

# CHEMISTRY 110 - General Chemistry I

Fall 2020

## Course Information



### Instructors

Prof. Maureen McKeague  
Otto Maass 220

Dr. Pallavi Sirjoosingh  
Otto Maass 100

**Contact:** Please use [chem110-120.chemistry@mcgill.ca](mailto:chem110-120.chemistry@mcgill.ca) or myCourses email function with "CHEM 110" in subject for communications with instructors and TAs

### Course Information

#### **Classes (online - Zoom; recorded)**

CHEM-110-001      Mon/Wed/Fri      10:35 – 11:25 am, Leacock 132

CHEM-110-002      Tues/Thurs      11:35 - 12:55 pm, Adams AUD

*\* you can attend EITHER lecture section without making any official changes on Minerva*

Concept videos will be posted on myCourses, and above class times will focus on discussion/practice problems/active learning activity based on the content covered in the concept videos.

**Office Hours:** By Appointment. Instructors will also be available to answer questions through email ([chem110-120.chemistry@mcgill.ca](mailto:chem110-120.chemistry@mcgill.ca)) and discussion boards.

#### **Online lab section:**

Six 2.5-hour TA moderated lab section (online recorded)

Students will have access to assistance during their experiments from a teaching assistant via video chat (ZOOM or Teams).

Each lab will include a hands-on element to help students explore Chemistry in their every-day lives. We will focus on safety both in the lab and at home. Students will make connections between experiments and chemistry that occurs in “real” labs with videos that describe the theory and use of equipment and techniques done in actual chemistry labs.

Whenever feasible, students will generate data through at-home experiments. When needed, “research-quality” data will be provided by web based simulations. With guided instruction, students will work up and interpret these results, adding a practical element to the theory introduced in the lecture. They will then communicate their newfound chemistry knowledge to either their teaching assistant, colleagues, or to a general audience, to develop scientific communication and scientific literacy skills.

#### **Tutorials (optional)**

1.5 hour tutorials led by TAs.

Students are divided into groups of ~15-20 (use Teams or Zoom breakout rooms), and work with TAs on assigned problems.

Questions and solutions will be posted on myCourses.

#### **FRezCa (optional)**

3-times (2-hour) weekly sessions with undergraduate mentors (through Zoom or Teams)

## **Course Material**

### **Recommended Textbook (McGill Bookstore, \$99.90 – \$179.95) (SAME AS CHEM 110)**

*Chemistry: The Molecular Nature of Matter and Change* (2<sup>nd</sup> Canadian Edition) by Silberberg, Amateis, Laveri, and Venkateswaran

Hard cover text + Connect/e-book + Digital Student Solutions Manual      \$179.95

Connect/e-book + Digital Student Solutions Manual                              \$ 99.00

### **Connect Online Learning**

Purchasing the textbook/ebook gives you access to the McGraw-Hill online learning system ‘Connect’. This program will be used for weekly ‘LearnSMART’ readings and ‘Connect’ homework. The homework site can be accessed directly from our myCourses lecture page. *These readings and assignments will not be graded.*

### **In-Class Polling ‘Turning Point Cloud’**

Polling will be used in this course as a self-check for your understanding of course content, to provide us with feedback, and to enhance your engagement in class. Polling will NOT be used for grading.

During a Zoom online activity with polling questions, you will be asked to respond to questions from the instructor from a personal device (smartphone, tablet, or laptop). Please come to class with your devices charged and connected to the Internet. If you do not have a phone, tablet, or laptop to use for polling questions, and wish to participate, please contact the instructor immediately in order for appropriate arrangements to be made. Polling will be available through [www.mcgill.ca/polling](http://www.mcgill.ca/polling) using your McGill username/password.

### **Lecture Notes/Recordings**

Course notes will be available as pdf files on myCourses before lecture. We encourage you to add your own notes as you watch the pre-recorded lecture.

Lectures will be pre-recorded and available through the ‘Lecture Recordings’ tab in myCourses.

## Course Evaluation

Grade Item	Chem110	Chem110 (Lab exempt)
Quizzes (timed)	<b>15*%</b> <b>(Drop Worst)</b>	<b>20*%</b> <b>(Drop Worst)</b>
Assignments	<b>20*%</b>	<b>20*%</b>
Tutorial	<b>5*%</b>	<b>10*%</b>
Take Home (1-2-3)	40% (15-15-10)	50% (20-20-10)
Online Labs	20%	-----

\* *Quizzes, assignments, and tutorial grade values are flexible (40% of your total grade or 50% for lab exempt students). The default (recommended) values are noted in bold.*

**Quizzes:** *Timed quizzes held through myCourses. You will have 2 attempts for each quiz, and the best attempt will count towards your grade. Each quiz will be timed.*

**Assignments:** *Assignments will be submitted/graded using CrowdMark.*

**Tutorial:** *The tutorial grade will consist of: Participation, Workbook submission, and Discussion/Feedback during and after tutorials.*

**Take-Home assessments:** *Take-home assessments will be administered using CrowdMark. Details on these will become available closer to the date of the exams. These will be a mix of short-answer or long-answer format. Practice questions will be posted prior to the exams. The lowest graded take home will receive the 10% weight.*

**Policy Statement on Academic Integrity:** McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see [www.mcgill.ca/students/srr/honest/](http://www.mcgill.ca/students/srr/honest/) for more information) (Approved by Senate on 29 January 2003)

**Policy Statement on Language:** In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded. (Approved by Senate on 21 January 2009)

Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté (sauf dans le cas des cours dont l'un des objets est la maîtrise d'une langue).

**Policy Statement on Extraordinary circumstances:** In the event of extraordinary circumstances, the content and/or evaluation scheme in this course is subject to change.

**Policy Statement on Course Material:** Instructor-generated course materials (e.g., handouts, notes, summaries, exam questions, etc.) are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor. Note that infringements of copyright can be subject to follow up by the University under the Code of Student Conduct and Disciplinary Procedures.

**Policy Statement on Diverse Learners:** As instructors of this course we endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with us and the Office for Students with Disabilities, 514-398-6009.

## **Learning Objectives**

Chemistry 110 aims to provide you with a solid understanding of the fundamental principles of atomic and molecular structure, the periodic table, valence, hybridization and molecular orbital theory, and introductions to organic and inorganic chemistry. Our main focus is on understanding the basic chemical properties that link atoms to molecules and molecules to macroscale materials

## **Summary of Course Content**

### **Topics Covered by Dr. Sirjoosingh**

Quantum Theory and Atomic Structure (Ch 6): Early Atomic Theory, Light Radiation, Atomic Spectra, Bohr Atom, Wave-Particle Duality of Matter and Energy, Blackbody Radiation, Photoelectric effect, Quantum Mechanical Model of the Atom

Electron Configuration and Chemical Periodicity (Ch 7): Many Electron Atoms, Quantum Numbers, Electron Configurations, Constructing the Periodic Table, Periodic Trends

Models of Chemical Bonding (Ch 8): Lewis Structures, Covalent and Ionic Bonds, Resonance, Bond Polarity, Bond Energy

The Shapes of Molecules (Ch 9): VSEPR Theory, Molecular Shape and Polarity

Theories of Covalent Bonding (Ch 10): Valence Bond Theory, Hybridization, Molecular Orbital Theory

Intermolecular Forces and Phase Changes (Ch 11): Polarizability, Induced Dipoles, Dispersion Forces, Ion-Dipole/Dipole-Dipole Interactions, Hydrogen Bonding, Properties of Liquids, Uniqueness of Water

Periodic Patterns in Main Group Elements (Ch 13): Descriptive Chemistry by Periodic Group

### **Topics Covered by Prof. McKeague**

Organic Compounds and Intro to Reactions (Ch 20/21): Characteristics of Organic Molecules, Common Functional Groups, Nomenclature of Hydrocarbons, Conformations of Alkanes, Stereochemistry, Introduction to Reactions and Applications

Transition Elements and Their Coordination Compounds (Ch 24): Properties of Transition Metals, Ligands and Coordination Compounds, Crystal Field Theory

\*\* Ch 1-3 and the definitions in Ch 4-5 are the assumed prerequisite material for Chem 110. Please review these chapters before the first class to confirm familiarity. The beginning of the course (including the first tutorial) will review key points from Ch1-5, as necessary.

## **Laboratory (see lab syllabus for more details)**

### **Instructors**

Mitchell Huot  
Otto Maass 211  
[mitchell.huot@mcgill.ca](mailto:mitchell.huot@mcgill.ca)

Badawy Sha'ath  
Otto Maass 1  
[badawy.sha'ath@mcgill.ca](mailto:badawy.sha'ath@mcgill.ca)

*\* for any questions related to the labs, email Mitch Huot*

You must read the detailed lab syllabus and watch both a lab safety video and a lab introductory videos at the start of the course. The lab syllabus and videos are accessible via our lab myCourses page. Once you have read the syllabus and watched the videos you will need to complete a safety/syllabus/schedule quiz. The quiz is not worth any marks but you will need to complete it and receive 9/9 in order to access the rest of the course material. You have an unlimited amount of attempts for the quiz.

All lab information will be available through myCourses (including the lab schedule and lab manual).

The laboratory counts for 20% of the course grade.

### **Lab Exemption**

If you are repeating this course, you *could* be eligible for a lab exemption. You must have passed the lab component within the past 3 years. Contact Mitch Huot to confirm your eligibility for a lab exemption and obtain authorization. Be aware that when exempted from the labs, the grade is redistributed between other assessment (See course evaluation). *Lab grades are not transferred from previous years.*