



**Introductory Chemistry II (CHMA11H3)
Summer 2022 Syllabus
University of Toronto at Scarborough**

Dear Students,

Welcome to CHMA11 – Introductory Chemistry Part II! Our teaching team is excited to have you back in our labs (to a certain degree) and offer you opportunities to build and strengthen your technical skills as a chemist.

As you've learned and experienced in CHMA10, chemistry is an exciting subject with far-reaching applications in countless disciplines (biology, medicine, geology, environmental science, materials science, food science, neuroscience, forensics—the list goes on!). We hope to continue our discussions around the fundamentals of chemistry and offer applications of these phenomena at play through real-world examples, whether it be the chemistry behind every day products or cutting-edge research led by professors here at DPES.

Below is the syllabus for this course. Please read the course syllabus carefully to understand the learning expectations and assessment methods for this course. Below you will find details regarding how the labs and lectures will be delivered through this summer.

That said, please don't hesitate to reach me via email (kris.kim@utoronto.ca) if you have any concerns or questions as we move through the course together.

Looking forward to the semester ahead,

Kris Kim

(Instructor and Lab Coordinator)

Office: EV560

email: kris.kim@utoronto.ca

Office Hours: (details posted on Quercus)

EMAIL POLICY:

Believe it or not, your time here at UofT will fly by! As part of your training to pursue post-graduate studies or a job/career after your time here at UTSC, we want to ensure you're best prepared to communicate effectively in a professional environment. This includes the emails that we will rely heavily on during these times as we engage fully online!

Please use the following guidelines when sending emails:

- i. Use your UofT account for all your correspondences. If other accounts (Yahoo, Gmail, Hotmail, etc.) are used, your email will be filtered out as spam and may not be received.
- ii. Please try and Put "CHMA11" in the subject line followed by the reason for the email and use professional language with a formal greeting.
- iii. Sign the email with your first and last name. Include your student ID number after your name.

Every effort will be made to respond to student emails within 48 hours (M-F) provided that the above protocol is used.

REQUIRED TEXTBOOK:

The book (below) will be the same as the one used for CHMA10.

- Chemistry: A Molecular Approach, 3rd Canadian Edition, by Nivaldo J. Tro, Travis D. Fridgen, Lawton E. Shaw, Pearson Canada Inc.

ASSESSMENT AND GRADING:

Course Component	Percentage
Laboratory component*	25%
End of chapter homework problem sets (7 in total)	5%
Writing Assignment	15%
Midterm 1 (in-person)	25% combined: One will be worth 10% and the other 15%. The midterm with the higher grade will be assigned to be 15% while the midterm with the lower grade will be assigned 10% of your final grade.
Midterm 2 (in-person)	
Final Exam	30%
Total	100%

**To pass the course, you must pass the Laboratory component.*

QUERCUS:

CHMA11 maintains a Quercus web space, which archives a variety of course related information including: grades, class announcements, lectures, and lab materials. **To login**, go to: <https://q.utoronto.ca>. Login using your UTORid username and password. Then click on the CHMA11H3 link.

Official announcements regarding test logistics, material covered for each test and other important announcements will be posted on the CHMA11H3 Quercus site. Please check these postings regularly for important announcements.

LECTURES:

Mondays & Wednesdays from 9 – 11 AM in SY110

OFFICE HOURS:

Office hours will be offered for 2 hours per week. Exact hours will be announced on Quercus.

LABS:

Please note that these are just some of the key details related to the labs this term. Further details including a specific schedule of when your labs will take place based on your PRACTICAL #s will be included in the lab manual that will be posted on Quercus. The laboratory component of CHMA11 is compulsory. **In order to pass the course, you must also pass the lab component.** We are operating at a 50% capacity in our teaching labs this summer. As such, you will be completing FOUR (4) labs in total: TWO (2) in-person labs + TWO (2) virtual labs.

Lab Manual and Notebook:

You **DO NOT** need to purchase a lab manual, it will be made available to you through Quercus. You **DO** need a lab notebook to keep record of all your virtual experiment. It is important that you continue to build effective note keeping habits as you will be expected to know how to prepare and manage your experimental results in a lab notebook in future courses. Further details as to how to prepare your notebook will be made available in the lab manual posted on Quercus.

Your lab notebook must be hard-cover notebook that is bound and with the approximate dimensions 8.25" × 10.5" inches. They can usually be purchased at the UTSC bookstore; however, students are free to purchase their books at a merchant of their choice (so long as they meet the above requirements). If you have a lab notebook from a previous course and it has plenty of blank pages remaining, you're welcome to repurpose that, as well.

Laboratory Marking Scheme

The laboratory component will be worth 25% of your final grade.

	% of final grade	Marks
Quiz:	6.25	5 marks (x 4)
Pre-lab assignment:	6.25	5 marks (x 4)
Post-lab report sheets:	12.5	10 marks (x 4)
Total Marks:	25 %	80

You must complete the laboratory section with a passing grade in order to pass the course.

WRITING ASSIGNMENT: Peer Reviewed Mock Journal using PeerScholar

Not only do we want everyone to be comfortable with communicating through emails, but we also want to support your writing skills in the context of chemistry. You will be asked to write an essay with the goal of exploring modern topics in chemistry. You will learn how to utilize both UofT Library resources and Web of Science while also training your writing skills. You will convey your research and learning on your topic in the form of a peer-reviewed 500-word essay.

Several of you may have completed a similar assignment during CHMA10/CHMA11 in Winter 2022. If you took CHMA10 last term, note that the grade distributions will be different this term. **Please note that you are required to choose a different topic this time around. It is an academic offense to re-submit work from other courses, so please take this as an opportunity to explore another topic that may be of interest to you. **

The peer-review process is the cornerstone of writing and communicating new results and ideas in the sciences. A part of this process heavily depends on you! You will be asked to apply critical thinking skills to give and receive feedback to fellow colleagues. You will experience this process while doing this assignment by using PeerScholar and online learning modules that will guide you throughout the various components of the assignment. The assignment will be worth 15% of your final grade. Below is the breakdown of those marks, as well as relevant deadlines (mark your calendars!):

	Weight (%)
Final essay	10
Quality and participation in the peer-feedback process	5
	Total = 15%

Task	Deadline (all times are in Eastern time)
Submit first-draft of your essay	11:59 PM Sunday, June 26 th
Submit feedback to 2 of your colleagues	11:59 PM Sunday, July 10 th
Submit final draft of your essay	11:59 PM Sunday, July 24 th

You can find more details about the writing assignment on the CHMA11 Quercus page.

HOMEWORK:

Short homework problem sets will be released on Quercus at the end of each “module”. These are quizzes designed to test your understanding of concepts after we complete each chapter of the textbook. In general, once we complete a chapter during the lectures, you will be given 2 weeks to complete the homework quiz. Keep an eye out for announcements that will clarify details regarding specific deadlines.

FACILITATED STUDY GROUPS (FSGs):

Facilitated Study Group (FSGs) will continue to be offered this summer. They are run through the Centre for Teaching and Learning. These weekly sessions are open to all students taking this course who want to improve their understanding of course material, improve their study techniques, and improve their grade. Attendance is voluntary. In these sessions you will compare notes, discuss important concepts, develop study strategies, and prepare for exams and assignments on course material. Course material is NOT re-lectured. The FSGs are led by a trained facilitator who has previously taken the course. Exact details as to when/how they will be offered will be posted on Quercus.

MIDTERM AND EXAM POLICY:**Midterms**

There will be 2 x 90-minute midterms in this course. Each midterm will be worth either 10% or 15%, depending on your scores, and will be administered online. **Both midterms will take place IN-PERSON.** The midterm you score higher on will be assigned 15%. The exact dates and times for your midterms will be announced through Quercus.

Please note that if you miss Midterm #1 and provide the proper documentation to verify the reason for your absence (see below for missed evaluations), the weight of this midterm will automatically be re-distributed over to Midterm #2 (this means Midterm #2 will be worth 25%). If you miss Midterm #2 and provide the proper documentation to verify the reason for your absence, the weight of this midterm will be re-distributed over to the Final (this means your Midterm #1 will be worth 15% and your Final will be worth 45%). If you happen to miss BOTH midterms and provide the proper documentation to verify the reason for your absences, then the weight of both midterms will be re-distributed into the Final (this means your Final exam will be worth 60%). **If no acceptable documentation is received, you will receive a grade of zero for that test.**

Final Exam

There will be a 3-hour, **cumulative** exam written during the end of semester exam period. The exact date, time, and further logistics will be announced as soon as they are available. Please note that if you miss the Final Exam, you must petition the Registrar's Office to write a make-up exam in the next formal exam period. Check the UTSC Calendar for instructions and deadlines.

WEEKLY SUMMARIES:

One of the biggest challenges in adjusting to university life is finding a time management system that works best for YOU. This strategy might include ensuring to attend lectures so that you don't fall behind, taking time to read the textbook and review practice problems at regular times each week, time set aside each week there's a lab to complete the pre- and post-lab components, etc. It can be helpful to keep a to-do list, but it can also be helpful to choose times that work best for you in completing each type of task and keeping yourself accountable.

One thing that can help in keeping up to date with course content is to reserve just a few minutes at the end of each week to reflect and summarize what you learned that week. As such, we will offer opportunities every week for you to submit a weekly summary (on Quercus) of what you learned. You can also use these as opportunities to reflect on perhaps what you found most interesting, or not interesting, confusing, or simply a place for you to practice articulating what you found were the most important points to highlight each week. If you **complete 10 submissions** (so 10 weeks), then you will be awarded **an extra 2% on your final grade** at the end of the term. For a submission to count, we ask that you please write **at least 200 words**. Note that you either get the 2% or you don't, there is no in between for this bonus assignment.

MISSED EVALUATIONS (LABS, MIDTERMS, ASSIGNMENTS)

For missed term work due to illness, emergency, or other mitigating circumstances, please follow the procedures outlined below.

Notes:

- The following reasons are not considered sufficient for missed term work: travel for leisure, weddings, personal commitments, work commitments, human error.
- Missed Final Exams are handled by the Registrar's Office and should be declared on eService: <http://www.utsc.utoronto.ca/registrar/missing-examination>
- Instructors cannot accept term work any later than five business days after the last day of class. Beyond this date, you would need to file a petition with the Registrar's Office: <https://www.utsc.utoronto.ca/registrar/term-work>

Accommodations for Illness or Emergency, Religious Conflicts

For missed work due to ILLNESS, EMERGENCY, or RELIGIOUS CONFLICTS please complete the following process:

1. Complete the **Request for [Missed Term Work Form](#)**
2. **Declare your absence** on [ACORN](#) (Profile & Settings > Absence Declaration)

Deadline: You must complete the above form **within 5 business days** of the missed work.

After submitting your documentation:

You are responsible for checking your Quercus course announcements daily, as accommodations may be time critical.

You should continue to work on your assignments to the best of your ability, as extension accommodations may be as short as one business day, depending on the nature of the illness/emergency.

If an accommodation has been granted but you are unable to meet the conditions of the accommodation (ex. you need a longer extension, or you missed a make-up test), you will need to repeat the missed term work procedure and submit additional forms to request further accommodation. Note that in the case of a missed make-up test, an opportunity to write a second make-up test may not be provided.

Completion of this form does not guarantee that accommodations will be made. The course instructor reserves the right to decide what accommodations (if any) will be made. Failure to adhere to any aspect of this policy may result in a denial of your request for accommodation.

Missed Accommodations

If an accommodation is granted but a continued illness/emergency prevents you from meeting the requirements of your accommodation, you must repeat the missed term work procedure to request additional accommodations.

MENTAL HEALTH RESOURCES:

University life is tough and the pandemic has only introduced even further challenges. If you feel that you need to seek help for yourself or someone you care about, you may wish to contact the Toronto Distress Centre (416-408-4357), Good2Talk (866-925-5454), or [UTSC Health and Wellness Centre](#). UTSC Health and Wellness is currently offering same day appointments, which can be booked by either calling 416-287-7065 or emailing at health-services@utsc.utoronto.ca.

ACCESSIBILITY:

Students with diverse learning styles and needs are welcome in this course. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact us and or the Accessibility Services as soon as possible: (416) 287-7560 or ability@utsc.utoronto.ca

ACADEMIC INTEGRITY:

Academic integrity is one of the cornerstones of the University of Toronto. It is critically important both to maintain our community which honours the values of honesty, trust, respect, fairness, and responsibility and to protect you, the students within this community, and the value of the degree towards which you are all working so diligently. Detailed information about how to act with academic integrity, the Code of Behaviour on Academic Matters, and the processes by which allegations of academic misconduct are resolved can be found online: <http://www.artsci.utoronto.ca/osai/students> According to Section B of the University of Toronto's Code of Behaviour on Academic Matters <http://www.governingcouncil.utoronto.ca/policies/behaveac.htm> which all students are expected to know and respect, it is an offence for students to:

- To use someone else's ideas or words in their own work without acknowledging that those ideas/words are not their own with a citation and quotation marks, i.e. to commit plagiarism.
- To include false, misleading or concocted citations in their work.
- To obtain unauthorized assistance on any assignment.
- To provide unauthorized assistance to another student. This includes showing another student completed work.
- To submit their own work for credit in more than one course without the permission of the instructor.
- To falsify or alter any documentation required by the University. This includes, but is not limited to, doctor's notes.
- To use or possess an unauthorized aid in any test or exam.

There are other offences covered under the Code, but these are by far the most common. Please respect these rules and the values which they protect. Offences against academic integrity will be dealt with according to the procedures outlined in the Code of Behaviour on Academic Matters.

CHMA11H3 Lecture Schedule (Tentative):

Week	Dates	Topic(s)	Suggested Reading
1	May 9 – 13	Solutions	12.1–12.8
2	May 16 – 20	Chemical Equilibrium	14.1–14.8
3	May 23 – 27	Acids and Bases (May 23 – Victoria Day)	15.1–15.6
4	May 30 – June 3	Acids and Bases cont.	15.7–15.11
5	June 6 – 10	Aqueous Ionic Equilibria	16.1–16.4
6	June 13 – 17	Aqueous Ionic Equilibria cont.	16.5–16.8
7	June 20 – 24	Aqueous Ionic Equilibria cont. / Reading week (June 21 - 24)	
8	June 27 – July 1	Gibbs Energy and Thermodynamics	17.1–17.5
9	July 4 – 8	Gibbs Energy and Thermodynamics cont.	17.6–17.11
10	July 11 – 15	Electrochemistry	18.1–18.4
11	July 18 – 22	Electrochemistry cont.	18.5–18.8
12	July 25 – 29	Chemical Kinetics	13.1–13.4
13	August 1 – 5	Chemical Kinetics cont. (August 1 – Civic Holiday)	13.5–13.7
14	August 8 – 12	Chemical Kinetics cont. (August 10 – Last day of classes for summer term)	

Lecture Topics and Learning Outcomes

Below is a list of topics that will be covered in this course, along with the corresponding chapters and learning outcomes.

1. Solutions Chemistry (Chapter 12): in this section, we will...

- i. Discuss the interplay between intermolecular forces (CHMA10) and solubility when preparing solutions
- ii. Consider the factors that affect solubility
- iii. Quantify the solubility of gases at different pressures (Henry's Law)
- iv. Compare the influence of colligative properties on physical properties
- v. Distinguish the difference between solutions and colloids

2. **Chemical Equilibrium (Chapter 14):** in this section, we will...
 - i. Be introduced to the concept of dynamic equilibrium and learn ways of quantitatively expressing equilibrium
 - ii. Practice applying the equilibrium expressions to quantify the amounts of products and reactants in a reaction
 - iii. Practice predicting the direction in which a reaction will proceed by comparing the reaction quotients with equilibrium constants
 - iv. Discuss how we can predict how a system at equilibrium will respond to disturbances (Le Chatlier's principle)
3. **Acids and bases (Chapter 15):** in this section, we will...
 - i. Define various ways of describing acids and bases (Arrhenius, Bronsted-Lowry, Lewis)
 - ii. Quantify the strength of acids and bases through ionization constants (K_a)
 - iii. Quantify the strength of acids and bases using pH and pOH
 - iv. Relate pH for weak acids and bases with equilibrium constants
 - v. Consider pH and K_a for polyprotic acids
 - vi. Relate the strength of acids to molecular composition and structure
4. **Aqueous Ionic Equilibria (Chapter 16):** in this section, we will...
 - i. Describe how buffers are prepared and understand how they function
 - ii. Calculate the pH of buffers using the Henderson-Hasselbalch equation
 - iii. Quantify the effectiveness of buffers
 - iv. Introduce titration and applications with acids and bases
 - v. Practice how titrations can be monitored by calculating the pH during acid base titrations
5. **Thermodynamics (Chapters 6 and 17):** in this section, we will...
 - i. Describe and apply the First, Second, and Third Laws of Thermodynamics
 - ii. Relate heat, work, and energy
 - iii. Discuss enthalpy and application of Hess's Law
 - iv. Introduce entropy, spontaneity, and consider the ways in which energy can be distributed
 - v. Relate entropy and enthalpy
 - vi. Introduce Gibbs energy
 - vii. Differentiate how entropy, enthalpy, and temperature contribute to Gibbs energy (under standard and non-standard conditions)
 - viii. Apply Gibbs energy under equilibrium and non-equilibrium conditions
6. **Electrochemistry (Chapter 18):** in this section, we will...
 - i. Discuss how energy and electricity can be generated from spontaneous chemical reactions
 - ii. Revisit redox reactions and applications in electrochemical cells
 - iii. Practice calculating standard potentials for electrochemical cells
 - iv. Relate spontaneity with cell potentials and predict spontaneous redox reactions
 - v. Relate cell potential to Gibbs energy and equilibrium constant
 - vi. Calculate cell potential under nonspontaneous conditions (Nernst equation)
7. **Chemical Kinetics (Chapter 13):** in this section, we will...

- i. Quantify reaction rates and relate to concentration of reactants using rate laws
- ii. Discuss zero, first, and second order reactions and derive integrated rate laws
- iii. Practice applying rate laws
- iv. Discuss how reactions can be depicted using energy diagrams and define relevant components
- v. Analyze kinetic data using Arrhenius plots
- vi. Discuss the importance of elementary steps and relate to reaction mechanisms
- vii. Discuss how catalysis relates to kinetics