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Syllabus

CHEM 1310: University 1 Chemistry: Introduction to Physical Chemistry

Winter 2020

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# COURSE DETAILS

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| **Course Title & Number:** | CHEM 1310 |
| **Number of Credit Hours:** | 3.0 |
| **Class Times & Days of Week:** | A01: TR, 8:30am-9:45am, Armes 200 (Dr. Carl Bartels)  A02: TR, 1:00pm-2:15pm, Armes 200 (Dr. David Herbert)  A03: TR, 2:30pm-3:45pm, Armes 200 (Dr. Sabine Kuss)  A04: MW, 2:30pm-3:45pm, Armes 200 (Dr. Christian Kuss) |
| **Location for classes/labs/tutorials:** | Lectures: Armes 200  Labs: Parker 205 |
| **Pre-Requisites:** | All students entering CHEM 1310 must have successfully completed CHEM 1300 with a minimum grade of C and should also have a minimum of two years of previous chemistry study or its equivalent.  **It is your responsibility to ensure that you are entitled to register for this course.** This means that: you have the appropriate prerequisites, as noted in the calendar description, or have permission from the Chemistry Department 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 If you are not entitled to be in this course, you will be withdrawn, or the course may not be used in your degree program.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. |

# Instructor Contact Information

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| --- | --- | --- | --- |
| **Name** | Role | Office  Office hours | Email |
| Dr. Christian Kuss (he/him/his) | Course coordinator /  Lecturer section A04 | Parker 520E  W 10-12am | [Christian.Kuss@umanitoba.ca](mailto:Christian.Kuss@umanitoba.ca) |
| Dr. Carl Bartels (he/him/his) | Lecturer section A01 | Parker 355 | [Carl.Bartels@umanitoba.ca](mailto:Carl.Bartels@umanitoba.ca) |
| Dr. David Herbert (he/him/his) | Lecturer section A02 | Parker 570 | [David.Herbert@umanitoba.ca](mailto:David.Herbert@umanitoba.ca) |
| Dr. Sabine Kuss (she/her/hers) | Lecturer section A03 | Parker 336  W 1-3pm | [Sabine.Kuss@umanitoba.ca](mailto:Sabine.Kuss@umanitoba.ca) |
| Dr. Angela Kuchison (she/her/hers) | Lab coordinator | Parker 520G | [Angela.Kuchison@umanitoba.ca](mailto:Angela.Kuchison@umanitoba.ca) |

**Electronic Communications and Questions**

Your instructors are here to facilitate your learning and will be happy to answer your questions. To effectively communicate in this very large class, please stick to the following rules: As per University policy (<http://intranet.umanitoba.ca/registrar/email-policy>), all e-mail communications must be conducted using your University of Manitoba e-mail account. Messages from other accounts will not be answered. Sometimes it cannot be avoided that information is distributed on short notice, so check your University of Manitoba e-mail account daily for communications sent to you by University instructors, administrators, and staff. You can set up email forwarding on your UM email account.

When e-mailing your lecturer, course coordinator or lab coordinator **always include the course (CHEM 1310)** in the subject of the e-mail, and for the lab, your lab section and rotation. This allows the lecturer, course coordinator or lab coordinator to understand your situation better and address your concerns efficiently.

Here is who you should contact:

* Questions about the course material: *your* lecturer
* Administration of the lecture component: Dr. Christian Kuss ([Christian.Kuss@umanitoba.ca](mailto:Christian.Kuss@umanitoba.ca))
* Questions about the lab component: Dr. Angela Kuchison ([Angela.Kuchison@umanitoba.ca](mailto:Angela.Kuchison@umanitoba.ca))
* Technical problems with Mastering Chemistry and MyLab: Pearson support <https://support.pearson.com/getsupport/s/> and <https://support.pearson.com/getsupport/s/contactsupport>

# Course Description

CHEM 1310 is the second part of the fundamental chemistry courses offered to students who are planning to specialize in health, natural, or physical sciences. This course builds on the quantitative and qualitative chemistry foundation began in CHEM 1300. Many of the topics are applicable in other courses and programs. In addition to providing necessary pre-requisite knowledge, CHEM 1310 improves problem solving, analysis, and critical thinking skills. Together, CHEM 1300 and 1310 are the basic chemistry requirements of many non-chemistry programs (Microbiology, Dentistry, Medicine, Pharmacy, and Biosystems, Civil and Mechanical Engineering) and they also form the basis of a Chemistry or Biochemistry major.

# Course Goals

Chemistry is the study of matter and its changes. CHEM 1300 introduced a basic understanding of the energetics behind atomic and macroscopic properties, leading the way to understanding reactivity. The central importance of understanding energy continues in CHEM 1310, while broadening its applications to studying matter and reactivity in greater depth. The course is divided into five units:

1. Intermolecular Forces (*atomic-level electrostatic interactions that influence physical properties and energies)*
2. Equilibria of Solutions (*important aqueous reactions involving acids, bases, complexes, and salts)*
3. Chemical Kinetics (*rates of reactions and reaction mechanisms*)
4. Entropy and Gibbs Energy (*determining reaction spontaneity)*
5. Electrochemistry (*reduction-oxidation reactions, galvanic cells, and cell potentials*)

# Course Learning Objectives

**Prerequisite Knowledge**

Before coming into CHEM 1310, you should already be able to:

* Convert between mass, volume, density and concentration for gases, liquids, solids, and solutions.
* Write balanced chemical equations and use them to carry out stoichiometry calculations, including the concept of limiting reagent.
* Name inorganic chemical compounds.
* Define acidity and basicity, use these definitions to classify reactants as acids and bases, and recognize and name common acids and bases.
* Assign oxidation states and use these to classify reactants as oxidants and reductants.
* Apply concepts learned in CHEM 1300, including thermochemistry, atomic structure, electron configurations, periodic trends, bonding models, and equilibrium.

Prerequisite knowledge is covered in the following textbook sections/chapters:

* High school review sections: 1.1 – 1.5, 2.3 – 2.7, 3.2 – 3.4, 3.6 – 3.8, 4.2 – 4.9, 5.2 – 5.7
* CHEM 1300 review chapters: 6, 7, 8, 9, 10, 14

**These concepts are essential to CHEM 1310 and subsequent courses in chemistry and other subject areas, and will be assumed as background knowledge in CHEM 1310 assignments, labs, and exams. Mastering includes ungraded primer assignments that can help you in developing these prerequisite skills. It is important to develop these skills early in the course to be able to follow the material.**

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| **Unit 1: Intermolecular Forces (about 2 weeks), Textbook Sections:** | **Covered by:** |
| Liquids, Solids, and Intermolecular Forces (Ch. 11, sections: 11.2 – 11.12) | Jan 16 |

***Learning objectives***

* Relate properties of density, shape and volume to phase
* Describe intermolecular forces including:
  + Ion-induced dipole force
  + Dispersion force
  + Dipole-dipole force
  + Hydrogen bonding
  + Dipole-induced dipole force
  + Ion-dipole force
* Understand intermolecular forces influence on boiling point, melting point, surface tension, viscosity, capillary action.
* Understand energetics of phase changes (heat of vaporization, heat of sublimation, heat of fusion)
* Relate dynamic equilibrium to phase changes.
* Understand the relationship between vapour pressure and temperature (Clausius-Clapeyron equation)
* Sketch and understand heating curves.
* Calculate the heat of a phase transition(s) and relate to heat required for phase conversions
* Understand phase diagrams.
* Understand crystalline solid cubic unit cells and close-packing and be able to relate these to density and atomic radii.
* Identify types of solids (crystalline and atomic solids).

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

Chapter 11: Review Questions 1-45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 95, 97, 99, 101, 103, 105, 107, 109, 110, 111, 113, 115, 117, 123, 125, 129, 131, 133, 135, 137, 139, 141.

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| **Quiz 1 Material (Quiz 1 on January 15/16)** |

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| **Unit 2: Equilibria of Solutions (about 4 weeks), Textbook Sections:** | **Covered by:** |
| Acids and Bases (Ch. 15, sections: 15.2 – 15.11)  Aqueous Ionic Equilibrium (Ch. 16, sections: 16.2 – 16.6, 16.8) | Feb 13 |

***Learning objectives***

* Definition of an acid and base (Arrhenius, Brønsted-Lowry, Lewis).
* Identify molecular formula and chemical structures as acids or bases.
* Relate Ka and Kb to appropriate chemical reactions in water.
* Calculate the equilibrium concentrations of ions in an aqueous solution.
* Determine the equilibrium pH or pOH of an acidic or basic solution.
* Understand the autoionization of water (Kw).
* Convert between pH, pOH, pKa, pKb, pKw and [H3O+], [OH-], Ka, Kb, and Kw, respectively.
* Calculate percent ionization of an acid.
* Calculate the ions in mixtures of acid solutions (more than one acid and polyprotic acids).
* Identify a salt as acidic, basic, or neutral.
* Relate the structure to the acidity or basicity of a given compound.
* Identify conjugate acid/base pairs.
* Definition of a buffer.
* Calculate the pH of a buffer solution.
* Calculate buffer range.
* Calculate titration curves.
* Use titration curve to identify acids and Ka.
* Choose appropriate indicators for acid/base titrations.
* Relate molar solubility to the solubility product.
* The common ion effect.
* Understand selective precipitation.
* Understand complex-ion equilibria and Kf.

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

Chapter 15: Review Questions: 1-32; 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147.

Chapter 16: Review Questions: 1-28; 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 141, 143, 147.

**Quiz 2 Material: Feb. 12/13**

***End of Midterm Material* (February 13) (Midterm date: Monday/Tuesday February 24/25)**

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| **Unit 3: Kinetics (about 2 weeks), Textbook Sections:** | **Covered by:** |
| Chemical Kinetics (Chapter 13: sections 13.2 – 13.7) | Mar 5 |

***Learning objectives***

* Relate concentration and stoichiometry to observed rate.
* Understand average rate and instantaneous rate.
* Determine the rate law of a chemical reaction using initial rates.
* Determine reaction order overall and with respect to reactants.
* Identify and use the integrated rate laws.
* Determine the half-life and lifetime of a reaction.
* Understand the Arrhenius equation.
* Identify reaction mechanisms and the molecularity of each elementary step.
* Determine the rate law for an elementary step.
* Determine rate determining steps.
* Use the steady-state approximation to predict a rate law based on a mechanism.
* Understand the influence of a catalyst on a reaction.
* Know the difference between homogeneous and heterogeneous catalysis.

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

Chapter 13: Review Questions: 1-24; 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 85, 87, 93, 97, 99, 101, 103, 105, 107, 109, 111, 115, 119.

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| **Unit 4: Entropy and Gibbs Energy (about 2 weeks), Textbook Sections:** | **Covered by:** |
| Gibbs Energy and Thermodynamics (Ch. 17: sections 17.1 – 17.9) | Mar 19 |

***Learning objectives***

* Identify spontaneous and nonspontaneous processes.
* Define entropy.
* Understand the second law of thermodynamics.
* Relate entropy to phase, molar mass, allotropes, and dissolution.
* Calculate the entropy of the universe, surroundings, and system.
* Determine the Gibbs energy of a reaction.
* Relate Gibbs energy change of a reaction to the enthalpy change, temperature, and entropy change.
* Relate Gibbs energy to spontaneity.
* Determine the change in entropy of a reaction.
* Understand the third law of thermodynamics.
* Relate rG° to rG.
* Relate Gibbs energy to reaction quotient and equilibrium constant.

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

Chapter 17: Review Questions: 1-22; 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 87, 89, 91, 93, 95, 97, 107.

**Quiz 3: Mar 18/19**

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| **Unit 5: Electrochemistry (about 2 weeks), Textbook Sections:** | **Covered by:** |
| Electrochemistry (Ch. 18 (sections 18.2 – 18.8 )) | Apr 7 |

***Learning objectives***

* Use oxidation numbers to identify what is oxidized and what is reduced in a redox reaction.
* Balance redox reactions using the half-reaction method.
* Describe galvanic cells.
* Calculate standard cell potentials.
* Relate cell potential to the reaction conditions.
* Relate cell potential to equilibrium constant.
* Understand electrolysis and its stoichiometry.

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

Chapter 18: Review Questions: 1-36; 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 95, 97, 99, 103, 105, 109, 111, 113, 115, 117, 119, 121, 123.

# Textbook, Readings, and Course Materials

**Course website:** <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, course FAQ, link for Mastering, laboratory information, course-related internet and e-mail links, lecture notes, textbook solutions manual, practice exams, exam keys, marks, and course announcements.
* You will also submit lab reports and receive feedback for them on UM Learn.
* You should check UM Learn **daily** for course news and information.

**Required Course Materials**

**Note: the textbook is the same as that used in CHEM 1300 in Fall 201****9. If you purchased this last term, there is no further cost to use e-text and Mastering Chemistry for CHEM 1310.**

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 four options:**

* E-text with Mastering Chemistry: ISBN: 9780134381954, price: $115.00. 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).

1. **CHEM 1310 Laboratory Manual, Winter-Summer 2020:** ISBN 9780100000438. Bookstore price: $15.95
2. **Laboratory coat and safety glasses** are ***required*** in the CHEM 1310 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.

**Mastering Chemistry**

Mastering Chemistry is the online homework system in which you will complete six assignments. Thus, purchasing access to Mastering Chemistry is mandatory for CHEM 1310.

* Students who purchased Mastering Chemistry in the Fall 2019 semester 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.
* “Chemistry Primer Semester 1” reviews the math skills and chemistry skills you will require to succeed in CHEM 1310
* “Chemistry Primer Semester 2” reviews many chemistry skills you will require and introduces some of the topics you will see in CHEM 1310.
* 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 1310 course site.
* Click on **Resources / Content / Mastering Chemistry / 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, 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 **$115.00 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 to the right.
* 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.

**Resources for those with special needs**

* 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/saa/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/>

# Supplementary Instruction (SI)

***What is SI?*** Supplemental Instruction sessions are voluntary weekly review sessions that are available to students who want to improve their understanding of course content. They offer an opportunity to interact on an informal basis to ask questions, compare notes, discuss course content, solve practice problems, and develop study strategies under the guidance of a Supplemental Instruction leader.

**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, and usually they have already taken the course. They are not there to lecture or re-teach course materials; their job is to help you think about your learning and provide you with opportunities to review with other students in an organized setting.

**Why should you come?** If you attend SI regularly, you will gain a better understanding of course content, get a better grade, and you might also learn some useful study strategies for future courses. While you are encouraged to attend the SI session for your class section, you are welcome to attend the SI sessions for ***any*** section. See<http://umanitoba.ca/student/academiclearning/services/supplemental_instruction.html>

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| **Section** | **Leader** | **Time** | **Room** |
| **A01** | Arqum | Tuesday (10:00-11:00 a.m.) | 207 Human Ecology |
|  |  | Thursday (10:00-11:00 a.m.) | 115 Armes |
| **A02** | Vicky | Tuesday (11:30 a.m.-12:30 p.m.) | 301 Biology |
|  |  | Thursday (11:30 a.m.-12:30 p.m.) | 301 Biology |
| **A03** | Tyler | Monday (1:30-2:30 p.m.) | 115 Armes |
|  |  | Friday (1:30-2:30 p.m.) | 115 Armes |
| **A04** | Cynthia | Monday (12:30-1:30 p.m.) | 406 Tier |
|  |  | Friday (12:30-1:30 p.m.) | 406 Tier |

# Using Copyrighted Material

Please respect copyright. We will use copyrighted content in this course. We have ensured that the content we use is appropriately acknowledged and is copied in accordance with copyright laws and university guidelines. Copyrighted works, including those created by me, are made available for private study and research and must not be distributed in any format without permission. 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](mailto:um_copyright@umanitoba.ca).

# Course Technology

You will need to be able to access UM Learn and Mastering to take this course. Mastering system requirements are described at the Mastering help website: <https://support.pearson.com/getsupport/s/>. You need your UMNetID and password to log in to UM Learn at <http://www.umlearn.ca/>.

Additionally, some sections may require or encourage the use of iClicker during lectures. The iClicker reef app allows you to respond to questions in class. The app is available on the Google Play, the Apple App Store and accessible online at <https://app.reef-education.com/>.

# Expectations: We Expect You To

To help you achieve the learning objectives in this course, you should keep the following expectations in mind:

* You are required to attend ***all*** classes.
* 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. See [Respectful Work and Learning Environment Policy.](http://umanitoba.ca/admin/governance/governing_documents/community/230.html)
* You are responsible for ***all*** course material, whether or not it is explicitly covered in class. It is a good idea to read ahead.
* It is in your best interests to complete all on-line assignments. You are encouraged to also complete the suggested end-of-chapter questions.
* Laboratoryattendance is ***mandatory***. You must earn a passing grade of at least 50% in the laboratory program to pass the course.

We also expect you to follow these policies around Class Communication, Academic Integrity, and Recording Class Lectures:

**Class Communication:**

You are required to obtain and use your University of Manitoba email account for all communication between yourself and the university. All communication must comply with the Electronic Communication with Student Policy: <http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html>.

**Academic Integrity:**

Each student in this course is expected to abide by the University of Manitoba [Academic Integrity principles](http://crscalprod1.cc.umanitoba.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=300&chapterid=3762&topicgroupid=20190&loaduseredits=False). Always remember to reference the work of others that you have used. Also be advised that you are required to complete your assignments independently. If you are encouraged to work in a team, ensure that your project complies with the academic integrity regulations. You must do your own work during exams. Inappropriate collaborative behavior and violation of other Academic Integrity principles, will lead to the serious [disciplinary action](http://umanitoba.ca/admin/governance/media/Student_Academic_Misconduct_Procedures_-_2016_09_01.pdf). Visit the [Academic Calendar](http://crscalprod1.cc.umanitoba.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=300&chapterid=3755&topicgroupid=20145&loaduseredits=False), [Student Advocacy](http://umanitoba.ca/student/resource/student_advocacy/cheating_plagiarism_fraud.html), and [Academic Integrity](http://umanitoba.ca/academicintegrity/) web pages for more information and support.

**Recording Class Lectures:**

No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission of the lecturer. Course materials (both paper and digital) are for the participant’s private study and research.

**Student Accessibility Services:**

The University of Manitoba is committed to providing an accessible academic community. [Students Accessibility Services (SAS)](http://umanitoba.ca/student/saa/accessibility/) offers academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations.  Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services

520 University Centre

Phone: (204) 474-7423

Email: [Student\_accessibility@umanitoba.ca](mailto:Student_accessibility@umanitoba.ca)

# Expectations: You Can Expect Us To

We want to facilitate your learning and make this a rewarding experience for you. For this reason, you can expect your lecturer to be prepared and on time for class, to respond to emails within 2 working days and to be available during agreed upon office hours. We will be respectful of everyones personal learning situation and do our best to help you achieve your goals for this class.

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# CLASS SCHEDULE AND COURSE EVALUATION

This schedule is subject to change at the discretion of the instructor and based on the learning needs of the students but such changes are subject to [Section 2.8 of ROASS](http://umanitoba.ca/admin/governance/governing_documents/students/278.html).

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| Jan 6 | Classes begin, lab rotation, lab room and bench allocations posted on UM Learn |
| Jan 6 – 20 | Registration revision period for winter 2020 courses |
| Jan 15 | First update to lab rotation, lab room, and bench allocations posted on UM Learn |
| Jan 15/16 | In-class Quiz #1 |
| Jan 17 | Last day to drop a course without financial or academic penalty |
| Jan 22 - Jan 30 | Experiment 1: Laboratory Safety and Colourimetric Analysis |
| Jan 26 | Assignment 2 released, Assignment 1 due *before* 11:00 PM |
| Feb 5 - Feb 13 | Experiment 2: Synthesis and Analysis of Acetylsalicylic Acid runs |
| Feb 9 | Assignment 3 released, Assignment 2 due *before* 11:00 PM |
| Feb 12/13 | In-class Quiz #2 |
| Feb 17 - 21 | Louis Riel Day, reading week; no classes or examinations |
| Feb 23 | Assignment 4 released, Assignment 3 due *before* 11:00 PM |
| Feb 24/25 | In-class midterm examination |
| Feb 26 - Mar 5 | Experiment 3: Solubility |
| Mar 8 | Assignment 5 released, Assignment 4 due *before* 11:00 PM |
| Mar 11 - Mar 19 | Experiment 4: Buffer Chemistry |
| Mar 18 | Last day for voluntary withdrawal from winter 2020 courses |
| Mar 18/19 | In-class Quiz #3 |
| Mar 22 | Assignment 6 released, Assignment 5 due *before* 11:00 PM |
| Mar 25 - Apr 2 | Exp. 5: Kinetics |
| Apr 7 | Classes end, Assignment 6 is due *before* 11:00 PM |
| Apr 13 - Apr 25 | Final examination period |

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# Lab Expectations

Chemistry labs show you the chemistry in action. Here you can see how the materials you have learned in class transform into real-world osbervations.

**Laboratory program administrators**

* Laboratory coordinator: Angela Kuchison ([Angela.Kuchison@umanitoba.ca](mailto:Angela.Kuchison@umanitoba.ca))
* Laboratory supervisor: Scott McKay ([Scott.Mckay@umanitoba.ca](mailto:Scott.Mckay@umanitoba.ca))

**Learning objectives**

* Experience chemistry in action!
* Apply and test chemistry concepts covered in lectures and in the textbook.
* Perform standard chemistry techniques and select appropriate equipment and glassware for specific experimental procedures.
* Operate safely in a chemical laboratory; assess hazard and environmental issues associated with chemicals, and dispose of chemicals accordingly.
* Report on experiments, and estimate errors associated with measurements.

**Laboratory experiments**

Expt. 1: Laboratory Safety and Colourimetric Analysis

Expt. 2: Synthesis and Analysis of Acetylsalicylic Acid

Expt. 3: Solubility

Expt. 4: Buffer Chemistry

Expt. 5: Kinetics

**Preparing for your first lab**

* The CHEM 1310 laboratory program begins on Wednesday, January 22. Your lab room and bench assignments will be posted on UM Learn on the first day of classes, with the first update on Wednesday January 15, and with regular updates thereafter until the end of the drop/add period.
* Bench assignments are non-negotiable.
* Read information about the laboratory program and safety policies in the lab manual (pages 4 – 16).
* Review the WHMIS handbook and the 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.
* Show up at least 15 minutes early.
* Bring your **lab coat**, **lab glasses**, 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).
* Do not bring your valuables, including laptops, to the lab.
* If you have a locker to store your personal belongings (assigned Parker 206, 216), you are responsible for bringing your own lock to every lab and taking your lock home after the lab

**Attendance**

* You must attend all scheduled lab sessions.
* You must complete the prelab at least 90 minutes before Experiments 2-5. Failure to complete the prelab at least 90 minutes before the experiment will be treated as an inexcuseable absence.
* You must be in the lab and with your lab glasses and lab coat on and be ready to start at 8:30 AM or 2:30 PM 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 to the lab in order to conduct experiments. Photocopies are not acceptable. You will be provided with data sheets in the lab.
* You can make-up a lab without penalty 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)

To make arrangements for a make-up assignment, you must contact Angela Kuchion and Scott McKay (not your TA!) by e-mail **within 24-hours** of your missed lab session.

* **For inexcusable absences, no makeup lab or alternative arrangement will be considered. You will receive a grade of zero for that lab.**

**Laboratory exemptions**

* Students who receive a final grade in CHEM 1310 and who pass the lab component of CHEM 1310 with a minimum grade of 70% and have completed at least 4/5 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 dishonesty in CHEM 1310 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://fluidsurveys.com/s/Lab_Exemption_Form/>

# Lab Schedule

**Lab schedule, Winter 2020**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Section, Time** | **Rotation** | **Expt 1** | **Expt 2** | **Expt 3** | **Expt 4** | **Expt 5** |
| **B01, Wed AM** | **1** | Jan 22 | Feb 5 | Feb 26 | Mar 11 | Mar 25 |
| **2** | Jan 29 | Feb 12 | Mar 4 | Mar 18 | Apr 1 |
| **B02, Wed PM** | **1** | Jan 22 | Feb 5 | Feb 26 | Mar 11 | Mar 25 |
| **2** | Jan 29 | Feb 12 | Mar 4 | Mar 18 | Apr 1 |
| **B03, Thurs AM** | **1** | Jan 23 | Feb 6 | Feb 27 | Mar 12 | Mar 26 |
| **2** | Jan 30 | Feb 13 | Mar 5 | Mar 19 | Apr 2 |
| **B04, Thurs PM** | **1** | Jan 23 | Feb 6 | Feb 27 | Mar 12 | Mar 26 |
| **2** | Jan 30 | Feb 13 | Mar 5 | Mar 19 | Apr 2 |

**Lab marking**

* The lab component is worth 20% of your final mark in CHEM 1310.
* Regardless of your total score in the course, you need a grade of **at least 50.0%** in the lab component to pass CHEM 1310.
* The mark breakdown for the lab is as follows:
  + Data sheets for Experiment 1: 2/20
  + Data sheets for Experiment 2 – 5: 12/20 total, 3/20 each
  + Safety team participation: 2/20
  + Prelab exercises for Experiments 2 – 5: 4/20 total, 1/20 each

# Assessment and Grading

**Laboratory grades**

* See laboratory overview and manual for details.
* You need **at least 50%** in the lab component grade to pass CHEM 1310!

**Online assignments**

* There are six assignments, all having equal weight, with due dates indicated in the course schedule.
* You are encouraged to practice entering different types of data into Mastering.
* Begin assignments early! You should anticipate that it will take 3 hours to complete one assignment.
* No extensions or make-up options will be given for any assignment. Special cases may be considered only for documented medical or compassionate reasons.
* Any input errors will not be considered in appeals. Be cautious when entering the information – mistakes in sign, symbols, significant figures, etc. will be considered errors and no additional grades will be given.
* An adaptive follow up assignment will be made available after you complete your assignment that is due within two days of the due date of the assignment, that can add 15% to your homework grade.
* Appeal surveys are available on UM Learn for mistakes in the online homework.

**Quizzes**

* There are three in-class quizzes, with the dates indicated in the course schedule. They will be held in class and you will be given 20 minutes to complete the quiz. You must write the quiz in your registered section.
* Your best two quizzes count towards 10% of your final grade (i.e., your lowest quiz mark is dropped).
* Quizzes are short answer questions where you write the final answer in a box and it is marked as right or wrong.
* An absence will count as the lowest dropped quiz.
* There are **NO** makeup quizzes.
* If you miss more than one quiz, you must submit full documentation for your reason to the course coordinator within 24 hours of the quiz date. If the absence is considered unavoidable, the weight of the quiz will be transferred to the final exam.

**Midterm examination**

* The midterm exam will be held in class **Monday/Tuesday Feb 24/25 2020.**
* The midterm exam will be 60 minutes in length and will consist of a combination of multiple-choice and open answer questions.
* The midterm exam will test all materials covered up to the reading week.
* Be sure to bring pencils, pens, an eraser, a calculator, and Student I.D. to the exam.
* The midterm exam is **mandatory** and covers course material up to and including the end of kinetics. There is **NO** makeup midterm exam. If you miss the midterm exam your assigned grade will be zero.
* The midterm exam must be written in pen. Marks lost due to exams written in pencil with unclear markings, will be awarded a zero in an appeal.
* If you miss the exam due to any reason, detailed official documentation must be provided to the course coordinator within 48 hours. If the absence is deemed unavoidable, your final exam will be worth 65%.

**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 final exam will consist of multiple-choice, short answer and open answer questions that will cover all course material covered during the term and will include questions on review material.
* You will need to bring pencils, pens, an eraser, a calculator, and Student I.D. to the exams.
* The final exam must be written in pen. Marks lost due to exams written in pencil with unclear markings, will be awarded a zero in an appeal.
* The writing of 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>
* For more resources about examinations, see: <http://umanitoba.ca/faculties/science/undergrad/resources/Academic%20Resources%20index.html>

**Final grades**

Lab Program: 20% Midterm Exam: 15% Online Assignments: 5% Quizzes: 10% Final Exam: 50%

Numerical grades will not be rounded up or scaled. A letter grade is then assigned 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 |  |  |

**Appeals**

* If you have concerns or questions about posted scores, examination problems, and/or answer keys, promptly consult the course coordinator: Dr. Christian Kuss.
* For appeals of lab, quizzes, homework, and midterm marks, fill out the appropriate appeals survey on UM Learn.
* No appeals of term work (laboratory, assignment, or mid-term examination 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 can 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

You can drop the course without penalty and with refund until January 17, 2020. If the course is dropped after this date, no refund will be given and a VW will be recorded on your transcript. The voluntary withdrawal (VW) deadline is March 18, 2020. If you do not withdraw from the course by this deadline, you will be assigned a final grade. Refer to the [Registrar’s Office](http://umanitoba.ca/student/records/leave_return/695.html) web page for more information. We will be happy to review your progress with you before you decide on a withdrawal.

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 more information, please see the Repeated Course policy available at: <http://www.umanitoba.ca/admin/governance/media/Repeated_Course_Policy_-_2016_09_01.pdf>

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# UNIVERSITY SUPPORT OFFICES & POLICIES

**Writing and Learning Support**

The Academic Learning Centre (ALC) offers services that may be helpful to you throughout your academic program. Through the ALC, you can meet with a learning specialist to discuss concerns such as time management, learning strategies, and test-taking strategies. The ALC also offers peer supported study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In these study groups, students have opportunities to ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

You can also meet one-to-one with a writing tutor who can give you feedback at any stage of the writing process, whether you are just beginning to work on a written assignment or already have a draft. If you are interested in meeting with a writing tutor, reserve your appointment two to three days in advance of the time you would like to meet. Also, plan to meet with a writing tutor a few days before your paper is due so that you have time to work with the tutor’s feedback.

These Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at: <http://umanitoba.ca/student/academiclearning/>

You can also contact the Academic Learning Centre by calling 204-480-1481 or by visiting 205 Tier Building.

**University of Manitoba Libraries (UML)**

As the primary contact for all research needs, your liaison librarian can play a vital role when completing academic papers and assignments.  Liaisons can answer questions about managing citations, or locating appropriate resources, and will address any other concerns you may have, regarding the research process.  Liaisons can be contacted by email or phone, and are also available to meet with you in-person.  A complete list of liaison librarians can be found by subject  or name at <https://libguides.lib.umanitoba.ca/staff/home>.  In addition, library and archives assistance are provided in person at 11 locations on both the Fort Garry and Bannatyne campuses. For a listing of all libraries, please consult<https://libguides.lib.umanitoba.ca/c.php?g=298526>. When working remotely Libraries’ staff can also be contacted though the Ask Us chat found on the Libraries’ homepage: [www.umanitoba.ca/libraries](http://www.umanitoba.ca/libraries).

**For 24/7 mental health support, contact the Mobile Crisis Service at 204-940-1781.**

**Student Counselling Centre**

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling. *Student Counselling Centre:* <http://umanitoba.ca/student/counselling/index.html>

474 University Centre or S207 Medical Services

(204) 474-8592

**Student Support Case Management**

Contact the Student Support Case Management team if you are concerned about yourself or another student and don’t know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

*Student Support Intake Assistant* <http://umanitoba.ca/student/case-manager/index.html>

520 University Centre

(204) 474-7423

**University Health Service**

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.

*University Health Service* <http://umanitoba.ca/student/health/>

104 University Centre, Fort Garry Campus

(204) 474-8411 (Business hours or after hours/urgent calls)

**Health and Wellness**

Contact our Health and Wellness Educator if you are interested in information on a broad range of health topics, including physical and mental health concerns, alcohol and substance use harms, and sexual assault.

*Health and Wellness Educator* <http://umanitoba.ca/student/health-wellness/welcome.html>

[Katie.Kutryk@umanitoba.ca](mailto:Katie.Kutryk@umanitoba.ca)

469 University Centre

(204) 295-9032

**Live Well @ UofM**

For comprehensive information about the full range of health and wellness resources available on campus, visit the Live Well @ UofM site:

<http://umanitoba.ca/student/livewell/index.html>

**Notice with respect to copyright:**

All students are required to respect copyright as per Canada’s *Copyright Act*. Staff and students play a key role in the University’s copyright compliance as we balance user rights for educational purposes with the rights of content creators from around the world. The Copyright Office provides copyright resources and support for all members of the University of Manitoba community. Visit <http://umanitoba.ca/copyright> for more information.

**University and Unit policies, procedures, and supplemental information available on-line:**

**Your rights and responsibilities**

As a student of the University of Manitoba you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The [Academic Calendar](http://umanitoba.ca/student/records/academiccalendar.html) <http://umanitoba.ca/student/records/academiccalendar.html> is one important source of information. View the sections *University Policies and Procedures* and *General Academic Regulations*.

While all of the information contained in these two sections is important, the following information is highlighted.

* If you have questions about your grades, talk to your instructor. There is a process for term work and final **grade appeals**. Note that you have the right to access your final examination scripts. See the Registrar’s Office website for more information including appeal deadline dates and the appeal form <http://umanitoba.ca/registrar/>
* You are expected to view the General Academic Regulation section within the Academic Calendar and specifically read the **Academic Integrity** regulation. Consult the course syllabus or ask your instructor for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/> View the **Student Academic Misconduct** procedurefor more information.
* The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected conduct yourself in an appropriate respectful manner. Policies governing behavior include the:

**Respectful Work and Learning Environment**

<http://umanitoba.ca/admin/governance/governing_documents/community/230.html>

**Student Discipline** <http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html>and,

**Violent or Threatening Behaviour** <http://umanitoba.ca/admin/governance/governing_documents/community/669.html>

* If you experience **Sexual Assault** or know a member of the University community who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting. The **Sexual Assault** policy may be found at: <http://umanitoba.ca/admin/governance/governing_documents/community/230.html> More information and resources can be found by reviewing the Sexual Assault site <http://umanitoba.ca/student/sexual-assault/>
* For information about rights and responsibilities regarding **Intellectual Property** view the policy <http://umanitoba.ca/admin/governance/media/Intellectual_Property_Policy_-_2013_10_01.pdf>

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site <http://umanitoba.ca/faculties/>

Contact an **Academic Advisor** within our faculty/college or school for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>

**Student Advocacy**

Contact Student Advocacy if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns.

<http://umanitoba.ca/student/advocacy/>

520 University Centre

204 474 7423

[student\_advocacy@umanitoba.ca](mailto:student_advocacy@umanitoba.ca)