Syllabus

CHEM 1412 — General Chemistry II — Spring, 2018

Faculty Information

Dr. Ralph Zehnder
Office: CAV 204B
Phone: 486-6662
E-mail: Ralph.Zehnder@angelo.edu
Office Hours: WF 11:00-12:30, TR 12:30-2:00, or by appointment
Tutorials: T 5:30 PM CAV 215

Dr. John J. Osterhout
Office: CAV 102B
Phone: 486-6663
E-mail: John.Osterhout@angelo.edu
Office Hours: M-R 1:00-2:00, or by appointment
Tutorials: MW 5:00-6:00 CAV 211

Dr. Edith Osborne
Office: CAV 204A
Phone: 486-6629
E-mail: Edith.Osborne@angelo.edu
Office Hours: MWF 11:00-12:00, R 10:50-11:50
Tutorials: M 5:00-6:00 Cav 215

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>MWF</td>
<td>9:00 am-9:50 am</td>
<td>Dr. Osterhout</td>
<td>CAV 211</td>
</tr>
<tr>
<td>020</td>
<td>MWF</td>
<td>10:00 am-10:50 am</td>
<td>Dr. Osterhout</td>
<td>CAV 211</td>
</tr>
<tr>
<td>030</td>
<td>TR</td>
<td>9:30 am-10:45 pm</td>
<td>Dr. Osborne</td>
<td>CAV 215</td>
</tr>
<tr>
<td>040</td>
<td>TR</td>
<td>9:30 am-10:45 am</td>
<td>Dr. Zehnder</td>
<td>CAV 219</td>
</tr>
<tr>
<td>050</td>
<td>MWF</td>
<td>9:00 am-9:50 pm</td>
<td>Dr. Zehnder</td>
<td>CAV 219</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 SmartWork.)

  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**

<table>
<thead>
<tr>
<th></th>
<th>Point Breakdown</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exams, (3 x 100 pts each)</strong></td>
<td><strong>A</strong> = 90-100% 900-1000 pts</td>
<td>300 pts</td>
</tr>
<tr>
<td>Final</td>
<td><strong>B</strong> = 80-89.9% 800-899 pts</td>
<td>150 pts</td>
</tr>
<tr>
<td>Quizzes, classroom participation</td>
<td><strong>C</strong> = 70-79.9% 700-799 pts</td>
<td>150 pts</td>
</tr>
<tr>
<td>Smartwork Homework</td>
<td><strong>D</strong> = 60-69.9% 600-699 pts</td>
<td>200 pts</td>
</tr>
<tr>
<td>Laboratory</td>
<td><strong>F</strong> = &lt;60% 0-599 pts</td>
<td>200 pts</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1000 pts</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Exams**

Exams 1, 2, and 3 will be worth 100 pts and proctored as common exams on February 16, March 23 and April 20.

<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>Thursday, February 16</td>
<td>CAV100</td>
<td>5:30 pm</td>
<td>100 pts</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Thursday, March 23</td>
<td>CAV100</td>
<td>5:30 pm</td>
<td>100 pts</td>
</tr>
<tr>
<td>Exam 3</td>
<td>Thursday, April 20</td>
<td>CAV100</td>
<td>5:30 pm</td>
<td>100 pts</td>
</tr>
</tbody>
</table>

All exams will be at **5:30 pm**. 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.**
Make-up Exams
To obtain permission to make up an examination, prior to the next class meeting you must verify with the course instructor whether or not an absence is excused according to the ASU Student handbook (www.angelo.edu/cstudent/). (This handbook also provides information concerning academic integrity and student services.)

Final Exams
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

Final Exam Schedule

<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-9:50 am</td>
<td>Dr. Osterhout</td>
<td>Wednesday, May 10</td>
<td>8:00am - 10:00 am</td>
</tr>
<tr>
<td>012</td>
<td>MWF</td>
<td>10:00 am- 10:50 am</td>
<td>Dr. Zehnder</td>
<td>Monday, May 8</td>
<td>10:30 am- 12:30 pm</td>
</tr>
<tr>
<td>020</td>
<td>MWF</td>
<td>10:00 am- 10:50 am</td>
<td>Dr. Osterhout</td>
<td>Monday, May 8</td>
<td>10:30 am- 12:30 pm</td>
</tr>
<tr>
<td>030</td>
<td>MWF</td>
<td>09:00 am-09:50 am</td>
<td>Dr. Zehnder</td>
<td>Wednesday, May 10</td>
<td>8:00am - 10:00 am</td>
</tr>
<tr>
<td>040</td>
<td>TR</td>
<td>9:30 am-10:45 am</td>
<td>Dr. Osborne</td>
<td>Thursday, May 11</td>
<td>8:00 am- 10:00 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. 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 Monday, April 2, 2018.

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 a F in the course and disciplinary action as warranted in accordance with university guidelines. Don’t even consider it.

**Computer Homework**

Smartwork (www.wwnorton.com/smartwork) is an online homework program which accompanies the Gilbert textbook. The homework assignments will be averaged to give a 200-point grade. To register with Smartwork, follow the instructions on the “Smartwork Student Registration” page which is posted on blackboard.

**DR. OSTERHOUT SECTIONS ONLY – No Lecture Classes**

The sections taught by Dr. Osterhout sections use a Flipped Classroom in which reading, homework and other preparation are done before class and worksheets are done in groups during class. There will be no lectures.

**Syllabus and Schedule**

The syllabus and the schedule for the Osterhout sections will be posted on Blackboard. The schedule contains the reading assignments, exam dates, worksheet numbers and other information. The schedule will updated if I find mistakes. Be sure that you are using the latest version of the schedule. The class schedule in this syllabus is the general one for all the sections, so it does not contain the daily reading assignments.

**Assignments and Worksheets**

At 11:00 am MWF, the assignment sheet for the next class will be posted on Blackboard. The assignment sheets contain the reading assignments, general information about the material, links to videos if I can find good ones and, most importantly, **THE LEARNING OBJECTIVES**. After class, the blank worksheets and the worksheet keys will be posted.

Completed worksheets must be turned in at the beginning of the next class. Late worksheets will not be accepted unless there is a valid excuse. Turning in the completed (perfect) worksheets will count for 50 points.
Daily quizzes.
Class each day will start with a group quiz. The quiz will contain simple questions about the LEARNING OBJECTIVES that were given in the assignments and one or two more complicated questions about the previous day's worksheet. The daily quizzes will count for a total of 100 points.

Smartwork On Line Homework
Homework will be assigned before every class. It will be due at 6 am on the day of the class. The first homework assignment will be due Friday morning at 6 am (think of this as the Thursday night homework.) You can do make up homework only if you have a good medical excuse. Note that you will be doing homework before you come to class. Actually reading the assignments will help as will using the internet for help.

Lecture Schedule — Spring 2017
There is a more detailed schedule available for Dr. Osterhout's sections. This document is called “Schedule” and is available on Blackboard. If the Schedule is updated, an announcement will be posted on Blackboard.

<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic</th>
</tr>
</thead>
</table>
| Jan 15  | Monday, Jan 15 — Martin Luther King Day  
Chapter 10 Intermolecular Forces |
| Jan 22  | Chapter 10 continued  
Chapter 11 Properties of Solutions |
| Jan 29  | Chapter 11 continued  
Chapter 12 Solids |
| Feb 5   | Chapter 12 continued  
Chapter 14 Chemical Kinetics |
| Feb 12  | Chapter 14 continued  
**Thursday, February 15 Exam 1 (Chpt. 10, 12, 14)** |
| Feb 19  | Chapter 14 continued  
Chapter 15 Chemical Equilibrium |
| Feb 26  | Chapter 15 continued |
| Mar 5   | Chapter 15 continued  
Chapter 16 Acid and Base Equilibria |
| Mar 12  | Spring Break – No Classes! |
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.

E-mails

For conducting official ASU business faculty and students are required, by the ASU administration, to use the official ASU e-mail accounts only. Please make sure that you check your Angelu.EDU account on a regular basis. The instructor may send important announcements regarding this course, homework, and/or exams to your ASU e-mail account. You will not be able to use the excuse of not checking your e-mail with regard to assignments, tasks, or exams you missed. The instructor will only answer e-mails that are sent from an ASU e-mail account. Any submitted e-mails to the instructor are expected to be written in a professional format and include your first and last name and course number and section/meeting time. The instructor will not respond to any messages that do not comply with such requirements. The instructor will respond to legitimate e-mails within 24-48 hours during the week and may not respond until after weekends or holidays if messages are received on any of such days.

CHEM 1412 LAB CLASSES

<table>
<thead>
<tr>
<th>Section</th>
<th>Day</th>
<th>Meeting Time</th>
<th>Instructor</th>
<th>Lab Room</th>
<th>Class Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>06Z</td>
<td>M</td>
<td>11:00 am - 1:50 pm</td>
<td>Dr. Zehnder</td>
<td>CAV 212</td>
<td>CAV 211</td>
</tr>
<tr>
<td>07Z</td>
<td>M</td>
<td>2:00 pm - 4:50 pm</td>
<td>Dr. Osborne</td>
<td>CAV 212</td>
<td>CAV 215</td>
</tr>
<tr>
<td>08Z</td>
<td>T</td>
<td>11:00 am - 1:50 pm</td>
<td>Dr. Osborne</td>
<td>CAV 212</td>
<td>CAV 215</td>
</tr>
<tr>
<td>09Z</td>
<td>T</td>
<td>2:00 pm - 4:50 pm</td>
<td>Dr. Osborne</td>
<td>CAV 212</td>
<td>CAV 215</td>
</tr>
<tr>
<td>10Z</td>
<td>W</td>
<td>2:00 pm - 4:50 pm</td>
<td>Dr. Zehnder</td>
<td>CAV 212</td>
<td>CAV 211</td>
</tr>
<tr>
<td>11Z</td>
<td>R</td>
<td>2:00 pm - 4:50 pm</td>
<td>Dr. Zehnder</td>
<td>CAV 212</td>
<td>CAV 211</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 Manual and Lab Reports

All laboratory experiment handouts will be posted on Blackboard. Print off the experiment handout and bring it with you to lab. The lab handout provides 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 handout before coming to class. Grades for 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 Quizzes and Lab Final

There will be two 50-point lab quizzes, given during the week of February 22 and March 28, and a 100-point lab final given during the last week of classes. These grades will not be dropped from the total.
### Lab Schedule — Spring 2017

<table>
<thead>
<tr>
<th>Week of</th>
<th>Experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 15</td>
<td>MLK day Monday, January 15. Take home assignment (Significant Figures and Algebra worksheet) will be posted on Blackboard and is due at the beginning of lab during the week of January 22 (lectures will continue Tuesday through Friday)</td>
</tr>
<tr>
<td>Jan 22</td>
<td>Qualitative Analysis of Anions (all lab procedures are posted on Blackboard)</td>
</tr>
<tr>
<td>Jan 29</td>
<td>Qualitative Analysis of Group I Cations</td>
</tr>
<tr>
<td>Feb 5</td>
<td>Qualitative Analysis of an Unknown Salt</td>
</tr>
<tr>
<td>Feb 12</td>
<td>Spectrophotometry of FD&amp;C Red 40</td>
</tr>
<tr>
<td>Feb 19</td>
<td>A Kinetic Study: The Reaction of Crystal Violet with NaOH</td>
</tr>
<tr>
<td>Feb 26</td>
<td>A Kinetic Study Part II: Temperature Dependence and Activation Energy of the Rate of Reaction of Crystal Violet and NaOH</td>
</tr>
<tr>
<td>Mar 5</td>
<td>Equilibrium and Le Châtelier’s Principle</td>
</tr>
<tr>
<td>Mar 12</td>
<td>Spring Break – No Classes!</td>
</tr>
<tr>
<td>Mar 19</td>
<td>Lab Mid-Term</td>
</tr>
<tr>
<td>Mar 26</td>
<td>Analysis of Antacid Tablets</td>
</tr>
<tr>
<td>Apr 2</td>
<td>Analysis of Titration Curves</td>
</tr>
<tr>
<td>Apr 9</td>
<td>Lab Practical</td>
</tr>
<tr>
<td>Apr 16</td>
<td>Gibb’s Free Energy, Entropy, and Spontaneous Reactions</td>
</tr>
<tr>
<td>Apr 23</td>
<td>Electrochemistry: Anodizing Aluminum and Etching Brass</td>
</tr>
<tr>
<td>April 30</td>
<td>Lab Final</td>
</tr>
</tbody>
</table>

### 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 Sunday, Jan. 24 2017

– 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.