CHEM 1311/1111
General Chemistry
Spring, 2020

Instructors:

Dr. Ralph Zehnder
Email: Ralph.Zehnder@angelo.edu
Phone: 486-6662
Office: CAV 204B
Office Hours: M 11:00-12:30, W 11:00-12:30, F 11-1:00, or by appointment; Review sessions W 5 pm

Mr. Kevin Boudreaux
Email: Kevin.Boudreaux@angelo.edu
Phone: 486-6623
Office: CAV 207B
Office Hours: M-F 9:30-11, or by appointment; Review sessions M 5 pm

Mr. Rigel Rilling
Email: Rigel.Rilling@angelo.edu
Phone: 486-6654
Office: CAV 201B
Office Hours: W 2:00-5:00 pm, F 11:00 am-2:00 pm, or by appointment

Dr. Janet Maxwell
Email: Janet.Maxwell@angelo.edu
Phone: 486-6624
Office: CAV 229B
Office Hours: MWF 10:00-11:00 am, T 2:00-3:00 pm, R 9:30-10:30 am, or by appointment

CHEM 1311 — GENERAL CHEMISTRY LECTURE CLASS

Lecture Class Meeting Times

<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>10:00 am-10:50 am</td>
<td>Dr. Zehnder</td>
<td>CAV 215</td>
</tr>
<tr>
<td>020</td>
<td>TR</td>
<td>08:00 am-09:15 am</td>
<td>Mr. Boudreaux</td>
<td>CAV 200</td>
</tr>
</tbody>
</table>
Required Texts and Materials

- **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 at the ASU Bookstore.
Option 3 is only available from the publisher.

- **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. *Bring your calculator to class and to lab every day. Only non-programmable calculators may be used on the exams.*

Course Description

**1311/CHEM 1311 General Chemistry I (3-0).** An introduction to the fundamental laws and theories of chemistry, chemical nomenclature, stoichiometry, atomic structure, chemical bonding, periodic table, chemical equations and reactions, and the properties of heat flow and gases. **Prerequisites:** Students must have received: a score of 580 or above on the mathematics portion of the SAT if taken before March 2016, a score of 600 or above on the mathematics portion of the SAT if taken in March 2016 or after, a score of 26 or above on the mathematics section of the ACT, completed college algebra with a grade of “C” or better, or completed Chemistry 1305 with a grade of “C” or better in order to enroll in Chemistry 1311/1111. **Corequisite:** Chemistry 1111.

**1111/CHEM 1111 General Chemistry I Laboratory (0-3).** Laboratory experiments that focus on laboratory technique, data collection, and analysis. The experiments will expand upon the concepts and topics presented in Chemistry 1311. **Corequisite:** Chemistry 1311.

Technology Requirements

To successfully complete this course, students need to obtain access to **SmartWork**, an online homework program which accompanies the Gilbert textbook.¹ These assignments will be averaged to give a 200-point grade.
Grading

Evaluation and Grades
Course grades will be determined as indicated in the table below.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Total Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams (3×100 pts)</td>
<td>300 pts</td>
</tr>
<tr>
<td>Final Exam</td>
<td>150 pts</td>
</tr>
<tr>
<td>Quizzes, classroom participation</td>
<td>150 pts</td>
</tr>
<tr>
<td>SmartWork Homework</td>
<td>200 pts</td>
</tr>
<tr>
<td>Laboratory</td>
<td>200 pts</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1000 pts</strong></td>
</tr>
</tbody>
</table>

Students who are taking both CHEM 1111 and CHEM 1311 for the first time who wish to drop either course must drop both courses, because dropping either course would result in the co-requisite requirement no longer being met.

Overall grades in CHEM 1311/1111 will be determined as follows:

- If BOTH CHEM 1311 and CHEM 1111 are completed, the letter grade will be based on a total of 1000 points.
- For students who begin and complete ONLY CHEM 1311, a percentage will be calculated using only lecture assessments (first four items listed above with 800 points possible) and the letter grade will be assigned based on that percentage.
- For students who begin and complete ONLY CHEM 1111, the percentage will be calculated using only lab assessments and that percentage will be used to assign a letter grade.

Grading System
Course grades will be dependent upon completing course requirements and meeting the student learning outcomes.

The following grading scale will be used for this course:

- A = 900-1000 points (90-100%)
- B = 800-899 points (80-89.9%)
- C = 700-799 points (70-79.9%)
- D = 600-699 points (60-69.9%)
- F = 0-599 points (<60%)
Exams
The exams will be given outside of regular class time on the dates listed below:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Room</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>Wednesday, February 12</td>
<td>MCS 100</td>
<td>5:30 pm</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Wednesday, March 18</td>
<td>MCS 100</td>
<td>5:30 pm</td>
</tr>
<tr>
<td>Exam 3</td>
<td>Wednesday, April 15</td>
<td>MCS 100</td>
<td>5:30 pm</td>
</tr>
</tbody>
</table>

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 (i.e., no graphic calculators are allowed).**

Make up exams will be at the discretion of your individual faculty. Usually, allowances will only be made in the case of an excused university absence. Communication with your instructor is critical.

Final Exam
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. The schedule for the 1311 final exams is shown below. The complete final exam schedule is also available on the ASU web page.

<table>
<thead>
<tr>
<th>Sec</th>
<th>Days</th>
<th>Time</th>
<th>Instructor</th>
<th>Final Exam Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>MWF</td>
<td>10:00 am- 10:50 am</td>
<td>Dr. Zehnder</td>
<td>Mon., May 4</td>
<td>10:30 am-12:30 pm</td>
</tr>
<tr>
<td>070</td>
<td>TR</td>
<td>08:00 am- 09:15 am</td>
<td>Mr. Boudreaux</td>
<td>Tues., May 5</td>
<td>08:00-10:00 am</td>
</tr>
<tr>
<td>030</td>
<td>TR</td>
<td>11:00 am- 12:15 pm</td>
<td>Dr. Zehnder</td>
<td>Tues., May 5</td>
<td>10:30 am-12:30 pm</td>
</tr>
</tbody>
</table>

Blackboard
Grades will be posted on Blackboard. Information, handouts, homework assignments, and other course documents will either be posted on your instructor’s faculty web page, or on Blackboard.

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 Thursday, March 26, 2020.

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CHEM 1111 — GENERAL CHEMISTRY LABORATORY

Laboratory Meeting Times
The lab classes that accompany the CHEM 1311 lecture course are shown in the table below. The labs will meet first for pre-lab lectures in the Class Room listed in the table.

<table>
<thead>
<tr>
<th>Section</th>
<th>Day</th>
<th>Meeting Time</th>
<th>Instructor</th>
<th>Class Room</th>
<th>Lab Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>03Z</td>
<td>M</td>
<td>2:00 pm-04:50 pm</td>
<td>Dr. Zehnder</td>
<td>CAV 215</td>
<td>CAV 216</td>
</tr>
<tr>
<td>04Z</td>
<td>T</td>
<td>11:00 am-01:50 pm</td>
<td>Mr. Rilling</td>
<td>CAV 211</td>
<td>CAV 216</td>
</tr>
<tr>
<td>05Z</td>
<td>W</td>
<td>11:00 am-01:50 pm</td>
<td>Mr. Rilling</td>
<td>CAV 211</td>
<td>CAV 216</td>
</tr>
<tr>
<td>06Z</td>
<td>W</td>
<td>2:00 pm-04:50 pm</td>
<td>Dr. Zehnder</td>
<td>CAV 215</td>
<td>CAV 216</td>
</tr>
<tr>
<td>07Z</td>
<td>R</td>
<td>11:00 am-01:50 pm</td>
<td>Mr. Rilling</td>
<td>CAV 215</td>
<td>CAV 216</td>
</tr>
<tr>
<td>08Z</td>
<td>R</td>
<td>02:00 pm-04:50 pm</td>
<td>Mr. Rilling</td>
<td>CAV 215</td>
<td>CAV 216</td>
</tr>
<tr>
<td>09Z</td>
<td>M</td>
<td>02:00 pm-04:50 pm</td>
<td>Dr. Maxwell</td>
<td>CAV 200</td>
<td>CAV 206</td>
</tr>
</tbody>
</table>

The CHEM 1111 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. 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 Procedures and Lab Reports
The procedures for these labs will be posted on Blackboard in the section labeled “Lab Resources.” The procedures will 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. It is essential that you read the materials posted in Blackboard for that week’s lab before coming to lab. Each lab will be worth 100 points.

**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. Points may get deducted if you leave the lab in unsatisfactory conditions.

**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 Sunday, January 26.

**Lab Midterm and Lab Final**
There will be a 100-point lab midterm and a 100-point lab final given during the week of 3/30/20 and the last week of classes respectively. These grades will not be dropped from the lab total.
<table>
<thead>
<tr>
<th>Date</th>
<th>Week Of</th>
<th>Lecture</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/13</td>
<td>1/13</td>
<td><strong>Chapter 1: Matter and Energy</strong> — Composition of Matter, States of Matter, Measurements, SI Units, Significant Figures, Unit Conversions</td>
<td>Lab Safety Lecture Significant figure lecture and worksheet Mandatory Lab Safety Training and Quiz — instructions given in <em>Lab Safety Training</em> section (must be completed by Jan. 26)</td>
</tr>
<tr>
<td>1/20</td>
<td>1/20</td>
<td><strong>Monday, Jan. 20 MLK-day</strong> <strong>Chapter 2: Atoms, Ions, and Molecules</strong> — Nuclear Model, Atomic Mass, Periodic Table, Molecular and Ionic Compounds, Naming Compounds and Writing Formulas</td>
<td>Labs Do Not Meet Take Home Assignment: “Scientific Measurement and Presentation of Data” must be completed before start of lab next week</td>
</tr>
<tr>
<td>1/27</td>
<td>1/27</td>
<td>Chapter 2, cont.</td>
<td>Measuring Mass and Volume</td>
</tr>
<tr>
<td>2/3</td>
<td>2/3</td>
<td><strong>Chapter 3: Stoichiometry</strong> — The Mole Concept, Balancing Equations, Stoichiometry, Percent Composition, Limiting Reactants</td>
<td>Measuring Density</td>
</tr>
<tr>
<td>2/10</td>
<td>2/10</td>
<td>Chapter 3, cont. <strong>Exam 1 – Wed., Feb. 12 (Ch. 1, 2,3)</strong></td>
<td>The Use of Volumetric Glassware</td>
</tr>
<tr>
<td>2/17</td>
<td>2/17</td>
<td><strong>Chapter 4: Solution Chemistry</strong> — Concentration, Electrolytes, Acid-Base Reactions, Precipitation Reactions, Redox Reactions</td>
<td>Percentage Water in a Hydrate</td>
</tr>
<tr>
<td>2/24</td>
<td>2/24</td>
<td>Chapter 4, cont.</td>
<td>Percentage of Potassium Chlorate in a Mixture</td>
</tr>
<tr>
<td>Date</td>
<td>Week Of Lecture</td>
<td>Lab</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>----------------</td>
<td>----------------------</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>3/2</td>
<td><strong>Chapter 5: Thermochemistry</strong> — Energy, Systems, Enthalpy, Heat Capacity, Calorimetry, Hess’s Law, Standard Enthalpies of Formation</td>
<td>Titration of Vinegar</td>
</tr>
<tr>
<td>9</td>
<td>3/9</td>
<td><strong>Spring Break</strong></td>
<td>No classes or labs</td>
</tr>
<tr>
<td>10</td>
<td>3/16</td>
<td><strong>Chapter 6: Properties of Gases</strong> — Pressure, The Gas Laws, the Ideal Gas Law, Gas Density, Dalton’s Law, Kinetic-Molecular Theory</td>
<td>Specific Heat Capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Exam 2 – Wed., March 18 (Ch. 3, 4, 5)</strong></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>3/23</td>
<td>Chapter 6, cont.</td>
<td>Heats of Reaction: Hess’s Law</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Thurs., Mar. 26 Last Day to Drop</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Lab Midterm Exam</strong></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>4/6</td>
<td><strong>Chapter 8: Chemical Bonds</strong> — Lewis Structures, Covalent Bond, Polar Bonds, Resonance, Exceptions to the Octet Rule 4/10 is spring holiday, no classes that day.</td>
<td>Gas Law Labs April 7th at 2 pm Moon lecture On that day labs will meet at 3:15 pm</td>
</tr>
<tr>
<td>14</td>
<td>4/13</td>
<td><strong>Chapter 9: Molecular Geometry</strong> — VSEPR, Valence Bond Theory, MO Theory</td>
<td>The Emission Spectra of Atoms</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Exam 3 – Wed., April. 15 (Ch. 7, 8, 9)</strong></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>4/20</td>
<td>Chapter 9, cont.</td>
<td>Molecular Structures and Shapes</td>
</tr>
<tr>
<td>16</td>
<td>4/27</td>
<td><strong>Chapter 10: Intermolecular Forces</strong> — Intermolecular Forces, Vapor Pressure, Phase Diagrams, Water</td>
<td>Lab Final Exam</td>
</tr>
<tr>
<td>17</td>
<td>5/4</td>
<td><strong>Final Exams</strong></td>
<td></td>
</tr>
</tbody>
</table>
General Policies Related to This Course

All students are required to follow the policies and procedures presented in these documents:

- [Angelo State University Student Handbook](#)
- [Angelo State University Catalog](#)

Academic Integrity

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

The College of Science and Engineering adheres to the university’s [Statement of Academic Integrity](#).

Accommodations for Students with Disabilities

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student’s responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at ADA@angelo.edu. For more information about the application process and requirements, visit the [Student Disability Services website](#).

The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
dallas.swafford@angelo.edu
Houston Harte University Center, Room 112
Incomplete Grade Policy
It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 Grading Procedures for more information.

Plagiarism
Plagiarism is a serious topic covered in ASU’s Academic Integrity policy in the Student Handbook. Plagiarism is the action or practice of taking someone else’s work, idea, etc., and passing it off as one’s own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality. Resources to help you understand this policy better are available at the ASU Writing Center.

Student Absence for Observance of Religious Holy Days
A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for Observance of Religious Holy Day for more information.

Title IX at Angelo State University:
The University prohibits discrimination based on sex, which includes pregnancy, sexual orientation, gender identity, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination including: sexual assault, sex-based discrimination, sexual exploitation, sexual harassment, public indecency, interpersonal violence (domestic violence and/or dating violence), and stalking. As a faculty member, I am a Responsible Employee meaning that I am obligated by law and ASU policy to report any allegations I am notified of to the Office of Title IX Compliance.

Students are encouraged to report any incidents of sexual misconduct directly to ASU’s Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator at:

Michelle Boone, J.D.
Director of Title IX Compliance/Title IX Coordinator
Mayer Administration Building, Room 210
325-942-2022
michelle.boone@angelo.edu

You may also file a report online 24/7 at www.angelo.edu/incident-form.

If you are wishing to speak to someone about an incident in confidence you may contact the University Health Clinic and Counseling Center at 325-942-2173 or the ASU Crisis Helpline at 325-486-6345.

For more information about Title IX in general you may visit www.angelo.edu/title-ix.
### 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.

1 www.wwnorton.com/smartwork
2 http://uwm.edu/acs-exams/students/student-study-materials/
3 http://www.angelo.edu/services/registrar-entrepreneurial/final.html
4 http://blackboard.angelo.edu (or access Blackboard from RamPort)
5 https://www.angelo.edu/student-handbook/
6 https://www.angelo.edu/catalogs/
7 https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php
8 https://www.angelo.edu/services/disability-services/
9 https://www.angelo.edu/content/files/14197-op-1011-grading-procedures
10 https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php
11 https://www.angelo.edu/dept/writing_center/academic_honesty.php
12 https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of