

# CHEM 1311/1111

## General Chemistry

Summer I 2022



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### Instructors:

#### Dr. Shanmugapriya Dharmarajan

Email: [sdharmarajan@angelo.edu](mailto:sdharmarajan@angelo.edu)

Phone: 325-486-6626

Office: CAV 204A

**Office Hours:** TWR 8:00-9:00 am, MF (online) 2:00-3:00 pm or by appointment

#### Dr. Edith Osborne

Email: [edith.osborne@angelo.edu](mailto:edith.osborne@angelo.edu)

Phone: 325-486-6629

Office: CAV 218

**Office Hours:** TWR 2:00-3:30PM or by appointment

### Course Information

#### Lecture Meeting Time

MTWRF 9:00 am -10:45 am in Cavness 215

#### Lab Meeting Time

TWR 11:00 am -1:50 pm in Cavness 215 for pre-lab and Cavness 216 for lab

## 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.

## 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.

### **Course Delivery**

This course will meet face-to-face, and students are expected to attend all class meetings in person. In some instances, remote instruction, virtual labs, and online quizzes and tests will be implemented.

You will also be expected to complete coursework via [Blackboard](#).<sup>1</sup> Please refer to this [Health and Safety web page](#)<sup>2</sup> for updated information about campus guidelines as they relate to the COVID-19 pandemic.

## Attendance

You are expected to attend the in-person lectures and labs. You will get points for participating in the lecture quizzes through TopHat. You cannot make-up the missed TopHat points. The student is responsible for making-up any other work missed under the following conditions:

- Unavoidable emergency absences (illness, death in the immediate family, etc.): You must contact the instructor before the absence with a valid, and verifiable excuse.
- Planned absences (university related): You must get the instructor's approval to make-up the missed work prior to the absence. The reason for the absence should be the participation in university sponsored events.

## Required Texts and Materials

- **Lecture Textbook and ALEKS online homework [Both Required]:**  
Paul Flowers, Klaus Theopold, Richard Langley, and William R. Robinson, *Chemistry 2e* (2<sup>nd</sup> edition). <https://openstax.org/details/books/chemistry-2e>  
Purchasing Options:
  1. Textbook – FREE!
  2. ALEKS – McGraw-Hill; <https://www.aleks.com> (Class Code: PVQQQ-D3VTD)
- **Respondus Lockdown & Respondus Monitor** Access through Blackboard. Make sure that your computer/laptop is compatible with Respondus software. Respondus Monitor requires a webcam. Lockdown and Monitor will be used for the administration of exams.
- **Laboratory software requirements: Labflow.** Codes may be purchased from the bookstore or during the registration process. To register with for Labflow, navigate to <https://labflow.com/app/login>.
- **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.*
- **Lab notebook:** Students must bring a bound laboratory notebook with them to each lab period. A composition book or the laboratory notebook listed as a required material at the bookstore will be acceptable.

- **ACS Exam Study Guide (Recommended):** To prepare for the final exam, you may use the ACS General Chemistry Study Guide. You may purchase the study guides from one of the links given below.

[ACS study guide](#)

[Amazon link](#)

## Technology Requirements

To successfully complete this course, students need to obtain access to **ALEKS**, an online homework program. These assignments will be averaged to give a 200-point grade. To register with ALEKS, follow the instructions in the “ALEKS Student Registration” handout.

While some exams and quizzes will be given face-to-face, access to some exams and quizzes will be through Respondus Lockdown Browser and will be video recorded via Respondus Monitor. Respondus requires a desktop computer or laptop (not a Chromebook) and a webcam. For best results, use an ethernet cable to connect to your Internet source instead of relying on Wifi. Refer to the Blackboard course for Respondus installation instructions. Respondus monitor requires the use of a web cam to record video.

You also need access to a printer. You will be required to print some documents, complete them by hand, and then scan them in using a scanner or smartphone. You will then need to be able to create a pdf and upload it to Blackboard.

For office hours, we will be using a combination of Blackboard Collaborate, email, telephone, and face to face meetings.

## Communication

Faculty will respond to email and/or telephone messages within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until Monday.

**Written communication via email:** All private communication will be done exclusively through your ASU email address. Check frequently for announcements and policy changes. In your emails to faculty, include the course name and section number in your subject line.

**Virtual communication:** Office hours and/or advising may be done with the assistance of the telephone, Collaborate, Skype, etc.

# Grading

## Evaluation and Grades

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

Assessment	Total Points
Exams (3×100 pts)	300 pts
Final Exam	150 pts
Quizzes (4 x 25 pts)	100 pts
Classroom participation (TopHat)	50 pts
ALEKS Homework	200 pts
Laboratory	200 pts
<b>Total</b>	<b>1000 pts</b>

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 graded 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%)

## Last Day to Drop

The last day to drop without creating an academic record: **Friday, June 10, 2022.**

The last day to drop the course with a grade of "W": **Monday, June 27, 2022.**

## Lecture Quizzes

There will be a total of 4 online quizzes. Each worth 25 points.

Quizzes	Date	Room	Time
Quiz 1	Thursday, June 9	Virtual	5:30 pm
Quiz 2	Monday, June 20	Virtual	5:30 pm
Quiz 3	Tuesday, June 28	Virtual	5:30 pm
Quiz 4	Wednesday, July 6	Virtual	5:30 pm

## Lecture Exams

The exams will be given outside of regular class time on the dates listed below:

Exam	Date	Room	Time
Exam 1	Tuesday, June 14	CAV 215	11:20 am
Exam 2	Thursday, June 23	CAV 215	11:20 am
Exam 3	Thursday, June 30	CAV 215	11:20 am

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.

## Lecture 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 and from the [ACS web page](#).<sup>3</sup> The schedule for the 1311 final exam is shown below.

Sec	Instructor	Final Exam Date	Time
020	Dr. Dharmarajan	Friday, July 8	10:15 am-12:15 pm

## Laboratory Information

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.

**Pay close attention to any announcements in your Bb lab section!!!!**

### 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 and will receive a grade of zero for that lab day.

### Lab Procedures and Lab Reports

We will be using the platform LabFlow by Catalyst Education for lab procedures, etc. You will have to register and to create an account with LabFlow by following this link:

[LabFlow Create Account](#)

A pdf document with more detailed instructions is provided in BlackBoard.

While you sign up, you will be prompted to pay a fee.

The procedures for the labs will be posted within the LabFlow platform. The procedures will provide a description of the background for each experiment. You will be asked to complete pre-laboratory questions prior to the lab meeting within the LabFlow platform. Your instructor will communicate to you at what time the prelab assignments are due. The lab report itself will be uploaded to LabFlow and must be turned in by whichever due date your instructor requires. Each lab will be worth up to 100 points (up to 20 points for the prelab questions, and up to 80 points for the lab report).

### 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 locations 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 and Chemical Hygiene."
2. Click on "Get Started Here" in the left-hand column.
3. Follow the instructions under "Welcome to Lab Safety and Chemical Hygiene Training!"
4. You must score 90% or higher on the lab safety quiz.

The Lab Safety Training must be completed by the evening of Tuesday, June 7.

## **Lab Final**

There will be a 100-point lab final given on July 7, 2022 during the lab time. This grade will not be dropped from the lab total.

## **Blackboard**

Some information and other course documents will be posted on Blackboard.

## **General Policies Related to This Course**

**Grading corrections:** Any discussion of corrections must be made within three weekdays of the return of the assignment.

**Courtesy:** For in class activities, please be on time, refrain from eating, and turn off cell phones. Attendance will be taken at the beginning of each face to face meeting.

**Late Work or Missed Assignments:** Due to the nature of how ALEKS is scored, homework extensions will not be given. Extensions will not be granted for lab reports except under rare conditions. Please communicate with your professor if a problem arises. Please keep in mind that due to the fast pace of summer courses, getting behind will greatly hinder your ability to be successful in the course.

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

- [Angelo State University Student Handbook](#)<sup>4</sup>
- [Angelo State University Catalog](#)<sup>5</sup>

## **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](#).<sup>6</sup>

## **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](mailto:ADA@angelo.edu). For more information about the application process and requirements, visit the [Student Disability Services website](#).<sup>7</sup> 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](mailto: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](#)<sup>8</sup> for more information.

## **Plagiarism**

Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#)<sup>9</sup> 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](#).<sup>10</sup>

## **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](#)<sup>11</sup> 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 Miller, J.D.

Special Assistant to the President and Title IX Coordinator

Mayer Administration Building, Room 210

325-486-6357

[michelle.boone@angelo.edu](mailto:michelle.boone@angelo.edu)

You may also [file a report online](#)<sup>12</sup> 24/7.

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, visit the [Title IX website](#).<sup>13</sup>

## Modifications to the Syllabus

This syllabus, including grade evaluation and course schedule, is subject to modification. In particular, the COVID-19 pandemic may require significant changes in course delivery and content on potentially short notice.

## LECTURE SCHEDULE — Summer I 2022

Date	Lecture
6/6	<b>Chapter 1: Matter and Energy</b> — Composition of Matter, States of Matter, Measurements, SI Units, Significant Figures, Unit Conversions
6/7-6/8	<b>Chapter 2: Atoms, Ions, and Molecules</b> — Nuclear Model, Atomic Mass, Periodic Table, Molecular and Ionic Compounds, Naming Compounds and Writing Formulas
6/9-6/10	<b>Chapter 3: Stoichiometry; Quiz 1 (Virtual)</b> The Mole Concept, Balancing Equations, Stoichiometry, Percent Composition, Limiting Reactants
6/13	<b>Chapter 4: Solution Chemistry</b> — Concentration, Electrolytes, Acid-Base Reactions, Precipitation Reactions, Redox Reactions
6/14	<b>Exam 1 – (Ch. 1, 2, 3)</b>
6/15	<b>Chapter 4: continued</b>
6/16-6/17	<b>Chapter 5: Thermochemistry</b> — Energy, Systems, Enthalpy, Heat Capacity, Calorimetry, Hess's Law, Standard Enthalpies of Formation
6/20	<b>Quiz 2 (Virtual)</b>
6/21-6/22	<b>Chapter 6: Electronic Structure and Periodicity</b> — Electromagnetic Radiation, Bohr Model, Quantum Theory, Electronic Configurations, Periodic Trends of Elements
6/23	<b>Exam 2 – (Ch. 3, 4, 5, and 6)</b>
6/24-6/28	<b>Chapter 7: Chemical Bonding and Molecular Geometry</b> — Ionic and Covalent Bonding, Lewis Structures, Formal Charges/Resonance, Strengths of Bonds, VSEPR Theory, Structure and Polarity <b>Quiz 3 (Virtual)</b>
6/27	<b>Last day to drop/withdraw from regular summer I term</b>

Date	Lecture
6/29	<b>Chapter 8: Covalent Bonding</b> — Valence Bond Theory, Hybrid Orbitals, Multiple Bonds, Molecular Orbital Theory
6/30	<b>Exam 3 – (Ch. 6, 7, 8)</b>
7/1	<b>Chapter 8: continued</b>
7/5-7/6	<b>Chapter 9: Gases</b> — Pressure, Temperature, Volume, Ideal Gas Law, Gas-Phase Stoichiometry, Effusion/Diffusion, Kinetic-Molecular Theory, Non-Ideal Gases <b>Quiz 4 (Virtual)</b>
7/7	<b>Chapter 10: Liquids and Solids</b> – Intermolecular Forces, Properties of liquids, Phase transitions
7/8	<b>Final Exam</b>

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## Lab SCHEDULE — Summer I 2022

Date	Lab
6/7	Lab Safety Lecture Safety videos and Quiz, Chemistry Math and Labware videos and Quiz Conversion Factors and Problem Solving Mandatory Lab Safety Training and Quiz — instructions given in <i>Lab Safety Training</i> section (must be completed by June 8)
6/8	Basic Laboratory Techniques
6/9	Density and Specific Gravity
6/14	<b>Exam 1</b>
6/15	Empirical Formulas
6/16	Chemistry of Copper and Percent Yield
6/21	Solutions, Electrolytes, and Concentrations
6/22	Titration: Determining the Concentration of an Acid
6/23	<b>Exam 2</b>
6/28	Energy and Specific Heat
6/29	Atomic Spectra
6/30	<b>Exam 3</b>
7/5	Modeling Geometry and Polarity
7/6	Analysis of $\text{KClO}_3/\text{KCl}$ using the Ideal Gas Law
7/7	<b>Lab Final Exam</b>

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<sup>1</sup> <https://angelo.blackboard.com/>

<sup>2</sup> <https://www.angelo.edu/covid-19/returning-to-campus/health-and-safety.php>

<sup>3</sup> <http://uwm.edu/acs-exams/students/student-study-materials/>

<sup>4</sup> <https://www.angelo.edu/current-students/student-handbook/>

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- 5 <https://www.angelo.edu/academics/catalog/>
  - 6 <https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=96>
  - 7 <https://www.angelo.edu/current-students/disability-services/>
  - 8 <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>
  - 9 <https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=96>
  - 10 [https://www.angelo.edu/current-students/writing-center/academic\\_honesty.php](https://www.angelo.edu/current-students/writing-center/academic_honesty.php)
  - 11 <https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>
  - 12 <http://www.angelo.edu/incident-form>
  - 13 <https://www.angelo.edu/title-ix>