who cannot attend in-class meetings for legitimate reasons (e.g. lengthy illness, etc.). Detailed instructions will be posted in UM Learn after the beginning of the course.
  - Please note: It is considered to be academic dishonesty to use your classmates account to answer the iClicker questions.

- **Laboratory program (see p. 18)**.

Missed Examinations

Illnesses or other different events unfortunately are part of life.

- If you miss a midterm test or the deadline for an assignment, you are required to contact your instructor **and** the course coordinator within 24 hours by email to inform them of the missed work and provide explanation for your reason. Medical notes are not required. In case you provide a reasonable explanation of your absence for the test, you will be allowed to take an alternative test option. Please note: this may be an oral examination. **There won't be any weight transfer to the final exam!**
- For a missed final exam, you must contact an advisor in your home faculty and your instructor as soon as possible (within 48 hours of the date of the exam).
- Please note that circumstances that result in missing multiple course assignments/tests/classes may require medical documentation (e.g., Authorized Withdrawal, Tuition Fee Appeal, Leave of Absence, or accessibility-related accommodations). Students are advised to speak with an advisor in their faculty/college/school of registration in this instance.

Appeals

- If you have concerns or questions about posted scores and examination problems promptly consult the course coordinator: Olesya.fedoryak@umanitoba.ca
- **No appeals of term work (laboratory, assignment, or test grade) will be considered by the course and laboratory coordinators after the final examination has been written.**
- If you are not satisfied with the outcome of an appeal regarding term work addressed by the course coordinator or the laboratory coordinator, you can appeal a grade for term work through the Registrar's office. A fee is charged for each appeal. For more information see: http://umanitoba.ca/student/records/grades/690.html
- To appeal your final grade, you must initiate the process at the Registrar's office. A fee will be charged for each appeal. For more information, see: http://umanitoba.ca/student/records/

Voluntary Withdrawal (VW), Authorised Withdrawal (AW) and Limited Access Policies

- Students have the opportunity to voluntarily withdraw (VW) from a class on or before November 23, 2020. By then, you will have received feedback so you can assess your progress. If you are not likely to pass the course, or achieve your desired grade, you should consider a VW. You may contact the instructor of the course to review your progress in more detail, or you may discuss the VW option with a Faculty academic advisor. Students enrolled in the course after the VW deadline will be assigned a final grade. Please visit http://umanitoba.ca/u1/know_yourself/573.html for more information.

- At times medical or compassionate circumstances arise that prevent a student from performing as they would under normal circumstances; in these cases, you can apply for authorised withdrawal (AW). If you are in this position you should contact a Faculty academic advisor to discuss your options. Be prepared to provide documentation supporting your situation. Please visit the following website for more information: http://www.umanitoba.ca/student/resource/student_advocacy/authorized-withdrawal/index.html

- At present, Limited Access does not apply to students who have previously been subject to this restriction for three consecutive terms. Students will be able to register to repeat a course (or equivalent) during their initial registration time. https://umanitoba.ca/student/records/academicpolicychanges/limitedaccessfaq.html

Respectful Work and Learning Environment

- You are expected to be respectful of your fellow classmates and your lecturer. We recognize that these are unusual circumstances, and that there are some adjustments needed when working virtually. At the same time, we do want to remind you that University policies, such as the **Respectful Work and Learning Environment policy**, still apply, as do basic expectations around how students will engage

with each other, and with the University. This means that when participating in classes, online meetings, etc., students are expected to behave professionally, and follow the same basic norms as they would in person, such as being clothed, not being impaired, and participating respectfully. **Essentially, if you wouldn't do it in an in-person class, don't do it in virtual setting!**

- Please familiarize yourself with the UM Respectful Work and Learning Environment (RWLE) http://umanitoba.ca/admin/governance/media/Respectful_Work_and_Learning_Environment_RWLE_Policy_-_2016_09_01.pdf and Section 2.5(c) of the Student Non-Academic Misconduct and Concerning Behaviour Procedure describes types of inappropriate or disruptive behaviour (https://umanitoba.ca/admin/governance/media/Student_Non-Academic_Misconduct_and_Concerning_Behaviour_Procedure_-_2018_09_01.pdf).

Important Dates

Sept 9	First day of classes
Sept 22/23	Last day to drop/add a course
Oct 12	Thanksgiving Day (no classes)
Nov 9 – 13	Fall Term Break
Nov 23	Last day for Voluntary Withdrawal (VW) deadline
Dec 11	Last day of classes
Dec 12 – 23	Final Exams
Jan 5 – 15	Fall Term Labs (B81-B86 sections)

Supplemental Instruction (SI)

Supplemental Instruction sessions are **free** weekly review sessions that are available to students who want to improve their understanding of certain courses. These voluntary sessions offer students an opportunity to interact on an informal basis so that they can:

- ask each other questions about the course
- compare notes
- discuss course content
- solve practice problems together
- develop new study strategies

SI leaders are experienced students who can help you by sharing their own study strategies and techniques. They are familiar with the course material because they have already taken the course. They attend classes with you and offer weekly review sessions to help you learn. SI leaders are not there to lecture or re-teach the course; they provide you with opportunities to review actively with other students in an organized setting.

When do SI review sessions start?

SI study sessions are scheduled to start on September 14th. They will be held online. The schedule is posted on UM Learn and will be updated regularly. Attendance at any of these sessions is voluntary, and there will be different content to discuss each week. Bring class notes, your textbook, and be prepared to ask questions and discuss class material with other students. You are not required to sign up in advance, and you can come to as many sessions as you would like.

How can I find out more?

Visit the following link for details on Supplemental Instruction offerings and SI schedule updates: http://umanitoba.ca/student/academiclearning/services/supplemental_instruction.html.

Fall 2020 Schedule:

Section	SI Leader	SI Session Time
A01	Divleen Mangat	Mon & Wed 2:30 pm – 3:30 pm
A02	Ryan Kum	Tues & Thurs 7:00 pm – 8:00 pm
A03	Marvin Routley	Mon & Wed 4:30 pm – 5:30 pm
A04	Cynthia James	Tues 10:00 am – 11:00 am & Thurs 4:00 pm – 5:00 pm
A05	Efe Erhie	Thurs 2:30 pm – 3:30 pm & Sun 3:00 pm – 4:00 pm
A06	TBA	Mon & Wed 4:30 pm – 5:30 pm
A07	Tyler Szun	Mon & Wed 3:30 pm – 4:30 pm

University Policies

Academic Integrity

Academic integrity is taking responsibility for and being honest with your work and respecting the work of others. Since you are a member of the university community, we want you to learn what that responsibility and honesty entails and how we respect the work of others.

The Faculty of Science continues to uphold high standards of academic integrity. We know that our students support us in this endeavour and we count on each and every one of you to do your part. The same academic standards apply online, for remote learning, and in class education. We expect all students to strictly adhere to instructions from their professors regarding what resources can and cannot be used during exams, and to follow all rules professors decide to set.

To aid professors in ensuring that all forms of assessments have been administered fairly, the University will be electronically monitoring tests, quizzes and examinations, included, but not limited to overseeing chat-rooms, relevant predatory web-sites and, in so doing, we will analyze scholastic evidence of individual exams. E-monitoring tools will include one of the following: Respondus Lockdown Browser & Respondus Monitor; WebEx; Zoom or Microsoft Teams.

For students, in exceptional circumstances, who cannot participate in an e-proctored exam, in-person written or oral exams may be administered. The University of Manitoba adheres to the Provincial health and safety recommendations and those will be strictly followed if an in-person examination is administered.

Academic fraud

Academic fraud is an act by a student that may result in a false evaluation (including papers, tests, examinations, etc.). It is not tolerated by the University. Any person found guilty of academic fraud will be subject to severe sanctions. *Please be particular mindful of academic integrity requirements in your courses online—if you are not sure about the expectations surrounding academic integrity, ASK!*

Please carefully review information with regards to academic integrity: be aware; be proactive; be smart and be honest.

- Academic Integrity Message from Associate Dean Krystyna Koczanski : https://youtu.be/Ok-lilm4SeE
- UM Respondus Student Guide https://universityofmanitoba.desire2learn.com/d2l/le/content/6606/viewContent/1463719/View
- The Student Discipline By-Law may be accessed at: http://umanitoba.ca/admin/governance/media/Student_Discipline_Bylaw_-_2009_01_01.pdf
- The list of suggested minimum penalties assessed by the Faculty of Science for acts of academic dishonesty is available on the Faculty of Science webpage: Faculty of Science – Suggested Minimum Penalties for Acts of Academic Dishonesty

- All Faculty members (and their teaching assistants) have been instructed to be vigilant and report every incident of academic dishonesty to the Head of the Department. https://universityofmanitoba.desire2learn.com/d2l/le/content/6606/viewContent/1463719/View

Using Copyright material

Please respect copyright. We will use copyrighted content in this course. University guidelines state that copyrighted works, including those created by instructors of the course are made available for private study and research and must not be distributed in any format without permission. Since it is illegal, do not upload copyrighted works to a learning management system (such as UM Learn), or any website, unless an exception to the Copyright Act applies or written permission has been confirmed. For more information, see the University's Copyright Office website at http://umanitoba.ca/copyright/ or contact um_copyright@umanitoba.ca .

University Student Services

We encourage students to use resources available at the university. If you are experiencing difficulties with your studies or assignments, have a physical or mental health problem or illnesses that may affect your course of study, or have experienced a traumatic or tragic event, please discuss these issues with a councillor in one of the following Student Affairs offices as soon as possible:

- **Academic Learning Center**, 201 Tier Building, (204)480-1481
  Website: http://umanitoba.ca/student/academiclearning/
- **Student Counselling,** 474 University Center, (204)474-8592.
  Website: http://umanitoba.ca/student/counselling/
- **University Health Services**, 104 University Centre, (204)474-8411 Website: http://umanitoba.ca/student/health/
- **Sexual Violence Support and Education**
  Website: http://umanitoba.ca/student-supports/sexual-violence-support-and-education Klinic Sexual Assault Crisis Line (for immediate 24/7 support): 1-888-292-7565

Students Accessibility Services (SAS)

If you need adaptive measures to progress or participate fully in university life, please contact SAS as soon as possible for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a mental illness, learning, medical, hearing, injury-related, visual impairment are invited to contact SAS to arrange a confidential consultation. The Academic Accessibility Service offers services and implements measures to break down barriers to learning for students with physical or mental health issues, visual impairments or blindness, hearing impairments or deafness, permanent or temporary disabilities, or learning problems.

Student Accessibility Services: http://umanitoba.ca/student/saa/accessibility/.

Ways to stay engaged!

Your university experience is not only about learning course content but also about connecting with others and establishing a network during your time here. Don't let this opportunity slip away – reach out to your professors, instructors, teaching assistants as well as classmates. These connections will be helpful for your future endeavors.

Even though much of this term's academic experience is remote, there are ways for you to connect with others in our community. Here are some suggestions:

- For academic resources, please explore: https://www.sci.umanitoba.ca/students/undergraduate-students/academic-resources/getting-help-with-courses/

- To get involved with the Faculty of Science Students' Community, connect with Science Student Association as well as various discipline-specific groups. https://www.sci.umanitoba.ca/students/undergraduate-students/student-life-and-resources/student-council-associations-and-groups/
- There are so many great opportunities available for research in the Faculty of Science. Gain first-hand experience in our labs as a summer research assistant. https://www.sci.umanitoba.ca/students/undergraduate-students/current-students/undergraduate-research-opportunities/

Notice Regarding Collection, Use, and Disclosure of Personal Information by the University

Your personal information is being collected under the authority of The University of Manitoba Act. It will be used for the purposes of grading papers and providing feedback to students. Personal information will not be used or disclosed for other purposes, unless permitted by The Freedom of Information and Protection of Privacy Act (FIPPA). The University of Manitoba has taken steps to ensure that its agreement with Crowdmark, Inc. for services provided by the Crowdmark application is in compliance with FIPPA. Please be aware that information held by Crowdmark Inc. may be transmitted to and stored on servers outside of the University of Manitoba, or Canada. The University of Manitoba cannot and does not guarantee protection against the possible disclosure of your data including, without limitation, against possible secret disclosures of data to a foreign authority in accordance with the laws of another jurisdiction. If you have any questions about the collection of personal information, contact the Access and Privacy Office (tel. 204-474-9462), The University of Manitoba, 233 Elizabeth Dafoe Library, Winnipeg, Manitoba, Canada, R3T 2N2.

Intended Learning Outcomes

These learning outcomes indicate the knowledge, skills, or values that you should be able to demonstrate as they are addressed in the course.

High School Chemistry review (self-study, completed by Sep 15, tested on Sept 16/17)

Chapter 1 – Units of Measurement for Physical and Chemical Change (sections 1.1 – 1.5)

- Distinguish between chemical and physical changes, chemical and physical properties
- Understand energy and its types, and the law of conservation of energy
- Know the SI system of measurement, including units, prefixes, and **conversion between units**
- Distinguish between extensive and intensive properties.
- Identify significant figures and apply them correctly in calculations
- Distinguish between accuracy and precision
- Apply general problem-solving strategies for solving chemical problems using dimensional analysis

Chapter 2 – Atoms and Elements (sections 2.3 – 2.7)

- Understand the implications of the law of conservation of mass, the law of definite proportions, and the law of multiple proportions.
- Know the structure of an atom and the properties of the subatomic particles.
- Know what isotopes are, their chemical symbols, and how to determine an element's atomic mass.
- Convert between mass, moles, and numbers of particles.
- Know the groups that make up the periodic table and the basic properties of the elements in them.
- Know the element symbols and names of the main group elements in periods 1 – 6, the transition elements in period 4, and Ag, Cd, Au, Hg, and U.
- Know the common ions of main group elements.

Chapter 3 – Molecules, Compounds, and Nomenclature (sections 3.1 – 3.4, 3.6 – 3.8)

- Distinguish between ionic and covalent bonds.
- Distinguish between empirical and molecular formulas.
- Recognize different representations of molecular structures.
- Categorize the different types of pure substances.
- Name ionic compounds, inorganic molecules, and acids, and determine chemical formula from name.
- Know the common polyatomic ions listed in Table 3.3.
- Calculate the molar masses (formula masses) of compounds.
- Calculate mass percent of an element in a compound
- Use ratios derived from chemical formulas as conversion factors in chemical problems.
- Determine chemical formulas from experimental data (e.g. combustion analysis).

Chapter 4 – Chemical Reactions and Stoichiometry (sections 4.1 – 4.9. Note: only first subsection of section 4.6)

- Write and balance chemical equations (molecular, total ionic, and net ionic equations).
- Understand the molecular view of the formation of solutions, and distinguish between electrolyte and nonelectrolyte solutions.
- Review (but not memorize) general solubility rules of ionic compounds, with an understanding of how to write, and balance precipitation reactions.
- Know the Arrhenius definition of acids and bases, and write and balance neutralization reactions.
- Understand what a redox reaction is, and write and balance simple redox reactions, *i.e.*, reactions that can be balanced without employing oxidation numbers, such as reactions of elements to give compounds, combustion, and single replacement reactions.
- Solve stoichiometry problems, **including the determination of limiting reagents and the calculation of theoretical yield and percent yield**.
- Calculate the concentration of solutions prepared by adding pure solutes to water, and via dilution.

Chapter 5 – Gases (sections 5.2 – 5.7)

- Understand the nature and origin of pressure, and be familiar with the different units of pressure.
- Know the interrelationships between volume, pressure, moles, and temperature of gases, which are all reflected in the ideal gas law.
- Calculate molar volume and density of gases, and **solve stoichiometry problems involving gases**.
- Know the relationship between the total pressure of a gas mixture and the partial pressures and mole fractions of the gas components, and use this in relevant chemical calculations.

Module 1: Thermochemistry (Chapter 6) Covered by: Sept 30

- Understand the terms energy, heat, work, kinetic energy, thermal energy, potential energy, chemical energy, internal energy, system, surroundings, state functions, thermal equilibrium, enthalpy, endothermic and exothermic reactions.
- Know the units of energy (J, cal, Cal, kWh), and be able to interconvert between them.
- Understand and apply the first law of thermodynamics (the law of conservation of energy).
- Understand energy flow and its associated sign conventions.
- Distinguish between extensive and intensive values of energy and know when and how to apply each.
- Understand and perform calculations using heat capacity, molar heat capacity, and specific heat.
- Perform calculations involving thermal heat transfer and pressure-volume work.
- Distinguish between constant volume and constant pressure calorimetry, and solve calorimetry-related problems.
- Interconvert between internal energy and enthalpy.
- Understand the enthalpy changes in chemical reactions on a molecular scale.
- Calculate the stoichiometric amount of heat evolved or released by a chemical reaction.
- Use Hess' Law to determine the energy change in a chemical reaction.
- Define standard enthalpies of formation and use these to calculate enthalpy changes of reaction.
- Understand the need for energy conservation and the development of renewable energy sources.

Module 2: The Quantum Mechanical Model of the Atom (Chapter 7) Covered by: Oct 13

- Know that the behaviour of macroscopic objects like baseballs is strikingly different from the behaviour of microscopic objects like electrons.
- Know that the quantum-mechanical model provides the basis for the organization of the periodic table and our understanding of chemical bonding.
- Define and understand electromagnetic radiation, and its amplitude, wavelength, and frequency.
- Use the speed of light to convert between wavelength and frequency.
- Know the electromagnetic spectrum and its different forms of radiation.
- Know and understand interference and diffraction and how they demonstrate the wave nature of light.
- Know and explain the photoelectric effect and how it demonstrates the particle nature of light.
- Use equations to interconvert energy, wavelength, and frequency of electromagnetic radiation.
- Define and understand atomic spectroscopy and emission spectrum.
- Understand how the Bohr model explains the emission spectrum of hydrogen.
- Know that electrons and photons behave in similar ways: both can act as particles and as waves.
- Know that photons and electrons, even when viewed as streams of particles, still display diffraction and interference patterns in a double-slit experiment.
- Use de Broglie's relation to interconvert wavelength, mass, and velocity.
- Know the complementarity of position and velocity through the Heisenberg's uncertainty principle.
- Know the similarities and differences in classical and quantum-mechanical concepts of trajectory.
- Differentiate between deterministic and indeterminacy.
- Define orbital and wave function.
- Know that the Schrödinger equation is the ultimate source of energies and orbitals for electrons in atoms.
- Know the properties and allowed values of the principal quantum number (n), the angular momentum quantum number (l), and the magnetic quantum number (m_l).

- Know and understand how atomic spectroscopy defines the energy levels of electrons in the hydrogen atom.
- Calculate the energies and wavelengths of emitted and absorbed photons for hydrogen.
- Define and understand probability density and radial distribution function.
- Know the shapes of s, p, d, and f orbitals and their relationships to quantum numbers.
- Know that the shape of an atom is dictated by the combined shapes of the collection of orbitals for that atom.
- Define and understand phase and nodes.
- Identify the number of nodes in the radial distribution function for an s orbital.
- Define ground state and be able to write both expanded and condensed electronic configurations.
- Know the properties and allowed values of the spin quantum number (m_s).
- Represent the electronic configuration of an atom using orbital diagrams in conjunction with the Pauli exclusion principle, the Aufbau principle, and Hund's rule.
- Define and understand degenerate orbitals.
- Understand Coulomb's law, the principles of shielding and penetration, and how these factors relate to orbital ordering in multielectron atoms.
- Define paramagnetism and diamagnetism and predict whether a gas phase atom or ion is paramagnetic or diamagnetic.

Module 3: Periodic Properties of the Elements (Chapter 8) Covered by: Oct 23

- Know that Mendeleev organized the modern form of the periodic table to group together elements with similar characteristics.
- Know and understand that the periodic law summarizes the behaviour of the elements—arranging them by atomic number results in strong correlation with elemental properties.
- Define valence and core electrons.
- Know the *s*, *p*, *d*, and *f* blocks of the periodic table.
- Use the periodic table to predict electron configurations.
- Understand that many of the chemical properties of elements are due to the number of valence electrons and that elements in the same group have the same number of valence electrons.
- Know the definitions and differences among van der Waals, covalent, and atomic radii.
- Know and predict trends in atomic radius.
- Use the ideas of screening and effective nuclear charge to explain the trends for atomic radii.
- Know that the radii of transition elements remain approximately constant across each period.
- Know how to write electron configurations for ions. For anions, extra electrons are simply filled in. For cations, electrons are removed from the highest sublevel of the highest principal energy level.
- Identify and distinguish between paramagnetic and diamagnetic atoms/ions.
- Know the relationship between the radius of a neutral atom and its ions
- Know and predict trends in first ionization energy
- Use the ideas of screening and effective nuclear charge to explain the trends for ionization energy.
- Understand trends in second and successive ionization energies with respect to the noble-gas core.
- Define and understand the basic trend for electron affinity
- Know the periodic trends in metallic character
- Know the names, periodic trends, and representative chemical reactions of the elements of a few groups: group 1 (alkali metals), group 2 (alkaline earth metals), group 17 (halogens), and group 18 (noble gases).

Module 4: Chemical Bonding I: Lewis Theory (Chapter 9) Covered by: Nov 6

- Know that Lewis structures are simple predictors of how atoms combine to form ionic compounds and molecules.
- Know and understand that chemical bonds form because they lower the potential energy between the charged particles in the constituent atoms.
- Define and understand ionic bond, covalent bond, and metallic bonding.
- Know that valence electrons can be represented with dots around an element symbol.

- Identify and draw atoms with their valence electrons represented as dots.
- Know that Lewis theory involves the sharing or transfer of electrons.
- Define and know the octet rule.
- Know that most nonmetal atoms prefer to be surrounded by eight valence electrons, but hydrogen requires only two.
- Understand that in Lewis theory, a pair of electrons, one from each of two atoms, forms a bond or bonding pair that helps each atom achieve an octet. The two atoms can also share two pairs of electrons (a double bond) or three pairs of electrons (triple bond).
- Identify and draw covalent compounds with single, double, and triple bonds between constituent atoms.
- Draw Lewis structures for molecular compounds and polyatomic ions.
- Draw Lewis structures of ionic compounds containing main-group elements.
- Understand that the formation of an ionic compound from neutral atoms is exothermic: the amount of energy released is largely caused by lattice energy.
- Know that the Born–Haber cycle is a way of accounting for the energetics of each of the steps in the formation of an ionic compound from its constituent elements, and use it to calculate the lattice energy of an ionic compound.
- Know that lattice energy decreases for larger ions and increases with increasing charge.
- Understand why ionic solids are poor electrical conductors while ionic liquids and aqueous solutions of ionic compounds are good electrical conductors.
- Define bond energy, and estimate reaction enthalpies using average bond energies for all bonds broken and formed in a chemical reaction.
- Understand the inverse relationship between bond length and bond strength.
- Know and understand that a pair of electrons does not have to be shared equally between two atoms. Unequal sharing results in a polar covalent bond.
- Define electronegativity and know its periodic trends.
- Understand that bonds can range from a nonpolar covalent bond to a polar covalent bond to an ionic bond depending on the difference in electronegativity between the two atoms.
- Define dipole moment and percent ionic character.
- Define resonance structures and understand how Lewis structures represent the individual and the hybrid structures.
- Define formal charge and understand how to calculate it for the atoms in a Lewis structure.
- Draw Lewis structures for odd-electron species.
- Draw Lewis structures for molecules containing atoms with incomplete octets.
- Draw Lewis structures for molecules containing atoms with expanded octets.
- Understand why the second-period elements cannot have expanded octets.
- Define hypercoordination, and draw Lewis structures for hypercoordinate compounds.

Module 5: Chemical Bonding II: Molecular Shapes, VB and MO Theory (Chapter 10) Covered by: Nov 27

- Know and understand that VSEPR theory is based on electron groups that repel each other.
- Know that VSEPR predicts five basic shapes according to the number of electron groups surrounding a central atom: linear (2), trigonal planar (3), tetrahedral (4), trigonal bipyramidal (5), and octahedral (6).
- Know the ideal bond angles for each basic shape.
- Recognize molecules in their correct shapes based on their number of electron groups.
- Understand the difference between electron geometry and molecular geometry.
- Know and understand the effect of lone pair electrons on molecular geometry with respect to shape and bond angle.
- Know the different molecular geometries that arise from trigonal planar, tetrahedral, trigonal bipyramidal, and octahedral electron geometries.

- Predict and draw the electron and molecular geometries for molecules, including molecules with more than one central atom.
- Identify polar bonds in molecules based on differences in electronegativity.
- Understand how polar bonds translate into net dipole moments for molecules.
- Understand how microscopic polarity results in macroscopic properties of molecules, e.g., the immiscibility of water and oil.
- Understand an interaction energy diagram for the formation of bonds with respect to internuclear distance.
- Know and understand how the overlap of atomic orbitals leads to bonds and how this is explained by valence bond theory.
- Define and understand hybridization and the role of atomic orbitals.
- Know and understand the common types of hybridization: sp^3, sp^2, and sp.
- Know how to predict hybridization and draw valence bond models of molecules.
- Know the basis for molecular orbital theory.
- Know and understand how linear combinations of atomic orbitals (LCAO) form molecular orbitals.
- Define bonding orbital and antibonding orbital and understand the differences between the two.
- Use the MO diagram for a diatomic molecule to predict bond order, bond energy/strength, and predict whether the molecule is diamagnetic or paramagnetic.
- Understand how molecular orbital theory can be applied to larger molecules and solids to model electron delocalization.
- Know that the relative energies of conduction and valence bands of molecular orbitals forms the basis for conductors, semiconductors, and insulators.
- Know and understand how the doping of semi-conductors to produce n-type and p-type semi-conductors alters their properties.

Module 6: Chemical Equilibrium (Chapter 14) Covered by: Dec 11

- Understand the concept of dynamic equilibrium, and know and understand that in a dynamic equilibrium, the rate of the forward reaction equals the rate of the reverse reaction.
- Write and interpret the equilibrium expressions given by K_P and K_C for a chemical reaction, and interconvert between them for gas-phase reactions.
- Know the standard states of aqueous solutions, solids, liquids, and gases.
- Understand activity, and know how the thermodynamic equilibrium constant K is defined using activities, and why this results in a unitless quantity. Write and interpret the equilibrium expressions given by K.
- Distinguish between K_P and K_C and K.
- Know and understand why solids and liquids in a reaction do not contribute to the value of equilibrium constants.
- Define and understand the law of mass action.
- Understand the significance of numerical values of the equilibrium constant, especially very large and very small values.
- Know and understand the mathematical relationships between chemical equations and equilibrium constants.
- Know and understand that the equilibrium constant will be identical for a given reaction at a given temperature; the equilibrium can be established at an infinite combination of concentrations.
- Know that the reaction quotient Q is defined in the same way as the equilibrium constant K except that Q can be defined for a state other than equilibrium.
- Know and understand how Q can be compared with K and used to determine in which direction a reaction will proceed in order to establish equilibrium, and predict this direction.
- Understand how ICE tables are used to determine equilibrium concentrations and/or partial pressures, and use them to solve for these quantities.
- Know how to use approximations when calculating equilibrium concentrations from initial concentrations or partial pressures in cases in which the equilibrium constant is small.

- Know and understand Le Châtelier's Principle.
- Know, understand, and predict the effect on a system at equilibrium of changing concentration, partial pressure, total pressure or volume (for a system that involves gases), and temperature (when direction of heat flow is known).

Laboratory Overview

Lab Coordinator: Dr. Angela Kuchison (Angela.Kuchison@umanitoba.ca)

Welcome to the CHEM 1300 laboratory! The general chemistry laboratories build your skillset in chemistry. The lab will reinforce material you learn within the course and help you prepare for responsibly working with chemicals. Due to the high number of students in CHEM 1300, A. Kuchison cannot always reach you immediately after an e-mail, but tries to get send a reply within 2 working days. If A. Kuchison takes longer than a week to reply, please e-mail her again if it is important. Please note that if several students report the same problem, an announcement will be posted on UM Learn regarding the issue before she replies. Regularly checking the appropriate UM Learn page for the labs is important to your success in the course. There are three general sections with different UM Learn pages: Sections B01-B06; Sections B81-B86; Section B99. Please read the appropriate section below for information relating to it.

Sections B01-B06
This semester, the CHEM 1300 lab will be delivered in a hybrid model with: a) remote assignments on UM Learn; b) remote prelabs on UM Learn; and c) in-person labs.

a) Remote assignments (4 × 3% = 12%)
There are four remote assignments that will each be available on UM Learn and due approximately every 3 weeks. Each assignment will have material to read/watch provided on UM Learn. The average time to complete the assignment is approximately 3 hours, so please ration your time appropriately. Due to limitations on UM Learn, these assignments are called "quizzes".

You will have 2 attempts at each of the quizzes, with feedback provided. The assignments are: Safety Assignment (due dates vary according to section beginning Sept 29); Glassware Assignment (due Oct 23); Observations and Academic Misconduct in the Laboratory Assignment (due Nov 20); and Synthesis and Stoichiometry in the Laboratory Assignment (due Dec 11).

If you wait until the assignment is due, you may not receive appropriate feedback in time if you have a question. It is recommended that you start these assignments early and use them to help you become more confident for working in the laboratory.

b) Remote prelabs (2 × 1% = 2%)
There will be two in person labs, each with a prelab available on UM Learn. The prelabs are meant to help prepare you for answering the questions and being prepared for various safety incidents that may arise. They are important to your success in the in-person labs. The due dates are suggested as the day before each in-person lab. This is so you can receive appropriate feedback on them.

c) In-person labs (2 × 3% = 6%)
You have the opportunity to work in a laboratory during a pandemic and will have this skill added to the chemistry knowledge you gain. You will be required to wear safety glasses and for your protection we strongly recommend a lab coat and face mask. Further details regarding safety will be completed in the first UM Learn assignment. You MUST complete the safety assignment before the first laboratory. This is for your and your classmates' safety. The chemistry laboratory is a community where we all are responsible for each other's safety.

Due to distancing measures, there are two in-person labs that begin on Oct 6. You will be assigned to one of four rotations and a room (Parker 206, 216, 240, 290, 406, 416, 422, 428, 442, 562). These assignments will be posted on UM Learn by the end of the first week of classes and be updated weekly. The rotation you are assigned to are non-negotiable. There will be signs with arrows in Parker to guide you to the appropriate laboratory. Please arrive no more 30 minutes early and arrive at least 10 minutes early. Students who show up to the laboratory after the first 30 minutes will not be able to complete the lab.

The procedures and datasheets required for the labs will be printed and be in the lab for you. They will be available on UM Learn prior to the lab and you should carefully review them.

The two laboratories will reinforce your chemistry knowledge from the course and are:

1. Experiment 1: Calorimetry (IP Lab 1)
2. Experiment 2: Identifying Unknown Acids Using Titrations (IP Lab 2)

Below are the due dates for the safety assignment, the recommended times to complete the prelabs and the dates for the in-person laboratories (IP Lab). Please show up early and practice distancing measures when you enter the building.

Section, Time	**Rotation**	**Safety Assignment 1**	**Prelab 1**	**IP Lab 1**	**Prelab 2**	**IP Lab 2**
B01, Tues AM (8:30 am)	1	Sept 29	Oct 5	Oct 6	Nov 2	Nov 3
	2	Sept 29	Oct 12	Oct 13	Nov 16	Nov 17
	3	Sept 29	Oct 19	Oct 20	Nov 23	Nov 24
	4	Sept 29	Oct 26	Oct 27	Nov 30	Dec 1
B02, Tues PM (2:30 pm)	1	Sept 29	Oct 5	Oct 6	Nov 2	Nov 3
	2	Sept 29	Oct 12	Oct 13	Nov 16	Nov 17
	3	Sept 29	Oct 19	Oct 20	Nov 23	Nov 24
	4	Sept 29	Oct 26	Oct 27	Nov 30	Dec 1
B03, Wed AM (8:30 am)	1	Sept 30	Oct 6	Oct 7	Nov 3	Nov 4
	2	Sept 30	Oct 13	Oct 14	Nov 17	Nov 18
	3	Sept 30	Oct 20	Oct 21	Nov 24	Nov 25
	4	Sept 30	Oct 27	Oct 28	Dec 1	Dec 2
B04, Wed PM (2:30 pm)	1	Sept 30	Oct 6	Oct 7	Nov 3	Nov 4
	2	Sept 30	Oct 13	Oct 14	Nov 17	Nov 18
	3	Sept 30	Oct 20	Oct 21	Nov 24	Nov 25
	4	Sept 30	Oct 27	Oct 28	Dec 1	Dec 2
B05, Thurs AM (8:30 am)	1	Oct 1	Oct 7	Oct 8	Nov 4	Nov 5
	2	Oct 1	Oct 15	Oct 15	Nov 18	Nov 19
	3	Oct 1	Oct 21	Oct 22	Nov 25	Nov 26
	4	Oct 1	Oct 28	Oct 29	Dec 2	Dec 3
B06, Thurs PM (2:30 pm)	1	Oct 1	Oct 7	Oct 8	Nov 4	Nov 5
	2	Oct 1	Oct 14	Oct 15	Nov 18	Nov 19
	3	Oct 1	Oct 21	Oct 22	Nov 25	Nov 26
	4	Oct 1	Oct 28	Oct 29	Dec 2	Dec 3

Marking Scheme:

Remote Assignments: 4 × 3% = 12%
Remote Prelabs: 2 × 1% = 2%
In-Person Labs: 2 × 3% = 6%
Total: 20%

Note: You can receive up to a bonus 1/20 in the laboratory for cleaning up after the lab (cleaning all glassware, making sure all instruments used are clean, wiping down your bench) and leaving on time. This will be recorded by your TA and each lab can have a bonus of up to 0.5. The maximum mark for the laboratory cannot exceed 20% of your final grade.

Attendance

- You must complete all lab assignments with a mark of 50% or more.
- If you cannot complete a lab assignment due to an extenuating circumstance, you must e-mail A. Kuchison within 24 hours of its due date.
- If you cannot complete an in-person lab due to an extenuating circumstance, you must e-mail A. Kuchison within 24 hours of its due date.

Sections B81-B86

This semester, the CHEM 1300 lab will be delivered in a hybrid model with: a) remote assignments on UM Learn; b) remote prelabs on UM Learn; and c) in-person labs (January 5-15).

a) Remote assignments (4 × 3% = 12%)
There are four remote assignments that will each be available on UM Learn and due approximately every 3 weeks. Each assignment will have material to read/watch provided on UM Learn. The average time to complete the assignment is approximately 3 hours, so please ration your time appropriately. Due to limitations on UM Learn, these assignments are called "quizzes".

You will have 2 attempts at each of the quizzes, with feedback provided. The assignments are: Safety Assignment (due Oct 1); Glassware Assignment (due Oct 23); Observations and Academic Misconduct in the Laboratory Assignment (due Nov 20); and Synthesis and Stoichiometry in the Laboratory Assignment (due Dec 11).

If you wait until the assignment is due, you may not receive appropriate feedback in time if you have a question. It is recommended that you start these assignments early and use them to help you become more confident for working in the lab.

b) Remote prelabs (2 × 1% = 2%)
There will be two in person labs, each with a prelab available on UM Learn. The prelabs are meant to help prepare you for answering the questions and being prepared for various safety incidents that may arise. They are important to your success in the in-person labs. They must be completed with a grade of 50% or more by Dec 11 for entry into the laboratory in January.

c) In-person labs (2 × 3% = 6%)
You MUST complete all of the remote assignments, each with a grade of 50% or more, to complete the in-person labs in January. You have the opportunity to work in a laboratory during a pandemic and will have this skill added to the chemistry knowledge you gain. You will be required to wear safety glasses and for your protection we strongly recommend a lab coat and face mask. Further details regarding safety will be completed in the first UM Learn assignment. The chemistry laboratory is a community where we all are responsible for each other's safety.

The procedures and datasheets required for the labs will be printed and be in the lab for you. They will be available on UM Learn prior to the lab and you should carefully review them. Further information regarding the in-person labs will be released closer to the date.

The two laboratories will reinforce your chemistry knowledge from the course and are:

1. Experiment 1: Calorimetry (IP Lab 1)
2. Experiment 2: Identifying Unknown Acids Using Titrations (IP Lab 2)

Marking Scheme:

Remote Assignments: 4 × 3% = 12%
Remote Prelabs: 2 × 1% = 2%
In-Person Labs: 2 × 3% = 6%
Total: 20%

Section B99

If you have completed CHEM 1300 laboratories between Fall 2019-Winter 2020 with a grade of 70% or more, you may be eligible for a lab exemption. Please fill out the form on:
https://www.emailmeform.com/builder/form/a2c6x8j9ds4KUoEreD
Note: Students taking the CHEM 1300 laboratory in the Fall 2020 semester will not be eligible for lab exemptions in the future.