

# Student Course Information

## General Chemistry II

### CHEM\*1050

### Winter 2013

**Course Calendar Description:** F,W, (3-3) [0.50 credit] This course provides an introductory study of the fundamental principles governing chemical transformations: thermodynamics (energy, enthalpy, and entropy); kinetics (the study of rates of reactions); and redox/electrochemistry. Prerequisite: CHEM\*1040

**Course Co-ordinator:** Prof. Dan THOMAS SCIE 2515 [dfthomas@uoguelph.ca](mailto:dfthomas@uoguelph.ca)

Lecturers	Section	Room	Days	Time
Dr. Rick de Laat <a href="mailto:rdelaat@uoguelph.ca">rdelaat@uoguelph.ca</a>	1	ROZH 104	MWF	12:30 P.M.
Prof. Lori Jones <a href="mailto:lojones@uoguelph.ca">lojones@uoguelph.ca</a>	2	ROZH 104	TuTh	8:30 A.M.
Dr. Rick de Laat <a href="mailto:rdelaat@uoguelph.ca">rdelaat@uoguelph.ca</a>	3	ROZH 104	MWF	3:30 P.M.

#### 1. Course Materials

- (a) **Textbook.** General Chemistry, 10<sup>th</sup> ed. Ebbing and Gammon, Houghton Mifflin (2013), which included a Student Solution Manual and Essential Algebra for Chemistry Students if you purchased it in the bookstore last semester. Earlier editions are also acceptable, though the numbering of end-of-chapter questions may be different.
- (b) **Laboratory Manual** for CHEM\*1050. Purchased in the Department.
- (c) **Safety Goggles** (not safety glasses). Purchased in the Department.
- (d) A **lab coat** is required.
- (e) **Scientific calculator** with ln, exp or e<sup>x</sup>, log<sub>10</sub> and 10<sup>x</sup> functions. Calculators or notebook computers capable of storing text information are **NOT** allowed in examinations.
- (f) **Stapler.** All lab reports must be stapled prior to being put into the Grey Boxes near MACN 128.
- (g) **Sapling Learning Access.** To complete the optional online Sapling Homework you will need to purchase access either online with a credit card ([www.saplinglearning.ca](http://www.saplinglearning.ca)) or in the University Bookstore. If you purchased two-semester access in the fall for CHEM\*1040, you may already have it.
- (h) **An iClicker Student Response Unit** is available from the University Bookstore. Students will use the “clicker” unit to register their responses to questions posed in class. A score will be awarded towards your final grade depending upon your level of participation in these activities. This is optional. The grading scheme is described further on.

## 2. WET LABORATORY

*Begins in Week 1 which starts Monday January 7. Bring your lab manual.*

- (a) Students attend their wet chemistry labs according to their lab section number. If your lab section is an odd number (e.g. 0113 – Lab section 13) then you follow the Group A Student schedule. If your lab section is an even number e.g. 0214 Lab section 14 then you follow the Group B Student schedule. The schedules are listed later in this document. The laboratory is an integral part of the course and you **must** attend all wet laboratories.
- (b) **Laboratory Time and Authorization. Bring “My Class Schedule.”**  
You must attend your first lab to receive mandatory safety training. This safety lab is a prerequisite for all subsequent labs. As proof that you are registered in a particular lab, you **must** bring a computer printout dated January 1, 2013 or later of “My Class Schedule” from Web Advisor to your first lab.
- (c) **Laboratory Quizzes - completed on-line**  
A pre-lab quiz will be given on Sapling for some of the wet labs. You do not need to purchase access to the Sapling Homework in order to complete the pre-lab quizzes. See the Laboratory Schedule for experiments which have pre-lab quizzes. These quizzes count towards your laboratory grade and will usually be based on the experiment that you are about to perform. Each pre-lab quiz will open on the Thursday before your particular wet lab and will close on Monday at 7:00 A.M. of the week of your lab. Note that this is different from last semester.
- (d) **Laboratory Reports**  
Laboratory reports normally are handed in exactly one week after your lab period (and not an earlier day) and before 4:30 p.m. Put your **stapled** report in the appropriate Grey Box (labeled with your lab room number) located near MACN 128. If your report is not received a grade of zero will be assigned.
- (e) **Missed Wet Laboratory.**  
Refer to the Purple Page for Lab Absences in First-Year Chemistry on the CHEM\*1050 website.
- (f) **Laboratory Exemptions for students who are repeating CHEM\*1050.**  
*DEADLINE: Wednesday, January 9.* Students who obtained a lab grade of **at least 60 per cent** but who failed the course as a whole may apply for a laboratory exemption. The laboratory work must have been completed **during one of the three preceding semesters** in which the course was offered. Apply online at [www.chemistry.uoguelph.ca/labexemption](http://www.chemistry.uoguelph.ca/labexemption). Students who are granted a wet lab exemption **must nevertheless complete the online dry computer labs available on Courselink** and may attend any Midterm Preparation Problems Lab in Week 5.

## 3. WEB SITE

The CHEM\*1050 website is an integral part of the course and must be accessed several times per week. All important announcements for the course will be made on the website.

The web site can be accessed through the portal <http://www.uoguelph.ca/courselink/> Your Username is your Central Login (that part of your assigned University of Guelph e-mail address before the @ sign). Your password is your Central Login Account Password. The course website provides numerous resources such as practice quizzes and a discussion board.

#### 4. COURSE HELP

(a) **Your Lecturer.**

Your professor will be available at certain times for consultation and help. Office hours will be arranged at the first class meeting.

(b) **Chemistry Learning Centre for Lecture and Lab Help.**

Assistance is available in the Chemistry Learning Centre in Lib360 in the Science Commons on the third floor of the library. A graduate teaching assistant will be available to assist you with both lecture and laboratory material. The Chemistry Learning Centre schedule is posted on the CHEM\*1050 website.

(c) **Supported Learning Groups (SLGs)**

SLGs are regularly scheduled small group study sessions. Attendance is voluntary and open to all students enrolled in the course. The study groups are facilitated by successful senior undergraduate students who have recently taken the course. Students who attend SLG sessions have an opportunity to apply and demonstrate their understanding of course concepts in a safe practice environment. The group study format exposes students to various approaches to learning, problem-solving, and exam preparation. The session times and locations will be available at the SLG web site. There is a link to the SLG page on the CHEM\*1050 website.

(d) **Course Web Site.**

The CHEM\*1050 website contains a variety of materials to assist you with the course. There are practice quizzes and examinations, examples of problems with full solutions, a question of the week, and much more.

#### 5. Evaluation

(a) **Online Sapling Homework - optional**

The Sapling Homework provides a means for you to test your learning weekly. You may choose not to complete the online Sapling Homework and the weights of your midterm and final examinations will be increased proportionally. If you choose to do the Sapling Homework, there will be eleven assignments delivered through Sapling. Normally you will have one week to complete the assignments which are due by 11:55 p.m. on Wednesdays. The first homework assignment is due January 16. If an assignment is not attempted a grade of zero is assigned. There will be **eleven** assignments and **the top ten** will be used in calculating your final homework grade. Dropping one allows you to miss one without penalty. Don't use it up too soon in the semester. Better yet, do them all because of the learning advantage it provides. Further details are available on the course website. In addition, there is a Practice Assignment and a Math Review which are **not** for credit which may be completed.

(b) **i>Clicker Questions in Class - optional**

Participation in classroom discussions and interacting with your class colleagues is an important aspect to successful learning. One proven approach has been the use of i>Clicker response systems. If you really want to learn and succeed in the class, you will want to participate in the questions posed by your lecturer during the class. The learning value with these devices lies not so much in getting the right answer - in fact, the best questions are those in which you get the wrong answer - but rather in confronting an unknown situation and being forced to think through it. This is really when new learning occurs (in learning theory this is called cognitive dissonance). For this reason, we will not be giving marks for correct answers - correct answers are for the exams. Rather, we need to have you honestly participate in the class using these clickers. We know of many ways students can get around doing the hard work of thinking. But we hope that you will avail yourself of this learning tool and work with your colleagues and the instructor.

To this end, we will provide 3% of your grade to be calculated as follows. There will be many days throughout the semester in which clicker questions will be posed. If you respond

to the majority of the questions on a given day, then it will be taken that you have participated in the i>Clicker questions that day. If you participate in clicker questions for at least 85% of the days on which questions are asked, you will receive 3 marks towards your final grade. If you participate for at least 60% of the days, you will get 2 marks; at least 35% will earn you 1 mark. If you choose to not participate at all, then that 3% will be added to your exams. We expect that the class will divide into those who fully participate and receive 3% towards their final grade, and those who do not and have that weighting add to their exams. We know that students will do better on their exams if they participate in this learning activity and we feel it is important to offer this to those who are willing to make the effort.

- (c) On-line Dry Laboratory Work (courselink.uoguelph.ca) - required** Each of the three computer labs consists of three parts - experimental information in your Lab Manual, the Experiment itself, and a Marking Module. All experiments are delivered on the course website. The Experiment can be done as many times as you wish. Each time you repeat the experiments you will be given different conditions. After you are satisfied with your results and have completed all calculations **only then** open the Marking Module to submit your results.
- 1. On-line Computer Lab A Bomb Calorimeter.** It is to be completed between Jan. 14 and Feb. 3. Your results must be submitted to the Marking Module by Feb. 3, 11:59 p.m.
  - 2. On-line Computer Lab B  $\Delta G^\circ$ ,  $\Delta H^\circ$ ,  $\Delta S^\circ$**   
It is to be completed between Jan. 28 and Mar. 3. Your results must be submitted to the Marking Module by Mar. 3 at 11:59 p.m.
  - 3. On-line Computer Lab C Electrolysis.**  
It is to be completed between Feb. 25 and Mar. 17. Your results must be submitted to the Marking Module by Mar. 17 at 11:59 p.m.
- (d) Wet Laboratories and Laboratory Quizzes - required unless exempted**  
As mentioned above, the wet labs and the associated lab quizzes (on-line) are required unless you are allowed an lab exemption having successfully completed the lab portion in an earlier course attempt. Be sure to apply on-line for the lab exemption by January 9 (see earlier in this document for details).
- (e) Midterm Examination Saturday, February 9, 9:00 to 10:30 A.M. - required**  
Room assignments will be posted on the CHEM\*1050 website. This examination covers the material from Weeks 1 to 5.  
**Midterm Conflict:** Go to [www.chemistry.uoguelph.ca/alternateexam](http://www.chemistry.uoguelph.ca/alternateexam), select this course and indicate the reason for needing the alternate exam time. Having another exam nearby - even on the same day - is not an acceptable reason for taking the alternate exam time, unless the exams actually overlap in time. The alternate exam time is Thursday, February 7 from 7:00 to 8:30 P.M. The location will be announced later.
- (f) Final Examination: Friday, April 19, 2:30 to 4:30 P.M. - required**  
The final examination covers the entire course. The rooms will be assigned by the registrar and you will be able to find your room assignment by checking [www.uoguelph.ca/registrar/scheduling/index.cfm?exam\\_winter](http://www.uoguelph.ca/registrar/scheduling/index.cfm?exam_winter) prior to the final exam period.
- (g) All examinations will be closed book, with **no** written or printed materials of **any** kind permitted. Computers or calculators capable of storing text information or formulas are **not allowed**.**
- (h) The course grade will be calculated according to the following schemes; the grading approach that gives you the highest final grade will be used.**

Evaluation Activity	Scheme 1	Scheme 2	Scheme 3	Scheme 4
Mid-Term Examination	24%	25%	29%	30%
Final Examination	43%	45%	48%	50%
Wet Laboratories and Quizzes	15%	15%	15%	15%
On-line Dry Laboratories	5%	5%	5%	5%
Sapling Homework (optional)	10%	10%	0%	0%
i>Clicker Questions (optional)	3%	0%	3%	0%

## 6. POLICY ON MISSED EXAMINATIONS.

A grade of zero will be assigned for any missed examination except for valid medical or compassionate reasons.

**Missed Midterm Exam.** For a missed midterm examination, documentation must be given to your professor in person. There is no need to consult a doctor to obtain a note. However, if you have consulted a medical practitioner because of illness or injury, the doctor's note is acceptable documentation. In the case of a missed midterm, if a valid reason for missing the midterm is received, the weighting value of the midterm will be added to the final examination.

*No make-up midterm will be given.*

**Missed Final Exam.** Consult the Undergraduate Calendar and your Program Counsellor.

## 7. Lecture Schedule

Please read the relevant sections in the textbook before coming to the lecture.

Weeks/Dates	Topics	Textbook
Weeks 1 - 5 January 7 - February 8	Energy, Heat, Enthalpy, Work, Thermochemical Equations, Calorimetry, Hess's Law, Standard Enthalpies of Formation. Bond Enthalpies, Ionic Compounds Entropy, Free Energy, Thermodynamics and Equilibrium. Bioenergetics.	Sections 6.1 - 6.9 Section 18.1  Sections 9.1 and 9.11 Sections 18.2 - 18.7
Saturday February 9	Mid-Term Examination. Includes material from weeks 1 - 5	
Week 6 February 11 - February 15	Redox processes, half-reactions, balancing redox reactions.	Section 19.1
February 18 - February 22	Winter Break - No Classes	
Weeks 7 - 9 February 25 - March 15	Voltaic Cells, Cell notation, Electromotive Force, Standard Cell Potentials, Standard Electrode Potentials, Equilibrium Constants from Cell Potentials The Nernst Equation, Commercial Cells Electrolysis	Sections 19.2 - 19.11

Weeks/Dates	Topics	Textbook
Weeks 10 - 12 March 18 - April 5	Reaction Rates, Experimental Kinetics, Rate and Concentration, rate Laws, Temperature and rate, Arrhenius Equation, Reaction Mechanisms, Catalysis. Radioactive Decay	Sections 13.1 - 13.9  Section 20.4
Friday April 19	Final Exam. Covers all course material, but with emphasis on material covered since the mid-term (Electrochemistry and Reaction Kinetics).	

### 8. Lab Schedule

	Group A Students (Odd Section Number)	Group B Students (Even Section Number)
Week 1: January 7 - January 11	Check In and Safety. Arrive at regular starting time.	Check In and Safety. Arrive 90 minutes AFTER regular starting time.
Week 2: January 14 - January 18	Experiment 1: Enthalpy of Formation. Prelab Quiz (due 7:00 A.M. January 14) on WHMIS and Experiment #1.	On-line Computer Lab A - Bomb Calorimeter.
Week 3: January 21 - January 25	On-line Computer Lab A - Bomb Calorimeter.	Experiment 1: Enthalpy of Formation. Prelab Quiz (due 7:00 A.M. January 21) on WHMIS and Experiment #1. Arrive at regular start time.
On-line Computer Lab #1 results must be submitted by both groups by Sunday, February 3, 11:59 P.M.		
Week 4: January 28 - February 1	Experiment #2: Equilibrium Constant. Prelab Quiz (due 7:00 A.M. January 28).	On-line Computer Lab B - $\Delta G^\circ$ , $\Delta H^\circ$ , and $\Delta S^\circ$ .
Week 5: February 4 - February 8	Mid-Term Exam Preparation Problems Lab. Arrive at regular starting time.	Mid-Term Exam Preparation Problems Lab. Arrive 90 minutes AFTER regular starting time.
Week 6: February 11 - February 15	On-line Computer Lab B - $\Delta G^\circ$ , $\Delta H^\circ$ , and $\Delta S^\circ$ .	Experiment #2: Equilibrium Constant. Prelab Quiz (due 7:00 A.M. February 11). Arrive at regular start time.
February 18 - February 22	Winter Break	Winter Break
Week 7: February 25 - March 1	Experiment #5: Voltaic Cells. Prelab Quiz (due 7:00 A.M. February 25).	On-line Computer Lab C - Electrolysis.
On-line Computer Lab #2 results must be submitted by both groups by Sunday, March 3, 11:59 P.M.		

	<b>Group A Students (Odd Section Number)</b>	<b>Group B Students (Even Section Number)</b>
Week 8: March 4 - March 8	On-line Computer Lab C - Electrolysis.	Experiment #5: Voltaic Cells. Prelab Quiz (due 7:00 A.M. March 4). Arrive at regular start time.
Week 9: March 11 - March 15	Experiment #7: Chemical Kinetics	Independent Learning Work. Do not come to the lab.
On-line Computer Lab #3 results must be submitted by both groups by Sunday, March 17, 11:59 P.M.		
Week 10: March 18 - March 22	Independent Learning Work. Do not come to the lab.	Experiment #7: Chemical Kinetics. Arrive at regular start time.
Week 11: March 25 - March 29	Clean Up. Arrive at regular starting time.	Clean Up. Arrive 30 minutes AFTER regular starting time.
Documentation is due to your T.A. for all lab absences.		
Week 12: April 1 - April 5	Check Lab Grades. Arrive at regular starting time.	Check Lab Grades. Arrive 30 minutes AFTER regular starting time.
All missed labs without proper excuse notes receive zero.		

## 9. END of CHAPTER PROBLEMS

Problems are assigned to reinforce the principles covered in lectures, to help you to develop problem-solving skills, and to check your own knowledge. Work done on the problems is not graded, but there is a good correlation between mastering the problems on a week-by-week basis and performance in the course as a whole.

### Work the problems in the week that the material is covered in lectures.

A common reason why students fail first year Chemistry is that they fall so far behind with the material that they never catch up. Lectures become harder to comprehend without the reinforcement of constant practice.

**Work the problems first, then look at the solutions.** Working from the solutions is **not** useful for learning.

### Solutions to problems

The detailed solutions to the problems are in the Student Solutions Manual. Several copies of the Student Solutions Manual will be on two-hour reserve in the library along with several copies of the text.

#### Topic I: Thermodynamics. Weeks 1 to 5.

6.35, 6.37, 6.41, 6.53, 6.55, 6.59, 6.61, 6.67, 6.69, 6.79, 6.81, 6.85, 6.99, 6.103, 6.115, 6.117, 6.155.

18.23, 18.25, 18.27, 18.29, 18.31, 18.35, 18.39, 18.43, 18.45, 18.55, 18.61, 18.65, 18.69, 9.85, 9.107, 9.109,

18.73, 18.75, 18.83, 18.85, 18.89, 18.97, 18.108, 18.121.

#### Topic II: Electrochemistry. Weeks 6 to 9.

19.39, 19.41, 19.101, 19.25, 19.33, 19.43, 19.45, 19.47, 19.51, 19.53, 19.55, 19.59, 19.61, 19.63, 19.67, 19.71, 19.75, 19.79, 19.83, 19.85, 19.87, 19.91, 19.93, 19.95, 19.105, 19.111, 19.113, 19.117, 19.119, 19.123, 19.141.

#### Topic III: Chemical Kinetics. Weeks 10 - 12:

13.31, 13.33, 13.41, 13.45, 13.49, 13.53, 13.55, 13.57, 13.59, 13.63, 13.69, 13.71, 13.75, 13.79, 13.81, 13.85, 13.99, 13.101, 13.105, 13.107, 13.117, 13.119, 13.125, 13.143.

20.27, 20.61, 20.63, 20.67, 20.75.

## 10. UNIVERSITY POLICIES

- a) **E-mail Communication** – As per university regulations, all students are required to check their uoguelph.ca e-mail account regularly: e-mail is the official route of communication between the University and its students.
- b) **Accessibility** – The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Centre for Students with Disabilities as soon as possible at 519-824-4120 ext. 56208 or email [csd@uoguelph.ca](mailto:csd@uoguelph.ca) or see the website: <http://www.csd.uoguelph.ca/csd/>
- c) **Academic Misconduct Policy** – The University of Guelph is committed to upholding the highest standards of academic integrity and enjoins all members of the University community to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor. The Academic Misconduct Policy is detailed in the Undergraduate Calendar:  
<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>
- d) **Recording of Materials** – Presentations which are made in relation to course work – including lectures – cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.
- e) **Resources** – Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:  
<http://www.uoguelph.ca/registrar/calendars/index.cfm?index>
- i. **Drop Date:** The last date to drop one-semester courses, without academic penalty, is March 8. For regulations and procedures for dropping courses, see the Undergraduate Calendar:  
<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>
  - ii. **Schedule of Dates:** [www.uoguelph.ca/registrar/calendars/undergraduate/current/c03/index.shtml](http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c03/index.shtml)