

General Chemistry II (CHEM 102)

Winter Term, 2016

Course components:

1) lecture; 2) online homework (MasteringChemistry); 3) recitation; and 4) laboratory.

Objectives:

At the end of the course, students should be able to:

- understand the concept of the atomic and molecular nature of matter;
- learn the basis of the structure and the physical properties of solids, liquids, and gases;
- understand the factors affecting the chemical reactivity of solids, liquids, and gases;
- solve quantitative problems with stoichiometry, chemical equilibria, and rates of chemical reactions;
- use chemical terminology and units of measures correctly;
- run elementary chemistry experiments and interpret experimental data using appropriate software tools.

Lecturers:

- Dr. **Monica Ilies**; Chemistry Department; Office: Disqué 224 [course coordinator]
 - Lecture C: Mon, Wed, Fri; 11:00-11:50 AM; Disqué 103
 - Lecture D: Mon, Wed, Fri; 1:00-1:50 PM; Disqué 103
- Dr. **Anthony Addison**; Chemistry Department; Office: Disqué 418
 - Lecture E (honors): Mon, Wed, Fri; 2:00-2:50 PM; Disqué 103
- Dr. **Daniel King**; Chemistry Department; Office: Disqué 509
 - Lecture A: Mon, Wed, Fri; 9:00-9:50 AM; Disqué 103
- Dr. **Craig McClure**; Chemistry Department; Office: Stratton 418
 - Lecture F: Mon, Wed, Fri; 4:00-4:50 PM; Disqué 103
- Dr. **Molly O'Connor**; Chemistry Department; Office: Stratton 410
 - Lecture B: Mon, Wed, Fri; 12:00-12:50 PM; Disqué 103

First e-mail contact for general course inquiries:

Dr. Monica Ilies: mi73@drexel.edu

First e-mail contact for MasteringChemistry inquiries:

Dr. Paul Deroo: pwd26@drexel.edu

First e-mail contact for laboratory and recitation inquiries:

Please see the contact information for the corresponding instructors (posted to the course website).

Course Website: <https://learn.dcollege.net>

Note: Most of our communication will be by e-mail and via the course website. **Please check the course website and your Drexel e-mail account regularly. Make sure your Drexel e-mail account is set up correctly (see the instructions in the “Welcome aboard” e-mail that is also posted on the course website in case you did not receive it).**

Required Course Materials:

Note: Please read the “CHEM 102 - Welcome aboard e-mail” for instructions about how to purchase/use course materials. [The welcome e-mail is also posted on the course website in case you did not receive it.](#)

If you took CHEM 101 at Drexel University last fall, you do NOT need to purchase ANY new materials.

Textbook:

Nivaldo Tro, *Chemistry: Structure and Properties*, Pearson, Ed: 2015.

Note: You do not need to bring the textbook to any of your CHEM 102 classes. Therefore, you can purchase EITHER the e-copy OR the hardcopy of the textbook. The hardcopy can be a used copy from last year.

Laboratory Manual:

E. Thorne, *Laboratory Manual for General Chemistry, Drexel University, CHEM 101/CHEM 102 Academic Year 2015-2016.*

Note: Old copies of the lab manual **cannot** be used because the lab manual has been modified from previous years. Also, the lab manual contains original data sheets that you will need to work on.

Supplementary Materials

a) **MasteringChemistry access code**, EITHER as part of the textbook bundle OR purchased separately.

Notes:

- a₁) **Unless you took CHEM-050 over the summer, CHEM 101 over the fall and/or CHEM 101/102 during the 2014-2015 academic year**, the Mastering Chemistry access codes must be new, cannot be shared or reused and are valid for 24 months.
- a₂) If you opt for buying course materials directly from Pearson, you DO NOT NEED a course ID for purchasing. Simply select "No" when asked about it. **The course ID number is needed ONLY to register for the online homework AFTER you have the access code. The course ID will be unique for each lecture section and it will be provided during the first lecture.** If you buy the package “MasteringChemistry access code + e-book”, do not expect to get a separate number for the access code. Once the purchase is made online, you gain instant access to the e-book. Once you type in the course ID (after you receive it during the first lecture), you will have access to the online homework. **When registering for Mastering Chemistry, please use your Drexel e-mail address as the e-mail address and your Drexel ID number when asked for it. Your Drexel ID number is the 8-digit number, and NOT the Drexel username (e.g., abc12) associated with your Drexel e-mail account.**
- a₃) **Do not lose the access code or you will be required to purchase a new code to replace it. Do not forget the password for your Mastering Chemistry account.**

b) A **simple scientific or graphing calculator** for use in labs and exams.

Note: A periodic table and the values for constants will be provided as part of your test package at the time of each exam.

c) A pair of **safety glasses or goggles** and a **lab coat** that **must** be worn **at all times** in the laboratory.

1. Grading Structure:

Activity	% Grade	Additional Information
In-term Exams	35	See section 3.
Final Exam	25	See section 4.
MasteringChemistry Assignments	10	Do NOT register for MasteringChemistry before reading the “Supplementary Materials” sections above and the “Mastering Chemistry Instructions” posted on the course website.
Recitation	10	See section 5.
Lab	20	See section 6.
Total	100	

Grading policy:

As a general criterion, students who meet all the requirements will earn grades in the following ranges: **A- to A+** if they score **at least 90%** overall; **B- to B+** if their final score $\geq 80\%$; **C- to C+** if final score $\geq 70\%$; **D to D+** if final score $\geq 60\%$. Exact grade boundaries will be determined at the end of the term in a meeting with all lecturers. When determining grade boundaries, we consider student performance across all exams. **There is no rounding** in this course. Questions about final grades should be raised as soon as possible. **Please feel free to contact your corresponding instructors for any questions about your grades.** The course instructor(s) may contact you via e-mail if there are problems with your grades.

2. Lectures:

We will give lectures on topics and sections of the text listed in the Course Schedule (see p. 8). To make the most out of lecture, students are strongly encouraged to read the indicated subchapters **BEFORE** going to class. Some of the subject matter not covered in lecture will be covered in lab. Some of the lecture material will be posted to the course website, while some topics will be discussed only in class. Therefore, **constant attendance in lectures is highly recommended. Not all required material will be covered in lecture.** You are responsible for all material in the sections of the text listed on the Course Schedule, whether covered in lecture or not. The Course Schedule is provided as a guide and will be revised if dictated by prevailing circumstances (e.g., pedagogical purposes; level of students' knowledge, etc.). **Cell phone use is disruptive to the classroom environment; hence instructors have the right to prohibit it during class.**

3. In-term exams: non-cumulative

Three, 50 min exams will be given as **indicated in the Course Schedule** (see p. 8). Each in-term exam will consist of about **25 multiple-choice questions. Exams may include questions on lab material.** The average of the three in-term exams will represent **35% of the final CHEM 102 grade.**

Review sheets and a practice exam for each exam will be posted on the course website. A review session will be held before each exam. **The dates and times for the review sessions will be announced in class and posted on the course website.**

After each exam starts, no student will be allowed to leave the testing room without handing in the exam. **Once a student leaves the testing room, he/she will not be allowed to re-enter it for any reason.** Students arriving late to the exam, after any other student has left, will not be permitted to take the exam. All students are responsible for bringing to the exam their own operational writing instruments and calculators - **no sharing will be allowed.** A periodic table, key equations and values of important constants will be provided as needed. **No other materials will be allowed.**

It generally takes 2-5 school days for grades to be reported back to students.

Active cell phones and the use of random-access devices (e.g., MP3 players, tablets, iPods) are NOT ALLOWED in exam rooms. Cell phones MAY NOT be used as a calculator on exams.

There will be an opportunity **during the last week of classes** to make up **ONLY ONE** missed exam. The make-up exam will include material covered after the third exam and will be taken at the same time by all students who are eligible to take it. **To be eligible to take the make-up exam, a student must e-mail Dr. Ilies as soon as possible with a reasonable explanation for missing the initial exam.** Eligible students will be notified by email regarding the date, time, and location of the exam (about one week in advance). *The make-up exam can only be used to replace a missed exam, NOT to improve a grade on an exam that was taken.* There will be **no opportunity to retake the make-up exam**, regardless of the reason for missing it.

4. Final Exam: cumulative

The final exam will be a **2 hour exam** held during final exams week. The date, location and start time will be set by the University, announced in class, and posted to the course website. The final exam will consist of about **45-50 multiple-choice questions** and represents **25% of your final grade.** **A student who a) does NOT score at least 45 on the final exam AND b) ALSO received a failing grade (that is, < 60) on one of the in-term exams will NOT pass the course, regardless of his/her prior performance in the course.**

All rules mentioned in Section 3 apply to the final exam, too. There is NO MAKE UP FOR THE FINAL EXAM. Students MUST be present for the final.

Final Exam Week is Tue, March 15th – Sat, March 19th. Students should expect to be at Drexel the entire week. **The final exam will NOT be rescheduled to accommodate travel plans.**

5. Recitations:

Recitations are designed to give you experience in explaining and working problems. The recitation instructors are prepared to answer *any* questions in this chemistry course, but priority will be given to those on the current subject matter. Students are expected to solve the **problems assigned for Recitation** (listed in the **Course Schedule** - see p. 8) **before** coming to class. It is also expected that **students in the honors sections** will have fewer questions about the regular problems assigned for recitation, since they are supposed to have a better background for a deeper understanding of the material presented each week. Consequently, **additional problems** with a higher degree of difficulty are assigned to these sections. The aim is for honors students to develop specific critical thinking skills.

Recitation grades will be determined based on both **participation and attendance.** Since there are 10 recitations, **each missed recitation** will translate into **10 points lost** (5 points for attendance and 5 points for participation). If you cannot attend your regularly scheduled recitation, you **must** attend another recitation **that**

very same week AND you **MUST** sign in, with that instructor's permission, to earn credit for that week. **You must notify your regular instructor to let him/her know that you attended another recitation. You do not need to inform the course coordinator about any make-up. You may only make up 3 recitations during the term.**

Note: Recitations scheduled to meet on **Mon, Jan. 18th** (MLK University Holiday), will be **cancelled**. Students in these sections are encouraged to attend another recitation that week, but will **NOT** lose points if they do not attend another recitation. **These students will have recitation on Mon, Mar. 14th, so all students have 10 recitation classes.**

6. Laboratories:

Laboratory supplements the course material by offering you training in basic experimental techniques, as well as in recording and reporting of experimental results. **You will have a chemistry lab every other week, beginning in week 2 for even-numbered lab sections OR week 3 for odd-numbered lab sections** (see the Laboratory Schedule below).

Laboratory Schedule: Disque Hall (see the Note below for exceptions)

	Lab 1	Lab 2	Lab 3	Lab 4
Title	Exp. # 5 Ester Preparation (non-Honors only) OR Exp. #9 Separating Mixtures (Honors only)	Exp. #6 Kinetics of Alcohol Oxidation	Exp. #7 Acids & Bases	Exp. #8 Solubility Product Constant
Even Number Lab Section	Week of January 11 th	Week of January 25 th	Week of February 8 th	Week of February 22 nd
Odd Number Lab Section	Week of January 18th *	Week of February 1 st	Week of February 15 th	Week of February 29 th

***Note:** Labs for sections **63, 65, 67 and 69** will **NOT** run on **Mon, Jan. 18th** (MLK Holiday). These labs will run on **Mon, Jan. 11th**, in Disqué 302, at the same time as the originally scheduled labs.

For each lab experiment, you are required to submit a **legible, handwritten** procedure **at the beginning of each lab**, which is worth **5 points** of your lab report grade. This procedure should be a **brief summary** (between half- and one-page long) of the **Experimental Procedure subsection** that is part of each experiment in your lab manual (write the summary as steps, with bullets). If you do not hand in this procedure, you will still be allowed to complete the lab, but you will lose the 5 points associated with that report component. **Late submissions of the procedure will not be accepted. The lab instructor will keep your handwritten lab procedures.**

Data sheets **must be signed by the instructor prior to you leaving the lab** and may be shared with your lab partner only!

Each student is required to submit an individual lab report online. **Instructions on how to write and how to submit your lab reports online are posted on the course website in the "Lab Info" folder. Your signed**

data sheet must be uploaded when you submit your lab report. To write lab reports, **use the information** given in **both the detailed grading rubrics** posted on the course website and in the **“Treatment of the Data”** section for each experiment in your lab manual. As a check list, use the **"Laboratory Report"** section at the end of each experiment in your lab manual.

Lab reports are due one week after you do the lab. If you have any difficulty with the online submission of your lab report, you must contact your lab instructor to work out a solution BEFORE the deadline. Five points will be deducted for each day (NOT including weekends or holidays) that **the lab report is late.** Lab reports submitted **more than 2 weeks late** will **NOT** be accepted. **Failure to submit the lab report** during the 2 weeks period will result in **not more than 15-20 points** score for that lab (15 points for the signed data sheet + 5 points for the handwritten lab procedure). You may collaborate with lab partners on the calculations, but **you are not allowed to copy and paste data and calculations from your lab partner!** Your lab report **must** represent your individual work. **Any lab reports that are full or partial copies of any other source will receive zero (0) points at first offense. Students will be reported to the University at the second offense. Any copied phrase from any source constitutes plagiarism, even if the % similarity indicated by Turnitin is low.** Please read Section 7: "Academic Honesty and/or Cheating" below.

The average of the scores for all lab reports **must** be at least **55% to pass the course.** If you are retaking CHEM 102, you may be able to use the lab grade you earned during the previous term. You **must** contact the course coordinator to determine if you are eligible to take advantage of this opportunity.

Everyone MUST wear a long-sleeve lab coat and safety glasses or goggles while in the lab. Prescription glasses must be covered with safety goggles unless written documentation is provided to the instructor that indicates that the lenses meet or exceed the ANSI Z87 1-1989 standard and are equipped with side shields. **Bare legs (i.e., shorts or short skirts/dresses) or open-toed shoes are NOT ALLOWED.** All students must sign a form stating that you understand and will abide by this policy prior to being allowed to work in the lab. ***If you are more than 5 minutes late to lab, you will NOT be permitted to perform the experiment at that time.*** You can make up **ONLY ONE** experiment during the make-up lab week (see the course schedule on p. 8). Therefore, you are strongly advised to attend all of your regularly scheduled lab sessions or make up a missed lab in another section **during the 2 weeks in which the same experiment runs.** The schedule for all lab sections is posted outside the lab rooms. Only 24 students are allowed in the lab at the same time.

Notes: 1) Make-up labs at the end of the term DO NOT run in the same room or at the same time as your regular labs. You will be informed about the location of the make-up labs during lectures and through the course website.

2) The make-up lab day can **ONLY** be used for experiments that were missed, NOT to improve a lab grade OR to redo an experiment for which you never submitted a lab report.

7. Academic Honesty and/or Cheating

Please read, understand, and follow the academic policies on Academic Dishonesty located at http://www.drexel.edu/provost/policies/academic_dishonesty.asp

Students are held to the highest standards regarding honesty in all aspects of the course, including taking exams and in the preparation of lab reports. Cheating, **including misrepresentation of the work of others as your own,** will NOT be tolerated. **Please understand plagiarism and do NOT commit it. Students caught cheating will receive a failing (F) grade** for the assignment and/or course **and will be reported to the University,** according to the material in “Academic Dishonesty” under the “Academic Policies” tab at the following link:

http://drexel.edu/studentaffairs/community_standards/studentHandbook/

8. Disability Services

Students requesting accommodations due to a disability at Drexel University need to present a current Accommodation Verification Letter (AVL) to one of the CHEM 102 lecturers **at least seven (7) days prior to the exam** in order for the accommodations to be made. **Accommodations will NOT be made if the AVL is first provided on the day of the exam. Once submitted, the AVL letter is valid for all exams, including the final exam.**

AVL's are issued by the Office of Disability Resources (ODR). For additional information, visit the ODR website at <http://www.drexel.edu/oed/disabilityResources>, or contact the Office for more information:

215-895-1401 or disability@drexel.edu.

Students with disabilities should also see material under the "Health and Disability Services" tab at the following link:

http://drexel.edu/studentaffairs/community_standards/studentHandbook/

9. Add, Drop and Withdrawal Policies

You can **add this course until the end of week 2**: see http://www.drexel.edu/provost/policies/course_add.asp
If you add this course after the start of the term, you are responsible for completing ALL work that you may have missed.

You can **drop this course until the end of week 2**. The course will then be removed from your transcript:

http://www.drexel.edu/provost/policies/course_drop.asp

The course withdrawal deadline is Fri, February 19th by 5 PM (i.e., the end of week 7). You will have received some graded work prior to this deadline. If you have any questions about your progress at any time of the term, please contact your corresponding instructors. If you choose to Withdraw, a "W" will be recorded in your transcript:

http://www.drexel.edu/provost/policies/pdf/course_withdrawal.pdf

How Will You Learn Chemistry in This Course?

From our past experience, to do well in this course, you must spend at least two hours on chemistry for every hour you spend in class (three hours is recommended). However, the exact time of study needed to be successful really depends on your previous background and personal style of study. **We recommend focusing on successfully completing the homework assignments as we go through the term and only AFTER you read the corresponding lecture notes and/or the textbook. Use the provided review sheets to go through recommended solved examples in the textbook and through specific questions from the self-assessment quizzes at the end of each chapter. These quizzes are actually extra practice exams.** Don't ignore the extra questions at the end of each chapter. The assignments provided should prepare the "average" student to get the "average" grade. Higher grades require more practice. The more you practice chemistry (for example, by solving problems), the faster you will be able to get through the easy problems on an exam and thus have more time to think about the more difficult ones.

Starting week 2, there is free tutoring (**no appointment necessary**) available for additional help in **Stratton 106. Tutoring hours will be announced at the beginning of the second week of classes.**

We wish you much success for the Winter term '16 at Drexel!

Drexel CHEM 102 teaching team

Course Schedule

Week	Component	Monday	Tuesday	Wednesday	Thursday	Friday
1	Date	1/4/2016	1/5/2016	1/6/2016	1/7/2016	1/8/2016
	Lecture topic	12.3 (intermolec. forces); 11.11 (real gases; no calc.)		12.5-12.6 (phase changes)	12.7-12.8; 13.2 (specific propert. of H ₂ O; phase diag.)	
	Recitation	Ch. 11: 91, 92; Ch. 12: 34, 40, 42, 57, 67; Honors: Ch.11: 144				
	Lab	No lab this week				
2	Date	1/11/2016	1/12/2016	1/13/2016	1/14/2016	1/15/2016
	Lecture topic	22.2-22.3 (alkanes: isomers; chirality)	22.4-22.5 (nomencl.: alkanes, alkenes, alkynes; cis-trans isomers)	22.7-22.10 (arom. cmpds.; funct.gr.)		
	Recitation	Ch. 13: 19, 20; Ch. 22: 35, 37, 40, 46b&c, 52, 53a&d, 57a&d; Honors: Ch.22: 56c&d				
	Lab	Exp. 5 or 9 (Esters/Chromatography), even-numbered sections (and 63, 65, 67, 69)				
3	Date	1/18/2016	1/19/2016	1/20/2016	1/21/2016	1/22/2016
	Lecture topic	NO CLASSES		22.11-22.14 (funct.gr.; polymers)	13.5-13.7 (types of solids)	
	Recitation	(MLK day) Ch. 22: 70, 74a&d, 81, 85a&c, 91, 94, 100; Honors: Ch.22: 92, 95				
	Lab	Exp. 5 or 9 (Esters/Chromatography), odd-numbered sections (except 63, 65, 67, 69)				
4	Date	1/25/2016	EXAM 1	1/26/2016	1/27/2016	1/28/2016
	Lecture topic	15.2-15.3 (reaction rate)		15.4-15.5 (orders; rate laws; t _{1/2})	15.6 (only E _a);	15.8 (catalysis)
	Recitation	Ch. 13: 38, 39; Ch. 15: 27, 39, 41, 55; Honors: Ch. 13: 50				
	Lab	Exp. 6 (Kinetics), even-numbered sections				
5	Date	2/1/2016	2/2/2016	2/3/2016	2/4/2016	2/5/2016
	Lecture topic	16.1-16.3 (equil.: def.; K _c ; signif.; related reactions)		16.4-16.6 (K _p ; heterog. equil. ICE tables)	16.7-16.9 (Q; Le Châtelier pr. problem-solving)	
	Recitation	Ch. 16: 22, 33, 45, 47, 56, 71, 73a; Honors: Ch. 16: 23, 57				
	Lab	Exp. 6 (Kinetics), odd-numbered sections				
6	Date	2/8/2016	EXAM 2	2/9/2016	2/10/2016	2/11/2016
	Lecture topic	14.2; 14.4-14.5 (solub. & solutions; no Henry's Law)		17.1-17.3 (acids & bases: intro)	17.4-17.5 (K _a & acid strength)	
	Recitation	Ch. 14: 26, 47, 61; Ch. 17: 33, 36, 40, 45; Honors: Ch. 17: 43				
	Lab	Exp. 7 (Titration), even-numbered sections				
7	Date	2/15/2016	2/16/2016	2/17/2016	2/18/2016	2/19/2016
	Lecture topic	17.6-17.7 (pH, % ioniz. no acids mixtures)		17.8-17.10 (K _b ; K _a -K _b ; no cations as acids; no calc. for polyprot.acids)	18.1-18.2 (buffers)	
	Recitation	Ch. 17: 53, 55, 63, 77, 91, 132, 133; Honors: Ch. 17: 85				
	Lab	Exp. 7 (Titration), odd-numbered sections				
8	Date	2/22/2016	EXAM 3	2/23/2016	2/24/2016	2/25/2016
	Lecture topic	18.3-18.4 (buffers; titrations; indicators no weak bases w. strong acids)		18.5-18.6 (K _{sp})	19.1-19.4 (entropy)	
	Recitation	Ch. 18: 25, 45, 57a&c, 59, 83a&b, 92, 93a&b; Honors: Ch. 18: 54				
	Lab	Exp. 8 (Solubility product), even-numbered sections				
9	Date	2/29/2016	3/1/2016	3/2/2016	3/3/2016	3/4/2016
	Lecture topic	19.5-19.6 (ΔG; spont. pred.)		19.7-19.9 (ΔG° calc.)	9.9; 20.2 (redox - no acid/base sol.)	
	Recitation	Ch. 19: 26, 30, 37c, 41a&b, 49, 61, 75; Honors: Ch. 19: 44				
	Lab	Exp. 8 (Solubility product), odd-numbered sections				
10	Date	3/7/2016	3/8/2016	3/9/2016	3/10/2016	3/11/2016
	Lecture topic	20.3 (voltaic cells)		20.4-20.5 (stand. electro. pot. ΔG; E° _{cell} ; K)	20.6-20.7 (Nernst eq.; batteries)	
	Recitation	Ch. 9: 68; 69; Ch. 20: 40a&b, 49a&b, 57a, 59, 67; Honors: Ch. 20: 70a&b				
	Lab	MAKE UP LAB DAY: Tue, 3/8; 9-5 PM; rooms TBA				
11	Date	3/14/2016	3/15/2016	3/16/2016	3/17/2016	3/18/2016
	Lecture topic	Review				
	Recitation	MLK make-up				
		FINAL EXAM WEEK (Tue, 3/15 - Sat, 3/19)				