“Eighty percent of success is showing up”—Woody Allen

Chemistry 1425—Honors General Chemistry
Fall 2009

Instructor: Professor Ralph A. Wheeler  Office: 112 Chemistry Building
Contact Info: 325-3502; rawheeler@ou.edu  Office Hours  T 1:30-2:20 or by appointment
Review sessions: Th 1:30-2:20, 225 Bizzell

Meeting Times: Lecture: MWF 8:30-9:20, 416 PHSC. Recitation: F 1:30-2:20, 228 PHSC.
Prerequisites: High school chemistry, 3 years of high school math, and instructor’s permission.

Objectives: Earn up to 10 credit hours in Chemistry. Prepare to complete future Chemistry courses successfully by learning (a) general problem-solving techniques, (b) how to apply them to solve new problems in Chemistry and (c) the major concepts of modern Chemistry. Develop fundamental laboratory skills. Learn about the chemical literature and the Chemistry Library. Practice technical writing. Learn to think like a scientist.

(b) Laboratory manual “Experiments in Chemistry”.

Grading: Final grades will be assigned based on total points accumulated. Maximum possible score is 1000 points. Although I prefer to assign grades using a “curve”, I will guarantee the following letter grades:

<table>
<thead>
<tr>
<th>Points</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 or better</td>
<td>A</td>
</tr>
<tr>
<td>878-899</td>
<td>B</td>
</tr>
<tr>
<td>780-899</td>
<td>C</td>
</tr>
<tr>
<td>600-779</td>
<td>D</td>
</tr>
</tbody>
</table>

Each assignment counts toward the final point total in the following amounts:

1) Quizzes/Group work  350
2) Four exams  300 (75 each)
3) Laboratory  250
4) Final exam  100

Each student is expected to behave according to standards of proper conduct and each student is responsible for knowing the University of Oklahoma’s Academic Misconduct Code. The full text of the Academic Misconduct Code is available in writing and on the OU Web page at http://www.ou.edu/provost/integrity/. The Code states simply that students may not cheat, those who do cheat will be penalized, and those who are accused deserve due process and a fair hearing. Any student who chooses to engage in academic misconduct (including cheating, plagiarism, and any other action that may improperly affect evaluation) will be subject to sanctions in accordance with the Academic Misconduct Code. Dr. Wheeler routinely recommends "F" for the course and expulsion from the University for all such violations.

Homework: A new homework assignment will be distributed approximately every 1-2 weeks. Homework will allow students to practice using concepts presented in lectures and assigned reading and expand on those concepts to solve new problems. Students are encouraged to work on homework in small groups, discuss questions with me, and check answers against the correct solutions. Answer keys are on reserve in the Chem-Math Library. Although homework will not be graded, similar questions will appear on quizzes and exams, so it will be to your advantage to do the homework problems and understand their solutions. You cannot do well in this class without doing and understanding solutions to the homework!!

Quizzes/Group Work: Closed-book, closed-note, 10-15 minute quizzes will be given approximately every other Friday morning at the beginning of class. During Friday afternoon recitation, each group will take a similar quiz and one group will be chosen to present the solution to each problem
“Eighty percent of success is showing up”—Woody Allen
to the class. Individual quiz scores will count 250 points toward final grades, group work will count 100 points. I will explain assignment of group work scores more fully in the future. Quizzes/group work will emphasize material covered in lecture since the previous quiz, but may include any material covered previously in any aspect of the course, including lectures, reading, laboratory experiments, etc.

Examinations: There will be 4 exams during the semester. Exams will be closed-book, in-class tests, worth 75 points each. Anyone who cannot attend one of the examinations should make prior arrangements.

Special Situations: If you miss a quiz or examination without a verifiable illness or emergency, a grade of zero will be assigned for that quiz or examination. You have one week after any illness or emergency to document your special circumstances before a grade of zero is assigned.

The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are requested to speak with the instructor as early in the semester as possible. Students with disabilities must be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405/325-3852 or TDD only 405/325-4173.

Everyone should acquaint themselves with the University's codes, policies, and procedures involving academic misconduct, grievances, sexual and ethnic harassment, and discrimination based on physical handicap.

Reserve Materials: Lecture notes, homework solutions, and answer keys for quizzes and examinations, will be placed on Reserve in the Chem-Math Library. You are free to make one copy of the notes, homework solutions, and answer keys for your own private use.

Intellectual Property Policy: I have developed some of the material associated with this course and the presentation of all course material reflects my unique style and organization. It is therefore my intellectual property. You may make one copy of anything I provide for your own private use. Any attempt to use course materials in any other fashion, particularly any attempt to distribute course material in any way, will be considered an infringement on my rights and result in legal action.

Disclaimer: The instructor reserves the right to change by addition and/or subtraction any and/or all materials contained in this syllabus. This includes, but is not limited to course content, assignments, due dates, and portion(s) of the grade assigned to individual items within the course.

Drop Day: The last day to drop without permission from the Dean is Friday, October 30.
“Eighty percent of success is showing up”—Woody Allen

**Tentative Lecture Schedule**

**Introduction/Gas Laws/Kinetic-Molecular Theory of Gases**

<table>
<thead>
<tr>
<th>August</th>
<th>24</th>
<th>Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26</td>
<td>Components of Matter</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Molecules and molecular structure</td>
</tr>
<tr>
<td></td>
<td>31</td>
<td>Stoichiometry/Water as a solvent</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>September</th>
<th>2</th>
<th>Precipitation reactions/Acid-base reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>Acid-base reactions/Oxidation-reduction reactions</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Labor Day; no class</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Balancing redox reactions</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Gas laws/Dalton’s law of partial pressures</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Kinetic-molecular theory of gases/Non-ideal gases</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>September</th>
<th>16</th>
<th>Energy and the 1st Law of Thermodynamics/EXAM 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18</td>
<td>Enthalpy and heat capacity</td>
</tr>
<tr>
<td></td>
<td>21*</td>
<td>Hess’s Law/Standard enthalpies of formation</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>2nd and 3rd Laws of Thermodynamics/ Calculating ΔS</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Spontaneous processes and ΔG</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Electronegativity/Lewis structures</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>October</th>
<th>2</th>
<th>VSEPR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>Intermolecular forces/Phases of matter</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Phases of matter/Structures of solids</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>September</th>
<th>30</th>
<th>Valence shell electron pair repulsion</th>
</tr>
</thead>
<tbody>
<tr>
<td>November</td>
<td>2</td>
<td>Henderson-Hasselbalch equation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rates of Chemical Reactions (Kinetics)/Acids and Bases</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Empirical rate equations/Integrated rate equations/EXAM 2</td>
</tr>
<tr>
<td>12</td>
<td>Integrated rate laws/Temperature dependence of rate constants</td>
</tr>
<tr>
<td>14</td>
<td>Composite reactions/Types of composite reactions</td>
</tr>
<tr>
<td>16</td>
<td>Fall Holiday</td>
</tr>
<tr>
<td>19</td>
<td>Steady-state approximation/Mechanism and rate law</td>
</tr>
<tr>
<td>21*</td>
<td>Equilibrium/Changes in equilibrium</td>
</tr>
<tr>
<td>23*</td>
<td>Acid-base equilibrium/pH Thermodynamics</td>
</tr>
<tr>
<td>26</td>
<td>Polyprotic acids</td>
</tr>
<tr>
<td>28</td>
<td>Weak bases/Lewis acid-base theory</td>
</tr>
<tr>
<td>30</td>
<td>Acid-base titrations/Buffers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Descriptive Chemistry/Organic chemistry</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Oxidation-reduction reactions/Electrochemistry and electrolysism/EXAM 3</td>
</tr>
<tr>
<td>6</td>
<td>Thermodynamics of electrochemistry</td>
</tr>
<tr>
<td>9</td>
<td>Electrochemical cells/Alkanes and alkenes (hydrocarbons)</td>
</tr>
<tr>
<td>11</td>
<td>Alkynes/Stereoisomers/Organic reactions</td>
</tr>
<tr>
<td>13</td>
<td>Functional groups and their characteristic reactions</td>
</tr>
<tr>
<td>16</td>
<td>Aromatic molecules</td>
</tr>
<tr>
<td>18</td>
<td>Hydrogen/Saline hydrides</td>
</tr>
<tr>
<td>20</td>
<td>Covalent hydrides</td>
</tr>
<tr>
<td>23</td>
<td>Group 1,2 oxides/halides</td>
</tr>
<tr>
<td>25</td>
<td>Thanksgiving Holiday</td>
</tr>
<tr>
<td>27</td>
<td>Thanksgiving Holiday</td>
</tr>
<tr>
<td>30</td>
<td>Group 13 oxides/halides</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>December</th>
<th>2</th>
<th>Group 14 oxides/halides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>/EXAM 4</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Group 15 oxides/halides</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Group 16 oxides/halides</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Interhalogens/Noble gas compounds</td>
</tr>
</tbody>
</table>

* I will probably be out of town on these dates. If I am gone, I will arrange for a colleague to take over class.