# Trent University Department of Chemistry

## CHEM 1000H: Introductory Chemistry I

## 2016 Fall

## Peterborough

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| --- | --- |
| Instructor:  | Email:  |
| Office Location: | Office Hours:  | Telephone:  |

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| Academic Administrative Assistant:  | Email: chemistry@trentu.ca  |
| Office Location: CSB D105 | Telephone: 705-748-1011 ext. 7505 |

Course Description: This course is an introduction to the essential aspects of general, molecular and intermolecular chemistry. Topics include atomic structure, bonding, equilibrium, acids-bases, gases, liquids, solutions and the solid state. The course emphasis is on the relation between molecular and physical properties of the substances around us.

Course Pre-requisites: 4U Chemistry or equivalent or permission of the instructor

Please note: this course assumes every student has previous experience with chemistry at the high school level. Students with no previous experience in chemistry may find the course challenging, but may take the course with permission from the instructor. It is the responsibility of all students to ensure they are up to date with the content, and if a student has difficulty the course instructor should be contacted.

### Required Resources

* Laboratory Coat and Laboratory Safety glasses. All students are required to have a laboratory coat and proper safety glasses for laboratory experiments. Without these resources, students are not permitted entry into the laboratory room. Students who do not have the appropriate safety attire for labs will not be permitted to perform experiments with no rescheduling possible.
* Clickers (Personal Response Systems): Each student is required to have an iClicker personal response system device or the iClicker REEF mobile app subscription. These devices allow real-time interaction, in class, with the instructor for multiple-choice questions related to course material. As clicker records are used in this course to compute a portion of course grades, the use of a clicker or REEF account other than your own is an academic offence. In lecture or tutorial, possession of a clicker other than your own or accessing a REEF account other than your own may be interpreted as intent to commit an academic offense.
* Textbook: Chemistry: A Molecular Approach, 2nd Canadian Edition, Nivaldo Tro, 2016, Pearson

Note this resource is also available as an e-book from the Trent bookstore or publisher’s website. This is an acceptable alternative to purchasing the physical text.

* Mastering Chemistry Online Homework Access Code. All students are required to have a MasteringChemistry license for the Assignments component of Chemistry 1000H. This resource is included with all new textbooks and e-books, but can also be purchased separately for students who do not intend to buy the textbook or have purchased a used text. A single access code can be used for up to 4 attempts of CHEM 1000H/CHEM 1010H or 24-months before expiry.
* LearningSystem Course Website (Blackboard): Chemistry 1000H will rely on the Learning System (also called Blackboard) for distribution of all course material, grades, assignments, course announcements and other course information. All major course announcements will be made through the Learning System, at which point they are equivalent to being announced in-class. All students are expected to frequently review the Learning System site. On the Learning System students can find many valuable resources related to the course including suggested readings, practice problems, and all information regarding laboratory and tutorial. Additional links are provided for information about tests, exams, and supplementary resources that are available for each of these course components.

### Course Format

| Meeting Type | Day | Time | Location |
| --- | --- | --- | --- |
| Lecture | Monday | 7:00 p.m. – 8:50 p.m. | Wenjack (OCA W101.2) or SC137 |
| Lecture | Wednesday | 12:00 – 12:50 p.m. | Wenjack (OCA W101.2) or SC 137 |
| Laboratory/Tutorial |  | As per individual student | CSB D116 (Labs) |

\* Note: Students who have trouble with their laboratory section scheduling must contact Sue Landry (slandry@trentu.ca) as soon as possible. A laboratory / tutorial slot is the same timeslot for each student but alternates weekly. Scheduling details are provided in the Learning System.

### Learning Objectives:

Upon successful completion of this course the student will have:

1. Gained an understanding and practical experience of systematic quantitative and qualitative problem solving using the key concepts of atoms, molecules and chemical reactions.
2. Been introduced to the essential concepts of the quantum mechanical nature of the universe and the impact this has on the periodic properties of the elements.
3. Become familiar with the principles of bonding theory and the strengths and weaknesses of the three principle models for understanding chemical bonds.
4. Developed a molecular perspective in order to understand the interatomic and intermolecular interactions governing the properties of solids, liquids and gases.
5. Gained a practical and conceptual framework for understanding and solving problems involving reversible chemical reactions with a focus on aqueous equilibria including acids, bases and buffers.

### Course Evaluation

| Course Component | Weighting | Due Date |
| --- | --- | --- |
| iClicker Participation | 5% | In each lecture |
| Pre-Laboratory Quizzes | 5% | 1st attempt completed before each lab; best of two attempts is used |
| Laboratory Practice and Skills | 5% | In each laboratory period |
| Laboratory reports | 20% | In tutorial the week following lab completion.  |
| Assignments (Mastering Chemistry) | 15% | As per individual assignment, see Learning System |
| Midterm Examination | 20% | Monday, Oct. 17nd 7 pm-9pm |
| Final Examination | 30% | TBD, see exam schedule |
| Total | 100% |  |

Note: The final date to withdraw from fall half courses without academic penalty is Nov. 8th, 2016.

### Course Component Descriptions

* iClicker Participation: Sporadically during lectures, iClicker questions are posed to the class. These are multiple choice question designed to help students understand course content.
* Pre-laboratory quizzes (Learning System): Prior to starting each laboratory, students are asked basic questions about the laboratory experiment and concepts through the Learning System environment. Students are allowed up to two attempts for each quiz. The best grade achieved in any of the attempts is the student grade for the quiz. At least one attempt must be performed BEFORE a student is allowed to commence the laboratory experiment. Students who have not completed at least one attempt of the prelab quizzes prior to the lab will not be allowed to perform the experiment.
* Laboratory Practice and Skills: Based on in-laboratory participation and behaviour. This grade is assigned by teaching assistants evaluating the requirements discussed in each week’s laboratory. Further details are given in lab.
* Laboratory: Biweekly, students attend laboratory in CSB D116 to perform experiments for the course. For each experiment, a procedure and a report template are available on the Learning System. The report template must be used for submission of the lab report. Each student must complete an original submission of the report using their own experimental data.
* Lab report submission and late laboratory reports: Chemistry 1000H has a strict laboratory lateness policy. Please be aware that your laboratory report is due electronically through the Learning System at 11:55 pm one week after your lab period. You may submit it at any time prior to that date and time. You are allowed one late submission per semester with a penalty of 25% for anything up to 24 hours late and 100% thereafter.
* Tutorials: One week after your laboratory you will have a two hour tutorial. The tutorial is led by a Teaching Assistant and is an opportunity to work on your laboratory report and the tutorial questions provided through the Learning System.
* Assignments: Assignments are delivered using the Mastering Chemistry online resource. Up to 6 assignments focussing on applications of the course content will be assigned. Each assignment is due by the date specified in Mastering Chemistry. Late assignments will be penalized at a rate of 12% per day, to a maximum penalty of a 50% reduction on a late assignment until the last day of class.
* Midterm Test: The midterm test will be entirely multiple choice and will focus on material delivered in lecture. Laboratory material will not be directly examined except where the conceptual material overlaps with lecture content. Students will be given 1 hour 50 minutes for the test unless otherwise specified.
* Final Exam: The final exam will focus on material delivered in lecture. Students will be allowed 3 hours to write the final exam. The final exam is cumulative, and will cover the entire semester. Laboratory material will not be directly examined except where the conceptual material overlaps with lecture content.

### Weekly Schedule (Tentative)

The topics listed here are a general guideline and may be subject to minor modifications as the course progresses. Specific chapter readings and recommended questions along with links to assignments will be provided on Learning System.

| Week | Description |
| --- | --- |
| Weeks 1-2; Ch. 1-4 | Chemical problem solving and measurement, working with atoms and molecules, understanding chemical reactions and stoichiometery.  |
| Weeks 3-4; Ch. 7, 8 | Understanding the quantum mechanical model of the atom, periodic properties of the elements  |
| Weeks 5-6; Ch. 9, 10 | Chemical bonding: building molecules out of atoms using Lewis theory, valence bond theory and molecular orbital theory, understanding the shapes of molecules |
| Reading Break |  |
| Weeks 7-8; Ch. 5, 11 | Interatomic and Intermolecular Interactions: understanding Gases, Liquids and Solids  |
| Weeks 9; Ch. 12 | Solutions, solute and solvent interactions  |
| Weeks 10-12;Ch. 14-16 | Chemical Equilibria, acids and bases and buffers |

### Chemistry Department Policy on Completion of Course Work

* The Department of Chemistry considers that completion of all components of a course is necessary for a student to be given credit in that course. Therefore, it is the policy of the Department that a student must complete, and hand in if applicable, all material associated with each component of the course. This applies equally to work that is handed in or completed too late to earn any marks in the course, in conjunction with the policy of the course instructor on lateness.
* Students who fail to meet this requirement for reasons that would make it reasonable to assign an ”incomplete” mark for the course should consult the instructor well before on which final marks are due for the course in question. In the absence of an incomplete standing being assigned, the student will receive a mark of “0” and an “F” grade in the course.

### University Policies

* Academic Integrity: Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from failure on an assignment to expulsion from the University.  Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent University’s Academic Integrity Policy. You have a responsibility to educate yourself – unfamiliarity with the policy is not an excuse. You are strongly encouraged to [visit Trent’s Academic Integrity website to learn more](http://www.trentu.ca/academicintegrity).
* Access to Instruction: It is Trent University's intent to create an inclusive learning environment. If a student has a disability and documentation from a regulated health care practitioner and feels that he/she may need accommodations to succeed in a course, the student should contact the Student Accessibility Services Office (SAS) at Blackburn Hall, Suite 132, 705-748-1281 or email sas@trentu.ca.
* Clickers (Personal Response Systems): As clicker records are used in this course to compute a portion of course grades, the use of a clicker or iclicker REEF account other than your own is an academic offence. In lecture or tutorial, possession of a clicker other than your own or accessing a REEF account other than your own may be interpreted as intent to commit an academic offense.