



**University  
of Manitoba**

**Faculty of Science, Department of Chemistry**

**CHEM 1300: Structure and Modelling in Chemistry  
Course Syllabus, Sections A01 – A07, Fall 2019**

All Course Sections	Lecturers
<b>A01;</b> <u>Room:</u> 208 Armes Building Mon., Wed., & Fri.: 1:30 – 2:20pm	<b>Dr. Angela Kuchison</b> ( <a href="mailto:Angela.Kuchison@umanitoba.ca">Angela.Kuchison@umanitoba.ca</a> ) Office: 520G Parker building
<b>A02;</b> <u>Room:</u> 208 Armes Building Tues. & Thurs.: 11:30 – 12:45pm	<b>Dr. James Xidos</b> ( <a href="mailto:James.Xidos@umanitoba.ca">James.Xidos@umanitoba.ca</a> ) Office: 520A Parker building
<b>A03;</b> <u>Room:</u> 200 Armes Building Mon., Wed., & Fri.: 10:30 – 11:20am	<b>Dr. Angela Kuchison</b> ( <a href="mailto:Angela.Kuchison@umanitoba.ca">Angela.Kuchison@umanitoba.ca</a> ) Office: 520G Parker building
<b>A04;</b> <u>Room:</u> 208 Armes Building Tues. & Thurs.: 8:30 – 9:45am	<b>Dr. Olesya Fedoryak</b> ( <a href="mailto:Olesya.Fedoryak@umanitoba.ca">Olesya.Fedoryak@umanitoba.ca</a> ) Office: 520D Parker building
<b>A05;</b> <u>Room:</u> 208 Armes Building Tues. & Thurs.: 1:00 – 2:15pm	<b>Dr. James Xidos</b> ( <a href="mailto:James.Xidos@umanitoba.ca">James.Xidos@umanitoba.ca</a> ) Office: 520A Parker building
<b>A06;</b> <u>Room:</u> 208 Armes Building Mon. & Wed.: 2:30 – 3:45pm	<b>Dr. Olesya Fedoryak</b> ( <a href="mailto:Olesya.Fedoryak@umanitoba.ca">Olesya.Fedoryak@umanitoba.ca</a> ) Office: 520D Parker building
<b>A07;</b> <u>Room:</u> 208 Armes Building Tues. & Thurs.: 2:30 – 3:45pm	<b>Dr. Sarrah Vakili</b> ( <a href="mailto:Sarrah.Vakili@umanitoba.ca">Sarrah.Vakili@umanitoba.ca</a> ) Office: 289 Parker building

**Electronic Communications and Questions**

All e-mail communications with university faculty and staff must be conducted using your University of Manitoba e-mail account. E-mailed questions sent from other e-mail accounts will not be answered. It is also expected that you will check your University of Manitoba e-mail account **daily** for communications sent to you by University instructors, administrators, and staff. For more information, see:

<http://intranet.umanitoba.ca/registrar/email-policy>

**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 (e.g. conflicts in exam times, problems regarding grades):

- Contact the course coordinator, Dr. James Xidos ([James.Xidos@umanitoba.ca](mailto:James.Xidos@umanitoba.ca))

For questions involving the administration of the lab component (e.g. missed labs, lab grade appeals):

- Contact the lab coordinator: Dr. Angela Kuchison ([Angela.Kuchison@umanitoba.ca](mailto:Angela.Kuchison@umanitoba.ca))

For registration and technical questions for Mastering Chemistry:

- For search, chat, or phone, visit: <https://support.pearson.com/getsupport/s/>

## 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

CHEM 1300 teaches essential skills in chemistry. 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, this course begins to look at dynamic equilibrium and allows us to predict qualitative and quantitative results related to it.

The course has an emphasis on conceptual, qualitative and quantitative aspects of chemistry, and their relation with daily life. It consists of the following components:

- class lectures
- a laboratory program
- seven online assignments
- two term tests
- a final exam

## 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). It is strongly advisable for all students to review chapters 1 – 5 of the textbook.

## Registration eligibility

It is your responsibility to ensure that you are entitled to be registered in this course. This means that:

- You have the appropriate prerequisites, as noted in the calendar description, or have permission from the Department of Chemistry to waive these prerequisites.
- If you are not entitled to be in this course, you will be withdrawn, or the course may not be used in your degree program. There will be no fee adjustment, and this cannot be appealed.

## UM Learn Course Site

- The CHEM 1300 UM Learn course site is available for registered students at: <http://umlearn.ca>
- Your login name and password is the same as your UMnetID.
- Information posted on the UM Learn site includes: the full course syllabus, link for Mastering Chemistry registration, laboratory information and prelab exercises, course-related internet and e-mail links, lecture notes, practice exams questions with the keys, marks, and course announcements.
- You should check UM Learn **daily** for course news and information.

## Supplemental Instruction (SI)

### What are SI study groups?

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

### What is an SI leader?

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 usually start during the first or second week of classes. The SI leader will set up two or more sessions a week at various times throughout the day. The schedule is posted online 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. If it works better for your schedule, you can also go to the sessions that are attached to other sections of the course.

### Why should I come?

If you attend SI regularly, you will gain a better understanding of course content, get a better grade, learn some new study strategies, and you might meet some new people.

### 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](http://umanitoba.ca/student/academiclearning/services/supplemental_instruction.html).

Follow us on Facebook at <https://www.facebook.com/UniversityManitoba/>.

### Fall 2019 Schedule:

	Lecture Time	SI Leader	SI Session Time	Session Location
<b>A01</b>	MWF 1:30 – 2:20	Vicky Pham	Mon & Wed 2:30 – 3:30	115 Armes
<b>A02</b>	TTh 11:30 – 12:45	Patricia Machechera	Tues & Thurs 1:00 – 2:00	527 Buller
<b>A03</b>	MWF 10:30 – 11:20	Tyler Szun	Wed & Fri 3:30 – 4:30	115 Armes
<b>A04</b>	TTh 8:30 – 9:45	Arqum Shami	Tues & Thurs 11:30 – 12:30	115 Armes
<b>A05</b>	TTh 1:00 – 2:15	Tamarah Singh	Tues & Thurs 2:30 – 3:30	214 Tier
<b>A06</b>	MW 2:30 – 3:45	Cynthia James	Mon & Fri 1:30 – 2:30	111 Armes
<b>A07</b>	TTh 2:30 – 3:45	Simranpreet Dhaliwal	Mon & Wed 12:30 – 1:30	215 Tier

While you are encouraged to attend the SI session for your class section, you are welcome to attend the SI sessions for *any* section.

## 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 problems 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 Accessibility Services**, 155 University Center, (204)474-6213, (204)474-9790 (TTY).  
Website: <http://umanitoba.ca/student-supports/accessibility>
- **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

## Academic Learning Centre Tutoring Services

A tutor is available for a limited number of CHEM 1300 tutoring hours in the Migizii Agamik building. Students can book tutoring appointments by calling 204-480-1481 or online at: <https://manitoba.mywconline.com/>

## Course materials

1. **Textbook and online homework: N. Tro, T.D. Fridgen, L.E. Shaw; Chemistry: A Molecular Approach, Second Canadian Edition, and Mastering Chemistry. There are three options:**
  - E-text with Mastering Chemistry: ISBN: 9780134381954, price: \$115.50. Available in the Bookstore or online at: <http://bookstore.umanitoba.ca/SiteText.aspx?id=8773>
  - E-text with Mastering Chemistry bundled with a binder-ready copy of the textbook: ISBN: 9780134628592, price: \$130.00. Available in the Bookstore.
  - Access to Mastering Chemistry without the e-text: can be purchased for \$75 during Mastering Chemistry registration (see below).
2. **CHEM 1300 Laboratory Manual, 2019 – 2020:** ISBN 9780100000353. Bookstore price: \$9.95.
3. **Laboratory coat and safety glasses** are *required* in the CHEM 1300 Laboratory Program. The Chemistry Graduate Student Association sells new lab coats and safety glasses; location and times of these sales will be announced in class. Lab coats and safety glasses are also available in the Bookstore.
4. **Notebook** for laboratory, any kind that you can use throughout the term works.

### Optional Calculations Guide:

- E. Smirnova, N.R. Hunter; A Survival Kit for Stoichiometry, Ratios, and Proportions. ISBN 9780100015296, Bookstore price: \$6.95

## Mastering Chemistry

Mastering Chemistry is the online homework system in which you will complete six assignments and four prelab exercises. Thus, purchasing access to Mastering Chemistry is mandatory for CHEM 1300.

- Students who purchased Mastering Chemistry during the 2018 – 2019 academic year for CHEM 1300 can continue using their Mastering access at no additional charge.
- For those who purchased access to Mastering Chemistry with the e-text, the e-text will be available through the Mastering Chemistry interface.

In addition to the for-credit exercises on Mastering Chemistry, there are many review and practice exercises available (no credit). 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.
- The many Dynamic Study Modules are meant to guide your practice in a variety of Chemistry topics that cover both High School review and CHEM 1300 course material.

### Registering for Mastering Chemistry

- Log into UM Learn using your UMnetID (***must*** be your account) and go to the CHEM 1300 course site.
- Click on **Content / Mastering Chemistry / Pearson MyLab & Mastering Links launch**. For initial registration, your Mastering Chemistry account ***must*** be accessed through this link.
- Click on “Pearson MyLab and Mastering” in the new page.
- Enter your information and click on Next
- At this point, you have three options:
  - If you have purchased an access code from the Bookstore, you must first redeem the 12-digit code using the instructions provided. This will give you a new, longer code for Mastering. This second code will be the one you will enter when you click on the **Access Code** option and follow the instructions.
  - If you want to purchase access to Mastering Chemistry without access to the e-text, click on **\$75.00 CAD** option and follow the instructions.
  - If you haven’t paid for an access code yet or want to pay later, click on the “Get temporary access without payment for 14 days” link and follow the instructions.

Note that you cannot use the **\$115.50 CAD** online option to pay for access to Mastering Chemistry and the e-text. You can only gain this access by purchasing an access code from the Bookstore.

- You will be sent an e-mail from Pearson that contains a link to the course site that you need to use to complete your registration process. **Save this e-mail!**
  - This e-mail contains your Account ID and Order ID that you may need when contacting Pearson for support.
  - You can click on the registration link to upgrade your account.

Note that you can also upgrade your account by logging into your Mastering Chemistry account, then clicking on the **My Courses** tab. There you will see an upgrade link.

- After you click on the link in your e-mail, you will be prompted to enter your 7-digit student number. Please enter this accurately! The 7-digit student number is circled in the sample student card above.
- Once you have made it into Mastering Chemistry, you can click on “Open MyLab & Mastering”.
- After registering, you can continue to access your Mastering Chemistry account by clicking on the link in UM Learn.



## Things to do in preparation for CHEM 1300

- ✓ Buy all required course materials.
- ✓ Review chemistry background material (see pages 11 – 12 of syllabus).
- ✓ Prepare for the lab
  - See important information in lab overview section of this syllabus (pages 19 – 21).
- ✓ Register for Mastering Chemistry.

## Expectations

- ✓ You are required to attend *all* lectures in the class section that you are registered in. **You are not permitted to attend lectures in any of the other class sections.**
- ✓ You are responsible for *all* course material, whether or not it is explicitly covered in class. You are expected to read ahead.
- ✓ You are expected to complete all online assignments before the respective deadlines. These assignments do not provide sufficient practice to ensure success in this course. You are strongly encouraged to also complete the suggested end-of-chapter questions (pages 11–18) and practice exercises on Mastering Chemistry.
- ✓ Laboratory attendance is *mandatory*. You must earn a passing grade of at least 50% in the laboratory program to pass the course.
- ✓ You are expected to be respectful of your fellow classmates and your lecturer. Please refrain from making noise during lectures and turn off your cell phone. Policies regarding respectful work and learning environment and sexual assault can be found at:  
[http://umanitoba.ca/admin/governance/governing\\_documents/community/230.html](http://umanitoba.ca/admin/governance/governing_documents/community/230.html)

## Important dates

See 2019 – 2020 online calendar at: <http://umanitoba.ca/student/records/deadlines/index.html>

Sept 4	Classes begin, Assignment 1 and 2 released.
Sept 17	Last day to drop a course with full refund and no academic consequences.
Sept 18	Last day to add a course
Sept 20	Assignment 1 and 2 due <i>before</i> 6:00 pm, Assignment 3 is released
Sept 24	Laboratory Program begins, all prelabs released.
Oct 4	Assignment 3 due <i>before</i> 6:00 pm, Assignment 4 is released
Oct 7 - 8	Test I, held during class time
Oct 14	Thanksgiving Holiday; no classes or examinations
Oct 18	Assignment 4 due <i>before</i> 6:00 pm, Assignment 5 is released
Nov 1	Assignment 5 due <i>before</i> 6:00 pm, , Assignment 6 is released
Nov 5 - 6	Test II, held during class time
Nov 11 - 15	Midterm break; no classes or examinations
Nov 18	Last day for Voluntary Withdrawal from Fall Term 2019 courses
Nov 22	Assignment 6 due <i>before</i> 6:00 pm, Assignment 7 is released
Dec 6	Classes end; Assignment 7 due <i>before</i> <b>11:00 pm</b> .
Dec 9 – 20	Final examination period

## Grading

- Final grades are determined based on the following breakdown:

Laboratory Program:	20%
Online Assignments (7):	6%
Tests (2, 12% each):	24%
Final Examination:	50%

**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		

- We do not round up final percentage grades and we do not scale final class results.
- We do not accept or offer any other options for improving grades.
- You must earn a passing grade of at least 50% in the laboratory program to pass the course despite 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.

### Mastering Chemistry assignments:

- There are seven assignments, all have equal weight, with due dates indicated on page 6.
- Before attempting any assignments or prelabs, it is strongly recommended that you complete the practice assignment called, “Introduction to Mastering Chemistry”. This exercise will provide you with practice in entering different types of answers to Mastering Chemistry questions. ***No consideration will be made for making input errors in assignments.***
- Do not begin an assignment close to the deadline as they will take time to complete.
- 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.
- No extensions or make-up possibilities will be given for any assignment. Special cases may be considered only for documented medical or compassionate reasons.
- There will be no appeals or adjustments made for questions marked incorrect in MasteringChemistry for any reason. Be cautious when entering the information – mistakes in sign, symbols, significant figures, etc. will be considered errors and no additional grades will be given.
- 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 that 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.

### Laboratory grades

- See laboratory overview and manual for details.
- Regardless of your total score in the course, you need a grade of **at least 50%** in the lab component to pass CHEM 1300!

### Term Tests

- There are two tests that will be completed during class time on the following dates:

Test 1	Test 2
Mon Oct 7: A01, A03, A06	Tues Nov 5: A02, A04, A05, A07
Tues Oct 8: A02, A04, A05, A07	Wed Nov 6: A01, A03, A06

- The test will start at the beginning of class as soon as papers are distributed. All sections will be given exactly 40 minutes to write the test.
- You must write the test in your class section. Writing a test in a different class section will be considered an act of academic misconduct and will be subject to disciplinary action.**
- Material covered:
  - Test 1: High school review (Chapters 1 – 5) and Chapters 6 – 7
  - Test 2: Mostly Chapters 8 – 9, with some questions covering High school review and Chapters 6 – 7
- The tests will consist of a set of short answer questions where you will enter your answer in a box. These questions will be marked right or wrong; no credit will be given for any workings.
- Graphing and programmable calculators are allowed provided cheat notes have not been programmed in the calculator.
- If you miss a test, you must submit full documentation for your reason to the course coordinator within 24 hours of the test date. If the absence is considered unavoidable, the weight of the test will be transferred to the final exam. Otherwise, you will be assigned a grade of zero for the test.

### Final examination

- The final exam will be 3 hours long; the date of the final exam will be posted by the Registrar's Office.
- The format of the final exam will be posted on UM Learn before the end of classes. The final exam will have questions that will have a different style than what **you will see in your assignments and tests**.
- The final exam will cover all course material in a balanced manner and will include questions on review material.
- You will need to bring pencils, pens, an eraser, a calculator, and your Student I.D. to the exams and strictly follow the instructions provided on the first page of the examination papers. These instructions will be posted on UM Learn prior to the exam. Familiarization with the instructions is **required**.
- Graphing and programmable calculators are allowed provided cheat notes have not been programmed in the calculator.
- Writing of the final exam is **mandatory**. If you miss the final exam **you must contact your home faculty within 48 hours**. Your home faculty will decide whether or not to grant you the privilege of writing the deferred exam.
- Final examination and grades policies can be found at:  
[http://umanitoba.ca/admin/governance/governing\\_documents/academic/1299.html](http://umanitoba.ca/admin/governance/governing_documents/academic/1299.html)
- For more resources about examinations, see:  
<http://umanitoba.ca/faculties/science/undergrad/resources/Academic%20Resources%20index.html>

### 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.



## Appeals

- If you have concerns or questions about posted scores and examination problems promptly consult the course coordinator: [James.Xidos@umanitoba.ca](mailto:James.Xidos@umanitoba.ca)
- No appeals of term work (laboratory, assignment, or test grades) 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/>

## Limited Access and VW Resources

Students who fail or VW from a course will be subject to limited access to that course in future terms. That is, students will not be able to register for a course (for which they have VWed or failed) during the limited access registration period for the next three semesters. For more information, please see the Repeated Course FAQ available at:

<http://umanitoba.ca/student/records/academicpolicychanges/limitedaccessfaq.html>

## Copyright and Intellectual Properties Resources

Copyrights and intellectual property must be respected by all students. For more information, please refer to the Copyright Office: <http://umanitoba.ca/copyright/>

## Academic integrity policies

### Plagiarism

Plagiarism is copying someone else's or your own work. This includes:

- Copying another student's examinations, laboratory reports, laboratory notebook(s), or assignments.
- Copying your own laboratory reports, laboratory notebook, or assignments from a previous semester.
- Copying an instructor's answer sheet from a previous semester.
- Copying materials provided by SI, tutors, and other sources of help.

If you quote other sources of information in a laboratory report or other assignment, you must give proper credit. Plagiarism and other forms of cheating are prohibited. The full definition of plagiarism and the possible penalties associated with it are outlined in the General Calendar of the University. If you have any question about properly quoting information, please see the lab manual for examples or contact the lab coordinator.

### Cheating

The possession of unauthorized materials during an examination, including "crib notes" (whether hand-written or contained within a computer/calculator), is considered cheating and subject to action by the Student Disciplinary By-Law. Only calculators are permitted in an examination – no texts, notes, dictionaries, etc. Students found with cell phones, pagers, text in their calculators or other unauthorized material within their reach during a chemistry examination will be given a grade of zero (0) on that examination and further penalties may apply. Students caught copying answers from other students during a term test will be subject to the same penalties.

### Faculty of science statement on academic misconduct

The Faculty of Science and The University of Manitoba regard acts of academic misconduct in quizzes, tests, examinations, laboratory reports or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence. Acts of academic misconduct include, but are not limited to, bringing unauthorized materials into a test or exam, copying from another individual, using answers provided by tutors, plagiarism, and examination impersonation. **Cell phones, pagers, PDAs, MP3 units or electronic translators are explicitly listed as unauthorized materials, and must *not* be present during tests or examinations.**

Penalties that may apply, as provided for under the University of Manitoba's Student Discipline By-Law, range from a grade of zero for the assignment or examination, failure in the course, to expulsion from the University.

The Student Discipline By-Law may be accessed at:

[http://umanitoba.ca/admin/governance/governing\\_documents/students/student\\_discipline.html](http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html)

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report all incidents of academic misconduct to the Head of the Department.

For more information about academic integrity and the penalties for academic misconduct, see:

<http://www.sci.umanitoba.ca/undergraduate-students/academic-resources/academic-integrity-2/>

<http://umanitoba.ca/academicintegrity/>

## Lecture Overview

### High School Review

**self-study, complete by Sept 20**

CHEM 1300, later Chemistry courses, and other Science-based courses build on concepts covered in High School Chemistry. It is expected that you have mastery of this material, which will not be covered in lectures. It is strongly recommended that you review and practice this material, which will be covered on assignments, term tests, and the final exam. The textbook covers all required background material in Chapters 1 – 5:

### Chapter 1, sections 1.1 – 1.5

#### *Learning objectives*

- 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

#### *Suggested end-of-chapter problems*

- Problems 1 – 20; odd-numbered problems 21 – 111.

### Chapter 2, sections 2.3 – 2.7

#### *Learning objectives*

- 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.

#### *Suggested end-of-chapter problems*

- Problems 3 – 5, 12 – 18, 21 – 26; odd-numbered problems 27 – 35, 41 – 51, 57 – 87, 93 – 115.

### Chapter 3, sections 3.2 – 3.4, 3.6 – 3.8

#### *Learning objectives*

- 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).

#### *Suggested end-of-chapter problems*

- Problems 1 – 11, 16 – 22; odd-numbered problems 23 – 53, 85 – 121, 125 – 163.

**Chapter 4, sections 4.2 – 4.9 (note: only first subsection of section 4.6)*****Learning objectives***

- 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.

***Suggested end-of-chapter problems***

- Problems 1 – 16, 24; odd-numbered problems 25 – 35, 43 – 49, 59, 69 – 119, 123 – 127, 133 – 149.

**Chapter 5, sections 5.2 – 5.7*****Learning objectives***

- 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.

***Suggested end-of-chapter problems***

- Problems 1, 9 – 14; odd-numbered problems 25, 27, 31 – 77, 95 – 113, 117 – 123, 127, 129, 133 – 139.

**CHEM 1300 course material****Chapter 6: Thermochemistry****Covered by: Sept 17*****Learning objectives***

- 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.

***Suggested end-of-chapter problems***

- Problems 1– 24; odd-numbered problems 25 – 117, 121 – 125, 131 – 143.
- Corrections and notes for textbook questions for this chapter:
  - Question 91: Enthalpy should be  $\Delta_r H^\circ = -1418.4$  kJ/mol or -709.2 kJ per mole of nitromethane
  - Question 92: Enthalpy should be  $\Delta_r H^\circ = -22712$  kJ/mol or -5678 kJ per mole of nitroglycerin
  - Question 113: This reaction is not conducted under standard state conditions, it involves S in the gas phase. The reaction for the heat of formation of SO<sub>2</sub> under standard state conditions would involve solid S.

**Chapter 7: The Quantum Mechanical Model of the Atom****Covered by: Oct 1*****Learning objectives***

- 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.

***Suggested end-of-chapter problems***

- Problems 1 – 48; odd-numbered problems 49 – 67, 69 – 121, 125, 133, 135.

**Chapter 8: Periodic Properties of the Elements****Covered by: Oct 16*****Learning objectives***

- 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 down a group (larger radius) and to the right across a period (smaller 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: cations are smaller while anions are larger than the corresponding neutral atom.
- Know and predict trends in first ionization energy down a group (smaller ionization energy) and to the right across a period (larger 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: it generally gets less exothermic down a group and more exothermic to the right across a period.
- Know the periodic trends in metallic character: it increases down a group and decreases to the right across a period.
- 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).

***Suggested end-of-chapter problems***

- Problems 1, 4, 5, 7 – 30; odd-numbered problems 31 – 79, 85 – 93, 101 – 111, 115.

**Chapter 9: Chemical Bonding I: Lewis Theory****Covered by: Oct 30*****Learning objectives***

- 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.

***Suggested end-of-chapter problems***

- Problems 1 – 32; odd-numbered problems 33 – 53, 57 – 115, 121, 123.



**Chapter 10: Chemical Bonding II: Molecular Shapes, VB and MO Theory****Covered by: Nov 22*****Learning objectives***

- 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.

***Suggested end-of-chapter problems***

- Problems 1 – 34; odd-numbered problems 35 – 95, 99 – 117.

**Chapter 14: Chemical Equilibrium****Covered by: Dec 6*****Learning objectives***

- 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).

***Suggested end-of-chapter problems***

- Problems 1 – 20; odd-numbered problems 21 – 111.

## Laboratory Overview

**Lab Coordinator:** Dr. Angela Kuchison

### Learning objectives

- Experience Chemistry in action!
- Operate safely in a chemical laboratory; assess hazard and environmental issues associated with chemicals, and dispose of chemicals accordingly.
- Perform standard chemistry techniques and select appropriate equipment and glassware for specific experimental procedures.
- Report on experiments, and estimate errors associated with measurements.
- Gain collaborative skills with teams based on a balance of individual traits.
- Increase your written and oral science communication skills.

### Laboratory experiments

Expt 1: Laboratory Safety and Basic Laboratory Techniques

Expt 2: Copper Cycle

Expt 3: Identifying Unknown Acids Using Titrations

Expt 4: Calorimetry

Expt 5: Synthesis of Alum

### Laboratory schedule

The lab schedule provided in the lab manual has mislabeled the lab section. Below is the corrected schedule.

Section, Time	Rotation	Expt 1	Expt 2	Expt 3	Expt 4	Expt 5
B01, Tues AM	1	Sept 24	Oct 8	Oct 22	Nov 5	Nov 26
	2	Oct 1	Oct 15	Oct 29	Nov 19	Dec 3
B02, Tues PM	1	Sept 24	Oct 8	Oct 22	Nov 5	Nov 26
	2	Oct 1	Oct 15	Oct 29	Nov 19	Dec 3
B03, Wed AM	1	Sept 25	Oct 9	Oct 23	Nov 6	Nov 27
	2	Oct 2	Oct 16	Oct 30	Nov 20	Dec 4
B04, Wed PM	1	Sept 25	Oct 9	Oct 23	Nov 6	Nov 27
	2	Oct 2	Oct 16	Oct 30	Nov 20	Dec 4
B05, Thurs AM	1	Sept 26	Oct 10	Oct 24	Nov 7	Nov 28
	2	Oct 3	Oct 17	Oct 31	Nov 21	Dec 5
B06, Thurs PM	1	Sept 26	Oct 10	Oct 24	Nov 7	Nov 28
	2	Oct 3	Oct 17	Oct 31	Nov 21	Dec 5

### Preparing for your first lab

- ✓ The CHEM 1300 laboratory program starts on Tuesday, Sept 24.
- ✓ Your lab rotation, room and bench assignments will be posted on UM Learn on the first day of classes. It will not be updated between Sept 5 – 16, but will be updated on Sept 17 and as needed thereafter. Bench assignments are non-negotiable.
- ✓ Read information about the laboratory program, safety policies, and teams in the lab manual (pages 5 – 23).
- ✓ Review the WHMIS handbook and Safety Presentation on UM Learn.
- ✓ Come to the lab fully prepared and ready to work:
  - Read completely and familiarize yourself with Experiment 1 before the lab.
  - Watch the lab notebook videos on UM Learn and prepare your notebook before the lab.
  - Show up at least 15 minutes early.
  - Bring your **lab coat, lab glasses, lab notebook** and **lab manual** to the lab.
  - Make sure that you are dressed appropriately (e.g. no open-toe shoes or sandals, no shorts, no short dresses, no loose clothing or jewelry, no contact lenses, tie up your hair).
  - **Theft happens!** Do not bring your valuables, including laptops, to the lab.

### Storing personal items:

- **Students assigned to 206 and 216 Parker:** you have access to a locker in the hallway; we strongly suggest that you bring your own lock. Only students assigned to these two rooms can use these lockers. No student is allowed to use these lockers outside of their lab session. Any lockers used outside these times will have the locks cut off and items inside confiscated.
- **Students assigned to 222, 230, and 240 Parker:** you have access to an insecure cloakroom to store jackets, knapsacks, etc. You cannot use the lockers in the hallway. We recommend that you do not store any valuables in the cloakrooms.

### Attendance

- You must attend all scheduled lab sessions.
- You must be in the lab and with your lab glasses and lab coat on and be ready to start at 8:30am or 2:30pm sharp. You can be penalized for chronic lateness. If you are more than 30 minutes late you will not be allowed to start the lab and it will be considered an inexcusable absence.
- You must bring your lab manual and lab notebook to the lab in order to conduct experiments. Photocopies are not acceptable. Not bringing your lab manual is treated as an inexcusable absence.
- You can have an alternate arrangement to the lab in cases of:
  - ✓ sickness (doctor's note required)
  - ✓ undeniable and verifiable compassionate reasons (e.g. funeral, sick child)
  - ✓ University of Manitoba affiliated athletic/volunteering events (advance notice and letter from coach/mentor required)

Details of alternate arrangements are on p. 6 of the CHEM 1300 lab manual. To make arrangements for an alternate lab, you must contact Dr. Angela Kuchison (not your TA!) by e-mail **within 24-hours** of your missed lab session. Since team work is an important aspect of the CHEM 1300 lab, students are only eligible for one alternate arrangement.

- **For inexcusable absences, no makeup lab or alternative arrangement will be considered. You will receive a grade of zero for that lab.** Invalid excuses include:
  - ✗ I got up late or was too tired, I forgot to show up or didn't read the schedule correctly, I missed my bus or my car broke down, I need to study for an exam or finish an assignment, I had to work, I have a practice or event with a group not affiliated with the University of Manitoba, I missed my lab last week but I didn't get around to telling you, I am here on time, but I forgot to bring my lab manual, etc.

### Laboratory exemptions

- Students who receive a final grade in CHEM 1300 and who pass the lab component of CHEM 1300 with a **minimum grade of 70% and who have completed all 5/5 experiments** can apply for a lab exemption if they redo the course.
- Students who VW from the course cannot continue in the lab and are not eligible for a lab exemption.
- Students who are found guilty of academic misconduct in CHEM 1300 are not eligible for a lab exemption.
- The lab exemption can be used only once within a one-year period after the lab component has been completed.
- To apply for a laboratory exemption, go to the following website:  
<http://www.emailmeform.com/builder/form/a2c6x8j9ds4KUoEreD>

### Evaluation

- Your lab prelab for Experiments 2 – 5 must be completed **90 minutes** before the lab begins. Failure to complete the prelab will result in not being allowed entry into the lab and a mark of zero for that lab. There is no prelab exercise for Experiment 1.
- You must prepare your lab notebook before coming to the lab. Failure to prepare your lab notebook will result in you not being allowed entry to the lab and receiving a mark of zero for that lab. Information about lab notebook preparation are in the video on UM Learn and on pages 11 – 13 of the CHEM 1300 lab manual. Your TA will check your lab notebook at the beginning and end of every lab.
- To obtain credit for the work you conduct in the lab you must thoughtfully and **independently** complete your lab notebook during the lab. When instructed by the TA, you will be allowed to work in your groups.
- You will share responsibility for a safety presentation for one lab and an experiment presentation for another lab with your team. Your TA and peers will mark these with the provided rubrics.
- Your team participation is important. Your team will mark you for your participation in the team twice during the semester – after Experiment 3 and after Experiment 5. Each person will use a rubric to assess participation.
- Your lab notebook must be signed by your TA, and it is your responsibility to ensure that your TA gives you a grade on this before leaving the laboratory.
- Copying data or any portion of a lab report or notebook from another student is an act of academic misconduct. The minimum penalty is a grade of zero for the experiment.

### Marking Scheme

- The lab component is worth 20% of your final mark in CHEM 1300.
- Regardless of your total score in the course, you need a grade of at least 50.0% in the lab component to pass CHEM 1300.
- The mark breakdown for the lab is as follows:

○ Prelab exercises for Experiments 2 – 5:	2/20 total, 0.5/20 each
○ Lab notebook:	5/20
○ Team safety participation:	5/20
○ Team experiment presentation:	5/20
○ Lab team participation:	3/20