

CHEM 1311/1111

General Chemistry

Spring, 2022



Course Instructor:



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

Other Instructors:

Dr. Shanmugapriya Dharmarajan

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Office: CAV 204A

Office Hours: M 10:00-12:00 am, T 12:30-1:30 pm, W 12:30 to 2:30 pm

Dr. Janet Maxwell

Email: Janet.Maxwell@angelo.edu

Phone: 486-6624

Office: CAV 229B

Office Hours: MWF 9:00-10:00 am, TR 9:30-10:30 am, ONLINE ONLY

Mr. Rigel Rilling

Email: Rigel.Rilling@angelo.edu

Phone: 486-6654

Office: CAV 201B

Office Hours: W 1:30-5:00 pm, R 11:30 am-2:00 pm

Class Meeting Times

Sec	Days	Time	Instructor	Location
D10	MWF	08:00 am-08:50 am	Dr. Maxwell	ONLINE
020	MWF	09:00 am-09:50 am	Dr. Zehnder	CAV 219
030	MWF	10:00 am-10:50 am	Dr. Zehnder	CAV 219

Required

Texts and Materials

- **Textbook, Knewton Alta online homework by Wiley, LabFlow laboratory platform, and TopHat Pro online student engagement platform [all four 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. Knewton Alta – Wiley, \$39.95 for single term access; 14 day courtesy access for free.
 3. LabFlow; \$49.99 per semester,
 4. TopHat Pro; \$30 per semester
- **Respondus Lockdown & Respondus Monitor** Access through Blackboard. Make sure that your computer/laptop is compatible with Respondus software. Respondus Monitor requires a webcam. Lockdown Browser and Monitor will potentially be used for the administration of exams.
 - **Approved Lab Goggles [Required]** (available from the ASU Bookstore)
 - **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 **Knewton Alta**, an online homework program. These assignments will be averaged to give a 200-point grade. To register with Knewton Alta, follow the corresponding link in BlackBoard or click here: [Knewton Alta Homework](#). It is recommended you sign up for the 14 day courtesy access and pay once you decided to stay in the given section of this course.

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 follow the link and review the pdf file located in Blackboard.

TopHat student and classroom engagement platform [Required]

We will be using TopHat, which is an interactive system that will allow students to use their cellphones, tablets, or laptops to answer questions/quizzes instantly in class and at home.

Please see more detailed information for creating a TopHat account under the section specific link to TopHat in BlackBoard for your individual section.

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.

To maintain academic quality while accommodating social distancing needs in this case, this course will then use a split delivery model that combines face-to-face teaching with remote instruction. The goal then is to provide face-to-face instruction to

students who want to come to campus, while also allowing students who may need to learn remotely to participate via virtual class sessions.

It is also possible that the course might be transferred into a 100% remote 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.

If you feel sick, please stay home. 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.

Grading

Evaluation and Grades

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

Assessment	Total Points
Exams (3x100 pts)	300 pts
Final Exam	150 pts
Quizzes, classroom participation (TopHat)	150 pts
Homework (Knewton Alta)	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 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 administered as common tests inside a classroom OR remotely outside of regular class time on the dates listed below:

Exam	Date	Room	Time
Exam 1	Wednesday, Feb. 16	MCS 100	5:30 pm
Exam 2	Wednesday, March. 23	MCS 100	5:30 pm
Exam 3	Wednesday, Apr. 20	MCS 100	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 display 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 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](#).

Sec	Days	Time	Instructor	Final Exam Date	Time
D10			Dr. Maxwell		
020	MWF	09:00 -09:50 am	Dr. Zehnder	Wed., May 11	08:00-10:00 am
030	MWF	10:00 -10:50 am	Dr. Zehnder	Mon., May 9	10:30 am-12:30 pm

Blackboard

Grades will be posted on [Blackboard](#).¹ 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 with a grade of "W" is **Thursday, April 28, 2022**.

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 classroom listed in the table.

Section	Day	Meeting Time	Instructor	Class Room	Lab Room
06Z	M	11:00 am-01:50 pm	Mr. Rilling	CAV 211	CAV 216
07Z	W	11:00 am-01:50 pm	Dr. Zehnder	CAV 211	CAV 216
08Z	T	11:00 am-01:50 pm	Dr. Zehnder	CAV 211	CAV 216
09Z	R	11:00 am-01:50 pm	Dr. Zehnder	CAV 211	CAV 216
10Z	M	02:00 pm-04:50 pm	Dr. Dharmarajan	CAV 211	CAV 216
11Z	T	02:00 pm-04:50 pm	Dr. Dharmarajan	CAV 223	CAV 216

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.

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).

Labs will begin meeting in the second week of class. Bring your calculator! During the first week there are a few dry activities you must complete online using LabFlow as well as BlackBoard. These will be a safety training that you complete in BlackBoard and a conversion factor and problem-solving activity that you will submit in LabFlow.

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, January 23.

Lab Midterm and Final Exams

There will be a 100-point lab midterm (week of 3/7) and a 100-point lab final exam (week of 5/2).

LECTURE AND LAB SCHEDULE — SPRING, 2022

Date	Week Of	Lecture	Lab
1	1/17	<p><i>Monday, Jan 17 MLK day no classes</i></p> <p>Chapter 1: Matter and Energy — Composition of Matter, States of Matter, Measurements, SI Units, Significant Figures, Unit Conversions</p>	<p>Labs Do Not Meet</p> <p>Safety videos and Quiz, Chemistry Math and Labware videos and Quiz to be submitted through LabFlow</p> <p>Mandatory Lab Safety Training and Quiz — instructions given in <i>Lab Safety Training</i> section in BlackBoard (must be completed by Jan. 23 in BlackBoard)</p>
2	1/24	<p>Chapter 2: Atoms, Ions, and Molecules — Nuclear Model, Atomic Mass, Periodic Table, Molecular and Ionic Compounds, Naming Compounds and Writing Formulas</p>	<p>Lab Safety Lecture</p> <p>Discussion of measurements, significant figures, conversion factors, etc.</p> <p>Conversion Factors and Problem Solving dry lab to be submitted through LabFlow</p>
3	1/31	Chapter 2, cont.	Basic Laboratory Techniques
4	2/7	<p>Chapter 3: Stoichiometry — The Mole Concept, Balancing Equations, Stoichiometry, Percent Composition, Limiting Reactants</p>	Density and Specific Gravity
5	2/14	<p>Chapter 3, cont.</p> <p>Exam 1 – Wed., Feb. 16 (Ch. 1, 2,3)</p>	Empirical Formulas
6	2/21	<p>Chapter 4: Solution Chemistry — Concentration, Electrolytes, Acid-Base Reactions, Precipitation Reactions, Redox Reactions, Titrations</p>	Chemistry of Copper and Percent Yield
7	2/28	Chapter 4, cont.	Solutions, Electrolytes, and Concentrations
8	3/7	<p>Chapter 5: Thermochemistry — Energy, Systems, Enthalpy, Heat Capacity, Calorimetry, Hess's Law, Standard Enthalpies of Formation</p>	<p>Oxidation Reduction Reactions</p> <p>Lab Midterm Exam (covering the lab material from week 1 through week 6)</p>

9	3/14	Spring Break, no classes	No Labs
10	3/21	Chapter 6: Electronic Structure and Periodicity — Electromagnetic Radiation, Bohr Model, Quantum Theory, Electronic Configurations, Periodic Trends of Elements Exam 2 – Wed., March. 23 (Ch. 3, 4, 5, 6)	Titration: Determining the Concentration of an Acid
11	3/28	Chapter 6, cont.	Energy and Specific Heat
12	4/4	Chapter 7: Chemical Bonding and Molecular Geometry — Ionic and Covalent Bonding, Lewis Structures, Formal Charges/Resonance, Strengths of Bonds, VSEPR Theory, Structure and Polarity	Constant Pressure Calorimetry
13	4/11	Chapter 8: Covalent Bonding — Valence Bond Theory, Hybrid Orbitals, Multiple Bonds, Molecular Orbital Theory <i>Friday, April 15 spring holiday, no classes</i>	Atomic Spectra
14	4/18	Chapter 9: Gases — Pressure, Temperature, Volume, Ideal Gas Law, Gas-Phase Stoichiometry, Effusion/Diffusion, Kinetic- Molecular Theory Exam 3 – Wed., April. 20 (Ch. 6, 7, 8, 9)	Modeling Geometry and Polarity
15	4/25	Thursday, April 28: Last Day to Drop Chapter 9, cont.	Analysis of KClO_3/KCl using the Ideal Gas Law
16	5/02	Chapter 10: Intermolecular Forces — Intermolecular Forces, Vapor Pressure, Phase Diagrams, Water	Lab Final Exam
17	5/09	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](#)¹
- [Angelo State University Catalog](#)²

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](#).³

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](#).⁴ 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.

Any submitted e-mails are expected to be written in a professional format and impeccable English. For more information how to communicate by e-mail please see:

[How to E-mail a professor](#)

The instructor will refuse to read and/or respond to any messages that do not comply with such requirements.

The instructor will respond to legitimate e-mails within 24 - 48 hours during the week and may not respond until after weekends or holidays if messages are received on any of such days.

Virtual communication

Office hours and/or advising may be done with the assistance of the telephone, Collaborate, Skype, Facetime, 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](#)⁵ for more information.

Plagiarism

Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#)⁶ 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](#).⁷

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](#)⁸ 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](#)⁹

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](#).¹⁰

Information About COVID-19

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)¹¹ 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 <https://www.angelo.edu/current-students/student-handbook/>

² <https://www.angelo.edu/academics/catalog/>

³ <https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=96>

⁴ <https://www.angelo.edu/current-students/disability-services/>

⁵ <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>

⁶ <https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=96>

⁷ https://www.angelo.edu/current-students/writing-center/academic_honesty.php

⁸ <https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>

⁹ <https://www.angelo.edu/incident-form>

¹⁰ <https://www.angelo.edu/title-ix>

¹¹ <https://www.angelo.edu/covid-19/>