

## General Chemistry II

### CHEM 102 Winter Term, 2010

#### Objectives for CHEM 101-102

- to understand the concept of the atomic and molecular nature of matter and of the chemical reactions that transform matter from one substance to another;
- to develop problem-solving skills in the quantitative areas of chemistry, such as stoichiometry or mass balance, thermochemistry, properties of gases, chemical equilibria, and the rates of chemical reactions;
- to be introduced to elementary experimental chemistry;
- to learn the basis of the physical properties and structure of solids, liquids, and gases and to understand the factors affecting their chemical reactivity.

#### Lecturers:

- < Dr. D. King, Chemistry Department, Office: Disqué 509 [course coordinator]
  - < Lecture B: Mon., Wed., Fri. 12:00-12:50 PM, Disqué 103
- < Dr. A. Addison, Chemistry Department, Office: Disqué 418
  - Lecture A: Mon., Wed., Fri. 9:00-9:50 AM, Disqué 103
  - Lecture C: Mon., Wed., Fri. 11:00-11:50 AM, Disqué 103
- < Dr. A. Bandy, Chemistry Department, Office: Stratton 411
  - Lecture E (honors): Mon., Wed., Fri. 2:00-2:50 PM, Disqué 103
- < Dr. F. Ji, Chemistry Department, Office: Disqué 507
  - Lecture D: Mon., Wed., Fri. 1:00-1:50 PM, Disqué 103

#### First e-mail contact for general course inquiries:

Dr. Daniel King: email: [daniel.king@drexel.edu](mailto:daniel.king@drexel.edu)

#### First e-mail contact for OWL inquiries:

Dr. Paul Deroo: email: [pwd26@drexel.edu](mailto:pwd26@drexel.edu)

#### Course Website: [Bb Vista, CHEM 102 \(lecture section\)](#)

You will always find here the most current syllabus (supersedes this version), course schedule and announcements about changes in the course, labs and exams. **Check it regularly.** You can get there through DrexelOne ("My Courses") or directly (<http://learning.drexel.edu>).

#### 1. Required Textbooks and Manuals:

J.W. Moore, C.L. Stanitski, and P.C. Jurs, *Chemistry - The Molecular Science*, 3<sup>rd</sup> Ed., Thomson/Brooks/Cole, 2007.

The *Online Web-based Learning (OWL)* package is bundled with this textbook at the Drexel Bookstore. It is used for *additional* homework and credit.

Additional software: *CengageNow* (or *ThomsonNow*) is available online using the ID/Password bundled with the textbook. This is not a required element of the course.

Students are encouraged to purchase a simple scientific calculator for use on exams.

## 2. Required Laboratory Manual:

E. Thorne, *Laboratory Manual for General Chemistry, Drexel University, CHEM 101/CHEM 102 Academic Year 2009-2010.*

## 3. Required Supplementary Materials

Each student must purchase an OWL account code either as part of their textbook bundle or separately at the Textbook Information desk at the bookstore (a limited number are available, for those who may already possess the textbook). OWL accounts can not be shared.

Safety glasses or goggles must be worn in the laboratory (available at the bookstore).

A periodic table and other useful information will be provided as part of your test package at the time of the test.

## 4. Table 1. Grading structure:

| Activity        | % Grade | Additional Information   |
|-----------------|---------|--|
| Exams           | 35      | Three 50-minute exams will be given starting at 8:00 AM on dates indicated on the course schedule (p. 8). A missed exam can be replaced by the make-up exam or averaged with the recitation grade. |
| Recitation      |         | A recitation grade will be determined based on both attendance and recitation participation. The recitation grade will be averaged with the lowest exam grade.                                     |
| Final Exam      | 35      | You must score at least 45% on the final to pass the course.   |
| OWL assignments | 10      |  |
| Labs            | 20      | You must score at least 55% in lab to pass the course.   |
| Total           | 100     |  |

**Grading policy:** students who meet all the requirements will earn an A- if they score at least 90% overall, B-  $\geq$  80%, C-  $\geq$  70%, D  $\geq$  60%. If a question arises about an exam grade, for instance, feel free to contact us with your concerns. Any questions about final course grades should be raised as soon as possible; don't wait until the Spring Quarter has started. Be aware that the course instructor(s) may contact you via email if there are problems with your final grade or course components.

**5. Academic Honesty / 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. **(Understand plagiarism and do not commit it.)** Cases of cheating will be reported to the University and the College of Arts and Sciences. Students caught cheating will receive a failing (F) grade.

**6. Lectures:** Lectures will be given on topics as indicated by the course schedule (p. 8). Lecturers may call upon students to provide feedback from time to time, but attendance is not mandatory. Some lecture time will be used for review / catch-up during the term. If catch-up is not required, a review will be provided at the discretion of the lecturer. Otherwise, this time may be used to discuss new material. **Not all required material will be covered in lecture.** The course schedule is provided as a guide and will be revised if dictated by prevailing circumstances (e.g., weather, pedagogical purposes ...).

**7. Exams:** Three, fifty-minute exams will be given as indicated on the course schedule (p. 8). The lowest exam score (including a zero for a missed exam) will be averaged with the Recitation grade. Dates, times and locations of these exams will be posted on the course website. After the commencement of the exam, 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. The exams will consist of multiple-choice questions. **Exams may include questions on lab material.** All students are responsible for bringing to the exam their own operational writing instruments and calculators - no sharing will be allowed. A periodic table, constant values, etc. 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. Be aware that active cell phones and the use of random-access devices (e.g., MP3 players, Palm Pilots, iPods) are NOT ALLOWED in exam rooms, and such may be confiscated if they are found. *Be advised that cell phones may **not** be used as a calculator on exams.*

**THERE WILL BE AN OPPORTUNITY TO MAKE UP ONE MISSED EXAM.** During the last week of classes, a make-up exam will be given. The exam will include material covered after the third exam. To be eligible to take the make-up exam, a student must submit an application (available on the course website) by 3/5/10 that includes a reasonable explanation for missing the initial exam. Eligible students will be notified by email regarding the date, time and location of the exam. *The make-up exam can only be used to replace a missed exam; it cannot be used 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.

**8. Final Exam:** The final exam will be held during final exam week. The date, locations and start time will be announced in class and posted on the course website. **NO MAKE UP WILL BE GIVEN FOR THE FINAL EXAM. STUDENTS MUST BE PRESENT FOR THE FINAL.** After the commencement of the exam, no student will be allowed to leave the examination room without handing in the exam. Once a student leaves the examination 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. The exam will consist of multiple-choice questions. There is no penalty for guessing. All students are responsible for bringing to the exam their own operational writing instruments and calculators - no sharing will be allowed. Be aware, that active cell phones and the use of random-access devices (e.g., MP3 players, Palm Pilots, iPods) are **NOT ALLOWED** in exam rooms, and such may be confiscated if they are found. **The final exam will cover material from the entire term. A student who does not score at least 45% on the final exam will not pass the course, regardless of their prior performance in the course.**

*Final Exam Week is Tuesday, Mar. 16, through Saturday, Mar. 20. Students should expect to be at Drexel the entire week. The final exam will not be rescheduled to accommodate travel plans.*

**9. Recitations:** **The recitation grade will be based on the Recitation Classes. It will be averaged with the lowest exam grade.** There is a 50-minute recitation every week, designed to give you experience in explaining and working problems. Recitation instructors are prepared to answer *any* question in this chemistry course, but priority will be given to those on the current subject matter. The questions assigned are listed on the Course Schedule at the end of this syllabus (p. 8). Recitation grades will be determined based on both participation and attendance. If you cannot attend your regularly scheduled recitation, you should attend another recitation that same week and sign in, with that instructor's permission. You must notify your regular instructor to let him/her know that you attended another

recitation. Recitations scheduled to meet on Mon., Jan. 18 (MLK Day Holiday), will be cancelled. These recitations will be made up on Mon., Mar. 15, so all students have 10 recitation classes.

It is expected that students in the honors sections will have fewer questions about the conceptual problems assigned for recitation, because they will have a better general understanding of the material presented each week. Consequently, additional problems will be assigned to these sections. These will include problems from the following end-of-chapter sections: "Applying Concepts", "More Challenging Questions" and "Conceptual Challenge Problems". The aim is for honors students to develop a deeper understanding of the chapter concepts and the application of the concepts to novel circumstances. In addition to solving these additional problems, each honor student will be expected to present the solutions to the class in his/her recitation and/or lead a discussion about the problem.

**10. Laboratories:** The purpose of the laboratory is to supplement the course material. Subject matter not covered in the lecture part of the course may be covered in the lab. Exams may include questions on lab material. The major objective of the lab part of the course is for you to obtain training in the chemical laboratory, in experimental techniques and 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 (please refer to Table 2 below). All laboratory instruction is given in Disqué Hall. *If you are more than 5 minutes late to lab, you will not be permitted to perform the experiment at that time, and must make up the lab at another time.* You are required to submit a **legible, handwritten** Procedure at the beginning of the lab period. This procedure should provide a brief summary of what you will be doing during the lab period. If you do not turn in the procedure, you will still be allowed to complete the lab, but you will forfeit the 5 points associated with that report component; late submissions of the procedure will not be accepted.

If you miss a lab, try to make up the lab in one of the other sections, with that instructor's permission. You must let your regular instructor know that you have made up the lab. Your lab report is due to your **regular** lab instructor one week after the experiment was performed. If you are unable to make up the lab during the two weeks that it is running (see Table 2), you can make it up on the lab make-up day, held during the last week of classes. You can make up only one experiment in this make-up day. (Due to safety regulations, the number of persons allowed in the lab at one time is limited; you are advised to attend all of your regularly scheduled lab sessions to ensure that you perform all of the lab exercises.) The make-up lab day is only for experiments that were missed; it cannot be used to improve a lab grade or to redo an experiment where a lab report was never

submitted. To get a passing grade for CHEM 102, you must obtain a cumulative lab grade of 55% or higher.

**Table 2. Laboratory Schedule**

|                       | Lab 1   | Lab 2                                  | Lab 3                             | Lab 4                             |
|-----------------------|---|--|-----------------------------------|-----------------------------------|
| <b>Title</b>          | Exp. # 5 Ester Preparation or Exp. #9 Separating Mixtures (Honors only) | Exp. #6 Kinetics of Alcohol Oxidation. | Exp. #7 Acids & Bases.            | Exp. #8 Electrochemical Cells.    |
| <b>Even Lab Sect.</b> | Week of January 11 <sup>th</sup>  | Week of January 25 <sup>th</sup>       | Week of February 8 <sup>th</sup>  | Week of February 22 <sup>nd</sup> |
| <b>Odd Lab Sect.</b>  | Week of January 18 <sup>th</sup> *                                      | Week of February 1 <sup>st</sup>       | Week of February 15 <sup>th</sup> | Week of March 1 <sup>st</sup>     |

*\*Note that lab sections 63, 65, 67, and 69 will not be held on Monday, Jan. 18<sup>th</sup>, because of the Martin Luther King, Jr. Day Holiday. This lab will instead run on Monday, Jan. 11<sup>th</sup>. The rescheduled lab will meet at the same time as the originally scheduled lab, but in Disqué 302, which is **not** the regularly scheduled room.*

**11. Submitting Lab Reports:** The data sheet from the labs must be signed by your instructor prior to your leaving the lab. The data sheets may be photocopied and shared (with your lab partner only). For each of the four lab experiences, each student is required to submit an individual lab report. You may collaborate with your lab partner on the calculations, but the rest of the report must represent your individual work. Any lab reports that are direct copies of each other will receive zero (0) points for both reports. Your lab report is due before the building closes on the day one week after you do the lab. You should submit your lab report by placing it in your lab instructor's slot box across from Room 304 Disqué Hall. Ensure that the cover page of your report displays your lab instructor's name as well as the other essential information (your name, course number, section number, experiment title). A blank cover page is available on the course website. Five points will be deducted for each day (not including weekends or holidays) that the report is late. Any report submitted more than two weeks late is worth zero (0) points.

(See page 3 of the Lab Manual for more details.)

**12. Safety in the lab:** Everyone is required to wear 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 their lenses

meet or exceed the ANSI Z87 1-1989 standard and are equipped with side shields. 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. It is recommended that a pair of safety glasses is purchased from the Drexel Bookstore prior to coming to the lab.

## GENERAL INFORMATION

**Disability Services:** Students with disabilities who wish to request accommodations and services at Drexel University need to present a current accommodation verification letter ("AVL") to one of the instructors before accommodations can be made. AVL's are issued by the Office of Disability Services ("ODS"); <http://www.drexel.edu/ODS/index.html>.

Any student requesting special testing accommodations must contact Dr. King at least seven (7) days prior to the exam. Accommodations will **not** be made if the AVL is first provided on the day of the exam.

### How Will You Learn Chemistry in This Course?

It has been our experience in the past that to do well in this course, you must spend at least two hours on chemistry for every hour you spend in class (three hours per class hour is recommended). Focus on successfully completing the homework assignments, but don't ignore the problems at the end of the 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 more quickly you will be able to get through the easy problems on an exam. One common difference between the "A" student and the average student is that the "A" student gets through the easier problems quickly, and has more time to spend on the challenging problems. *There is a tutoring room for additional help, Matheson 011 A to D, and it will be staffed on Thursdays 12 - 4 and Fridays 1 - 5. More extensive tutoring is available through the Drexel Learning Center (DLC) in the Creese Student Center, Room 050 (215-895-2568).*

In the course Schedule, sections of the text are listed. You are responsible for all material in these sections whether covered in lecture or not.

Do not hesitate to speak with your recitation instructor or lecturer when you are having difficulty with concepts or problems covered in the course.

## Course Schedule

| Week | Component                            | Monday   | Tuesday   | Wednesday | Thursday  | Friday    |           |
|------|--------------------------------------|--|-----------|-----------|-----------|-----------|-----------|
| 1    | Date                                 | 1/4/2010   | 1/5/2010  | 1/6/2010  | 1/7/2010  | 1/8/2010  |           |
|      | Lecture (organic)                    | 3:3,4; 8:3,5,11  |           | 12:1-3    |           | 12:4-6    |           |
|      | Recitation                           | Ch 8: 24,27,31; Ch 12: 22, 27 Honors: Ch 12: 85,106                                  |           |           |           |           |           |
|      | Lab                                  | No Labs This Week  |           |           |           |           |           |
| 2    | Date                                 | 1/11/2010  | 1/12/2010 | 1/13/2010 | 1/14/2010 | 1/15/2010 |           |
|      | Lecture (phys. prop.)                | 12:7-8   |           | 11:1-2    |           | 11:3-6    |           |
|      | Recitation                           | Ch 12: 34,46,66,86; Ch 11: 17 Honors: Ch 12: 98,107,116                              |           |           |           |           |           |
|      | Lab                                  | Exp. 5 or 9, Even-numbered Lab Sections (and 63,65,67,69)                            |           |           |           |           |           |
| 3    | Date                                 | 1/18/2010  | 1/19/2010 | 1/20/2010 | 1/21/2010 | 1/22/2010 |           |
|      | Lecture (kinetics)                   | <b>No Classes</b>  |           |           | 11:7-11   |           | 5:6; 13:1 |
|      | Recitation                           | Ch 11: 36,48,52,86,101,109 Honors: Ch 11: 56,70,73                                   |           |           |           |           |           |
|      | Lab                                  | Exp. 5 or 9, Odd-numbered Lab Sections (except 63,65,67,69)                          |           |           |           |           |           |
| 4    | Date                                 | 1/25/2010  | 1/26/2010 | 1/27/2010 | 1/28/2010 | 1/29/2010 |           |
|      | Lecture (kinetics, equilibrium)      | 13:2-3   |           | 13:4-5    |           | 13:7-9    |           |
|      | Recitation                           | <b>EXAM 1</b><br>Ch 13: 17,22,41,65,81 Honors: Ch 13: 126,CP13.A,CP13.C              |           |           |           |           |           |
|      | Lab                                  | Exp. 6, Even-numbered Lab Sections   |           |           |           |           |           |
| 5    | Date                                 | 2/1/2010   | 2/2/2010  | 2/3/2010  | 2/4/2010  | 2/5/2010  |           |
|      | Lecture (equilibrium)                | 14:1-2   |           | 14:3-4    |           | 14:5,6,8  |           |
|      | Recitation                           | Ch 14: 15,22,38,43,103 Honors: Ch 14: 95,96,101,105                                  |           |           |           |           |           |
|      | Lab                                  | Exp. 6, Odd-numbered Lab Sections  |           |           |           |           |           |
| 6    | Date                                 | 2/8/2010   | 2/9/2010  | 2/10/2010 | 2/11/2010 | 2/12/2010 |           |
|      | Lecture (solutions, acid/base)       | 15:1,3   |           | 16:1-2    |           | 16:3-4    |           |
|      | Recitation                           | <b>EXAM 2</b><br>Ch 15: 1,29; Ch 16: 14,15,23,36 Honors: Ch 15: 83,CP15.A; Ch 16: 67 |           |           |           |           |           |
|      | Lab                                  | Exp. 7, Even-numbered Lab Sections   |           |           |           |           |           |
| 7    | Date                                 | 2/15/2010  | 2/16/2010 | 2/17/2010 | 2/18/2010 | 2/19/2010 |           |
|      | Lecture (acid/base)                  | 16:5   |           | 16:6-7    |           | 17:1      |           |
|      | Recitation                           | Ch 16: 48,59,61; Ch 17: 15,17,44 Honors: Ch 16: 114,122,129; Ch 17: 40               |           |           |           |           |           |
|      | Lab                                  | Exp. 7, Odd-numbered Lab Sections  |           |           |           |           |           |
| 8    | Date                                 | 2/22/2010  | 2/23/2010 | 2/24/2010 | 2/25/2010 | 2/26/2010 |           |
|      | Lecture (solubility, thermodynamics) | 17:2   |           | 17:4-6    |           | 18:1-3    |           |
|      | Recitation                           | <b>EXAM 3</b><br>Ch 17: 53,61,63; Ch 18: 16,22,31 Honors: Ch 17: 74,98,106,108       |           |           |           |           |           |
|      | Lab                                  | Exp. 8, Even-numbered Lab Sections   |           |           |           |           |           |
| 9    | Date                                 | 3/1/2010   | 3/2/2010  | 3/3/2010  | 3/4/2010  | 3/5/2010  |           |
|      | Lecture (thermo, redox)              | 18:4-5   |           | 18:6-7    |           | 19:1-2    |           |
|      | Recitation                           | Ch 18: 46,51,74,119; Ch 19: 11 Honors: Ch 18: 62,133                                 |           |           |           |           |           |
|      | Lab                                  | Exp. 8, Odd-numbered Lab Sections  |           |           |           |           |           |
| 10   | Date                                 | 3/8/2010   | 3/9/2010  | 3/10/2010 | 3/11/2010 | 3/12/2010 |           |
|      | Lecture (electrochem)                | 19:3-4   |           | 19:5-7    |           | 19:9-13   |           |
|      | Recitation                           | Ch 19: 33,38,49,54,78 Honors: Ch 19: 94,99,104                                       |           |           |           |           |           |
|      | Lab                                  | Tues., 3/9, is the make-up day for missed labs.                                      |           |           |           |           |           |
| 11   | Date                                 | 3/15/2010  | 3/16/2010 | 3/17/2010 | 3/18/2010 | 3/19/2010 |           |
|      | Lecture                              | Review   |           |           |           |           |           |
|      | Recitation                           | <b>FINAL EXAM WEEK (Tues - Sat)</b>  |           |           |           |           |           |

