

CHEM 1311/1111

General Chemistry

Fall, 2021



Instructors:

Dr. Ralph Zehnder

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Phone: 486-6662

Office: CAV 204B

Office Hours: W 2:30-5, F 11-1:30, or by appointment

Dr. Kyle Beran

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Phone: 486-6663

Office: CAV 102B

Office Hours: MWF 2-3, TR 11-12, or by appointment

Mr. Kevin Boudreaux

Email: Kevin.Boudreaux@angelo.edu

Phone: 486-6623

Office: CAV 207B

Office Hours: MWF 10-11, TR 11-12, or by appointment; Review sessions W 5 pm

Dr. Shanmugapriya Dharmarajan

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Phone: 486-6626

Office: CAV 204A

Office Hours: T 2:30-4 pm; W 8-9:30, R 9:30-11:00, or by appointment

Dr. Edith Osborne

Email: Edith.Osborne@angelo.edu

Phone: 486-6629

Office: CAV 218

Office Hours: MTWRF 11-12, M 1-2, or by appointment

Dr. Gregory Smith

Email: Gregory.Smith@angelo.edu

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Office: CAV 207A

Office Hours: MWF 11-12, TR 10-11, or by appointment

CHEM 1311 — GENERAL CHEMISTRY CLASS MEETINGS

Class Meeting Times

Sec	Days	Time	Instructor	Location
010	MWF	09:00 am-09:50 am	Dr. Beran	CAV 211
020	MWF	09:00 am-09:50 am	Dr. Zehnder	CAV 219
030	MWF	10:00 am-10:50 am	Dr. Beran	CAV 211
040	MWF	10:00 am-10:50 am	Dr. Smith	CAV 223
050	MWF	10:00 am-10:50 am	Dr. Zehnder	CAV 219
060	TR	08:00 am-09:15 am	Dr. Dharmarajan	CAV 200
070	TR	09:30 am-10:45 am	Mr. Boudreaux	CAV 211

Required Texts and Materials

- **Textbook, ALEKS online homework, and TopHat Pro online student engagement platform [all three required]:**
Paul Flowers, Klaus Theopold, Richard Langley, and William R. Robinson, *Chemistry 2e* (2nd edition). You can access the book by clicking on the following link: [OpenStax Chemistry Textbook by Paul Flowers](#)
Purchasing Options:
 1. Textbook – FREE!
 2. ALEKS – McGraw-Hill; \$70 for one semester, \$75 for 1 year, [ALEKS HW](#)
 3. LabFlow – Catalyst Education; \$49.99 per semester, [LabFlow Create Account](#)
- **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 potentially be used for the administration of exams.
- **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 **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” document. The ten-digit class code that you need for registering with ALEKS is: **Q9DFH-CJDHG**

You also need access to LabFlow, a platform that we will use for you to upload your lab reports and other related lab assignments. For signup instructions please review the pdf file that is located in Blackboard.

Respondus Lockdown Browser

Exams and quizzes will potentially be administered through Respondus Lockdown Browser, in which case you will be video recorded via Respondus Monitor. Respondus requires a desktop computer or laptop 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. Click here for more information:

[YouTube video with instructions about how to use Lockdownbrowser](#)

Course Delivery

This course will be delivered in a traditional face-to-face setting with students expected to attend class in person. In the event of the Covid 19 situation changing the course may be transferred into a hybrid setting.

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. Activities such as worksheets and quizzes cannot be made up. You will not be automatically dropped if you stop attending class.

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, classroom participation	150 pts
ALEKS Homework	200 pts
Laboratory	200 pts
Total	1000 pts

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%)

Exams

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

Exam	Date	Room	Time
Exam 1	Thursday, Sept. 23	CAV 211/215	5:30 pm
Exam 2	Thursday, Oct. 21	CAV 211/215	5:30 pm
Exam 3	Thursday, Nov. 18	CAV 211/215	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 (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](#).¹ The schedule for the 1311 final exams is shown below. The complete final exam schedule is also available on the [ASU web page](#).²

Sec	Days	Time	Instructor	Final Exam Date	Time
010	MWF	09:00 -09:50 am	Dr. Beran	Wed., Dec. 8	08:00-10:00 am
020	MWF	09:00 -09:50 am	Dr. Zehnder	Wed., Dec. 8	08:00-10:00 am
030	MWF	10:00 -10:50 am	Dr. Beran	Mon., Dec. 6	10:30 am-12:30 pm
040	MWF	10:00 -10:50 am	Dr. Smith	Mon., Dec. 6	10:30 am-12:30 pm
050	MWF	10:00 -10:50 am	Dr. Zehnder	Mon., Dec. 6	10:30 am-12:30 pm
060	TR	08:00 -09:15 am	Dr. Dharmarajan	Tuesd., Dec. 7	08:00-10:00 am
070	TR	09:30 -10:45 am	Mr. Boudreaux	Thursd., Dec. 9	08:00-10:00 am

Blackboard

Grades will be posted on [Blackboard](#).³ Information, handouts, homework assignments, and other course documents will either be posted on your instructor’s faculty web page, or on Blackboard.

Drop Dates

The last day to drop the course without creating an academic record: **Thursday, September 9, 2021.**

The last day to drop the course with a grade of “W” is **Monday, November 22, 2021.**

Section 070 Stuff

Lecture Slides and Practice Problems

Most of the slides which are projected on the LCD projector are available on the Blackboard page for this course, in the section entitled "Lecture Slides" under "Course Content." **The printed lecture notes do *not* contain all of the information presented during the class, such as solutions to the example problems. You should take good notes anyway.**

There will also be a set of "Practice Problems" for each chapter, which will be a set of questions covering most of the topics from each chapter, and which will be formatted in a way that is similar to what you will see on the exam. There will NOT be a key for these problems posted, but you can ask questions about them during my office hours or during Review Sessions.

Quizzes / Classroom Participation

Quizzes will be given *every week*. The quizzes will be made available on Blackboard after the class at 11:00, and will be due by 11:59 pm. They will be based on material presented since the previous quiz, and will be taken primarily from the problems in the textbook. There will be about 12 to 15 quizzes, worth 100 points each; the lowest two quiz grades will be dropped, and the remaining quizzes will be averaged on a 100-point scale.

The other 50 points in this "Quizzes / Classroom Participation" score are based on attendance in class, and on participation via the Top Hat interface. Two points will be taken off the 50-point Classroom Participation grade for each class missed.

Studying and Homework

The lectures will follow the general format for the textbook; it is expected that you will read the appropriate sections in the textbook. **In general, for any college-level class, you should be prepared to spend about 2-3 hours of studying for each hour of lecture.**

In order to understand chemistry, you **MUST WORK PROBLEMS**. This textbook has a good selection of problems within each chapter and at the end of each chapter. You should make an effort to work all of the problems within the text of the chapter; in addition, I will highlight some selected problems from the end of the chapter that you should try to work. You can expect to see a lot questions similar to these on the exams.

Review Sessions and Supplemental Instruction

Review sessions will be held weekly on Wednesdays at 5 pm using the Collaborate video conferencing program on Blackboard. (I will possibly be able to allow students to

attend these sessions live, if social distancing regulations allow for it.) During these sessions, I will work problems from the book, review concepts presented in the lecture, go over problems from the homework, or anything else that you may have questions about. These sessions should give you a chance to enhance your understanding of chemistry, and hence, your grade.

For this course, a Supplemental Instruction tutoring program may be available. A schedule of SI sessions, or other tutoring information, will be announced when it is available.

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.

Section	Day	Meeting Time	Instructor	Class Room	Lab Room
08Z	M	11:00 am-01:50 pm	Dr. Zehnder	CAV 215	CAV 216
09Z	M	02:00 pm-04:50 pm	Dr. Osborne	CAV 215	CAV 216
10Z	M	02:00 pm-04:50 pm	Dr. Smith	CAV 211	CAV 212
11Z	T	11:00 am-01:50 pm	Dr. Dharmarajan	CAV 211	CAV 212
12Z	T	11:00 am-01:50 pm	Dr. Osborne	CAV 215	CAV 216
13Z	T	02:00 pm-04:50 pm	Dr. Osborne	CAV 215	CAV 216
14Z	W	11:00 am-01:50 pm	Dr. Zehnder	CAV 215	CAV 216
15Z	W	02:00 pm-04:50 pm	Dr. Smith	CAV 211	CAV 212
16Z	W	02:00 pm-04:50 pm	Dr. Dharmarajan	CAV 215	CAV 216
17Z	R	11:00 am-01:50 pm	Dr. Zehnder	CAV 211	CAV 212
18Z	R	02:00 pm-04:50 pm	Mr. Boudreaux	CAV 215	CAV 212

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

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 of \$49.99

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 drawers before leaving the lab.

Make-Up Lab Policy

If you have to miss a lab you will be turning in a lab report based on virtual data LabFlow will generate for you. You will have to seek permission from your instructor to be eligible to turn in a 100% virtual lab report. Your instructor will first work with you to attend another face-to-face lab section if that is feasible.

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. Under the left-hand menu, choose: "Get Started Here".
3. Click on "Get Started Here" in the left-hand column.
4. Follow the instructions under "Welcome to Lab Safety and Chemical Hygiene Training!"

5. You must score 90% or higher on the lab safety quiz.

The Lab Safety Training must be completed by the evening of Sunday, August 29.

Lab Midterm and Final Exams

There will be a 100-point lab midterm (week of 10/4) and a 100-point lab final exam (week of 11/29).

LECTURE AND LAB SCHEDULE — FALL, 2021

Date	Week Of	Lecture	Lab
1	8/23	Chapter 1: Matter and Energy — Composition of Matter, States of Matter, Measurements, SI Units, Significant Figures, Unit Conversions	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 Aug. 29)
2	8/30	Chapter 2: Atoms, Ions, and Molecules — Nuclear Model, Atomic Mass, Periodic Table, Molecular and Ionic Compounds, Naming Compounds and Writing Formulas	Basic Laboratory Techniques
3	9/06	<i>Monday, Sep 6 Labor Day</i> Chapter 2, cont.	Labs Do Not Meet Density and Specific Gravity (dry lab)
4	9/13	Chapter 3: Stoichiometry — The Mole Concept, Balancing Equations, Stoichiometry, Percent Composition, Limiting Reactants	Determination of Density
5	9/20	Chapter 3, cont. Exam 1 – Thurs., Sep. 23 (Ch. 1, 2,3)	Empirical Formulas
6	9/27	Chapter 4: Solution Chemistry — Concentration, Electrolytes, Acid-Base Reactions, Precipitation Reactions, Redox Reactions, Titrations	Chemistry of Copper and Percent Yield
7	10/4	Chapter 4, cont.	Solutions, Electrolytes, and Concentrations Lab Midterm Exam (covering the lab material from week 1 through week 6)
8	10/11	Chapter 5: Thermochemistry — Energy, Systems, Enthalpy, Heat Capacity, Calorimetry, Hess's	Titration: Determining the Concentration of an Acid

		Law, Standard Enthalpies of Formation	
9	10/18	Chapter 6: Electronic Structure and Periodicity — Electromagnetic Radiation, Bohr Model, Quantum Theory, Electronic Configurations, Periodic Trends of Elements Exam 2 – Thurs., Oct. 21 (Ch. 3, 4, 5, 6)	Energy and Specific Heat
10	10/25	Chapter 6, cont.	Constant Pressure Calorimetry
11	11/1	Chapter 7: Chemical Bonding and Molecular Geometry — Ionic and Covalent Bonding, Lewis Structures, Formal Charges/Resonance, Strengths of Bonds, VSEPR Theory, Structure and Polarity	Atomic Spectra
12	11/8	Chapter 8: Covalent Bonding — Valence Bond Theory, Hybrid Orbitals, Multiple Bonds, Molecular Orbital Theory	Modeling Geometry and Polarity
13	11/15	Chapter 9: Gases — Pressure, Temperature, Volume, Ideal Gas Law, Gas-Phase Stoichiometry, Effusion/Diffusion, Kinetic-Molecular Theory Exam 3 – Thurs., Nov. 18 (Ch. 6, 7, 8, 9)	Analysis of KClO_3/KCl using the Ideal Gas Law
14	11/22	Monday, November 22: Last Day to Drop Chapter 9, cont. <i>Wed., Nov. 24 Holiday</i> <i>Thurs, Nov. 25 Thanksgiving</i> <i>Fri, Nov. 26 Holiday</i>	No Labs
15	11/29	Chapter 10: Intermolecular Forces — Intermolecular Forces, Vapor Pressure, Phase Diagrams, Water	Lab Final Exam
16	12/06	Final Exams	

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](#)⁴
- [Angelo State University Catalog](#)⁵

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](#).⁶

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](#).⁷ 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

E-mails

For conducting official ASU business please use your official ASU e-mail account. Please make sure that you check your ASU.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.

Virtual communication

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

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](#)⁸ for more information.

Plagiarism

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

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](#)¹¹ for more information.

Title IX at Angelo State University

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other

federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.

You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Miller, J.D. You may submit reports in the following manner:

Online: [Incident Reporting Form](#)¹²

Face to Face: Mayer Administration Building, Room 210

Phone: 325-942-2022

Email: michelle.miller@angelo.edu

Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).

For more information about resources related to sexual misconduct, Title IX, or Angelo State's policy please visit the [Title IX website](#).¹³

Information About COVID-19

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)¹⁴ web page for current information about campus guidelines and safety standards as they relate to the COVID-19 pandemic.

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.

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

² http://www.angelo.edu/services/registrar_office/final.html

³ <http://blackboard.angelo.edu> (or access Blackboard from RamPort)

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

⁵ <https://www.angelo.edu/catalogs/>

⁶ <https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>

⁷ <https://www.angelo.edu/services/disability-services/>

⁸ <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>

⁹ <https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>

¹⁰ https://www.angelo.edu/dept/writing_center/academic_honesty.php

¹¹ <https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>

¹² <https://www.angelo.edu/incident-form>

¹³ <https://www.angelo.edu/title-ix>

¹⁴ <https://www.angelo.edu/covid-19/>