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>
</tr>
</thead>
<tbody>
<tr>
<td>01D</td>
<td>MTWF</td>
<td>1:00 pm-2:45 pm</td>
<td>Dr. Carter</td>
</tr>
</tbody>
</table>

Required Texts and Materials

- **Class Test Textbook and Online Homework [Required]**
  Section 01D is utilizing an open source (OER) textbook which is available at no cost. Textbook: *Chemistry 2e*, Flowers et al., is available from the [OpenStax website](https://openstax.org).

- **SmartWork Online Homework [Required]**:

- **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**

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 (waved for Sum, 2020)

Technology Requirements
- Computer with webcam
- Access to SmartWork.\textsuperscript{2} Instructions for registering are available in Blackboard.
- Access to CHEM101.\textsuperscript{3}
- LockDown Browser. Instructions provided in Blackboard

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>200 pts</td>
</tr>
<tr>
<td>Quizzes, classroom participation</td>
<td>200 pts</td>
</tr>
<tr>
<td>SmartWork Homework</td>
<td>200 pts</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>100 pts</td>
</tr>
<tr>
<td>Total</td>
<td>1000 pts</td>
</tr>
</tbody>
</table>

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 (See course schedule)
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.

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 based on 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.

<table>
<thead>
<tr>
<th>Sec</th>
<th>Final Exam Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>01D</td>
<td>Wednesday, July 1</td>
<td>12:30-2:30 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**
Evidence of ongoing participation will be used to determine your “attendance”. All videos and some other activities will have the option to mark reviewed. This will be used to assign “attendance” points that will be part of your classroom participation grade.

**Last Day to Drop**
The last day to drop the course with a grade of “W” is **Friday, June 19, 2020**.

This syllabus is subject to change.
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 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 Title IX information 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.

---

2. www.wwnorton.com/smartwork
3. https://101edu.co/
5. http://blackboard.angelo.edu (or access Blackboard from RamPort)
7. https://www.angelo.edu/catalogs/
10. https://www.angelo.edu/content/files/14197-op-1011-grading-procedures
13. https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of
## Exam Schedule

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>Wednesday, June 10, 1:00-2:45 PM</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Thursday, June 18, 1:00-2:45 PM</td>
</tr>
<tr>
<td>Exam 3</td>
<td>Friday, June 26, 1:00-2:45 PM</td>
</tr>
<tr>
<td>FINAL</td>
<td>Wednesday, July 1, 12:30-2:30 PM</td>
</tr>
</tbody>
</table>

## Proposed Course Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 1st Day</td>
<td>States of Matter&lt;br&gt;Elements: metal, nonmetal and metalloid (semimetal)&lt;br&gt;Memorize 16 elements</td>
</tr>
<tr>
<td>Mon 6/1</td>
<td>Compounds: molecular vs. ionic&lt;br&gt;Properties: physical/chemical; intensive/extentive&lt;br&gt;Measurement Introduction - Sig figs Reading - one step calcs&lt;br&gt;Nomenclature Assignment 1</td>
</tr>
<tr>
<td>Tues 6/2</td>
<td>Classification of Matter&lt;br&gt;Conversions: Density (&quot;ratioed numbers&quot;)&lt;br&gt;Assignment: Nuclear Atom Pre-lecture Assignment due Wed</td>
</tr>
<tr>
<td>Wed 6/3</td>
<td>Nomen. Assignment 1 Quiz&lt;br&gt;Nomen. Assignment 2 (Sec. 2.6-2.7)&lt;br&gt;Nuclear atom (Sec. 2.4-2.5)&lt;br&gt;Atomic Weight &amp; Avogadro's Number&lt;br&gt;Assignment: History of Nuclear Atom pre-lecture for Thurs</td>
</tr>
<tr>
<td>Thur 6/4</td>
<td>History of Nuclear Atom see Openstax 2.1-2.3 (Blackboard)&lt;br&gt;Classification of Matter Revisited&lt;br&gt;Molar Mass &amp; Introduction to Stoichiometry (Sec.3.2)</td>
</tr>
<tr>
<td>Fri 6/5</td>
<td>Quiz on Nomenclature Assignments 1&amp;2&lt;br&gt;Memorize 7 Common Oxoacids&lt;br&gt;Mass Stoichiometry (ratios from formulas)</td>
</tr>
<tr>
<td>Mon 6/8</td>
<td>Quiz on 7 Common Oxoacids&lt;br&gt;Nomenclature Assignment 3 (Sec. 2.7)&lt;br&gt;Empirical Formulas (Sec. 3.6-3.7)&lt;br&gt;Chemical Equations (Sec. 3.3-3.4)</td>
</tr>
<tr>
<td>Tues 6/9</td>
<td>Quiz on Nomenclature Assignments 1-3&lt;br&gt;Reaction Stoichiometry (Sec. 3.5, 3.9)&lt;br&gt;Solutions and concentration (Sec. 4.2)</td>
</tr>
<tr>
<td>Wed 6/10</td>
<td>Exam 1 - Chapters 1-3</td>
</tr>
<tr>
<td>Thur 6/11</td>
<td>Nomenclature Assignment 4&amp;5 (Sec. 2.6)&lt;br&gt;Solution Stoichiometry (Sec. 4.6)&lt;br&gt;Electrolytes and nonelectrolytes (Sec. 4.4)&lt;br&gt;Classify reactions: number of reactants &amp; products/exchange</td>
</tr>
<tr>
<td>Fri 6/12</td>
<td>Precipitation reactions (Sec. 4.7)&lt;br&gt;Ion exchange, ionic and net-ionic equations&lt;br&gt;Acid-base reactions (Sec. 4.5)</td>
</tr>
</tbody>
</table>
| Mon 6/15 | Quiz on Nomenclature Assignments 1-4  
Redox reactions (Sec. 4.9)  
State Functions and Heat at constant pressure ($\Delta H$) |
|---------|------------------------------------------------------------------|
| Tues 6/16 | Endothermic, exothermic, thermochemical equations  
Standard Enthalpy of Formation |
| Wed 6/17 | Hess's Law  
Internal energy, definition of enthalpy  
Enthalpy of combustion (if time allows) |
| Thurs 6/18 | **Exam 2 - Chapters 4-5** |
| Fri 6/19 | Gas properties and pressure  
Ideal Gas Law  
Type I Ideal Gas Law Problems (Sec. 6.4)  
Gases in chemical reactions (Sec. 6.5) |
| Mon 6/22 | Type II Ideal Gas Law Problems (Sec.6.3)  
Named gas laws (Sec. 6.3)  
Advanced Ideal Gas Law concepts (Sec. 6.6-6.7) |
| Tues 6/23 | Kinetic molecular theory of gases (Sec. 6.8)  
Real vs ideal gases (Sec. 6.9)S  
Electromagnetic radiation (Sec. 7.1)  
Wave behavior of light (Sec. 7.2) |
| Wed 6/24 | Atomic line spectra (Sec. 7.1, 7.4)  
Particle nature of light (Sec. 7.3)  
Quantum nature of atom (Sec. 7.4-7.6)  
Atomic orbitals (Sec. 7.6-7.7) |
| Thurs 6/25 | Electron configurations (Sec. 7.8)  
Periodic properties (Sec. Sec. 7.9-7-12, 8.3)  
Lewis, VSEPR, Polarity I (Sec. 8.1-8.3, 8.5, 9.2-9.3) |
| Fri 6/26 | **Exam 3 - Chapter 6 to Sec. 9.3** |
| Mon 6/29 | Lewis, VSEPR, Polarity II (add Sec. 8.4)  
Lewis, VSEPR, Polarity III (add Sec. 8.6)  
Bond Properties (Sec. 8.7) |
| Tues 6/30 | Bond Energy and chemical reactions (est. $\Delta E$, Sec. 8.7)  
Intro to Molecular Orbital (MO) & Valence Bond (VB) Theory  
MO homonuclear diatomics (If time allows) |
| Wed 7/1 | **Final Exam, 12:30-2:30 PM** |
| Available to July 6 | **Self-Study: Sections 12.1-12.3**  
- Review States  
- Heating curves  
- Intermolecular interactions  
- Phase diagrams |