CHEMISTRY 162A (SLN 12186), WINTER 2021
SYLLABUS

Classes/Lessons: MWF 10:30 AM – 11:20 AM PST via Zoom, available asynchronously via Panopto Recordings

Course Website: https://canvas.uw.edu/

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

Course & Lab Instructor: Prof. Andrea Carroll | direct message via Canvas Inbox or email ageddes@uw.edu

Public Office hours: TBD, via Zoom

Private Office Hours: If you would like to discuss something personal/private, please email me to schedule a private appointment. I will send you scheduling link and specific Zoom details.

Discussion/Lab Section TAs:

<table>
<thead>
<tr>
<th>Sections</th>
<th>Name</th>
<th>Email</th>
<th>Quiz/Disc</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Emma Cave</td>
<td><a href="mailto:ecave@uw.edu">ecave@uw.edu</a></td>
<td>Tues</td>
<td>Wed</td>
</tr>
<tr>
<td>AC</td>
<td>Todd Lewis</td>
<td><a href="mailto:thlewis@uw.edu">thlewis@uw.edu</a></td>
<td>Tues</td>
<td>Thurs</td>
</tr>
<tr>
<td>AD</td>
<td>Emma Cave</td>
<td><a href="mailto:ecave@uw.edu">ecave@uw.edu</a></td>
<td>Tues</td>
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</tr>
<tr>
<td>AF</td>
<td>Todd Lewis</td>
<td><a href="mailto:thlewis@uw.edu">thlewis@uw.edu</a></td>
<td>Tues</td>
<td>Thurs</td>
</tr>
<tr>
<td>AG</td>
<td>Chris Woodburn</td>
<td><a href="mailto:cwoody@uw.edu">cwoody@uw.edu</a></td>
<td>Tues</td>
<td>Thurs</td>
</tr>
<tr>
<td>AH</td>
<td>Jake Busche</td>
<td><a href="mailto:buschj@uw.edu">buschj@uw.edu</a></td>
<td>Tues</td>
<td>Thurs</td>
</tr>
<tr>
<td>AI</td>
<td>Chris Woodburn</td>
<td><a href="mailto:cwoody@uw.edu">cwoody@uw.edu</a></td>
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<td>AJ</td>
<td>Jake Busche</td>
<td><a href="mailto:buschj@uw.edu">buschj@uw.edu</a></td>
<td>Tues</td>
<td>Fri</td>
</tr>
</tbody>
</table>

TA Help Sessions on Zoom: You may attend any and all TA help sessions! The TAs can help you course content, ALEKS, pre-labs, data analysis, lab write-ups, etc. TA Help Sessions will NOT be recorded or posted in order to protect student privacy.

REQUIRED MATERIALS AND CONNECTIVITY

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

- **Chemical Principles, 6th ed.**, Atkins/Jones/Laverman (custom-split Chem 162 version contains Chapters 4, 6, 7, 10, 16, 17, 18, 19, and 20 as well as the introductory Fundamentals Section and the student solutions manual for these chapters).
- **UW General Chemistry 162 Laboratory Manual, Autumn 2020-Summer 2021** (Hayden McNeil; e-book via link available through UW Bookstore or on the Labs Canvas site); Note that you do NOT need goggles and lab coats this quarter - Labs will be attendance-required synchronous Zoom sessions with your TA at the times published in the UW Time Schedule.
- **Scientific calculator**.
- **ALEKS access**. Purchase online: [www.aleks.com](http://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](https://www.washington.edu/students/techloan) funded through Student Technology Fees
• **Daily online access** to Canvas (canvas.uw.edu), Zoom (washington.zoom.us), 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](https://www.washington.edu/it/services/wa-state-drive-in-wifi-hotspots). Students outside of WA State: search for local options for free wi-fi access provided in response to the impacts of the COVID-19 pandemic.

**For Zoom Discussion and Lab Sessions you must be able to participate by voice.** If your computer/tablet does not have a working microphone, you may need to log in with your phone as well as your computer/tablet.

• **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](https://www.washington.edu/students/academic-support/academic-support-programs/technology-access/). Information and resources for technology access during remote learning.

**LEARNING OBJECTIVES**

Students who successfully complete CHEM 162 will be able to

• Explain the properties of chemical molecules using bonding models, including hybridization and molecular orbital theory, with the understanding of their limitations.
• At a beginning level, analyze spectroscopic results to determine the structure of molecules.
• Use isomerism (structural, geometric, and stereo) to explain variation in chemical and physical properties.
• Explain macroscopic properties based on intermolecular forces within the chemical system.
• Describe the structure and properties of the liquid and solid states, as well as phase changes, at the particulate and macroscopic levels.
• Explain the chemical, physical, and thermodynamic properties of solutions at the particulate and macroscopic level.
• Apply bonding models to the structural study of organic molecules and transition metal coordination complexes.
• Illustrate the concepts of kinetics, thermodynamics, and equilibria through application to organic and transition metal chemistry.
• Develop skill in visualizing the particulate level as related to the concepts above.
• Relate empirical observations, particularly in the laboratory portion of the course, to concepts listed above.
• Develop laboratory, data analysis, and scientific writing skills.

**COURSE COMPONENTS AND GRADING**

The course consists of:

• 3 synchronous sessions per week – recorded and available for asynchronous viewing. Details about accessing the sessions (in Zoom or Panopto) will be provided on the course Canvas site.
• 1 synchronous discussion section per week – with TA via Zoom (access details are on the course Canvas site). Sessions will NOT be recorded.
• 1 synchronous laboratory session in certain weeks of the quarter: 1 orientation and 5 labs. See the 162 Laboratory Resources page of the course website for details. Labs will be attendance-required Zoom sessions with your TA at the times published in the UW Time Schedule. Sessions will NOT be recorded.
• Daily work in the ALEKS online learning environment
• Online prelab assignments and online submission of post-lab reports
• Online quizzes and exams

**GRADING**

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Quizzes and Final Exam</td>
<td>60%</td>
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<tr>
<td>Participation</td>
<td>7%</td>
</tr>
<tr>
<td>ALEKS Objectives &amp; Mastery</td>
<td>18%</td>
</tr>
<tr>
<td>Laboratory</td>
<td>15%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
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</tbody>
</table>

**Quizzes.** Quizzes will be delivered and submitted via Gradescope on Wednesdays in weeks 2, 4, 6, 8 & 10 during the regularly-scheduled class session. There will be five quizzes and one quiz score will be dropped before course grades are assigned (if you are unable to take a quiz, whether it is an excused or unexcused absence, that will be the dropped score). Each quiz will focus mainly on the most recent set of lectures, but chemistry is a cumulative subject by nature, so I will assume that you have a firm understanding of material from earlier in the quarter and from previous 142/152 courses when I write the quiz questions. **The Quizzes represent 48% of your course grade (12% each since one of the five will be dropped).**

**Final Exam.** The Final Exam will be delivered and submitted via Gradescope during the regularly-scheduled final exam session for this course. The Final Exam is cumulative. I will provide details about the percentage by points of each course unit on the final towards the end of the quarter. **The Final Exam represents 12% of your course grade.**

**Participation.** Your Participation grade in this course is comprised of Discussion Section Participation and Professional Development Assignments. **The Participation category represents 7% of your course grade.**

• **Discussion section** (4%) (also called Quiz Section in the UW Time Schedule) will be conducted via Zoom during the regularly-scheduled discussion section time. 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 structure of Discussion Sections will be described in more detail by your TA. The first Discussion Section will not be graded, and two of the remaining Discussion Section scores will be dropped, allowing you to miss two without penalty. Overall, 7 of 9 possible Discussion Section scores will be counted.

• **Professional Development** (3%) assignments in this course, delivered via Canvas. These are intended to help you develop as a scholar and budding professional in your field. The tasks on these assignments introducing you to seminars and refereed-journal articles, standard methods by which scientists communicate their research findings. Details will be posted as the quarter goes on. These will be graded on participation and good faith effort only.

**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.** 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 10% of your overall course grade, so altogether the **ALEKS category represents 18% of your course grade.**
Laboratory. The Laboratory portion of this course will be conducted via Zoom during the regularly-scheduled lab session. More details about lab can be found on the 162 Lab Canvas page. The lab score is made up of a remote-labs orientation session and assignment and five labs (prelab, Zoom, and report). The Laboratory category represents 15% of your course grade.

Grade Distribution. The final median GPA in Chemistry 1x2 generally falls within the range 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.

Monitor your Scores. 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 162 Lab Resources page and the course component scores from ALEKS and the 162 Labs site in Canvas will be migrated to the Chem 162 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

Your submissions for online assignments and exams should be your own, individual work unless explicitly told otherwise. You will be signing and submitting an honor code statement for this course.

For exams and/or quizzes, you may not seek out or accept any input from other individuals nor should you communicate with other members of the class or provide assistance to other students during or after the assignments unless an instructor explicitly allows for that collaboration. This also prohibits the sharing of content from any assignments, quizzes, exams, etc. with 3rd-party websites and apps as well as any other course content repositories not explicitly approved by the instructor.

It is presumed that the data you submit in the lab reports is what was provided to you by the instructor. All data analysis and written/typed calculations and responses that you submit should be yours alone. We often find examples of plagiarism in which lab reports are copied from someone else, or from an earlier quarter. 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. Failure to adhere to this code of ethics will result in referral for possible disciplinary action as described in the Student Conduct Code.

LECTURES

Lectures. Lessons covering course content will be provided via Zoom during the published class time. These sessions will be recorded and made available for viewing in Panopto as your schedule allows. Part of your expected work is to participate in the Zoom sessions or view the lectures on Panopto and submit any questions that you have about the lectures the to the course discussion board on Canvas.
Textbook material. Lectures will cover only highlights of the textbook material. The textbook sections that correspond to each lecture are listed in the course schedule. You are responsible for material covered in class AND in the textbook (whether or not it was covered in lecture).

DISCUSSION SECTION

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

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

The Discussion Section problems are intended to help you synthesize the material covered in the previous week’s lectures, therefore, they will be quite challenging. A blank version of the worksheet will be available at least a week in advance of a particular Discussion Section. The worksheet key will be available after the last scheduled Discussion Section each Tuesday.

Important note for Zoom Discussion Sections: If you want to keep your video off to save on bandwidth that is fine, but you must interact with your colleagues through the audio in order to participate. If your computer microphone doesn't work, you can join the DS Zoom meeting through a phone connection. Ask your TA for details.

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 162 – 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.

QUizzes AND EXAMS

Quizzes. There are five quizzes in this course, delivered via Gradescope every other Wednesday (starting in Week 2). The lowest score among the lowest quiz will be dropped, with an absence (either excused or unexcused) being the quiz score that is dropped. The dates for the quizzes are provided in the course schedule on Canvas. Quizzes will be delivered during the regularly-scheduled class time.

Each quiz will focus mainly on the most recent set of lessons, but chemistry knowledge is cumulative by nature, so the quiz questions will often depend on knowledge from earlier chapters and courses. Information about quiz length and coverage will be posted as each quiz date nears.
Final Exam. The final exam will be delivered via Gradescope during the assigned exam time in the UW Finals Schedule. The final exam will be cumulative. Information about quiz length and specific 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. Regarding lab reports and accommodations for “quick turnaround assignments” – because students have >24 hours after their lab session to upload in-lab reports into Gradescope and a full week for take-home reports, there will not be DRS-related deadline extensions for Chem 162 reports.

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 as though they were a regular in-person sessions.
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 162 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

This schedule is tentative and subject to change. Any changes will be announced on the course website. For the Lecture content, the number in bold is the lecture/lesson number; the numbers in parentheses are the reading assignments and book sections related to the lecture/lesson.

<table>
<thead>
<tr>
<th>Week (Mon)</th>
<th>Monday (Lect)</th>
<th>Tuesday (Qz/Disc Sect)</th>
<th>Wednesday (Lect, Quiz, Lab* &amp; ALEKS **)</th>
<th>Thursday (Lab*)</th>
<th>Friday (Lect &amp; Lab*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1 (1/4)</td>
<td>Intro. to Course 1.1: Review of orbitals, LDS, and VSEPR (4.1-3)</td>
<td>Worksheet 1</td>
<td>1.2: Atomic Orbital Hybridization (4.4-7) ALEKS Initial K.C., Due 11:59pm</td>
<td>No labs this week</td>
<td>1.3: Molecular Orbital Model of Bonding (4.8-10) No labs this week</td>
</tr>
<tr>
<td>Week 2 (1/11)</td>
<td>1.4: Magnetism (Box 4.2, p. 130); Diatomics (4.11)</td>
<td>Worksheet 2</td>
<td>Quiz #1, Wed 1/13 L1.1-3 Remote-Labs Orientation ALEKS Obj. 1 (4.1-4.10), Due 11:59pm</td>
<td>Remote-Labs Orientation</td>
<td>1.5: UV-Vis Spect.(4.12; MT 2 (pp. 146-147)) Remote-Labs Orientation</td>
</tr>
<tr>
<td>Week 3 (1/18)</td>
<td>HOLIDAY</td>
<td>Worksheet 3</td>
<td>2.1: Intermolecular Forces (6.1-8) No labs this week ALEKS Obj. 2 (6.1-5) Due 11:59pm</td>
<td>No labs this week</td>
<td>2.2: Phase Changes (8.11-12; 9.4 (pdf in Canvas) P_vap; Boiling (10.1-4) No labs this week</td>
</tr>
<tr>
<td>Week 4 (1/25)</td>
<td>2.3: Phase Diagrams (10.5-7)</td>
<td>Worksheet 4 Prelab 2 due</td>
<td>Quiz #2, Wed 1/27 L1.4-5, 2.1-3 Lab 2 ALEKS Obj. 3 (8.11-12, 10.4, 10.6) Due 11:59pm</td>
<td>Lab 2</td>
<td>2.4: Structure of Solids (6.9-13; MT 3 (pp. 223-225)) Lab 2</td>
</tr>
<tr>
<td>Week 5 (2/1)</td>
<td>2.5: Bonding in Solids; Semiconductors (7.1-5, 7.12-13)</td>
<td>Worksheet 5</td>
<td>3.1: Solubility (10.8-9); Thermo of Solutions (10.12-13) No labs this week ALEKS Obj. 4 (6.9, 6.13), Due 11:59pm</td>
<td>No labs this week</td>
<td>3.2: P and T Effects on Solubility (10.10-11); Molality (10.14) No labs this week</td>
</tr>
<tr>
<td>Week 6 (2/8)</td>
<td>3.3: Colligative Properties (10.15-16)</td>
<td>Worksheet 6 Prelab 3 due</td>
<td>Quiz #3, Wed 2/10 L2.3-5, 3.1-2 Lab 3 ALEKS Obj. 5 (9.4, 10.8-14) Due 11:59pm</td>
<td>Lab 3</td>
<td>3.4: Colligative Props. (10.17); P_vap of Binary Solns (10.18) Lab 3</td>
</tr>
<tr>
<td>Week 7 (2/15)</td>
<td>HOLIDAY</td>
<td>Worksheet 7</td>
<td>4.1: The d-block metals; Coordination complexes (17.1-6) No labs this week ALEKS Obj. 6 (10.15-17, 17.2-5) Due 11:59pm</td>
<td>No labs this week</td>
<td>4.2: Isomers (17.7) No labs this week</td>
</tr>
<tr>
<td>Week 8 (2/22)</td>
<td>4.3: Crystal Field; Spectrochem. Series; Magnetism (17.8-12)</td>
<td>Worksheet 8 Prelab 4 due</td>
<td>Quiz #4, Wed 2/24 L3.3-4; 4.1-2 Lab 4 ALEKS Obj. 7 (17.5-7), Due 11:59pm</td>
<td>Lab 4</td>
<td>4.3: Crystal Field; Spectrochem. Series; Magnetism (17.8-12) Lab 4</td>
</tr>
<tr>
<td>Week 9 (3/1)</td>
<td>5.1: Aliphatic Hydrocarbons (19.1-3, 7)</td>
<td>Worksheet 9 Prelab 5 due</td>
<td>5.1: Aliphatic Hydrocarbons (19.1-3, 7) Lab 5 ALEKS Obj. 8 (17.8-10, 19.1-2) 19.7, 20.1-20.5; Due 11:59pm</td>
<td>Lab 5</td>
<td>5.2: Organic Rxns (19.4-6, 8) Lab 5</td>
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<tr>
<td>Week 11 (3/15)</td>
<td>162A Final MONDAY, March 15th 8:30-10:20am (PDT, Pacific Daylight Time) ***</td>
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**Notes:**
- **LABS:** prelabs are due 11:30am on Tuesdays in Canvas; Wi20 labs are W/Th/F depending on the registered section; reports are due 11:55pm in Gradescope: for Labs 2, 5, & 6 on the day after lab, for Labs 3 & 4 are 1 week after lab
- **ALEKS** deadlines are 11:59pm Wednesdays; last Knowledge Check of the quarter will be after Obj #8; ALEKS Pie Progress deadline is 11:59pm on Sun 3/14
- **PDT:** Daylight Savings Time begins at 2:00am Sun 3/14. Please be sure your clocks/alarms are set so you are ready to take it at the correct time.