COURSE INFO

COURSE INSTRUCTORS

SECTION M

Dr. Avik Bhattacharjee
bavik@yorku.ca

LEC: Wed: 7:00 – 1:00 pm (ACE 102)

TUT: Wed: 6:00 – 7:00 (ACE 102)

ADMINISTRATIVE SUPPORT

Course Director
Dr. Derek Jackson

First Year Chemistry Secretary
Ms. Mariam Ibrahim

For all administrative course matters
genchem@yorku.ca

LAB MEETINGS

Life Sciences Building

Please see Schedule in text and on eClass

CHEM 1000 – WINTER 2024

CHEMICAL STRUCTURE

COURSE

Introduction to chemistry with emphasis on physical and electronic structure of matter, including gases, liquids and solids. Topics include behaviour of gases; thermochemistry; atomic structure and periodic table; chemical bonding and architecture; structure of liquids and solids; frontiers of chemistry.

Three lecture hours per week, one tutorial hour per week, five laboratory sessions. One term. Three credits.

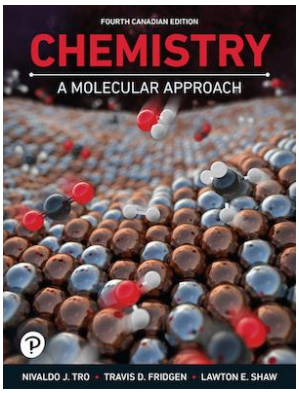
PREREQUISITES: OAC chemistry, 12U chemistry or SC/CHEM 1500 4.00 or equivalent.

COURSE CREDIT EXCLUSIONS: SC/CHEM 1100 4.00, SC/CHEM 1000 6.00, SC/CHEM 1010 6.00, SC/ISCI 1201 3.00.

TEXTBOOK

Course Textbook: Tro, N.; Fridgen, T.D.; Shaw, L.E. Chemistry: A Molecular Approach 4th Canadian Edition; Pearson Canada, Toronto, 2022

.



The textbook can be purchased as e-text on eClass (D1D link) or in loose-leaf format from the publisher (see link on eClass).

The second and third Canadian editions of this textbook are also acceptable for the course. Practice problems are posted on eClass for all three editions of the textbook.

The pdfs of the relevant chapters from the solutions manual have been posted on eClass.

COURSE WEBSITE

The course will be managed through the York eClass website: https://eclass.yorku.ca/

It is the primary resource for all course information and materials, hence it **should be visited frequently throughout the term**. It is the responsibility of the student to ensure course announcements are received by email or checked frequently on eClass. Each student is fully responsible for being able to login to eClass using 2-Factor Authentication (2FA). Our office will not be able to provide any help with 2FA troubleshooting. Please contact **ithelp@yorku.ca** if any login problems are encountered. No deadlines will be extended if a student encounters an eClass login/access issue.

Land Acknowledgement

York University recognizes that many Indigenous Nations have longstanding relationships with the territories upon which York University campuses are located that precede the establishment of York University. York University acknowledges its presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, and the Huron-Wendat. It is now home to many First Nation, Inuit, and Métis communities. We acknowledge the current treaty holders, the Mississaugas of the Credit First Nation. This territory is subject of the Dish with One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.

Lectures and Tutorials

You should make every effort to attend the live lectures, since the fundamental content of the course is going to be discussed there. Outlines of the lectures will be posted on-line, but details and example questions will only be provided during the lectures.

You are responsible for material taught in lectures. If you do not understand something, do get clarification right away. Note that, due to the large size of the class, it is not possible to answer questions by e-mail. However, you are encouraged to ask questions during lectures, office hours or during tutorials.

You must be able to apply concepts taught in lectures to solve problems.
Note that tutorials will provide very useful examples of problems that you should be able to solve on tests and on the exam and also provide an excellent opportunity to ask questions.

Lectures and tutorials will take place ***in-person*** during class time and will be recorded. Recordings will be available on eClass. Please note that class recordings are a courtesy. In the event of a technology failure in the classroom (e.g. power outage, Wi-Fi failure, computer malfunction, etc.), a lecture or tutorial may not be recorded.

Laboratories

All labs in CHEM 1000 will be conducted ***in-person*** at the Life Sciences Building (schedule to be posted on eClass). Each student will perform the labs during the 3-hour time period that corresponds to the lab section in which the student is registered. A student must bring their own lab safety equipment, i.e. a lab coat and safety goggles to the lab. A student must wear proper clothing (long pants and closed-toe shoes) while in the lab. Any student violating these rules will not be allowed into the lab. A face mask is optional based on the current public safety policy. There will be a total of five lab exercises during the semester.

Evaluation Scheme

Component	Percentage	Date/Time
Test 1 (90 min)	**20%**	**February 14, 2024 (6:00 – 7:30 pm)**
Test 2 (90 min)	**20%**	**March 27, 2024 (6:00 – 7:30 pm)**
Online Weekly quizzes (best 8 of 10)	**10 %**	*Weekly on eClass throughout the term (**start on January 22**)*
Laboratory	**20%**	*Throughout the term, 5 lab experiments (4% each)*
Final exam (cumulative, 3h)	**30%**	*Scheduled by Registrar's Office during the April exam period*

** Up to 1.0% **bonus course grade** MAY be earned for participation in chemical education research surveys. Details will be shared via eClass*

Quiz Schedule

There will be 10 weekly quizzes in total throughout the semester, beginning the week of January 22 and ending the week of April 1. No assignment will be set during February 19 - 23.

All quizzes open on Mondays at 8 am and close on Sundays at 11:59 pm.
Best 8 of 10 count towards the final grade.

Quiz	Week of	Quiz	Week of
Quiz 1	Week of January 22	**Quiz 6**	Week of March 4
Quiz 2	Week of January 29	**Quiz 7**	Week of March 11
Quiz 3	Week of February 5	**Quiz 8**	Week of March 18
Quiz 4	Week of February 12	**Quiz 9**	Week of March 25
Quiz 5	Week of February 26	**Quiz 10**	Week of April 1

Lab Schedule

Each student will perform their labs either during the first week in these periods (week A), or the second week (week B). The assignment of your lab section to week A or B will be posted on eClass and cannot be changed.

Each lab will consist of a pre-lab online quiz worth 10% of the lab (done on eClass before the lab), 10% for pre-lab preparation and 10% for adherence to safety regulations during the lab, and the lab report to be completed during the 3-hour lab period (worth 70% of the lab). Each pre-lab online quiz will open up on eClass on Monday at 10 am, one week prior to the lab for week A and the deadline for the quiz will be the start of your assigned lab period (the quiz has to be completed before the lab).

Experiment 1: Orientation and Gas Laws		Pre-Lab Quiz	
Week A	Jan 22 – Jan 26	**Opens**	January 15, 10:00 am
Week B	Jan 29 – Feb 2	**Closes**	Start of your lab period
Experiment 2: The Ideal Gas Constant		**Pre-Lab Quiz**	
Week A	Feb 5 – Feb 9	**Opens**	January 29, 10:00 am
Week B	Feb 12 – Feb 16	**Closes**	Start of your lab period
Experiment 3: Enthalpies of Chemical Reactions		**Pre-Lab Quiz**	
Week A	Feb 26 – Mar 1	**Opens**	February 12, 10:00 am
Week B	Mar 4 – Mar 8	**Closes**	Start of your lab period
Experiment 4: Mixed Melting Points & Synthesis of Acetylsalicylic Acid		**Pre-Lab Quiz**	
Week A	Mar 11 – Mar 15	**Opens**	March 4, 10:00 am
Week B	Mar 18 – Mar 22	**Closes**	Start of your lab period
Experiment 5: Vapour Pressure and Vaporization Enthalpy of a Liquid		**Pre-Lab Quiz**	
Week A	Mar 25 - Mar 29*	**Opens**	March 18, 10:00 am
Week B	April 1 – April 5	**Closes**	Start of your lab period

* Makeup labs for the March 29 statutory holiday will take place Monday April 8.

COURSE POLICIES

1. E-MAIL ETIQUETTE

Please use your **yorku email** for course related correspondence. All administrative enquires should be sent to genchem@yorku.ca. Lecture and tutorial specific questions should be addressed to the instructor of your section.

The subject line **must** include the course code and section and a brief indication of your inquiry (e.g.: CHEM 1000 M – Gas Law Question).

The body of your email **must** contain your full name and student number. This is essential since hundreds of students are enrolled in CHEM 1000/1001, and a student number is the best way to identify a unique student. All email correspondence should be as professional as possible, which means full sentences and proper grammar are more likely to be responded to promptly. Please do not use "text message lingo".

Before sending an administrative inquiry, read the syllabus and check eClass thoroughly to see if your question has been addressed in these materials.

Please allow our course personnel up to 2 business days to respond to emails. Please kindly note that the course email may not be monitored outside of normal business hours (9 am – 5 pm) or on weekends/holidays.

2. TESTS

Tests are designed to encompass 90 minutes of work. The testable material for each test will be announced on eClass. A student is allowed to bring writing utensils, a scientific calculator, and a photo ID to the test. A water bottle and a dry snack may also be allowed, depending on public health advice at the time of the test. A formula sheet will be provided during the test and will be posted on eClass for review prior to the test.

Students registered with **Student Accessibility Services** who wish to request test or exam accommodations must submit the online request form three weeks in advance of the scheduled test date. For the full procedure, follow the steps outlined at: https://altexams.students.yorku.ca/request-an-alternate-exam.

Tests are based solely on individual work. In-person tests will be closed-book. The use of any unauthorised devices, e.g. a cell phone, is strictly prohibited during the tests.

3. MISSED TEST POLICY

There are **no makeup tests, regardless of the reason for the absence**. The weight of each missed test will be automatically added to the final exam. **No documentation will be required to support a missed test**.

The **only exception** for which a makeup test may be offered is for students who know **in advance** that they will be missing a test for reasons of religious observance (https://registrar.yorku.ca/enrol/dates/religious-accommodation-guidelines-2023-2024). These students must contact us **at least two weeks prior to the test date** to be considered for accommodation.

4. TEST RE-MARKING REQUESTS

Students who believe that there was an error in the grading of their test, may submit a regrading request using eClass. A deadline will be announced to the class, after which regrading requests will not be considered. These requests must make clear reference to a specific question that requires attention, with reference to the posted answer key. Non-specific requests (such as simply requesting more marks without providing a clear rationale) will not be considered.

The course lecturer or director will reappraise the work and their decision will be final. The resultant grade may be higher, lower, or remain the same. The lecturers also reserve the right to inspect the entire test.

In order to be fair and consistent across the entire class, individual grades are not negotiable. No "extra credit" assignments will be provided. Marks for test will normally not be "bell-curved" and students will not be ranked against their peers.

Students are responsible for checking their eClass gradebook to ensure the marks being reported match those on the assessments. In the case of a clear clerical error, contact genchem@yorku.ca as soon as possible.

5. FINAL EXAM

The final exam for CHEM 1000 will be scheduled during the **April final exam period** and will be designed to be completed within 3 hours. A student is allowed to bring writing utensils, a scientific calculator, and a photo ID to the final exam. A water bottle and a dry snack may also be allowed, depending on public health advice at the time of the exam. A formula sheet will be provided during the exam and will be posted on eClass for review prior to the exam. The final exam is based solely on individual work. In-person exam will be closed-book. The use of **any** unauthorised devices, e.g. a cell phone, is strictly prohibited during the exam.

6. MISSED FINAL EXAM POLICY

Students at York who miss a final exam and wish to write a makeup exam must submit a request for deferred standing to their professors (called a **DSA form**) **within a week of the final exam**. Please note that the deferred exam may be held a significant amount of time after the original exam date. The deferred exam **may be a different format** compared to the original exam (ex: multiple choice as opposed to short answer).

7. LABORATORY

The laboratory component is mandatory in CHEM 1000. If a student completes a pre-lab quiz, but does not attend the lab, the overall mark for the lab will be zero and the lab will be considered missed.

It is the student's responsibility to review their marked lab report after receiving it from the lab TA. Any questions about marked lab reports or any re-marking requests must be emailed to your TA **within 1 week of receiving a marked report**. After this, the lab report mark becomes permanent and cannot be adjusted. If a student requests re-marking, a clear rationale must be provided to the TA detailing why the student believes original marking contained an error.

If you are repeating the course, please note that the LAB 99 exemption will not be offered during the Winter 2024 semester, and possibly at anytime in the future.

8. MISSED LABORATORY POLICY

Students who do not attend the lab and submit a lab report by the end of the lab period will have the 4% weight of the entire laboratory automatically shifted to the final exam. No documentation will be required to support a missed lab. Students are not allowed to miss more than 2 labs and must earn a cumulative minimum of 50% for the lab component of the course to pass the course.

NUMBER OF MISSED LABS	CONSEQUENCE
1	4% weight of the entire lab shifted to the final exam
2	8% weight of the entire lab shifted to the final exam
3-5	***Student fails the course as learning objectives are not fulfilled***

9. ONLINE WEEKLY QUIZZES

The eClass site will be used to administer a series of online quizzes that will collectively count for 10% of the final course grade.

Each assignment will consist of 5 questions relating to lecture topics discussed in roughly the two previous weeks. Both numerical and multiple-choice conceptual problems may be asked. There will be some variation within the questions among the students in the class.

There is no set time limit to complete the assignment once it has been opened on eClass. After attempting and submitting answers, a grade will appear in your eClass grade book a few days after the submission deadline. For some questions, part marks may be assigned for answers that are not completely correct (ex: expressed in units not specified by the question text).

For each assignment, students have the option to try it again as a second attempt (although some randomized values within the questions will be reset). Students who begin a second attempt will have their overall grade for that assignment be the higher of the two attempts.

At the end of the semester, the two lowest assignment grades will be dropped from the overall score. This policy will account for occasional illness or other situations which prevent students from completing an assignment on time.

There will be no extensions or exemptions on any of these assignments on medical or other grounds. Internet connectivity issues will not be reasonable grounds for accommodation unless it is an issue with the eClass site itself that affected every student in the class. In such cases, the course director will make the decision whether an extension for the entire class will be given. A student's inability to access a quiz due to 2-Factor Authentication (2FA) problems or any other login issues will not be considered as grounds for individual deadline extensions. To avoid any unexpected problems at the last minute, please complete the quiz, or at least its portion, as early before the deadline as possible.

COURSE CONTENT

The lecturer will inform the students of what material will be covered on the tests and the final exam.

CHAPTER 1 -4	**Prerequisite High School Knowledge** ***(assumed knowledge, will not be directly covered in lecture)*** *Units of measurement and significant figures; Logarithms and exponentials; Assigning oxidation states; Solutions and molarity*
CHAPTER 5	**Gases** *Definition pressure; Units of pressure; Manometer; Boyle's Law; Charles's Law; Avogadro's Law; The Ideal Gas Law; Mixture of gases; Partial pressure; Stoichiometry and gases in chemical reactions; Diffusion and effusion; Real gases*
CHAPTER 6	**Thermochemistry** *Nature of energy; First law of thermodynamics; Quantifying heat and work; Enthalpy change associated with chemical reactions; Hess's Law; Constant-Volume Calorimetry; Constant-Pressure Calorimetry*
CHAPTER 7	**Atomic Structure** *Nature of light; Atomic spectroscopy and the Bohr Model; de Broglie Wavelength; Uncertainty Principle; Quantum mechanics of the atom; Shapes of atomic orbitals; Electron configuration*
CHAPTER 8	**Periodic Properties** *Periodic table, electron configuration and valance electrons; Periodic trends: atomic radii, ionic radii, ionization energy, electron affinity, metallic character*
CHAPTER 9/10	**Chemical Bonding** *Valence electron dot representation; Lewis structure and introduction to ionic and covalent bonding; Ionic bonding model; Covalent bond energies and lengths; Electronegativity and bond polarity; Resonance and formal charge; Exceptions to the octet rule; Hypercoordinate compounds; VSPER Theory: five basic shapes, effect of lone pairs, molecular geometries; Molecular shape and polarity; Valence bond theory; Hybridization*
CHAPTER 11	**Solids, Liquids, and Intermolecular Forces** *Intermolecular forces; Surface tension, viscosity and capillary action; Vaporization and vapour pressure; Sublimation and fusion; Heating curve for water; Phase diagrams; Crystalline solids*

KEY LEARNING OUTCOMES

For detailed learning outcomes based on each chapter, please see document posted on eClass.

1. Solve quantitative and qualitative problems related to ideal and real gases, thermochemistry, stoichiometry, and simple atomic spectroscopy

2. Explain the periodic trends in the chemical elements related to: atomic size, ionization energy, electron affinity, and effective nuclear charge

3. Draw Lewis structures of simple molecules and polyatomic ions and use proper notation to represent formal charges and resonance forms

4. Predict the three-dimensional structures of simple molecules using VSEPR theory as well as valence bond theory

5. Compare and contrast several intermolecular forces (hydrogen bonding, London forces, etc.) and predict how they influence the physical properties of a compound

6. (Lab component) Learn and use various experimental techniques to obtain quantitative data, including the use of the Vernier LabQuest 2 system

7. (Lab component) Draw and interpret graphical representations of experimental data

TECHNICAL REQUIREMENTS

If the University shall require that the course be switched to remote/online delivery at any point during the Fall'23 semester, the following message from the Senate Executive at York University will apply to all students registered in courses that are temporarily delivered online.

"Several platforms will be used in this course through which students will interact with the course materials, the course director / TA, as well as with one another. Please review the syllabus further to determine how the class meets (in whole or in part), and how office hours and presentations will be conducted."

"Students shall note the following: Zoom is configured in a way that all participants are automatically notified when a session is being recorded. In other words, a session cannot be recorded without students knowing about it. Technology requirements and FAQs for eClass can be found at https://lthelp.yorku.ca/student-guide-to-moodle."

*"This course **may** require the use of online proctoring for the final examination. The instructor may use an online proctoring service to deliver the exam(s), which would be administered through the Learning Management System (e.g. eClass). Students are required to have access to minimum technology requirements to complete examinations. If an online proctoring service is used, students will need to become familiar with it at least five days before exam(s). Students are required to share any IT accommodation needs with the instructor as soon as they are able."*

The following is a list of technical requirements recommended for CHEM1000.

1. STABLE INTERNET CONNECTION

If the University shall require that the course be switched to remote/online delivery at any point during the Fall'23 semester, students will be attending lectures remotely using Zoom which requires an uninterrupted Internet connection. eClass will be used to administer the assessments in this course (in the event of online delivery), all of which require stable internet connections. It is the sole responsibility of the student to ensure their Internet connections are stable enough to submit their work on time. No individual accommodations will be offered to students who are unable to upload their work for any technical reasons.

Students are strongly urged to develop a backup plan in case of internet connection problems during a test or the final exam. For example, a cell phone with a data plan can be turned into a WiFi hotspot for a computer to connect to.

2. ACCESS TO EMAIL

It is the student's responsibility to ensure the email linked to their eClass profiles is active and checked regularly. Important course updates will be sent to that email address only.

UNIVERSITY POLICIES

1. ACADEMIC HONESTY AND INTEGRITY

Any assessments that are completed online are open-book. They are intended to be individual pieces of work. Collaborating with other students (in person, by phone or by Internet) is not permitted. During online evaluations, students are not permitted to use Internet resources such as Chegg, WhatsApp, Discord and similar websites. Please note the instructors may have access to these websites, which may be checked to detect and prosecute academic misconduct.

York students are required to maintain the highest levels of academic honesty and they are subject to the Senate Policy on Academic Honesty (https://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to improve students' research and writing skills, and cope with university life. Students are expected to review the materials on the Academic Integrity website (https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity).

Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty's Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be willfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting. Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.

2. UNIVERSAL ACCESS AND EQUITY

York University is committed to the principles of respect, inclusion, and equality of all persons with disabilities across campus. The university provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation relating to teaching and evaluation methods/materials. These services are made available to students in all faculties and programs at York University.

Students in need of these services are encouraged to register with Student Accessibility Services (SAS) as early as possible to ensure that appropriate accommodation can be provided with advance notice. Students may wish to discuss the nature of their accommodations with their professor early in the term.

Many students registered with SAS are entitled to test and final exam accommodations such as extra time. These students must register and book their tests and exams with the Alt Exam Centre at York as soon as possible.

The department of chemistry, or your professor, will not be able to provide extra time during the tests/final exam. The extra time during these evaluations **can only be received** by the arrangement with the Alt Exam center made by the student.

Additional information is available at https://accessibility.students.yorku.ca

Students with accommodation letters issues by SAS **do not** need to email them to the course director. All Letters of Accommodation (LOA) issued by SAS are automatically delivered to the course director.

If a student's LOA recommends extra time in the laboratory, please contact the course director at genchem@yorku.ca to discuss possible accommodations.

3. Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community and making accommodations for observances of special significance to adherents.

Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form (https://registrar.yorku.ca/pdf/exam-accommodation.pdf) and submit it to the course director at least 3 weeks before the final exam.

For requests regarding test, requests must be received by the course director at least 2 weeks in advance (there is no equivalent online form).

4. Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at –

http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/

ADDITIONAL NOTE

Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty's Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be willfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting.

Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e., whether the © is used or not). Scanning these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.