

CHEMISTRY 142A (SLN 12105), WINTER 2022

SYLLABUS

Course Web Site: <https://canvas.uw.edu/>

Registration Questions and Entry Codes: Chemistry Undergraduate Services | chemugs@uw.edu

Lectures/Lessons: M, W, F 9:30 –10:20AM in BAG 131

TEACHING TEAM

Course Instructor: Prof. Andrea Carroll | BAG 201A | ageddes@uw.edu or direct message via Canvas Inbox

Public Office hours: TBD

Private Office Hours: If you would like to discuss something personal/private, please email me to schedule an individual appointment.

Discussion/Lab Section TAs:

Name	Email	Sect.
Rosemary Ma	rm777@uw.edu	AA, AJ
Kyle Yu	kyleyu5@uw.edu	AB
Dakota Kennedy	dakotask@uw.edu	AC
Erin Dunnington	edunny@uw.edu	AD, AI

Name	Email	Sect.
Emma Cave	ecave@uw.edu	AE, AH
Wes Leininger	leisw17@uw.edu	AF, AL
Andrew Rossi	awrossi@uw.edu	AG, AK

TA Help Sessions: Details TBD. You may attend any TA help sessions! The TAs can help you course content, ALEKS, labs, etc.

REQUIRED MATERIALS AND CONNECTIVITY

Except where indicated, all items are required and available through the University Bookstore:

- **Chemical Principles**, 7th ed., Zumdahl/Decoste (custom-split Chem 142 version available through the bookstore contains, in the order of coverage: Chapters 2, 12, 13, 3, 4, 15, & 5, as well as the Student Solutions Manual, but you may purchase a different copy of the Chemical Principles 7th ed. text if you choose).
- **Study Guide, Chemical Principles**, 7th ed., Zumdahl/Kelter (*optional*).
- **UW General Chemistry 142 Laboratory Manual, Autumn 2021-Summer 2022** (Hayden McNeil).
- **Laboratory Notebook** (Hayden McNeil) *with numbered pages and carbonless duplicate pages*. The bookstore sells a version with “UW Chemistry Laboratory Notebook” information on the front, but this version is not required – it is the *type of notebook that is critical*).
- **Lab coat and safety goggles** (*NO* safety glasses or any other type of goggles).
- **Scientific calculator**. Graphing/text-entry calculators *WILL NOT* be permitted on exams.
- **ALEKS access**. Purchase online: www.aleks.com (see ALEKS info on the course website for more information). If your financial aid is delayed, contact your instructor for a temporary access code.

Internet and Instructional Technology:

- **Access to a computer or tablet.** [Student Technology Loan Program](#) funded through Student Technology Fees
- **Daily online access** to Canvas (canvas.uw.edu) and ALEKS. **Weekly online access** to Gradescope (www.gradescope.com). All necessary links are available on the course Canvas site.
- **Internet access.** Students in WA State without broadband internet service: visit [WA State Drive-in wifi hotspots](#).
- **Ability to convert a sheet of paper and/or file into a pdf.** *You do NOT need a printer or separate scanner for this course, but submissions cannot be a group of individual image files.* Free scanning apps are available for smartphones (such as Genius Scan and Scannable) – the Gradescope instructions page of the Labs site has more details for using these apps.
- **[UW Academic Support Programs Technology Access webpage](#).** Information and resources for technology access during any remote learning.

LEARNING OBJECTIVES**Students who successfully complete CHEM 142 will be able to**

- Explain the chemical and physical behavior of matter based on the modern atomic theory, quantum mechanics, and the resulting atomic periodicity.
- Describe the formation and energetics of chemical bonds based on electrostatic forces.
- Describe and predict the structure of covalent and ionic compounds
- Describe the physical and chemical changes taking place in chemical reactions at both the particulate and macroscopic levels.
- Write balanced chemical equations for acid-base, precipitation, and oxidation-reduction reactions and use the balanced equations to predict quantities of reactants and products.
- Explain the rate of chemical reactions and the conditions that influence the rate using rate laws, reaction mechanisms, and collision theory.
- Explain the behavior of gas phase chemical systems at the particulate and macroscopic level using ideal gas behavior.
- Develop skill in visualizing the particulate level as related to the concepts listed above.
- Clearly define a problem and develop solutions for that problem including the use of central and auxiliary equations and conversion factors.
- Relate empirical observations, particularly in the laboratory portion of the course, to concepts listed above.
- Demonstrate laboratory, data analysis, and scientific writing skills.

COURSE COMPONENTS AND GRADING**The course consists of:**

- 3 lectures per week
- 1 discussion section per week
- 1 three-hour laboratory session certain weeks of the quarter (6 labs total – see the 142 Laboratory Resources page of the course website for details.)
- Daily work in the ALEKS online learning environment
- Online prelab assignments and online submission of post-lab reports
- Periodic quizzes and exams
- Weekly reading assignments and completion of periodic surveys and reflections as part of the “Catalyze Your Success” learning strategies initiative.

GRADING

The point distribution for the evaluative components of the course is as follows:

Quizzes and Final Exam	60%
Participation	10%
ALEKS Objectives & Mastery	15%
Laboratory	15%
TOTAL	100%

Quizzes. Quizzes will be in-person during the regularly-scheduled class session on Fridays in weeks 3, 5, 7 and 9. There will be four quizzes and at the end of the quarter one quiz score will be ignored/dropped before course grades are assigned. (The score dropped will be the lowest, whether that is from an absence or from a low earned score. Zero scores related to cases of academic misconduct in which a student is found responsible for violating the student conduct code will NOT be dropped.) Each quiz will focus mainly on the most recent set of lectures, but chemistry is a cumulative subject by nature, so we will assume that you have a firm understanding of material from earlier in the quarter and from *previous courses* when we the quiz questions. **The Quizzes represent 42% of your course grade (14% each).**

Final Exam. The Final Exam will be in person during the University-assigned final exam session for this course on Wed 3/16. The Final Exam is cumulative. Towards the end of the quarter we will provide details about the coverage of each course unit on the final. **The Final Exam represents 18% of your course grade.**

Participation. Discussion section (called Quiz section in the UW Time Schedule) will be weekly on Thursdays. To earn your participation credit, you must *arrive on time* and *participate* in good faith during the Discussion Section, not simply be in attendance. The two lowest Discussion Section scores will be dropped, allowing you to miss two without penalty. Additional participation-based activities will include the surveys, reflections, and active reading assignments that are part of the “Catalyze Your Success” learning strategies initiative. These additional opportunities will not be “extra-credit” points, so please be sure to complete them when they are available. **The Participation category represents 10% of your course grade.**

ALEKS. Your ALEKS grade is constructed from your Objective scores and the percent of the Pie you complete by the end of the quarter. The more of the pie you complete, the higher your ALEKS score will be, **but you do not have to complete the entire pie to earn credit for ALEKS.** Similarly, **you do not have to complete all the topics in an Objective to earn credit for that Objective.** Whatever percentage of topics you complete by the due date will be your score for that Objective. The Objective and Pie Mastery portions of your ALEKS grade are weighted equally. They each represent 7.5% of your overall course grade, so altogether the **ALEKS category represents 15% of your course grade.**

Laboratory. The Laboratory portion of this course will be conducted in person during the regularly-scheduled 3-hr lab sessions on your schedule. More details about lab can be found on the 142 Lab Canvas page. The lab score is made up of a lab safety orientation session and assignment and six labs (prelab, experiment, and report). **The Laboratory category represents 15% of your course grade.**

Grade. The final median GPA in Chemistry 142 generally falls within the range of 2.6-2.9. It is the Chemistry Department’s policy not to make grade changes of 0.1 after final class grades are submitted to the UW Registrar. Your scores for the various assignments, reports, and exams will be recorded using the online Gradebooks in Canvas (canvas.uw.edu). The lab assignments will be recorded on the Chem 142 Lab Resources page and all of the course component scores from ALEKS, 142 Labs site in Canvas, and/or Gradescope will be migrated to the Chem 142 course gradebook periodically throughout the quarter.

ACADEMIC ETHICS

Original work performed in good faith is assumed on all assignments and course components.

The Student Conduct Code prohibits several forms of academic misconduct (see [section 7: Prohibited Conduct](#)), including:

- Cheating
- Falsification
- Plagiarism
- Unauthorized collaboration
- Engaging in behavior specifically prohibited by an instructor
- Recording and/or dissemination of instructional content without express permission of the instructor

You are required to sign and submit an honor code statement for this course, in which you will affirm your acknowledgment of what constitutes academic misconduct in this course as defined below. Failure to adhere to this code of ethics will result in referral for possible disciplinary action as described in the Student Conduct Code.

General policies for all course assignments

Your submissions for ALL assignments (including but not limited to homework assignments, lab reports, quizzes, and exams) should be your own individual work unless you are explicitly told otherwise by your instructor.

You are strictly prohibited from sharing any content from ANY assignment (including but not limited to homework assignments, lab reports, quizzes, and exams) with any website or app (including but not limited to Discord, Chegg, Course Hero, and Snapchat) or any other course content repository (virtual OR physical) that is not explicitly approved by the instructor. This prohibition applies both during the quarter that you are taking this course and any time after the course ends.

Specific policies for exams and quizzes

During exams and/or quizzes, you may not seek out or accept any input from ANY other individual, whether or not they are a classmate. Further, you may not provide assistance to other students during an exam or quiz unless an instructor explicitly allows for that collaboration.

Specific policies for lab reports

It is presumed that the data you record and report in laboratory is your work. All data analysis and written/typed calculations and responses that you submit should be yours alone, even if you collected data with a laboratory partner. We often find examples of plagiarism in which lab reports are copied from someone else, or from an earlier quarter and examples of improper collaboration in which lab reports or portions of lab reports are posted or shared for other people to view.

We understand that it can be difficult for students to discern what constitutes good-faith collegial support on lab reports, and what constitutes plagiarism or cheating. While we often find examples of explicit plagiarism in which lab reports are directly copied from a student in the current quarter or an earlier quarter, we also find many cases of students “over collaborating,” resulting in reports that are essentially identical or extremely similar with only minor edits made to achieve minimal differences between the reports. This does not meet our expectation that you are submitting your own independent work. In short, if you have not done something yourself, do not attempt to pass it off as original work. If you have questions about what might cross the line, please do not hesitate to ask your lab or class instructor prior to submitting your work. You will not get in trouble for asking this type of question!

LECTURES

Lecture Schedule. An approximate schedule for the chapters to be covered each week is at the end of this document. ***You are responsible for material covered in class AND in the textbook*** (whether or not it was covered in lecture). Lectures will cover only highlights of the textbook material.

Lecture and Discussion Section Etiquette. Out of respect for your classmates, please observe the following rules:

- Arrive on time. If an emergency causes you to arrive late, please enter quietly through the **rear doors** of the lecture hall/classroom.
- Do not pack up your belongings before the end of class.
- Keep side conversations to a minimum.
- Keep your phones and devices on silent, and refrain from sending or reading text messages.
- Do not browse or read materials that are unrelated to the lecture. This includes – but is not limited to – newspapers, books, magazines, and the internet.

DISCUSSION SECTION

Activities in Discussion Sections (“QZ” in the Time Schedule). The weekly Discussion Section will be facilitated by your TA. The primary activities during Discussion Section will include:

- TA fielding questions about quizzes, general course content, etc.
- working with your colleagues on worksheet problems relevant to current course topics.

The worksheet problems are intended to help you synthesize the material covered in the previous week’s lectures, therefore, some will be quite challenging. A blank version of the worksheet will be available in advance of a particular Discussion Section. You can find them in the relevant Unit page in the Course Topics module. The worksheet key will be available after the last Discussion Section wraps up each week.

ONLINE LEARNING (ALEKS)

This course uses the internet-based learning program **ALEKS** (Assessment and LEarning in Knowledge Spaces). In ALEKS, you will complete **learning objectives** rather than traditional homework assignments. An ALEKS **Objective** contains topics relevant to the class content and discussions. The **ALEKS Pie** is a visual indicator of your progress towards mastering the required course content. Both your % completion of Objectives by the posted deadlines and the % completion of the ALEKS Pie by the end of the quarter will contribute to your total % score for the course and course grade. Several resources for understanding ALEKS can be found in the ALEKS module on the course website.

- **Make sure that you register for the ALEKS course specific to your section of 142** – use only the registration code found on the course website.
- **Make sure you enter your UW Net ID** (first part of your UW email address before the @ symbol) in your account details so your ALEKS scores can be correctly transferred to the course gradebook in Canvas.
- You, alone, are responsible for monitoring the deadlines for all ALEKS Objectives. Your daily/weekly work on ALEKS will be on your own schedule outside of class, although there are specific deadlines by which you must complete various Objectives.
- Note that it is not possible to open an ALEKS Objective a few hours before it’s due and be able to complete it successfully while also retaining the information and skills for easy recall later.
- ALEKS will not let you access the problems corresponding to the more advanced topics in an Objective until you have mastered the basics, so *you will need to spend time nearly every day on ALEKS to complete the Objectives.*

QUIZZES AND EXAMS

There are four quizzes and one final exam in this course. The dates for these are provided in the course schedule at the end of this document.

Exam Protocol

- Bring a few pencils, your non-graphing, non-programmable scientific calculator, and a photo ID to all exams.
- You must sit according to the seating charts that will be posted on the course website.

Quizzes. There are four quizzes in this course, delivered in person during our class session every other week on Fridays in weeks 3, 5, 7 and 9. The lowest score among the four quizzes will be dropped. Information about quiz length and coverage will be posted as each quiz date nears.

Final Exam. The final exam will be in person during the assigned time slot in Finals Week. The final exam will be cumulative over the quarter and you must take it to earn a grade in the course. Information about length and coverage will be posted as the final exam date nears.

CLASSROOM CLIMATE

UW Chemistry is committed to a welcoming and inclusive classroom environment. Diverse backgrounds, embodiments, and experiences are essential to the critical thinking endeavor at the heart of university education. Therefore, I expect you to follow the UW Student Conduct Code in your interactions with your colleagues and me in this course by respecting the many social and cultural differences among us, which may include, but are not limited to: age, cultural background, disability, ethnicity, family status, gender identity and presentation, citizenship and immigration status, national origin, race, religious and political beliefs, sex, sexual orientation, socioeconomic status, and veteran status. Please talk with me right away if you experience or observe disrespect in this class, and I will work to address it with you.

ACCESS AND ACCOMMODATIONS

Your experience in this class is important to us, and it is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. Disability Resources for Students (DRS) offers resources and coordinates reasonable accommodations for students with disabilities. If you have not yet established services through DRS, but have a temporary or permanent disability that requires accommodations, you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or visit disability.uw.edu. If you have already established accommodations with DRS, the information for the Alternative Testing Contract will be submitted to DRS via their online system. Students with accommodations are solely responsible for scheduling the exams with DRS well in advance of the exam dates. If you require accommodations in the laboratory (including assistants and/or interpreters), please contact the Undergraduate Services Director (Bagley 303D) **in person in the first week** of the quarter to discuss your accommodations.

RELIGIOUS ACCOMMODATIONS POLICY

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy (<https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/>). *Accommodations must be requested within the first two weeks* of this course using the Religious Accommodations Request form (<https://registrar.washington.edu/students/religious-accommodations-request/>).

KEYS TO SUCCESS

1. **Participate in ALL available sessions**, pay close attention, and take notes.
2. **Learning chemistry is a sequential process.** You must understand today's material before you can understand tomorrow's. As with all courses at UW, your instructors and TAs will assume that you are studying at least two hours for each hour of lecture and one hour for every hour of lab. Find a place that allows for periods of uninterrupted study. Skim through chapter or sections to be covered in the next lecture.
3. Make daily, weekly, and quarterly learning plans and follow those plans.
4. **Working in shorter, more frequent sessions in ALEKS** will be more efficient than long, marathon sessions.
5. **Practice!** Work on suggested end-of-the-chapter problems as well as topics in ALEKS - focus on understanding the concepts and general processes, not just memorizing how to solve a specific problem.
6. **Talk chemistry with fellow Chem 142 students.** You will not only learn more, but you will probably also enjoy the course more. This is a much bigger challenge with remote learning, but also so much more important when there are not in-person sessions. Use the discussion board, conferences, chats, etc. to create study groups for talking about the course content.

COURSE SCHEDULE

Assigned sections from Zumdahl should be read prior to the indicated lecture. Lab details are on the Chem 142 Labs Canvas site. **Note:** R = "Reading from Zumdahl" L = "Lesson" Wkst = "Worksheet" K.C. = "Knowledge Check" Obj = "Objective"

Week	LECTURE			Qz/Disc Section	LAB	ALEKS
	<i>Monday</i>	<i>Wednesday</i>	<i>Friday</i>	<i>Thursday</i>	<i>TWThF</i>	<i>Due Sun 10pm</i>
1	Jan 3 Introduction to CHEM 142 at UW! (Review: Ch 2, App 1 & 2)	5 L1.1: The Nature of Light & Matter (R: 12.0-2)	7 L1.2: H-atom Emission, Bohr Model (R: 12.3-4)	Wkst 1	NO LABS	Initial K.C. (W 1/5) Obj 1 (Sun 1/9) Review of Ch 2 and Appendices 1 & 2
2	Jan 10 L1.3: Quantum Mechanics (R: 12.5,7-8)	12 L1.4: H-atom Orbitals Electron Spin, Aufbau Principle (R: 12.9-13)	14 L1.5: Periodic Trends (R: 12.14-16)	Wkst 2	Lab Safety Orientation LSO Worksheet due in Gradescope; UG Stockroom Contract in Canvas	Obj 2 (1/16) Ch 12
3	Jan 17 Holiday – no class	19 L2.1: Chemical Bonds (R: 13.1-9)	21 Quiz 1: (Intro/Review & Unit 1 – Ch 12)	Wkst 3	NO LABS currently scheduled	Obj 3 (1/23) Ch 12 & 13
4	Jan 24 L2.2: Lewis structures, Resonance, Formal Charge, Exceptions to Octet Rule (R: 13.9-12)	26 L2.3: VSEPR Theory (R: 13.13)	28 L3.1: Atomic mass; The mole; Molar mass (R: 3.1-4)	Wkst 4	Lab 1 Atomic Emission Prelab due Mon in Canvas; In-lab report due in Gradescope	Obj 4 (1/30) Ch 13
5	Jan 31 L3.2: Empirical formulas; Chemical equations (R: 3.5-8)	Feb 2 L3.3: Chemical eqns, Stoichiometry (R: 3.8-10)	4 Quiz 2: (Units 2 & 3 – Ch 13 & 3)	Wkst 5	Lab 2 Chemical Models Prelab due Mon in Canvas; In-lab report due in Gradescope	Obj 5 (2/6) Ch 3
6	Feb 7 L4.1: Solutions; Electrolytes; Dilutions (R: 4.1-3)	9 L4.2: Precipitation reactions (R: 4.4-8)	11 L4.3: Acid-base rxns; Oxidation-reduction rxns (R: 4.9-10)	Wkst 6	Lab 3 Stoichiometry Prelab due Mon in Canvas; In-lab report due in Gradescope	Obj 6 (2/13) Ch 3 & 4
7	Feb 14 L4.4: Balancing redox rxns; Redox stoich. (R: 4.11-12)	16 L5.1: Reaction Rates, Rate Laws (R: 15.1-3)	18 Quiz 3: (Units 3 & 4 – Ch 3 & 4)	Wkst 7	Lab 4 Calibration Curves Prelab due Mon in Canvas; Take-home report in Gradescope	Obj 7 (2/20) Ch 4
8	Feb 21 Holiday – no class	23 L5.2: Integrated Rate Laws (R: 15.4-5)	25 L5.3: Reaction Mechanisms (R: 15.6)	Wkst 8	NO LABS currently scheduled	Obj 8 (2/27) Ch 15
9	Feb 28 L5.4: A Model for Chemical Kinetics (R: 15.8-9)	Mar 2 L6.1: Empirical gas laws; Ideal gas law (R: 5.1-3)	4 Quiz 4: (Unit 5 – Ch 15)	Wkst 9	Lab 5 Kinetics I Prelab due Mon in Canvas; Take-home report in Gradescope	Obj 9 (3/6) Ch 15
10	Mar 7 L6.2: Gas stoich.; Partial pressures (R: 5.4-5)	9 L6.3: Kinetic Molec Theory; Real gases (R: 5.6-7, 10)	11 <i>Course wrap-up</i>	Wkst 10	Lab 6 Gas Laws Prelab due Mon in Canvas; In-lab report due in Gradescope	Obj 10 (3/13) Ch 5
11	Final: Wed, Mar 16 8:30a – 10:20a BAG 131 Part Review Material from Units 1-5 and Part New Material from Unit 6 (Ch 5)					Pie Progress due at 11:59 pm on Tues 3/15.

This schedule is tentative and subject to change. Any changes will be announced on the course website.