Foundations of Chemistry: CHEM 101 Spring 2025

Instructor: Suzanne Moore Nguyen

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Lecture: MWF 10:00 – 10:50 am, Jepson Science Center 217B

Final Exam: Friday, May 2, 8:30 – 11 a.m.

According to University policy, any student who does not take the final exam will fail the course.

Office Hours: MWF 11:00 – 12:00 pm; or by appointment

Required Materials:

- Foundations of Chemistry (Giancarlo and Scott) – available on Canvas as a downloadable electronic file; you may print the text or use it as an eBook
- subscription to Aktiv Chemistry – online learning tool; available through the Bookstore or directly from the website (aktiv.com). The course code: AZ6DTS
- Coursepack for CHEM 101 Spring 2025, available at the Bookstore
- small white board (8.5" x 11"), dry erase markers and eraser
- calculator with scientific notation and exponential functions – you will only be able to use non-graphing calculators on all quizzes and exams. TI-30X calculators are available in the Bookstore.

Course Description:

Chemistry is a quantitative science and is grounded in a mathematical and experimentally derived description of nature. This course is designed to develop fundamental mathematics skills and introduce foundational chemistry concepts for students intending to major in a scientific field and who will subsequently enroll in General Chemistry. Use of mathematics will be stressed in the context of chemical problems involving measurement, atoms, molecules, reactions (stoichiometry) and aqueous solutions.

The course is centered around development of critical thinking and problem-solving skills, especially those required to successfully navigate the "word problems" that comprise a mathematical and experimental science like Chemistry. Problem-solving skills and strategies are emphasized in accord with the numerical literacy inherent in the discipline. To succeed in this course, these problem-solving skills must be practiced and developed. By attending lectures faithfully and completing the suggested practice problems and assignments, each student can begin to acquire the skills necessary to become a critical thinker.

Course-Specific Learning Objectives:

After completing this course, a student should be able to

- Understand how to extract information from a chemical "word problem"
- Develop fundamental number skills related to solving chemical problems
- Be able to use information to solve problems related to chemical principles involving measurement, atomic structure, reactions (stoichiometry) and aqueous solutions

Grading: Grades will be based on the following

	Points	**Total**
Required Orientation Activities	40	40
Discussion Boards (6)	5	30
Hourly Examinations (3)	120	360
Team Activities (best 5)	20	100
In Class Assessments (best 5)	20	100
Aktiv Chemistry Assignments (12)	10	120
Cumulative Final Exam	250	250
		1000

Students with less than a C (<70% of possible points) or have not responded to instructor emails in a timely manner (within 1 week) will receive a midsemester report of unsatisfactory (U).

Extra credit, up to 30 points, can be awarded for **active** PASS participation (see below).

Points to overall grade conversions:

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

Honor System:

All graded work (hourly exams, online exercises, Aktiv Chemistry, extra credit assignments, *graded* assignments, final exam) must be your own. Online submission constitutes you abiding by the Honor System and pledging as such. All written work must have the Honor Pledge written in full and your signature. You must use **these** words and sign the pledge:

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

No late assignments will be accepted.

Please, discuss difficulties with the homework problems or lecture material with me.

It is a violation of the Honor Code to upload any course materials to online platforms.

Quiz and Exam Policies:

- No cell phones or other personal electronic communication devices may be used in the completion of quizzes or exams.
- All quizzes and exams are closed note, closed book, and closed internet; personal communication of any type to anyone either in the course or not is not permitted.
- 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 submit what you wish to be re-graded and why (your reasoning is critical). This must be turned in to me no later than one week after the graded exam is returned.
- If you feel there has been a numerical error in calculating your quiz or exam score, please bring this to my attention no later than one week after the graded assignment is returned.

AI Statement:

AI is permitted in a limited capacity in this course. Students should refer to individual assignments for authorization details as well as the appropriate citation the tool used.

Please note:

- AI can be used to clarify concepts and provide examples but <u>is not</u> a replacement for your understanding.
- AI answers are not always correct.
- AI can help you learn, but your own effort is key.
- AI generated answers may not be submitted as your own work. Be advised that I will request a meeting with you to discuss submissions that appear to be AI generated responses.

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 and practice problem-solving with your peers with instructor guidance. Students are responsible for all covered materials during a missed class. Missed exams **will not** be made up except 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.

Team Activities:

Occasional class periods, usually Fridays, there will be a graded team activity to be completed by students in teams of 3 or 4. Teams will be chosen for each activity at the beginning of the class at random. The team activities are listed in the schedule given below. The activities must be submitted by the end of the class period and will be graded; the best five (5) serve as 10% of your grade. Due to the collaborative nature of these activities, missed team activities cannot be made up.

Discussion Boards (DB):

This course will use discussion boards to help you think about the material covered from a different perspective. Each discussion board prompt will consist of a short reading and a series of questions to respond to. After your initial post, you will need to respond to two (2) different peers. Due to their interactive nature, discussion boards cannot be made up.

Answers to questions must be in your own words with complete sentences with proper punctuation. Non-text postings, such as images, videos, and/or figures that are included in blog and wiki posts must include a brief explanation of the posting; also in your own words and in a complete sentence. All non-text postings must also include an appropriate reference to the source of the material, unless you created it yourself. Certain assignments will require you to produce your own original figures and/or images. All original postings must be made by 11:59pm on the posted due date to receive credit.

In Class Assessments (quizzes):

Periodically, there will be a quiz given in class on the material that was presented. These quizzes examine your knowledge of fundamental concepts and math skills and typically take 10 minutes. They are a **lower stakes** way to assess whether you are understanding the material prior to the exams and the best five (5) constitute 10% of your grade.

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 you need refreshing
- Practice new material that you are ready to learn
- Review and prepare for exams
- Track your personal performance and progress ("pie" chart)

Assignments are worth 10 points each due as indicated on the course calendar, usually Wednesdays, by 11:59 pm. This component accounts for 12% of your course grade.

PASS (Peer Assisted Study Skills):

Extra credit in this course can be earned through attendance at Peer Assisted Study Skills sessions. These hour-long sessions are meant to bolster your study, math and/or chemistry skills. For each week of attendance, you will receive 3 points toward your final grade, up to 30 points total. This amounts to attending 10 out of the 13 weeks of the semester. 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. As an alternate extra credit, in place of PASS, I will give you 1 point per week to attend my office hours with a question/problem you want help with.

Resources:

The Office of Disability Resources (Seacobeck Hall 005) 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.

I want to support you in your overall wellness and in reaching your goals this semester. I know that students sometimes face challenges that can impact academic performance (examples include mental health concerns, food insecurity, homelessness, personal emergencies). Should you find that you are managing such a challenge and that it is interfering with your coursework, you are encouraged to contact me or the Dean of Students (mjones6@umw.edu) for support and referrals to campus and/or community resources.

Title IX Statement:

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 confidential resources found below. They can connect you with support services and help you explore your options. You may also seek assistance from UMW's Title IX Coordinator, their contact information can be found below.

Please visit http://diversity.umw.edu/title-ix/ 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.

Title IX Coordinator: Ruth Davison, Ph.D.

Lee Hall, Room 401
1301 College Avenue
Fredericksburg, VA 22401
Phone: 540-654-5656
E-mail: rdavison@umw.edu
Website: http://diversity.umw.edu/title-ix/

Confidential Resources:

On-Campus

- Talley Center for Counseling Services: Lee Hall, Room 106, 540-654-1053
- Student Health Center: Lee Hall, Room 112, 540-654-1040

Off-Campus

- Empowerhouse 24-hr hotline: 540-373-9373
- Rappahannock Council Against Sexual Assault (RCASA) 24-hr hotline: 540-371-1666

Class Recordings and Materials:

Students **may not** make audio or video recordings of any course activity unless the student has an approved accommodation from the Office of Disability Resources permitting the recording of class meetings. In such cases, the accommodation letter must be presented to the instructor in advance of any recording being done. All students are advised that classroom activities may be taped by students for this purpose.

Students who are permitted to record classes may not redistribute audio or video recordings of statements or comments from the course to individuals who are not students in the course without the express permission of the faculty member and of any students who are recorded. Distribution without permission is a violation of educational privacy law.

Any document or other item provided by or made available by the instructor to students enrolled in the course, 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, are for the personal, educational use of that student only, and may not be further copied, distributed, published, or otherwise used for any other purpose without the express written consent of the course instructor. Distribution or sale of such without express, written permission is a violation of copyright law. ****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.*

Community Values and Health and Safety:

All students are expected to adhere to the policies and expectations of the University to mitigate risk and support the health and safety of the UMW community.

Digital Knowledge Center:

The Digital Knowledge Center (DKC), located in the Hurley Convergence Center room 408, empowers UMW students to be digital creators by providing the support, technology, and spaces to complete digital projects, including audio, video, graphic design, 3D modeling, and website projects. The DKC:

- helps students learn the tools of digital creation through one-on-one appointments.
- provides the technology for digital creation through media equipment loan at the HCC Info Desk, design software available in the DKC, and web-building platforms such as Domain of One's Own.
- operates spaces for digital creation, including the HCC Video Production Studio, DKC Podcast Studio, HCC Vocal Booth, and DKC 3D Print Lab.

UMW students can find out more and book appointments with the DKC at dkc.umw.edu.

Other "helpful" information:

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. Team Activities are listed in parentheses because those dates may change depending on where we are in lecture.

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)

- reading the material prior to class.
- attending the lectures.
- taking good notes.
- asking questions. (The only "stupid" question is the one that goes unasked.)
- solving the suggested problems (and Aktiv) for each chapter. Attempting extra problems is also a great idea. "Practice makes permanent."
- attending PASS
- 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/after class).
- reviewing the appropriate sections of the text and all notes after class.
- attempting all suggested and assigned problems by yourself

Course Outline:

UNIT	Chapter	Topics
1	1	Active Learning, Study Skills Introduction to Chemistry
	2	Atomic Theory, Matter, Numbers
	3	Significant Figures Order of Operations Conversion Factors
2	4	Learning about Learning Periodic Table Atomic Structure Graphing
	5	Nomenclature Molar Masses

	6	Formulas Gases Pressure
3	7	Moles and Chemical Formulas Percent Composition Empirical and Molecular Formulas Combustion Analysis
	8	Moles and Chemical Equations Balancing Chemical Reactions
	9	Study Skills (Revisited) Stoichiometry (moles to moles) Limiting Reagents
	10	Chemical Reactions Electrolytes

Course Schedule

1/13 Introduction (Team Activity 0)	1/15 Study Strategies and Chapter 1	1/17 Chapter 1
1/20 MLK DAY – NO CLASS	1/22 Chapter 2 Aktiv #1 due	1/24 Chapter 2 (Team Activity 1)
1/27 Chapter 2 Quiz 1	1/29 Chapter 2 Aktiv #2 due	1/31 Chapter 3 (Team Activity 2, part 1)
2/3 Chapter 3 (Team Activity 2, part 2)	2/5 Chapter 3 Aktiv #3 due	2/7 Chapter 3 (Team Activity 3)
2/10 Chapter 4	2/12 Chapter 4 Aktiv #4	2/14 **Exam One**
2/17 Chapter 4	2/19 Chapter 4 Aktiv #5	2/21 Chapter 5

2/24 Chapter 5	2/26 Chapter 5 Aktiv #6	2/28 Chapter 5 (Team Activity 4)
3/3 SPRING BREAK – NO CLASS	3/5 SPRING BREAK – NO CLASS	3/7 SPRING BREAK – NO CLASS
3/10 Chapter 6	3/12 Chapter 6 Aktiv #7	3/14 Chapter 6 (Team Activity 5)
3/17 Chapter 6	3/19 Chapter 6 Aktiv #8	3/21 **Exam Two**
3/24 Chapter 7	3/26 Chapter 7 Aktiv #9	3/28 Chapter 7
4/7 Chapter 8	4/9 Chapter 8 Aktiv #10	4/11 Chapter 8
4/14 Chapter 8	4/16 Chapter 9 Aktiv #11	4/18 **Exam Three**
4/21 Chapter 9	4/23 Chapter 9 Aktiv #12	4/25 Chapter 10 (Team Activity 6)

Final Exam: Friday, May 2, 8:30 – 11 a.m.