

General Chemistry II (CHEM 102) Spring Term, 2016

Lecture: Mon, Wed, Fri; 4:00-4:50 PM/5:00-5:50 PM; Disque 103.

Course coordinator - Dr. Lee Hoffman; Chemistry Department; Office: Disque 417.

First e-mail contact for general course inquiries: Dr. Lee Hoffman - lwh28@drexel.edu

First e-mail contact for MasteringChemistry inquiries: Dr. Paul Deroo - pwd26@drexel.edu

First e-mail contact for laboratory and recitation inquiries: corresponding instructors (posted to course website).

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

Most of our communication will be made via “Announcements” on the course website. **You** are responsible for checking the course website regularly.

Required Course Materials:

Please read the CHEM 102 welcome e-mail for instructions. This e-mail is also posted to the course website, in case you did not receive it.

If you took CHEM 101 or 102 at Drexel University during the fall or winter quarters 2015-16, you do NOT need to purchase ANY new materials.

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

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

Supplementary Materials

- a) **MasteringChemistry access code** (part of the textbook bundle OR purchased separately.)

Note: MasteringChemistry access codes (valid for 24 months) cannot be shared or reused.

- Do not lose the access card or you will be required to purchase a new code to replace it.

- 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) **Safety glasses** or **goggles** and a **lab coat** and **pants** *must* be worn at all times in the laboratory.

Philosophy on education:

As an educator, my aim is to guide students and engage them into a dialogue where, in the end, the student will carry away with her/him a knowledge base for future use. While dissemination of knowledge is a central to learning, just as critical to the educational process is how students learn. Because learning is personal and varies individual-to-individual, the layout of this class has been constructed to accommodate many different learning styles. Acquisition of scientific knowledge, on the other hand, requires disciplined development of higher cognitive skills such as analysis, synthesis, comprehension, application and evaluation. Maximum learning will occur through regular, active participation in class activities, careful reading of the chapter material, and doing problems for practice. As such, you (the student) are expected engage in this class. Further work is expected outside of forum time (4-6 hours per week) to master the content, such as working/solving the suggested problems for recitation and completing the self-assessments on the Mastering Chemistry website.

Student Learning Outcomes:

As a result of successfully completing Chemistry CHEM 102, students will:

1. Employ the scientific method – both theoretically and in a laboratory experience. To meet this outcome, students will apply the scientific method and explore laboratory problems in chemistry.
2. Gather and critically evaluate data using the scientific method. To meet this outcome, students will draw conclusions from laboratory experiments and evaluate the validity of the data.
3. Identify and explain the basic concepts, terminology, and theories of general inorganic chemistry. To meet this outcome, students will identify and explain basic concepts in chemistry, including the concept of the atomic and molecular nature of matter; the basis of the structure and the physical properties of solids, liquids, and gases; and the factors affecting the chemical reactivity of solids, liquids, and gases.
4. Apply selected general and basic inorganic chemistry concepts and theories to contemporary issues. To meet this outcome, students will solve quantitative problems with stoichiometry, chemical equilibria, and rates of chemical reactions; use chemical terminology and units of measures correctly; and run elementary chemistry experiments and interpret experimental data using appropriate software tools.

Individual Student Learning Outcomes can be assessed through recitation attendance and participation, laboratory performance, online homework, three in-term exams, and one comprehensive final.

Grading Structure:

| Activity | % Grade | Additional Information |
|--------------------------------|------------|---|
| Exams | 35 | See in-term exam section (below). |
| Final Exam | 25 | See final exam section (below). |
| MasteringChemistry Assignments | 10 | Do NOT register for MasteringChemistry before reading the instructions sent to you as a pdf file attached to the Welcome e-mail. |
| Recitation | 10 | See recitation section (below). |
| Lab | 20 | See laboratory section (below). |
| Total | 100 | |

Grading policy:

The following outline (based on cumulative points earned through all components of the course) will be used for assigning grades at the end of the term:

| | | |
|----------------------------------|--------------------|--------------------------------|
| A ⁺ 96.60% and above; | A 93.30 - 96.59%; | A ⁻ 90.00 - 93.29%; |
| B ⁺ 86.60 - 89.99%; | B 83.30 - 86.59%; | B ⁻ 80.00 - 83.29%; |
| C ⁺ 76.60 - 79.99%; | C 73.30 - 76.59%; | C ⁻ 70.00 - 73.29%; |
| D ⁺ 66.60 - 69.99%; | D 60.00 - 66.599%. | |

There is no D-, no “extra credit”, and no rounding in this course.

NOTE: A student who A) does NOT score at least 45 on the final exam and also received a failing grade (that is, less than 60) on any one of the in-term exams **OR** B) receives failing grades (that is, less than 60) on all in-term exams and the final exam will NOT pass the course, regardless of his/her performance in all other course components (i.e. 36% of your overall grade **MUST** come from exams, no matter if you receive all possible points from recitation, lab, and MasteringChemistry).

Lectures:

Lectures are given on topics and sections of the text listed in the Course Schedule. Some subject matter not covered in lecture will be covered in lab. Some lecture material will be posted to the course website, while some things will be discussed only in class.

Therefore, attendance in lectures is highly recommended. Since 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.).

In-term exams:

Three (3) 50-minute exams will be given as indicated in the Course Schedule. Each in-term exam will consist of approximately 25 multiple-choice questions and can be taken either in electronic format (through computer or tablet) or via traditional paper format using a scantron answer sheet. Exams may include questions on lab material. After the exam starts, no student will be allowed to leave the testing room without handing in the exam. Once a student leaves the testing room, she/he will not be allowed to re-enter it for any reason. For those taking the electronic exam, results will be provided immediately upon submission of exam. For those taking the paper-based exam that requires use of a scantron, this is a slower process; thus, allow 2-5 business days for grades to be reported.

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

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, some formulas, and values of important constants will be provided as needed. No other materials will be allowed.

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. Hoffman within 24 hours of missing the scheduled exam with a reasonable explanation for missing the scheduled exam. Eligible students will be notified by email regarding the date, time, and location of the make-up exam. *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.

Final Exam:

The final exam will be a 2 hr exam held during the final exams week. As soon as the date, location and start time of the final exam is set by the University, this information will be announced in class and posted to the course website. The final exam will consist of approximately 50 multiple-choice questions and will represent 25% of your final grade.

****There is no make-up for the final exam. Students MUST be present for the final.****

Final Exam Week is Mon-Fri, June 6-10. Students should expect to be at Drexel the entire week. The final exam will NOT be rescheduled to accommodate travel plans.

Recitations:

Recitations are designed to give you experience in explaining and working problems. Recitation instructors are prepared to answer any questions in this chemistry course, with priority given to those on the current subject matter. Students are expected to solve the problems assigned for Recitation (listed in the Course Schedule) *before* coming to class.

Recitation grades reflect both participation and attendance. If you cannot attend your regularly scheduled recitation, you must attend another recitation that same week and sign in, with that instructor's permission, to earn credit for that week. You must also notify your regular instructor to let him/her know you attended another recitation. You do NOT need to inform the course coordinator about the make-up of your recitations. Only 3 make up recitations allowed per term. Students are responsible for finding the different recitation section that they would like to attend (use https://duapp2.drexel.edu/webtms_du/app to check the online Term Master Schedule for an alternative session).

Note: Recitations scheduled to meet on Mon, May 30th (Memorial Day), will be cancelled. Students in these sections are encouraged to attend another recitation that week, yet will NOT lose points if they do not attend another recitation.

Laboratories:

Everyone ***MUST*** wear a long-sleeve lab coat, safety glasses or goggles, long pants, and close-toed shoes 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 skirts/dresses) and open-toed shoes are NOT ALLOWED. Students will sign a form stating that he/she understands and will abide by this policy *before* being allowed to work in the lab. Any student not adhering to the above-stated safety guidelines, or for any reason an instructor deems a student is at safety risk, or poses a safety risk to others, may be removed from the lab at the discretion of the lab instructor.

NOTE: *If you are more than 5 minutes late to lab, (at the discretion of the lab instructor) you may (or may 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 pg. 8/9). 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.

Laboratory supplements the course material by offering 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.

Laboratory Schedule: Disque Hall

| | Lab 1 | Lab 2 | Lab 3 | Lab 4 |
|--------------------------------|--------------------------------------|---|---------------------------------|------------------------------|
| Title | Exp. # 5 Ester Preparation | Exp. #6 Kinetics of Alcohol Oxidation | Exp. #7 Acids & Bases | Exp. #8 Solubility |
| Even Number Lab Section | Week of April 4 | Week of April 18 | Week of May 2 | Week of May 16 |
| Odd Number Lab Section | Week of April 11 | Week of April 25 | Week of May 9 | Week of May 23 |

For every lab experiment, each student is required to submit an individual lab report. The average of the scores for all lab reports **MUST** be at least 55% to pass the course. If you are retaking CHEM 102 and you scored at least 80% (average on all 4 reports), you will be able to use the lab grade earned during the previous term. Contact Dr. Hoffman to take advantage of this opportunity. Keep in mind, the lab portion of the course is included in registration and 20% of the overall course grade. Thus, if you are retaking the course, repeating the lab could result in an additional 4% added to the overall course grade.

A legible, handwritten procedure is required at the beginning of each lab, which is worth 5 points. This procedure should be a brief summary (a half- to one-page long) of the Experimental Procedure subsection in your lab manual (write the summary of the experimental procedure as steps, with bullets). Failure to have a written procedure as you enter the lab will result in loss of 5 points associated with that report component. Late submissions of the procedure will not be accepted. The lab instructor will sign the handwritten lab procedures.

For each lab experiment, each student is required to submit an individual lab report online within one week after the scheduled lab. Instructions on how to write and submit your lab reports online are posted on the course website in the "Lab Reports Info" folder. Data sheets must be signed by the instructor prior to you leaving the lab and may be shared with your lab partner only! To write lab reports, use the corresponding grading rubrics and all the additional information given in the "Treatment of the Data" section for each experiment in your lab manual. Collaboration with lab partners is encouraged, yet the final report must represent your individual writing. *Lab reports that are full or partial copies of any other source will receive zero (0) points* and further actions (per Academic Honesty highlighted below) may be pursued.

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 after performing an experiment will result in 25 points score for that lab (20 points for the signed data sheet + 5 points for the handwritten lab procedure).

Make-up lab: 1) There will be a make-up lab at the end of the term and 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 an (1) experiment that was missed, NOT to improve a lab grade OR to redo an experiment where a lab report was never submitted.

Academic Honesty and/or Cheating:

Students are held to the highest expectations and standards regarding honesty in all aspects of the course, including taking exams and in the preparation of laboratory reports. Cheating, including misrepresentation of the work of others as your own, will not be tolerated. Please understand plagiarism and do NOT commit it. Cases of cheating will be reported to the College of Arts and Sciences and the University. Students caught cheating will receive a failing (F) grade for the assignment and/or course.

For more information, see material in “Academic Dishonesty” under the “Academic Policies” tab at the following link: http://drexel.edu/studentaffairs/community_standards/studentHandbook/

Disability Services:

Students with disabilities should see material under the “Disability Services” link at the following page: http://drexel.edu/studentaffairs/community_standards/studentHandbook/. Students with disabilities who wish to request special accommodations at Drexel University need to present a current accommodation verification letter (“AVL”) to Dr. Hoffman before accommodations can be made. AVL's are issued by the Office of Disability Resources (“ODR”); <http://www.drexel.edu/oed/disabilityResources/Overview>. Once submitted, the AVL letter is valid for all exams, including the final exam. Any student requesting special testing accommodations must contact Dr. Hoffman at least seven (7) days prior to the exam. Accommodations CANNOT be made if the AVL is first provided on the day of the exam.

Starting week 2, there is free tutoring (no appointment necessary) available in Stratton 106. Tutoring hours will be announced during the first week of the term and posted on the course website.

~ I wish you all the best in achieving success for the Spring term 2016 at Drexel, and I look forward to working with each and every one of you! ~

Course Schedule

| Week | | Monday | Tuesday | Wednesday | Thursday | Friday |
|------|---------------|---|-----------|---|---|-----------|
| 1 | Date | 3/28/2016 | 3/29/2016 | 3/30/2016 | 3/31/2016 | 4/1/2016 |
| | Lecture topic | 11.11; 12.3 (real gases; no calc. ; intermolec. forces) | | 12.5-12.6 (phase changes) | 12.7-12.8; 13.2 (specif propert. of H ₂ O; phase diag.) | |
| | Recitation | Ch. 11: 91, 92, 144; Ch. 12: 36, 38, 42, 56, 68 | | | | |
| | Lab | No lab this week | | | | |
| 2 | Date | 4/4/2016 | 4/5/2016 | 4/6/2016 | 4/7/2016 | 4/8/2016 |
| | Lecture topic | 22.2-22.3 (alkanes: isomers; chirality) | | 22.4-22.5 (nomencl.: -anes, -enes, -ynes; cis-trans) | 22.7-22.10 (arom. cmpds.; funct.gr.) | |
| | Recitation | Ch. 13: 19, 22; Ch. 22: 36, 38, 42, 46a&d, 51, 54a&d, 58a&d | | | | |
| | Lab | Exp. 5 (Esters), even-numbered sections | | | | |
| 3 | Date | 4/11/2016 | 4/12/2016 | 4/13/2016 | 4/14/2016 | 4/15/2016 |
| | Lecture topic | 22.11-22.14 (funct.gr.; polymers) | | 13.5-13.7 (types of solids) | 15.2-15.3 (reaction rate) | |
| | Recitation | Ch. 22: 70, 74a&d, 82, 86a&c, 92, 93, 99; | | | | |
| | Lab | Exp. 5 (Esters), odd-numbered sections | | | | |
| 4 | Date | 4/18/2016 | 4/19/2016 | 4/20/2016 | 4/21/2016 | 4/22/2016 |
| | Lecture topic | 15.4-15.5 (orders; rate laws; $t_{1/2}$) | | 15.6 (only E_a); 15.8 (catalysis) | 16.1-16.3 (equil.: def.; K _C ; signif.; related rxns) | |
| | Recitation | Ch. 13: 38, 40; Ch. 15: 28, 39, 42, 56 | | | | |
| | Lab | Exp. 6 (Kinetics), even-numbered sections | | | | |
| 5 | Date | EXAM I | 4/26/2016 | 4/27/2016 | 4/28/2016 | 4/29/2016 |
| | Lecture topic | 16.4-16.6 (K _p ; heterog. equil. ICE tables) | | 16.7-16.9 (Q; Le Châtelier pr., problem- solving) | 14.2, 14.4, 14.5 (solub. & sol'ns; no Henry's Law) | |
| | Recitation | Ch. 16: 21, 22, 33, 44, 48, 56, 72, 73 | | | | |
| | Lab | Exp. 6 (Kinetics), odd-numbered sections | | | | |

| Week | | Monday | Tuesday | Wednesday | Thursday | Friday | |
|------|---------------|--|--|---|--|--|--|
| 6 | Date | 5/2/2016 | 5/3/2016 | 5/4/2016 | 5/5/2016 | 5/6/2016 | |
| | Lecture topic | 17.1-17.3 (acids & bases: intro) | | 17.4-17.5 (K_a & acid strength) | | 17.6-17.7 (pH, % ioniz.) | |
| | Recitation | Ch. 14: 26, 48, 62; Ch. 17: 2, 17, 34, 36, 38, 40, 46 | | | | | |
| | Lab | Exp. 7 (Titration), even-numbered sections | | | | | |
| 7 | Date | EXAM II | 5/10/2016 | 5/11/2016 | 5/12/2016 | 5/13/2016 | |
| | Lecture topic | 17.8-17.10 (K_b ; K_a - K_b) | (buffers) no acid mix's no cations as acids; no. polyprot. acids calc) | | 18.1-18.2 | 18.3-18.4 (buffers; titrations; indicators; no weak base w/ str. acid) | |
| | Recitation | Ch. 17: 54, 55, 56, 64, 77, 92, 132, 135a&c | | | | | |
| | Lab | Exp. 7 (Titration), odd-numbered sections | | | | | |
| 8 | Date | 5/16/2016 | 5/17/2016 | 5/18/2016 | 5/19/2016 | 5/20/2016 | |
| | Lecture topic | 18.5-18.6 (K_{sp}) | 19.1-19.4 (entropy) | | 19.5-19.6 (ΔG ; spont. pred.) | | |
| | Recitation | Ch. 18: 2, 7, 25, 46, 57b&d, 59, 84a&b, 92, 94a&b | | | | | |
| | Lab | Exp. 8 (solubility), even-numbered sections (plus 065 and 067) | | | | | |
| 9 | Date | EXAM III | 5/24/2016 | 5/25/2016 | 5/26/2016 | 5/27/2016 | |
| | Lecture topic | 19.7-19.9 (ΔG^0 calc.) | 9.9; 20.2 (redox - no acid/base sol.) | | 20.3 (voltaic cells) | | |
| | Recitation | Ch. 19: 4, 18, 26, 30, 38b&c, 42a&b, 49, 61, 76 | | | | | |
| | Lab | Exp. 8 (solubility), odd-numbered sections | | | | | |
| 10 | Date | 5/30/2016 | 5/31/2016 | 6/1/2016 | 6/2/2016 | 6/3/2016 | |
| | Lecture topic | Memorial Day - No Classes | | 20.4-20.5 (std. elec. pot. ΔG ; E^0_{cell} ; K) | | 20.6-20.7 (Nernst eq.; batteries) | |
| | Recitation | Ch. 9: 3, 66, 70; Ch. 20: 1, 40b&c, 50a&b, 58a, 60, 67 | | | | | |
| | Lab | MAKE UP LAB DAY: Tue, 5/31 (approx. 9 AM - 5 PM) room(s) TBA | | | | | |
| 11 | Date | 6/6/2016 | 6/7/2016 | 6/8/2016 | 6/9/2016 | 6/10/2016 | |
| | | FINAL EXAM WEEK (Mon, 6/6 - Fri, 6/10) | | | | | |

