General Chemistry II with Lab, CHEM 112

Dr. Sarah Smith
Jepson 440
ssmith23@umw.edu
(540)-654-1409

 Lecture:
 MWF 9:00 am - 9:50 am Jepson 100

 Lab:
 Section 1: T 8:00 am - 10:45 am Jepson 210

 Section 2: T 12:30 pm - 3:15 pm Jepson 210

Office Hours:

Tuesday:	8:00 pm – 9:00 pm on Zoom only
Wednesday:	10:00 am – 11:00 am Jepson 440
	2:00 pm – 3:00 pm Jepson 440
Friday:	10:00 am - 11:00 am Jepson 440
	2:00 pm – 3:00 pm Jepson 440

Required Materials:

- **Text:** Openstax: Chemistry, 2nd edition. Its free!
- CHEM 112 Course Pack for Sections 1 and 2
- CHEM 112 Lab course pack
- subscription to Aktiv Chemistry online learning tool; available through the Bookstore or directly from the website (aktiv.com)
- Calculator: with scientific notation and logarithmic/exponential functions; you must purchase a Casio FX260 solar or TI-30X IIS for ALL examinations or an equivalent approved by the instructor. Cellular phones are not permitted on exam days.
- Lab coat
- Googles
- Carbon Copy lab notebook
- Web Site: This course will make use of the Canvas course management system. Please check here frequently as materials posted will include course announcements, assignments, and other course materials as necessary. There will be a weekly page with a list of all assignments and information you will need for the week.

Course Description and Objectives:

This course in part satisfies the Natural Science General Education requirement. After completing the course sequence, a student should

- Be able to describe the scientific methods that lead to scientific knowledge
- Be able to report and display data collected, interpret experimental observations and construct explanatory scientific hypotheses
- Be able to use theories and models as unifying principles that help us understand the natural world
- Be able to identify how the natural sciences are used to address real world problems

Chemistry is everywhere, whether you realize it or not; it can be exciting, useful, or dangerous. After completing the General Chemistry II course, a student should

- Understand the chemical principles governing chemical equilibrium, kinetics, and thermodynamics
- Be able to solve problems related to chemical equilibrium, kinetics, and thermodynamics
- Have gained hands-on experience in the lab and learned how to conduct scientific experiments

Grading:

	Points
Team Activities (best 5) at 15 points each	75 points
Quizzes (best 5) at 20 points each	100 points
AKTIV assignments (15) 5 points each	75 points
Laboratory	250 points
Exams (4 at 75 points each)	300 points
Final exam	200 points

Students with a course average of C or lower will receive a Mid-Semester Deficiency Report of unsatisfactory.

<u>A course grade of C or better in CHEM 112 is required to enroll in most upper level chemistry courses.</u>

Extra credit will be awarded for **active** participation in PASS (see below). Students can earn 2 points per week for attendance and active involvement in a PASS section up to a total of 30 points extra credit over the entire semester.

Grades will be determined on the following point scale.

Points	Letter Grade	Points	Letter Grade
accumulated		accumulated	
≥ 930 points	А	769 – 730 points	С
929 – 900 points	A-	729 – 700 points	C-
899 – 870 points	B+	699 – 650 points	D+
869 – 830 points	В	649 – 600 points	D
829 – 800 points	B-	below 600 points	F
799 – 770 points	C+		

In-Class Behavior: Please act respectfully in class of other students and myself. This includes turning your cell phone, etc. off during class time, using electronic devices only for note taking purposes, and arriving to class on time. You are expected to participate in all activities and discussions. I reserve the right to dismiss you from class if I feel you are acting disrespectfully or are disrupting the class.

When meeting online using Zoom or other software, please be mindful of distracting audio or video backgrounds. You will never be required to share your video.

Class Attendance: Class attendance is highly recommended. The material discussed in lecture frequently has a different emphasis from that provided by the textbook. Also, time has been set aside in the course schedule to discuss example problems. Students are responsible for all covered materials during a missed class. Missed exams **cannot** be made up. Exams will be rescheduled in the event of an excused absence due to an emergency. (Immediate notification of the instructor is mandatory). Lateness to lecture is distracting, and students should attempt to be on time. Lateness to an exam will result in less time allowed for completion of the exam.

> Regardless of attendance, all assignments are due on the scheduled date. No late assignments will be accepted without my prior consent.

- Absences: You should notify me of an expected absence as early as possible. Make-up exams and quizzes will not be given except in the event of EXTREMELY extenuating circumstances.
- Late Work Policy: No late work will be accepted. Each student will be given one no questions asked 1-week extension that can be used on a lab report or active assignment. It cannot be used for quizzes, exams, or team activities. When you want to use the extension, you must turn in a sheet of paper that includes your name, date, and the assignment you are using the extension on.
- **Quizzes:** A total of six 15-20 minute quizzes will be given throughout the semester at the end of class. Quiz questions will be similar to problems in the text or come from the assigned reading or lecture material. The lowest quiz grade will be dropped. There are no make-up quizzes.
- **Team Activities:** A total of six team activities will be completed on scheduled Fridays as a team of 3-4 students. The activities will consist of similar problems in the text or from assigned reading or lecture materials. The activities must be submitted by the end of the class period and will be graded. Team activities cannot be made up without prior consent. The lowest team activity grade will be dropped.

Aktiv Chemistry:

Aktiv is an adaptive, independent learning platform. You will use Aktiv in this course for "weekly" graded homework assignments. Aktiv will help you to

- Review topics and skills that need refreshing
- Practice new material that you are ready to learn
- Review and prepare for exams
- Track your personal performance

There will be "weekly" assignments worth 5 points each due as indicated on the course calendar below by 11:59 pm or as announced in class. After the assignment due date passes, you will have access to an adaptive follow-up

assignment. This assignment is unique to you to give you more practice on topics you had trouble with. If you complete this assignment before it is due, you can earn 1 extra credit point. If you do all adaptive follow-ups, you can earn 15 extra credit points.

Exams: There will be four in-class exams during the semester which will emphasize material introduced since the last exam. There will be no make-up exams without prior arrangements with me.

The final exam will be comprehensive and must be taken at the time scheduled by the University (December 11th, 8:30 am – 11:00 am). According to University policy, any student who does not take the final exam will fail the course.

Exam Policies: No cell phones or other personal electronic communication devices (including smart watches and headphones) will be permitted in the classroom during exams. You may only use approved non-graphing calculators for **ALL** quizzes and examinations.

If you feel a mistake has been made in the grading of your exam, you must write out what you wish to be re-graded and why (your reasoning is critical) on a separate sheet of paper. This must be turned in to me with the exam no later than one week after the graded exam is returned. Please note that the *entire* exam will be re-graded, and the new score (higher or lower) will be recorded.

If you feel there has been a numerical error in calculating your exam score, please bring this to my attention no later than one week after the graded exam is returned.

- **Reading:** Reading of the appropriate sections of the textbook should be done *before* coming to class. You will be responsible for this material, *even if it is not covered in lecture.*
- **PASS Sessions:** Peer-Assisted Study Sessions (PASS) are available for this course to assist you in better understanding of the course material. The PASS program provides peer-facilitated study sessions led by gualified and trained undergraduate leaders who attend the lectures with students and encourage students to practice and discuss course concepts in sessions. Sessions are open to all students and will focus on the most recent material covered in class. These sessions are not tutoring but rather sessions to compare class notes, review and discuss important concepts, develop appropriate strategies for studying, and prepare for exams. While attendance is free and voluntary, you may earn two extra credit points a week for attending a PASS session. You will not gain the points if you only go to the PASS sessions during the first three weeks of class or the last or only before exams. Your attendance must be more regular for you to benefit. In addition, for you to receive credit (the 2 points), you must be present for the entire PASS session. Students who are disruptive will lose credit for that session; continual disruptions will result in your removal from

PASS for the rest of the semester and the denial of any extra credit points associated with your attendance.

Honor System: In accordance with the University's Honor Code, All graded work (hourly exams, online exercises, extra credit assignments, graded assignments, final exam) must be your own and pledged as such. (use these words)

I hereby declare upon my word of honor that I have neither given nor received any unauthorized help on this work. Signed

Academic dishonesty in any shape or form will not be tolerated.

Suspected violations of the Honor Code will be addressed according to the policy established by the Honor Council. This includes the use of any website such as Chegg. Please familiarize yourself with the University's policies on academic dishonesty: ignorance is not an excuse!

- **Disability Services:** The Office of Disability Resources has been designated by the University as the primary office to guide, counsel, and assist students with disabilities. You will need to request appropriate accommodations through this office as soon as possible, and then make an appointment with me to discuss your approved accommodation needs. I will hold any information you share with me in the strictest confidence unless you give me permission otherwise.
- Title IX: University of Mary Washington faculty are committed to supporting students and upholding the University's *Policy on Sexual and Gender Based Harassment and Other Forms of Interpersonal Violence.* Under Title IX and this Policy, discrimination based upon sex or gender is prohibited. If you experience an incident of sex or gender based discrimination, we encourage you to report it. *While you may talk to me, understand that as a "Responsible Employee" of the University, I MUST report to UMW's Title IX Coordinator what you share.* If you wish to speak to someone confidentially, please contact the below confidential resources. They can connect you with support services and help you explore your options. You may also seek assistance from UMW's Title IX Coordinator. Please visit <u>http://diversity.umw.edu/title-ix/</u> to view UMW's *Policy on Sexual and Gender Based Harassment and Other Forms of Interpersonal Violence* and to find further information on support and resources.
- **Class Recordings:** Video and/or audio recording of class lectures and review sessions without the advance consent of the instructor is prohibited. On request, the instructor may grant permission for students to record course lectures, on the condition that these recordings are only used as a study aid by the individual making the recording. Unless explicit permission is obtained from the instructor, recordings of lectures and review sessions may not be modified and must not be transferred or transmitted to any other person, whether or not that individual is enrolled in the course. Students with

approved accommodations from the Office of Disability Resources permitting the recording class meetings must present the accommodation letter to the instructor in advance of any recording being done. On any days when classes will be recorded, the instructor will notify all students in advance. Distribution or sale of class recordings is prohibited without the written permission of the instructor and other students who are recorded. Distribution without permission is a violation of educational law. This policy is consistent with UMW's Policy on Recording Class and Distribution of Course Materials.

Distribution or sale of any and all class materials (any document or other item provided by or made available by the instructor to students enrolled, including but not limited to coursepacks, lecture videos, annotated lectures, handouts, laboratory experiments, quizzes, exams, review sheets or past exams) provided for this course (in the coursepack, during class or lab, or posted on Canvas or YouTube) is prohibited without the written permission of the instructor.

Students in violation of any part of this policy are subject to disciplinary action through the Office of Judicial Affairs and Community Standards.

This policy is consistent with UMW's Policy on Recording Class and Distribution of Course Materials.

Basic Needs Security:

Learning effectively and engaging wholly in class is dependent upon our basic security and having our fundamental needs met: having a safe place to sleep at night, regular access to nutritious food, and some assurance of safety. If you have difficulty affording groceries or accessing sufficient food to eat every day, or if you lack a safe and stable place to live, please contact Chris Porter, Assistant Dean of Students, at <u>ciporter@umw.edu</u>. Additionally, the Gwen Hale Resource Center is a free resource on campus, providing food, toiletries and clothing to any member of our community. It is open Monday, Tuesday and Friday from 1pm-6pm, on the 5th floor (floor A for Attic) of Lee Hall, or <u>resource@umw.edu</u>. Finally, you are always welcome to talk with me about needs, if you are comfortable doing so. This will enable me to provide any resources I may possess.

How to Succeed in Chem 112:

Success in chemistry requires considerable work on your part. Successful students typically spend a minimum of 1 hour per day on chemistry. This time is devoted to reviewing notes, attempting the suggested/assigned problems and reading ahead for the next lecture. Some of their "secrets" include (but are not limited to)

•DO PROBLEMS EVERY DAY!

Seriously, do problems every day! reading the material prior to class.

- attending ALL lectures.
- taking good notes.
- asking questions. (The only "stupid" question is the one that goes unasked.)

• solving the suggested problems for each chapter. (Attempting extra problems is also a great idea. As in all aspects of life, "practice makes perfect".)

• consulting your peers when you are struggling with the solution to a suggested problem. (First, they may have a different slant or see the problem in a different light. Second, scientists typically work in teams. Each member of the team is responsible for a particular aspect of the problem; therefore, each scientist must understand what each of the other members of the team does and have requisite background knowledge.)

• enlisting the aid of the instructor (office hours or appointments, before or after class).

- reviewing the appropriate sections of the text and all notes after class.
- attempting all suggested and assigned (team activity) problems by yourself
- reviewing topics from prerequisite courses.
- •Attend PASS sessions regularly
- •Review the appropriate sections of the text <u>before</u> class
- •Review the appropriate sections of the text <u>after</u> class and organize your notes

Chapter	Problems
Chapter 12	1, 3, 5, 7, 13, 15, 17, 21, 25, 27, 33, 36,
	40, 44, 46, 50, 54, 58, 68, 72, 74, 79, 80
Chapter 13	1, 3, 5, 9, 15, 17, 21, 25, 33, 36, 40, 46,
	50, 54, 58, 60, 64, 68, 76, 86,
Chapter 14.1-14.6	1, 7, 9, 13, 17, 19, 21, 25, 27, 28, 35, 37,
	41, 47, 48, 54, 56, 60, 70, 77, 78, 80, 82,
	84, 86, 88, 90
Chapter 15.1 – 15.2	4, 76
Chapter 15.1, 15.3	1, 7, 9, 11, 13, 15, 19, 27, 29, 35, 43, 47,
	53, 59, 88, 93, 101
Chapter 14.7	94
Chapter 11	1, 3, 5, 6, 7, 8, 16, 22, 23, 25, 29, 30, 31,
	33, 35, 37, 39, 43, 45, 47, 49, 53, 54, 61
	63, 69, 71
Chapter 16	3, 5, 7, 12, 15, 17, 23, 25, 27, 33, 35, 37,
	39, 41, 43, 47, 56, 60
Chapter 17	1, 3, 6, 7, 12, 13, 17, 19, 21, 25, 27, 29,
	30, 31, 33, 36
Chapter 21	2, 3, 5, 9, 11, 13, 29 (challenge problem)
	33, 39

Practice problems

Exam 1	Exam 2	Exam 3	Exam 4	Final exam
Chapter 12 and 13	Chapter 14.1 – 14.6, 15.1, 15.2	Chapter 15.1, 15.3, 14.7, 11	Chapter 16 and 17	Cumulative and Chapter 21

Course Schedule: The tentative schedule that follows is how I see the course arranged. It is not concrete. If there is material that you, as a class, find confusing, we will spend more time on that topic. The exam dates will remain set according to the schedule. If all of the "scheduled" material has not been presented prior to the exam, the exam will include only what has been covered.

Monday	Wednesday	Friday
8/26 Introduction Chemical Kinetics Chapter 12	8/28 Chemical Kinetics Chapter 12	8/30 Chemical Kinetics Chapter 12 Team Activity #1 AKTIV #1 due 8/31
9/02 Labor Day No CLASS	9/04 Chemical Kinetics Chapter 12 AKTIV #2	9/06 Chemical Equilibrium Chapter 13 Quiz #1
9/09 Chemical Equilibrium Chapter 13 AKTIV #3	9/11 Chemical Equilibrium Chapter 13	9/13 Exam 1 Chapters 12 and 13 AKTIV #4 due 9/14
9/16 Acids and bases Chapter 14	9/18 Acids and bases Chapter 14	9/20 Acids and bases Chapter 14 Team Activity #2 AKTIV #5 Due 9/21
9/23 Acids and bases Chapter 14	9/25 Aqueous Ionic Equilibrium Chapter 14	9/27 Aqueous Ionic Equilibrium Chapter 14 Quiz #2 AKTIV #6 Due 9/28
9/30 Aqueous Ionic Equilibrium Chapter 14	10/02 Aqueous Ionic Equilibrium Chapter 15	10/04 Exam 2 Chapter 14 AKTIV #7 due 10/05
10/07 Aqueous Ionic Equilibrium Chapter 15	10/09 Aqueous Ionic Equilibrium Chapter 15	10/11 Aqueous Ionic Equilibrium Chapter 15 Team Activity #3 AKTIV #8 due 10/12
10/14 Fall Break NO CLASS	10/16 Aqueous Ionic Equilibrium Chapter 15	10/18 Solutions Chapter 11 Quiz #3 AKTIV #9 due 10/19
10/21 Solutions Chapter 11	10/23 Solutions Chapter 11	10/25 Solutions Chapter 11 Team Activity #4 AKTIV #10 due 10/26

10/28 Free energy and thermodynamics Chapter 16	10/30 Exam 3 Chapters 11 and 15	11/01 Free energy and thermodynamics Chapter 16 AKTIV #11 due 11/02
11/04 Free energy and thermodynamics Chapter 16	11/06 Free energy and thermodynamics Chapter 16	11/08 Electrochemistry Chapter 17 Quiz #4 AKTIV #12 due 11/09
11/11 Electrochemistry Chapter 17	11/13 Electrochemistry Chapter 16	11/15 Electrochemistry Chapter 17 Team Activity #5 AKTIV #13 due 11/16
11/18 Electrochemistry Chapter 17 Quiz #5	11/20 Electrochemistry Chapter 17	11/22 Electrochemistry Chapter 17 AKTIV #14 due 11/23
11/25 Exam 4 Chapters 12 and 16	11/27 Thanksgiving	11/29 Break
12/02 Radioactive and Nuclear Chemistry Chapter 21	12/04 Radioactive and Nuclear Chemistry Chapter 21 Quiz #6	12/06 Radioactive and Nuclear Chemistry Team Activity #6 AKTIV #15 due 12/07

Final Exam: December 11th, 8:30 am - 11:00 am

<u>Last day to drop a course without a W</u>: September 13th, 2024 <u>Last day to withdraw from a course:</u> November 1st, 2024 <u>Last day to change to pass/fail grading</u>: November 1st, 2024 Lab Schedule: The tentative schedule that follows is how I see the course arranged. It is not concrete.

Date	Lab	Assignments
8/27	Safety, check-in, Volumetric glassware lab	Pre-lab volumetric glassware
9/03	Kinetics	Turn in volumetric glassware, prelab kinetics
9/10	Equilibrium	Turn in kinetics, prelab equilibrium
9/17	Titrations	Turn in equilibrium, prelab titrations
9/24	Determination of Ka	Turn in titrations, prelab Kb
10/01	Skills lab #1	Turn in Kb, turn in skills #1 by end of lab
10/08	Titration Curves	Turn in titrations curves before end of lab
10/15	Fall Break No lab	
10/22	Skills lab #2	Turn in skills #2 by end of lab
10/29	Determining K _{sp}	Prelab K_{sp} , Ksp lab due11/06 in lecture
11/05	Day of Democracy No lab	
11/12	Colligative properties	Prelab colligative properties. Colligative properties due 11/20 in class
11/19	Redox	Turn in Colligative Properties, Prelab Redox, Redox lab due 12/02 during class
11/26	TBD	
12/03	Lab Practical and checkout	Lab practical