Course Description
Chemistry 1210 is the first of a two semester sequence of general chemistry for students in the physical and biological sciences and engineering. The course will cover topics presented in the first 13 chapters of the Brown, Lemay and Bursten text. Chemistry 1220 will cover the remainder of the material in the text.

Text: "Chemistry: The Central Science" 12th ed., 2009; Brown, Lemay & Bursten. A previous edition of this text (9th, 10th or 11th ed.) will work just fine for this course and chem1220 and can be purchased for a fraction of the price of the current edition. Older edition ISBN numbers: 11th edition, 0136006175, 10th edition, 0131096869; 9th edition, 0130669970. Two texts are on reserve in the library (you will have to show your id, tell them the course # and section [Chem1210-002] and our class password [coolchemistry]).

Prerequisites: Math 1050 or equivalent; prior introductory chemistry can be an advantage

Canvas: I will be utilizing the web management system called Canvas for this section of Chem 1210. All registered students will have access to Canvas using the following process: Using a web browser from any location go to online.usu.edu. Log on using your A # and Password. Class notes, practice quizzes, and any further reading material will be posted on Canvas. I am new to Canvas-be patient with me ;)

Recitations: All Chem 1210 students must register for a recitation section (must be specific sections 522 or 523). A recitation section consists of about 20 students and meets weekly, starting the second week of the term (September 4). These will not be review sessions. Students will be given problems and will work in small teams to develop the skills needed to identify how to solve the problems. Celeste Excell will be your Teaching Assistant (celeste.excell@gmail.com). She will help students work through the problems. At the end of each recitation session, a short quiz will be administered. There are a total of 11 recitations; therefore there will be 11 quizzes, the lowest quiz grade may be dropped. At least one recitation per exam period will be devoted to exposing students to real-world applications of the chemical principles being covered during the exam period. Attendance is mandatory. Make-up recitation quizzes will not be offered.

Additional Resources: Multiple choice practice quizzes will be available on-line through Canvas. The quizzes are meant to be used as self-evaluation tools.

Research Problems: Three research problems will be completed over the course of the semester; each will be worth 25 points.

IN-class participation: One of the best ways to know if you understand a subject is if you can teach it yourself. Every lecture will start with a mini-review question that will be presented by one lucky student at random. We may end up doing 2-3 one lecture and none on some lectures-we will see how it works. This will encourage you to stay up to date with the lecture material because you will never know when your name will be called. Your goal is to TEACH the class as if they had not been introduced to the subject. You only have 5 minutes. 15 pts. Celeste will give the first example of what I expect to see so you know how to prepare. Another 10 point will be given to students who participate in class and recitations-ask questions, comment, teach your fellow students. Please leave your cell phones OFF; if you are texting, you are not paying attention.

Teaching Assistant: Celeste Excell (celeste.excell@gmail.com) will post office hours before the end of the first week of classes. She will run a review session before each exam but you will need to come with questions-she will not “lecture”.
Exams: Three hourly exams (100 points each) will be given during class on the dates indicated on the course schedule. At the moment I think we will have ~50 points of multiple choice and ~50 pts of “other”. The final exam is in-class and counts 200 points (~80 points on material presented since exam 3; ~120 points comprehensive). You are strongly encouraged to read the text chapters, work the on-line practice quizzes, and work the practice exams given in previous years. Your performance ultimately depends on your proficiency under testing conditions. Anyone caught cheating will receive an immediate zero and will not have the opportunity to retake the exam. The use of your smartphone as a calculator during an exam will not be allowed.

Missed exams: Anyone missing one of the hour exams for legitimate reasons (marriage, births, deaths, athletics) will be eligible to take the make-up exam offered on December 7 by appointment only. This exam will be comprehensive through the material covered in the first twelve weeks of the course. This is the only make-up exam that will be offered. Vacations are not considered legitimate reasons. Missed exams that are not made-up will be scored as zero.

Grading: A total of 675 points is possible in Chem 1210. Points are distributed as follows:

- 1st Hour Exam (M, 9/24, 8:30 am, ESLC 053) 100 pts
- 2nd Hour Exam (M, 10/23, 8:30 am, ESLC 053) 100 pts
- 3rd Hour Exam (M, 11/20, 8:30 am, ESLC 053) 100 pts
- Final Exam (W, 12/11 7:30 am, ESLC 053) 200 pts
- Recitation quizzes.(best 10 of 11) 75 pts
- Research Problems 25 pts

Total 700 pts

THERE IS NO EXTRA CREDIT IN THIS COURSE
if you ask for some it will only irritate me

Tentative Letter grade brackets (brackets could be lowered- will Not be raised):

- A/A- 90-100%
- B-/B/B+ 80-89%
- C-/C/C+ 70-79%
- D/D+ 60-69%

Course withdrawal: Withdrawal from the course after Sept. 17 will result in a “W” notation being placed on your transcript. No withdrawal is permitted after October 26.

Course Provisions: In accordance with the Americans with Disabilities Act, reasonable accommodations will be provided for all persons with disabilities in order to ensure equal participation in Chem 1210. In cooperation with the Disability Resource Center, reasonable accommodation will be provided for students with disabilities. Please meet with the instructor during the first week of class to make arrangements. Alternative format print materials, large print, audio, diskette or Braille, will be available through the Disability Resource Center.

The administration of Chem 1210 will adhere strictly to the academic regulations stipulated in the most recent Schedule of Classes and the USU General Catalog (http://catalog.usu.edu/content.php?catoid=3&navoid=263).

SAVE this syllabus and schedule for future reference!
<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>What?</th>
<th>Topic</th>
<th>Chap</th>
<th>Notes</th>
<th>Recitation Dates, Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>8/27</td>
<td>L1</td>
<td>Intro to Canvas, Course Overview, Matter</td>
<td>1</td>
<td></td>
<td>NO Recitations 8/27-8/31</td>
</tr>
<tr>
<td>W</td>
<td>8/29</td>
<td>L2</td>
<td>Elements, Compounds</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>8/31</td>
<td>L3</td>
<td>Measurements, calculations</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>9/3</td>
<td>Holiday</td>
<td>Labor Day</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>9/5</td>
<td>L4</td>
<td>Atomic Structure</td>
<td>2</td>
<td>Dr. Hevel out of town</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>9/7</td>
<td>L5</td>
<td>Periodic Table</td>
<td>2</td>
<td>Dr. Hevel out of town</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>9/10</td>
<td>L6</td>
<td>Nomenclature</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>9/12</td>
<td>L7</td>
<td>Balancing Equations</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>9/14</td>
<td>L8</td>
<td>Atomic/Molecular Wts</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>9/17</td>
<td>L9</td>
<td>Empirical Formulas</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>9/19</td>
<td>L10</td>
<td>Chem Equation Calcs</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>9/21</td>
<td>L11</td>
<td>Review</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>9/24</td>
<td>EXAM 1</td>
<td>Chapters 1, 2, 3</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>9/26</td>
<td>12</td>
<td>Molarity, Electrolytes</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>9/28</td>
<td>13</td>
<td>Acid, Bases, Salts</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>10/1</td>
<td>14</td>
<td>Metals, Titrations</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>10/3</td>
<td>15</td>
<td>Energy, First Law</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>10/5</td>
<td>16</td>
<td>Energy, Hess’s Law</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>10/8</td>
<td>17</td>
<td>Enthalpy of Formation</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>10/10</td>
<td>18</td>
<td>Radiant Energy</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>10/12</td>
<td>19</td>
<td>Quantum Effects</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>10/15</td>
<td>20</td>
<td>Bohr Atom, Orbitals</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>10/17</td>
<td>21</td>
<td>Many-electron system</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Th</td>
<td>10/18</td>
<td>EXAM 2</td>
<td>Chapters 4, 5, 6</td>
<td>Dr. Hevel out of town</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>10/19</td>
<td>Holiday</td>
<td>Fall Break</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>10/22</td>
<td>22</td>
<td>Atomic sizes, energies</td>
<td>7</td>
<td>Dr. Hevel out of town</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>10/24</td>
<td>23</td>
<td>Ionization energies</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>10/26</td>
<td>24</td>
<td>Periodic Properties</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>10/29</td>
<td>25</td>
<td>Lewis Structures</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>11/1</td>
<td>26</td>
<td>Covalent Bonds</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>11/2</td>
<td>27</td>
<td>Resonance, Octet</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>11/5</td>
<td>28</td>
<td>Bond Energies</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>11/7</td>
<td>29</td>
<td>VSEPR theory</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>11/9</td>
<td>30</td>
<td>Bond polarity</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>11/12</td>
<td>31</td>
<td>Hybrid Orbitals</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>11/14</td>
<td>32</td>
<td>Catch-up and/or Review</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>11/16</td>
<td>EXAM 3</td>
<td>Chapters 7,8,9</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>11/19</td>
<td>33</td>
<td>Gases, Gas Laws</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>11/21</td>
<td>Holiday</td>
<td>Happy Turkey eating</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>11/23</td>
<td>Holiday</td>
<td>More Happy Turkey eating</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>11/26</td>
<td>34</td>
<td>Partial Pressures</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>11/28</td>
<td>35</td>
<td>Liquids and Solids</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>11/30</td>
<td>36</td>
<td>Phase Changes, phase diagrams</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>12/3</td>
<td>37</td>
<td>Solutions, Concentration definitions</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>12/5</td>
<td>38</td>
<td>Colligative Properties</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>12/7</td>
<td>39</td>
<td>Catch-up and/or Review</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>12/12</td>
<td>FINAL EXAM</td>
<td>7:30 am</td>
<td>30% Chap 10, 11, 13</td>
<td>70% Comprehensive</td>
<td>NO Recitations 11/19-11/23</td>
</tr>
</tbody>
</table>

NOTE: The Final is at **7:30 am!!**
Learning Objectives for Chemistry 1210
Describe units of measurement for mass, length, velocity, time
Use the metric system of units and perform conversions mathematically
Perform calculations utilizing correct significant figures
Identify and describe the different particles inside an atom and describe the structure of an atom
Describe the Periodic Table as it relates to atomic number, atomic mass, valence electron count
Be able to name simple atoms and general ionic and molecular compounds
Balance chemical equations
Differentiate between a chemical formula and an empirical formula
Define units of solution concentration
Define an acid, a base, a salt, and electrolyte
Calculate formula weights and perform stoichiometric calculations
Determine theoretical yields and experimental yields
Utilize the First Law of thermodynamics and the Law of Hess; predict enthalpies for chemical processes
Describe the nature of electromagnetic radiation
Describe the origin of line spectra and how it relates to the development of quantum numbers
Describe the forces that favor the formation of the H₂ molecule over two isolated H atoms
Describe Bohr orbitals and the structure of a many-electron atom
Describe and draw the shapes of the Hydrogenic Orbitals (s, p, d, f)
Utilize the Periodic Table to predict atomic trends in size, ionization energies, electron attachment
Draw Lewis diagrams for atoms and polyatomic species
Describe the Octet Rule and draw resonance structures
Predict molecular shapes using the Valence Shell Electron Repulsion Model
Predict molecular polarity
Differentiate single, double, and triple bonds and estimate bond relative bond energies
Describe the notion of hybrid orbitals and when this approximation works
Describe the properties of gases and utilize the gas laws of Boyle, Charles, and Avogadro
Perform calculations using the Ideal Gas Law and understand the associated pitfalls
Describe and differentiate between the solid, liquid, and gas phases
Draw and use a phase diagram to describe temperature and pressure relationships
Define the term colligative property
Show how vapor pressure of a solvent is affected by solute concentration

“Gain Score” Assessment Strategies
In order to gauge the effectiveness of the Chemistry 1210 course, several different methods of “Gain Score Analysis” will be employed. A “gain score” is a measurement of how much a student’s capability has (hopefully) increased from the beginning of a class and the completion of the course.

One measurement is the comparison of the performance on weekly quizzes and to the performance on the midterm exams. Another measurement is how the midterm exam scores compare to the comprehensive final exam grade. It is possible that the final exam could be a nationally “standardized” exam designed to cover the material in Chem 1210. Throughout the semester, “embedded questions” will be presented. These kind of questions emphasize the above-mentioned “Learning Objectives” and help us assess the overall quality of the Chem 1210 course.
EXPECTATIONS

For some of you this may be your first year in college. So that we are both on the same page, I am outlining what I expect of you and what you can expect from me.

YOUR JOBS

1) Come to Class Prepared
   a) look over the last lecture notes before coming to class
   b) read the text before or very near lecture time; your goal is to be aware of what I am going to lecture about, NOT be surprised by what I am lecturing on.
   c) instead of the typical Socratic method of teaching where the teacher/professor speaks AT the students, this class is meant to employ a more interactive method of learning; for this to work the student must come to the class prepared to engage themselves in the learning process.

2) Understand I am Trying to Prepare You for the Real World
   a) it is unlikely that you will have to solve a problem in the real world that is directly out of my lectures or the text; for this reason I strive to never ask the same question twice. My goals for you are that you are able to intelligently talk about concepts and apply facts/concepts to solve problems.
   b) if you cannot communicate what you know to others, you won’t be very helpful

3) Study Consistently-Don’t Cram
   a) your objective is not to perform a “data dump” at the end of each exam
   b) read the chapter to fill-in/supplement my lectures to provide yourself with a comprehensive view of the material
   c) as we move through chapters, do the suggested questions at the end of the chapter; answers are at the back
   d) practice being engaged in class-think about the material we are discussing, ask questions (if you are prepared for class this will be much easier)

MY JOBS

1) Come to Class Prepared
   a) dissect the chapter and highlight the most important concepts in lectures
   b) question the class in ways that help students think about concepts specifically (current lecture material) and broadly (over multiple chapter material)
   c) inject lectures with examples of how the information is relevant to your careers/lives

2) Provide You with Problems that Develop Your Critical Thinking and Problem Solving Skills
   a) test your ability to apply the information, not just regurgitate the information
   b) show you the relevance of such skills using real-world problems (keep in mind that I am a fan of sci-fi--)

3) Encourage You to Study Consistently
   a) provide weekly quizzes as a way to evaluate your learning
   b) provide time in class for you to comment and ask questions.

4) Remind you that “Science” is not about the ability to regurgitate facts in a textbook-science is about experimentation and observation (this often gets lost in a general chemistry class)