

# CHEM 1312/1112

## General Chemistry

Summer II, 2020



### Instructor:

#### Dr. Gregory Smith

Email: [Gregory.Smith@angelo.edu](mailto:Gregory.Smith@angelo.edu)

Phone: 486-6628

Office: CAV 207A – I will be working from home this session, please use email.

Office Hours: MTWRF after 2 pm, please contact me to set a specific time to meet in Collaborate.

### CHEM 1312 — GENERAL CHEMISTRY LECTURE CLASS

#### Lecture Class Meeting Times

Sec	Days	Time	Instructor	Location
D20	MTWRF	10:00 am-11:50 am	Dr. Smith	ONLINE

#### Required Texts and Materials

- **Textbook and SmartWork online homework [Both Required]:**  
Thomas R. Gilbert, Rein V. Kirss, Natalie Foster, Stacey Lowery Bretz, Geoffrey Davies, *Chemistry: The Science in Context* (5<sup>th</sup> edition, 2018).  
Purchasing Options:
  1. Textbook (printed) + eBook + SmartWork
  2. eBook + SmartWork
  3. SmartWork only (only if you get a textbook from another source that does not include SmartWork.)
- **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.*
- Access to **LearnSmart Labs**. This is being provided free of charge. See the Laboratory Blackboard page for instructions. (This is only for students also taking the lab, CHEM 1112.)
- Access to **Slack**. Along with email, we will be using Slack to communicate.

## Course Description

**CHEM 1312 General Chemistry II (3-0).** This course, which is a continuation of Chemistry 1311, focuses on chemical kinetics, chemical equilibrium, acid-base chemistry, and thermodynamics. Additional topics, such as environmental chemistry, electrochemistry, coordination chemistry, nuclear chemistry, organic chemistry, and/or polymers, may also be introduced.

**Prerequisites:** Chemistry 1311/1111 or 1411, must be completed with a “C” or better in order to enroll in Chemistry 1312/1112. **Corequisite:** Chemistry 1112.

**CHEM 1112 General Chemistry II 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 1312.

**Corequisite:** Chemistry 1312.

## Technology Requirements

This is an online course. Student must have internet access to attend lecture, do homework and work on labs (if applicable). Students are required to have access to:

- A computer with internet access and a webcam.
- Access to **SmartWork**.
- Access to **LearnSmart Labs** for the laboratory course.
- LockDown Browser installed for exams.
- Access to **Slack**. Join our Slack workspace using this link: [https://join.slack.com/t/asuchem131211-mfr1716/shared\\_invite/zt-fo8foz2s-g674DkFmqLC0oXABs\\_cAOQ](https://join.slack.com/t/asuchem131211-mfr1716/shared_invite/zt-fo8foz2s-g674DkFmqLC0oXABs_cAOQ). Slack is an easy way to get in touch with me or other students to discuss homework and form study groups.

## 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
SmartWork Homework	200 pts
Laboratory Points	200 pts
<b>Total</b>	<b>1000 pts</b>

Students who are taking both CHEM 1112 and CHEM 1312 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 1312/1112 will be determined as follows:

- If **BOTH** CHEM 1312 and CHEM 1112 are completed, the letter graded will be based on a total of 1000 points.
- For students who begin and complete **ONLY** CHEM 1312, 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 1112, 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 during regular class time on the dates listed below:

Exam	Date	Room	Time
Exam 1	Tuesday, July 14	ONLINE	10:00 am
Exam 2	Wednesday, July 22	ONLINE	10:00 am
Exam 3	Thursday, July 30	ONLINE	10:00 am

These exams will be taken using the **Respondus LockDown Browser** and your computer's **webcam**.

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 from the [ACS web page](#).<sup>1</sup> The schedule for the 1312 final exam is shown below. The complete final exam schedule is also available on the [ASU web page](#).<sup>2</sup>

Sec	Days	Lecture Time	Instructor	Final Exam Date	Time
D20	MRWRF	10:00 - 11:50 am	Dr. Smith	Wednesday, August 5	10:15 am-12:15 pm

## Blackboard

This is an online course. Lectures will be livestreamed on Blackboard using Collaborate. Grades will be posted on [Blackboard](#).<sup>3</sup> Information, handouts, homework assignments, and other course documents will either be posted on Blackboard.

## Attendance

You are expected to attend all class meetings in Collaborate. You do not have to use your webcam for normal lectures, only for exams. You are expected to arrive on time and to stay until the end of the lecture. In-classroom activities such as worksheets and quizzes cannot be made up. You will not be automatically dropped if you stop attending class.

## Last Day to Drop

The last day to drop the course with a grade of “W” is **July 24, 2020**.

# CHEM 1112 — GENERAL CHEMISTRY LABORATORY

## Laboratory Meeting Times

The lab class that accompanies the CHEM 1312 lecture course is shown below. This is an online course as well. I will be giving the Lab Lecture at the designated time, but you are not required to be present. They will be recorded for you to watch when it is convenient. We will be doing approximately three labs a week, and they will be due 2 days after I give the Lab Lecture.

Section	Day	Lab Lecture Time	Instructor	Class Room	Lab Room
D2Z	TWR	12:00~1:00 pm	Dr. Smith	ONLINE	ONLINE

The CHEM 1112 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.

### Required Materials

- **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.*
- Access to **LearnSmart Labs**. This is being provided free of charge. See the Laboratory Blackboard page for instructions. (This is only for students also taking the lab, CHEM 1112.)
- Access to **Slack**. Join our Slack workspace using this link: [https://join.slack.com/t/asuchem131211-mfr1716/shared\\_invite/zt-fo8foz2s-g674DkFmqLC0oXABs\\_cAOQ](https://join.slack.com/t/asuchem131211-mfr1716/shared_invite/zt-fo8foz2s-g674DkFmqLC0oXABs_cAOQ). Slack is an easy way to get in touch with me or other students to discuss homework and form study groups.

### Lab Procedures and Lab Reports

I will be going over the procedure for each lab or worksheet in the prelab lecture. Be sure to watch it carefully for instructions on each lab. Some labs and the worksheets will be turned in through Blackboard. Each lab will be worth 100 points. The point average in Lab will be scaled to 200 points and then incorporated into your overall CHEM 1312/1112 grade if applicable.

### Lab Exams

There will be one 100-point lab mid-term and a 100-point lab final.

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**This syllabus is subject to change.**

## LECTURE AND LAB SCHEDULE — Summer II, 2020

Day	Date	Lecture	Lab
1	July 6	Chapter 10 Intermolecular Forces	
2	July 7	Chapter 11 Properties of Solutions	Intro – Lab Skills LearnSmart Lab
3	July 8	Chapter 11 continued	Qualitative Analysis LearnSmart Lab
4	July 9	Chapter 12 Solids	Colligative Properties LearnSmart Lab
5	July 10	Chapter 12 continued	
6	July 13	Chapter 13 Chemical Kinetics	
7	July 14	Exam 1 (Chapters 10, 11, 12)	Crystal Structures Worksheet
8	July 15	Chapter 13 continued	Kinetics – Concentration LearnSmart Lab
9	July 16	Chapter 14 Chemical Equilibrium	Kinetics – Temperature LearnSmart Lab
10	July 17	Chapter 14 continued	
11	July 20	Chapter 15 Acid and Base Equilibria	
12	July 21	Chapter 15 continued	Lab Midterm Worksheet
13	July 22	Exam 2 (Chapters 13, 14)	Equilibrium LearnSmart Lab
14	July 23	Chapter 16 Additional Aqueous Equilibria	Acid/Base Equilibrium 1 LearnSmart Lab
15	July 24	Chapter 16 continued	
16	July 27	Chapter 17 Thermodynamics	
17	July 28	Chapter 17 continued	Acid/Base Equilibrium 2 LearnSmart Lab
18	July 29	Chapter 18 Electrochemistry	Buffers LearnSmart Lab
19	July 30	Exam 3 (Chapters 15, 16, 17)	Electrochemistry LearnSmart Lab
20	July 31	Chapter 18 continued	
21	Aug. 3	Chapter 19 Nuclear Chemistry	Lab Final Worksheet (due Aug. 4)
22	Aug. 4	Chapter 22 Transition Metals	
23	Aug. 5	Final Exam	

## 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](#)<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 Boone, J.D.  
Director of Title IX Compliance/Title IX Coordinator  
Mayer Administration Building, Room 210  
325-942-2022  
[michelle.boone@angelo.edu](mailto:michelle.boone@angelo.edu)

**You may also file a report online 24/7 at [www.angelo.edu/incident-form](http://www.angelo.edu/incident-form).**



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

For more information about Title IX in general you may visit [www.angelo.edu/title-ix](http://www.angelo.edu/title-ix).

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## Student Learning Outcomes

- **Learning Goal 1:** Students will be able to analyze complex chemical problems and draw logical conclusions.
  - Students will be able to identify intermolecular interactions in a solid, liquid or solution and analyze the strength and nature of those interactions.
  - Students should be able to write equilibrium expression for any chemical reaction and determine the value of equilibrium constants from experimental data.
  - Students should be able to use equilibrium constants and expressions to
    - describe the tendency of the reaction to favor reactants or products
    - predict the direction of the reaction given the equilibrium constant and the starting concentrations of all reactants and products
    - determine the equilibrium concentrations given sufficient information about either the equilibrium or starting concentrations of the reactants and products
  - Students should be able to use Le Chatelier's Principle to determine how a system at equilibrium will change with changes in reaction conditions such as concentration, pressure or temperature.
  - Students should be able to describe electrochemical cells using cell notations or a sketch and determine the standard state cell potential.
  - Students should be able to use the relationship between cell potential, free energy and equilibrium constants.
- **Learning Goal 2a:** Students will be able to understand and apply scientific reasoning in the chemical sciences.
  - Students should be able to classify solids by type of bonding (molecular, ionic, metallic or network covalent) and extent of organization (crystalline, microcrystalline and amorphous) and describe and explain the properties of different solids based on that classification.
  - Students will be able to define the phases of matter using the following frameworks:
    - Compressibility and fluidity
    - Kinetic molecular theory (movement of molecules within a sample)
    - Kinetic molecular theory (kinetic energy vs. intermolecular interactions)
  - Students should be able to describe phase transitions in terms of enthalpies, heating curves and phase diagrams.
  - The student should be able to state the first three laws of thermodynamics and explain how they affect real world systems.

- Students should have a knowledge of common forms of nuclear radiation and processes.
- Student should be able to use oxidation numbers to identify and balance redox reactions.
- **Learning Goal 2b:** Students will be able to employ mathematics in the analysis of chemical problems.
  - Students should be able to describe solution concentrations in a variety of ways and use concentration to predict properties of solutions.
  - Students should be able to do calculations involving solution concentrations including those involving colligative properties.
  - Students should be able to use experimental data to obtain reaction rate laws and use reaction rate laws to predict the rates of reactions.
  - Students should understand how free energy, enthalpy and entropy are related and how free energy is dependent on temperature.
  - Students should be able to determine the entropy and enthalpy changes of a reaction from free energy values or equilibrium constants measured at different temperatures.
  - Students should be able to use an understanding of the relationship between free energy, enthalpy and entropy to explain the dependence of free energy on temperature.
- **Learning Goal 3:** Students will be able to demonstrate technical and analytical skills in chemistry.
  - Students will be able to analyze rates of chemical reactions and be able to relate reaction rates to the molecular mechanisms of those reactions.
  - Students should be able to determine the entropy and enthalpy changes of a reaction from free energy values or equilibrium constants measured at different temperatures.
  - Students should be able to use reaction rate versus temperature data to determine the activation energy of a chemical reaction.
  - The student should be able to predict the products of  $\alpha$ -particle and  $\beta$ -particle emission.
  - The student should know how to determine cell potentials at non-standard state concentrations and partial pressures of reactants and products or be able to use potentials measured under these conditions to determine the concentration of a reactant or product.

### **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.

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<sup>1</sup> <http://uwm.edu/acs-exams/students/student-study-materials/>

<sup>2</sup> [http://www.angelo.edu/services/registrars\\_office/final.html](http://www.angelo.edu/services/registrars_office/final.html)

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

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

<sup>5</sup> <https://www.angelo.edu/catalogs/>

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

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

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

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

<sup>10</sup> [https://www.angelo.edu/dept/writing\\_center/academic\\_honesty.php](https://www.angelo.edu/dept/writing_center/academic_honesty.php)

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