CHEM 1412 — General Chemistry II — Fall 2017

Syllabus

Faculty Information

Dr. Gregory Smith
Office: CAV 207A
Phone: 486-6628
E-mail: Gregory.Smith@angelo.edu
Office Hours: MWF 9:00 am – 10:00 am, TR 11:00 am to 12:00pm, or by appointment

CHEM 1412 Classes

<table>
<thead>
<tr>
<th>Sec</th>
<th>Days</th>
<th>Time</th>
<th>Instructor</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>TR</td>
<td>9:30 am - 10:45 am</td>
<td>Dr. Smith</td>
<td>CAV 223</td>
</tr>
</tbody>
</table>

Required Supplies

- **Textbook and SmartWork online homework [Both Required]:**

  **Purchasing Options:**
  1. Textbook (printed) + eBook + SmartWork
  2. eBook + SmartWork
  3. SmartWork only (only if you get a textbook from another source that does not include the textbook.)

  Options 1 and 2 are available from the ASU Bookstore or directly from the publisher at [http://wwnorton.com/college/custom/chemistry/asu/](http://wwnorton.com/college/custom/chemistry/asu/)

  Option 3 is only available from the publisher.

- **Carbon Copy Lab Notebook [Required]** (available from the ASU Bookstore or from the lab stockroom)

- **Approved Lab Goggles [Required]** (available from the ASU Bookstore or from the lab stockroom)

- **Calculator [Required]:** Scientific calculator capable of performing calculations with scientific notation and logarithms. **Only non-programmable calculators may be used on the exams.**

  *Bring your calculator to class and to lab every day.*

Course Description

In this class, you will study the fundamental laws and theories of chemistry, chemical nomenclature, chemical equilibrium, metals and non-metals and their compounds, nuclear chemistry and the quantum theory of structure.

**Prerequisites:** Chemistry 1411 is to be completed with a grade of C or better before Chemistry 1412. Proficiency in algebra required. Only students eligible to take college-level mathematics courses may take Chemistry 1412.
Grading
Exams, (100, 100, and 100 pts) 300 pts  
Final 150 pts A = 90-100% 900-1000 pts  
In Class Portion 150 pts B = 80-89.9% 800-899 pts  
Quizzes, etc. Smartwork Homework 200 pts C = 70-79.9% 700-799 pts  
Laboratory 200 pts D = 60-69.9% 600-699 pts  
Total 1000 pts F = <60% 0-599 pts

Exams
Exams 1, 2, and 3 will be worth 100 pts and will follow this schedule:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Room</th>
<th>Time</th>
<th>Point Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>Tuesday, Sept. 26</td>
<td>CAV 223</td>
<td>5:00 pm</td>
<td>100 pts</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Tuesday, Oct. 24</td>
<td>CAV 223</td>
<td>5:00 pm</td>
<td>100 pts</td>
</tr>
<tr>
<td>Exam 3</td>
<td>Tuesday, Nov. 21</td>
<td>CAV 223</td>
<td>5:00 pm</td>
<td>100 pts</td>
</tr>
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</table>

All exams will be in the evening on a Tuesday. Most of the exams will be over material covered since the last exam. However, the course builds on material delivered earlier so the concepts, calculations and techniques from earlier exams may be required. Only non-programmable calculators may be used on the exams.

Final Exam Schedule
The Final Exam will be a comprehensive multiple-choice standardized exam published by the American Chemical Society (ACS). Study guides for the ACS exam (“General Chemistry - Official Study Guide”) are available for sale in the lab stockroom and from the ACS web page (http://chemexams.chem.iastate.edu/). The schedule for the 1412 final exams is shown below. The complete final exam schedule is also available on the web:
http://www.angelo.edu/services/registrars_office/final.html

<table>
<thead>
<tr>
<th>Sec</th>
<th>Days</th>
<th>Time</th>
<th>Instructor</th>
<th>Final Exam Date</th>
<th>Final Exam Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>MWF</td>
<td>9:00 am</td>
<td>Dr. Smith</td>
<td>Thursday, December 14</td>
<td>8 am – 10 am</td>
</tr>
</tbody>
</table>

Attendance
You are expected to attend all class meetings. You are expected to arrive on time and to stay until the end of the lecture. In-classroom activities such as worksheets and quizzes cannot be made up. You will not be automatically dropped if you stop attending class. If you have the flu, please stay home. Do not help spread the flu to everyone else. Keep your professor informed as to your status by email (preferred) or telephone (if necessary). Your faculty will work with you to keep up to date in the class.

Last Day to Drop
The last day to drop the course with a grade of “W” is Wednesday, Nov. 3, 2017.

Blackboard
Grades, information, handouts, homework assignments, and other course documents will be posted on Blackboard. http://blackboard.angelo.edu (or access Blackboard from RamPort).
Honor Code / Academic Dishonesty
Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. Students are responsible for understanding the Academic Honor Code, which is to be found in the Student Handbook (www.angelo.edu/cstudent/). The penalty for ANY sort of dishonesty, cheating or plagiarism can range from a grade of zero on the assignment to an F in the course and disciplinary action as warranted in accordance with university guidelines. Don’t even consider it.

Disabilities
Persons with disabilities which may warrant academic accommodations must contact the Student Life Office, Room 112 University Center, in order to request and to implement academic accommodations.

Computer Homework
Smartwork (https://digital.wwnorton.com/chem5) is an online homework program which accompanies the Gilbert textbook. These assignments will be averaged to give a 200-point grade. To register with Smartwork, follow the instructions on the “Smartwork Student Registration” page at the end of this syllabus.

Lecture Schedule — Fall 2017

<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic</th>
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</table>
| Aug. 28  | Chapter 10 *Intermolecular Forces* (review)  
Chapter 11 *Solutions* |
| Sept. 4  | **Monday, Sept. 5 – Holiday**  
Chapter 11 continued |
| Sept. 11 | Chapter 12 *Solids* |
| Sept. 18 | Chapter 13 *Chemical Kinetics* |
| Sept. 25 | Chapter 13 continued  
Chapter 14 *Chemical Equilibrium*  
**Tuesday, Sept. 26 Exam 1 (Chapters 10, 11, 12, 13)** |
| Oct. 2   | Chapter 14 continued |
| Oct. 9   | Chapter 14 continued  
Chapter 15 *Acid and Base Equilibria* |
| Oct. 16  | Chapter 15 continued  
Chapter 16 *Additional Aqueous Equilibria* |
| Oct. 23  | Chapter 16 continued  
Chapter 17 *Thermodynamics*  
**Tuesday, Oct. 24 Exam 2 (Chapters 14, 15)** |
| Oct. 30  | Chapter 17 continued |
Nov. 6  | Chapter 18 *Electrochemistry*
---|---
Nov. 13 | Chapter 18 continued
Nov. 20  | Chapter 19 *Nuclear Chemistry*
          | **Tuesday, Nov. 21 Exam 3 (Chpt. 17 and 18)**
          | **Wednesday, Nov. 22 through Friday, Nov. 24 – Holiday**
Nov. 27  | Chapter 19 continued
Dec. 4   | Chapters 21 and 22
Dec. 12  | **Final Exam – Thursday Dec. 14 8 – 10 am**

<table>
<thead>
<tr>
<th>Section</th>
<th>Days</th>
<th>Meeting Time</th>
<th>Instructor</th>
<th>Lab Room</th>
<th>Class Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>02Z</td>
<td>M</td>
<td>11:00 am - 1:50 pm</td>
<td>Dr. Smith</td>
<td>CAV 216</td>
<td>CAV 215</td>
</tr>
<tr>
<td>03Z</td>
<td>W</td>
<td>11:00 am - 1:50 pm</td>
<td>Dr. Smith</td>
<td>CAV 216</td>
<td>CAV 215</td>
</tr>
</tbody>
</table>

Pre-lab lectures will be given in the classrooms listed above.

**Lab Course**
The CHEM 1412 General Chemistry laboratory class accompanies this lecture class. The lab is designed to illustrate some of the principles involved in performing scientific measurements, handling chemicals, and performing chemistry experiments. In some cases, the experiments in the lab will introduce you to concepts *before* you cover them in the lecture course, and in some cases, the experiments will reinforce concepts already covered in the lecture course.

*Labs will begin meeting on the first day of class during the second week of the semester. Bring your calculator!*

**Laboratory Attire**
Beginning on the first day of lab, everyone MUST have *approved goggles, long-sleeved shirts which cover the midriff, long pants, and shoes with closed toes and heels* (no sandals, slides, etc.). (Basically, you should have as little exposed skin as possible.) Anyone not wearing the appropriate attire will not be allowed into lab.

**Lab Handouts and Lab Reports**
The lab handouts provide a description of the background for each experiment, pre-laboratory questions that will be turned in at the beginning of the lab period, a procedure for the experiment, and a lab report form which must be handed in when the lab is completed. You will also need to record data in a lab notebook, and hand in the carbon copies from that notebook when the lab is complete. It is essential that you read the appropriate section in the manual before coming to class. The lab reports for the experiments, the lab assignments, and the lab final will be averaged together, and reported to your lecture instructor as a 200 point grade.
Cleaning Up After Lab
Make sure that your lab area is clean and that all glassware and hardware has been cleaned and returned to the appropriate drawers before leaving the lab.

Make-Up Lab Policy
The lowest lab score will be dropped from the total. If you miss a lab for a valid reason, that is the score that will be dropped.

Lab Safety Training
All students enrolled in lab courses are required to take a Mandatory Laboratory Safety Training and Quiz on Blackboard. Instructions for completing the quiz are given below:
1. Login to Blackboard, and choose the course: entitled “Lab Safety Training.”
2. Under the left hand menu, choose: “Get Started Here”.
3. There are three sections:
   a. Welcome to Lab Safety Training -- There are your instructions.
   b. Lab safety training — Click on “Lab Safety - Click here to begin” . This will download a PowerPoint slide show which will cover the safety training.
   c. The lab safety quiz. You must score 90% or higher. You can take it again in 24 hours.

The Lab Safety Training must be completed by the evening of Friday, September 2, 2016

Lab Final
There will be a lab final. This grade will not be dropped from the total.

Lab Schedule — Fall 2017

<table>
<thead>
<tr>
<th>Week of</th>
<th>Experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 28</td>
<td>Significant Figures and Algebra worksheet</td>
</tr>
<tr>
<td>Sept. 4</td>
<td>Qualitative Analysis of an Unknown Salt</td>
</tr>
<tr>
<td>Sept. 11</td>
<td>Qualitative Analysis of an Unknown Salt (cont.)</td>
</tr>
<tr>
<td>Sept. 18</td>
<td>Spectrophotometry of FD&amp;C Red 40</td>
</tr>
<tr>
<td>Sept. 25</td>
<td>Kinetics of Crystal Violet (Handout will be posted on Blackboard)</td>
</tr>
<tr>
<td>Oct. 2</td>
<td>Arrhenius Experiment (TBD)</td>
</tr>
<tr>
<td>Oct. 9</td>
<td>Stresses Applied to Equilibrium Systems: Le Chatelier’s Principle</td>
</tr>
<tr>
<td>Oct. 16</td>
<td>Evaluation of Commercial Antacid Tablets</td>
</tr>
<tr>
<td>Oct. 23</td>
<td>Analysis of Unknown Acid Sample</td>
</tr>
<tr>
<td>Oct. 30</td>
<td>Thermodynamics Experiment (TBD)</td>
</tr>
<tr>
<td>Nov. 6</td>
<td>Electrochemistry Experiment (TBD)</td>
</tr>
</tbody>
</table>
“Quizzes, etc.” grade portion:

There are two parts to this portion. **Quizzes** will be given on Mondays and Wednesdays. These quizzes will cover material that we are going to cover that day. Read ahead! They will be limited to 5 minutes at the start of class. We will also be doing in-class problems and other activities which will contribute to this section.

In addition, **section summaries** may be turned in to recover some points lost from your **quizzes**. However, these summaries must be turned in before we cover them in class. These summaries must be handwritten, in your own words, and include the relevant equations, etc. from the textbook.

**Email:**

The best way to reach me is through email. However, I will only respond to emails from your ASU account. If it doesn’t end in @angelo.edu, I will not respond. Please follow good email etiquette. Include who you are addressing it to (me), use complete sentences, and end with who it is from (you). I may not respond if your email is like a text message.

**This syllabus is subject to change.**
Student Learning Outcomes

- **Learning Goal 1:** Students will be able to analyze complex chemical problems and draw logical conclusions.
  - Students will be able to use an understanding of atomic structure at the basic and atomic levels to analyze the structure and reactivity of substances and chemical species.
  - Students will be able to use an understanding of how energy interacts with matter to predict stable chemical species, and perform thermodynamic calculations describing chemical reactions.

- **Learning Goal 2a:** Students will be able to understand and apply scientific reasoning in the chemical sciences.
  - Students will be able to use an understanding of ions and molecules at the atomic level to predict the behavior of reactions in aqueous solutions.
  - Students will be able to use the basic ideas of quantum mechanics to describe how molecular bonds form and to predict molecular shape and polarity. Molecular structure and polarity will be used to predict the forces between molecules and relate those forces to the states of matter and phase changes.

- **Learning Goal 2b:** Students will be able to employ mathematics in the analysis of chemical problems.
  - The mole concept, chemical formulas and balanced chemical equations will be used to do chemical calculations that relate macroscopic measurements to numbers of atoms, ions or molecules.
  - Students will be able to do calculations involving solution concentration and know how to prepare solutions of given concentrations.
  - Students will be able to quantitatively predict gas properties using gas law calculations.

- **Learning Goal 3:** Students will be able to demonstrate technical and analytical skills in chemistry.
  - Students will be able to use the periodic table to determine basic atomic information and to predict trends in atomic properties.
  - Students will be able to interconvert between chemical names and formulas to the extent that they can work problems given only one of those pieces of information.
  - Students will be able to classify common types of chemical reactions and predict the outcomes of reactions.

Evaluation of Student Learning Outcomes

Student learning outcomes will be evaluated by test questions or by the grading of in-classroom activities, as described by your instructor.

Texas Higher Education Coordinating Board Natural Sciences Objectives

The objective of the study of a natural sciences component of a core curriculum is to enable the student to understand, construct, and evaluate relationships in the natural sciences, and to enable the student to understand the basis for building and testing theories.

Exemplary Educational Objectives

1. To understand and apply method and appropriate technology to the study of natural sciences.
2. To recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings, analyses, and interpretation both orally and in writing.
3. To identify and recognize the differences among competing scientific theories.
4. To demonstrate knowledge of the major issues and problems facing modern science, including issues that touch upon ethics, values, and public policies.
5. To demonstrate knowledge of the interdependence of science and technology and their influence on, and contribution to, modern culture.