Introductory Chemistry I (CHMA10H)
Winter 2018 Syllabus
University of Toronto at Scarborough

Instructors:	
Dr. Marco Zimmer-De Iuliis Office: ENV546 email: m.zimmer.deiuliis@utoronto.ca Lecturing from Jan 5th until Feb 16th 2018 Lectures are on Mondays, Wednesdays and Fridays 10:00-11:00 am SW 309 (all lectures are recorded and posted) Office Hours: Monday, Wednesday, Friday 10:30-11:30 am	Dr. Nirusha Thavarajah Office ENV544 Email: nirusha.thavarajah@utoronto.ca Lecturing from the week of Feb 26th 2018 Lectures are on Wednesdays (SW 309), Thursdays (SW 128) and Fridays (SW 309) 10-11 am (*please note that the Monday lectures are moved to Thursdays for the second half of the term. All lectures are recorded and posted) Office Hours: Wednesdays, Thursdays & Fridays 11:10-12:10 pm
Lab Manager:	
Dr. Scott Ballantyne Office: SW155C Email: sballant@utsc.utoronto.ca Office Hours: Mon and Wed 10:30 am to 12:00 pm	

Welcome to Introductory Chemistry Part I! Our primary goal is to ignite your passion for chemistry by creating a meaningful learning environment with many real life applications of chemistry. The knowledge you gain in this course is applicable in diverse disciplines, including Medicine, Pharmacy, Environmental Sciences, Neuroscience, Biochemistry and Biology. We are looking forward to teaching you many interesting topics on molecular structure, chemical reactions and nuclear chemistry. Please read through the course syllabus to understand the learning expectations and assessment methods. Looking forward to meeting all of you!

Achieving Success in First Year Chemistry.

Although it is there are no pre-requisites for this course, it is highly recommended that you have completed grade 12 Chemistry and Grade 12 Advanced Functions or Grade 12 Calculus. The lectures for this course are 3 times a week for one hour and you strongly encourage you to attend all the lectures to engage in the participatory lessons!

Assessment and Grading Practices:

Methods of Evaluation	**Contribution to the Final Grade**
Problem Sets (more details to be provided on Course web space on Blackboard)	5%
Laboratory ***(Must pass the lab component to pass the course)***	25%
Mid-Term Test	25%
Final Exam	45%
TOTAL	100%

To pass the course, you **MUST** pass the laboratory **AND** either the term test or the final exam (and receive a final grade of 50+, of course!). The laboratory component of CHMA10 is **compulsory**.

There will be a 100-minute term test around the middle to end of February which will count as 25% of your final grade. This test will be written outside of class time. The exact date, time and location will be announced as soon as this information is made available from the registrar.

Policy on Missed Tests

This course will not have any make-up tests. Should you miss the term test due to a legitimate reason, you must submit appropriate documentation *within one week of your absence.* If the reason is medical, an official UTSC medical form should be downloaded from http://www.utsc.utoronto.ca/~registrar/resources/pdf_general/UTSCmedicalcertificate.pdf and completed by your doctor. **If no acceptable documentation is received, you will receive a grade of zero for that test.** With a validated absence, the value of the missed test will be added to your final exam. Please note that in UTSC Calendar it states: "You cannot petition to withdraw from a course on the grounds that no work was returned to you before the last day to withdraw without academic penalty if this is the result of your having been given an extension to complete your work for reasons relating to you and not the rest of your class."

Individual grades for labs and the mid-term will be posted on the Blackboard as they become available. Please check these periodically to make sure that the posted grades match your own records. Any discrepancy should be reported immediately to the instructor or the lab coordinator, as appropriate.

There will be a 3-hour, **cumulative** exam written during the end of semester exam period. The exact date, time and location 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.

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. **Chemical Reactions and Stoichiometry (Chapter 4)**
   a) Students will be able to apply the concept of the mole to balance chemical equations including neutralization and redox reactions and use these concepts to determine chemical yields.
   b) Students will be able to calculate solution concentration and solution stoichiometry from balanced chemical equations.
   c) Students will be able to predict solubility of ionic compounds using Solubility rules.

2. **Gases (Chapter 5)**
   a) Students will be able to apply Boyle's law, Charles's law, Avogadro's law, The Ideal Gas Law and Dalton's Law of Partial Pressures to solve problems related to the molar volume, density, and molar mass of a gas
   b) Students will be able to explain and understand the physical behavior of gases including diffusion and effusion using the Kinetic Molecular Theory and the Mean Free Path of a gas.
   c) Students will be able to qualitatively compare and contrast the behavior of real gases and ideal gases wing the van der Waals equation.

3. **Thermochemistry (Chapter 6)**
   a) Students will be able to define heat, work and energy and relate these concepts to chemical reactions and physical processes.
   b) Students will be able to understand and apply The First law of Thermodynamics to solve problems the transfer of heat and work.
   c) Students will be able to solve problems involving Constant –Volume and constant pressure calorimeters.
   d) Student's will be able to apply Hess's law to determine enthalpies of reaction.

4. **Liquids, Solids and Intermolecular forces (Chapter 11)**
   a) Students will be able to describe the types of intermolecular forces and use them to explain and understand the physical properties of substances such as surface tension, viscosity and capillary action.
   b) Students will be able to interpret vapor pressure curves and determine heat of vaporization using the Clausius–Clapeyron Equation 2-Point Form.
   c) Students will be able to read and interpret heating curves and perform calcualtions based on data extracted from heating curves.

d) Student will be able to describe and identify various types of crystalline solids.

5. Solutions (Chapter 12)

a) Students will apply their knowledge of intermolecular forces and thermochemistry to solution formation.
b) Students will be able to define colligative properties such as vapor pressure, freezing point depression, boiling point elevation and osmotic pressure.
c) Students will be able apply Henry's Law to problems involving solubility of gases.

6. The Quantum-Mechanical Model of the Atom (Chapter 7)

a) Students will be able to assign the four principle quantum numbers to elements. (selected content from section 7.5)
b) Students will be able to assign a electron configuration for elements and ions based on their location in the periodic table. (selected content from section 7.7)

7. Periodic Properties of the Elements (Chapter 8)

a) Students will be able to determine the number of valence electrons of a given element based on its location in the periodic table.
b) Students will be able to explain the Periodic Trends of the elements using Students will be introduced to the concept of Effective Nuclear Charge

8. Chemical Bonding I: Lewis Theory (Chapters 9)

a) Students will be able to draw Lewis structure of atoms and ions using the periodic table.
b) Students will be able to explain periodic trends including atomic and ionic radii, ionization energy, electron affinity and metallic character using the concept of effective nuclear charge
c) Students will be able to identify and explain ionic, covalent and metallic bonding.
d) Students will be able to draw Lewis Structures of simple molecules based using formal charges and resonance structures.
e) Students will be able to use a Born-Haber cycle to determine the Lattice Energy of a crystalline solid.
f) Students will be able to use Hess's Lab to calculate enthalpy changes for reactions.
g) Students will be able to explain differences in bond length how bond vibrations can be used to classify bonds.
h) Students will be able to apply electronegativity to rationalize trends in bond polarity, dipole moment, percent Ionic character, and resonance.

9. Chemical Bonding II: Molecular Shapes, Valence Bond & Molecular Orbital Theory (Chapter 10)

a) Students will be able to apply VSPER to analyze Lewis structures and predict the shape of simple molecules.

Laboratory Component of CHMA10

Laboratory periods are three hours in length and run every other week. Odd numbered practicals (Week 1 students) start during week of January 15th. Even numbered practicals (Week 2 students) will have their first lab the week of January 22nd.

Lab Manual and Notebook

A lab manual must be purchased from the UTSC Bookstore before your first lab. You may not use a lab manual from a previous semester: the experiments and course requirements will be different.
DO NOT wait to purchase your lab manual as it contains a host of important information:

- Lab Schedules and other important dates
- Late and absence policies
- Rules regarding safety
- Appropriate attire for the labs
- Guidelines on how to properly prepare for the lab

The bookstore **DOES NOT** stock enough lab manuals for everyone. If they run out, you **MUST** preorder a copy through the bookstore – this takes time. Failure to adhere to the rules and policies outlined within the lab manual will adversely affect your lab mark – in some instances the impact will be severe. In addition, students will be required to purchase their own lab notebook. The book must be hard-cover, permanently bound (not spiral or loose leaf) with the approximate dimensions 8.25" x 10.5" inches. They can 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).

Lab Safety

Safety in the laboratory is an extremely important element in the chemistry program at this University. Failure to follow safe practices can cause laboratory accidents which may result in the loss of time, damage to clothing and other property, and most importantly personal injury. By following suitable precautions, you can anticipate and prevent situations that would otherwise lead to accidents. Students registered in CHMA10H3F will be automatically enrolled in the WHMIS 2015 Training course for the Fall 2017 semester

Once the course is made available an email announcement will be made and a link to the course will appear in your "My Courses" window of your blackboard home page. As part of this course, students will be expected to watch a couple of videos (approximately 90 minutes long in total) and take a multiple choice quiz on the material you just learned. Students must obtain 80% on the quiz to pass the WHMIS course. **In addition, students will be required to print off your quiz results and present them to your TA before you will be allowed to enter the lab.**

Safety Equipment

Students will be required to purchase approved indirect vented chemical splash safety goggles, and a lab coat before attending their first lab. These items can be purchased from both the Environmental and Physical Sciences Student Association (EPSA) and the Biology Student Association (BioSA) or through the bookstore. All safety eyewear must meet either ANSI Z87+ or CSA Z94.3 Standard for high impact protection (if you see one of those standards stamped on your eyewear somewhere then they meet that particular standard). As part of your ancillary fees, all CHMA10H3F students will be provided a pair safety glasses at their first lab session which can be worn during your quizzes and pre-lab discussion; however, when the experiment begins, students will be required to wear their indirect vented chemical splash goggles.

Labs coats must be 100% cotton – no exceptions.

Further information regarding appropriate attire please see the guidelines outlined in your lab manual.

Note that students not wearing approved safety gear will not be allowed to participate in the lab.

Ancillary Fees

Students taking CHMA10 will be assessed a $20.00 ancillary fee which will cover the cost of chemicals, filter paper, Pasteur pipettes and other items consumed over the course of the lab. For more information regarding ancillary fees students are encouraged to visit the following website: http://www.planningandbudget.utoronto.ca/tuition/Ancillary_Fees.htm

Aids Allowed in Lab quizzes & Tests, Midterm Test and Final Exams

Please note* that only non-programmable, non-communicating calculators are allowed in tests and exams for this course (both lecture and lab). Invigilators have the authority to check calculators during the tests and exams. Students who have illegal calculators confiscated during a test/exam will be supplied with an allowed calculator but an immediate penalty of 10% will be imposed for that test/exam. Students without a calculator will also be allowed to borrow an allowed model, but at the cost 10% off their mark on that test/exam.

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.

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: SW 302, (416) 287-7560 or ability@utsc.utoronto.ca

Active Learning in Introductory Chemistry I:

Course Surveys: There will be a pre-class and a mid-class surveys during the term to gather student feedback. More information on this will be announced on blackboard.

Peer Facilitator Program

Facilitated Study Group (FSG) is being 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 FSG's are led by a trained facilitator who has previously taken the course. A survey will be taken during the first week of class to determine the best days and times for most students, and they will begin probably the 2nd or 3rd week of class.

Email Policy: Please use a valid "utoronto.ca" or "utsc.utoronto.ca" account for all CHMA10 correspondence. Emails sent from other accounts are frequently filtered out as spam and may not be received. When composing your email, please use professional language. Be sure to include the

course code as part of the subject line and sign the email with your first and last name, as well as your student ID. Your email will be answered as soon as possible (likely within 36 hours, unless it is a weekend or holiday). **Please Note: Double check the course syllabus before emailing us with a question. Questions on the lab material should be directed to the lab coordinator or your TA.**

Textbook: Chemistry: A Molecular Approach, Second Canadian Edition Plus MasteringChemistry Access Card Package (2nd Edition) by Nivaldo J. Tro *et al.*

Website: CHMA10 maintains the Blackboard web space which archives a variety of course-related information. There are two instructors for the course and at the beginning of each of their sections, they will inform you where you will find: contact information, class announcements, lecture slides, handouts, assigned readings, suggested end-of-chapter problems, and links to some useful outside resources.

Accessing WebOption Lecture Videos

WebOption lecture videos can be accessed at the Blackboard via the “Lecturecasts” link.

Announcements: Official announcements regarding test locations, material covered for each test and other important announcements will be posted on the CHMA10H3 course web site. It is absolutely your responsibility to check these postings regularly for important announcements.