Course Syllabus

Chemistry 2310 – Organic Chemistry I

Instructor Contact Information:

Dr. Bradley S. Davidson  
Office: Widtsoe 341  
Phone: (435) 720-3617  
Email: brad.davidson@usu.edu

The instructor will communicate with students mainly using the Canvas Announcements, Discussions tools, and via Zoom. For further communication, the preferred method is email, either directly or through Canvas. Please put "CHEM 2310" in the subject line of any email. You will typically receive responses within 24 to 48 hours. Please allow an entire business day before emailing again on the same question or issue. Emails sent on Saturday or Sunday will receive a reply by Monday or Tuesday. Please do not expect to receive emails from your instructor late at night or on Saturdays or Sundays.

All times listed in this syllabus refer to the mountain time zone. As such, all due dates and times will be in mountain time. If you are enrolled from a geographic location outside this time zone, adjust your times, accordingly.

Office Hours:  
W and Th, 9:30-11:00 AM  
Office hours (Zoom): W, 2:00-3:00 PM

Supplemental Instructor (SI):  
Kaden Bunch  
SI sessions:  
M, 5:00-6:00 PM  
Th, 7:00-8:00 PM

Undergraduate Teaching Fellows (UTF):  
Nathan Barber  
Office hours (Zoom): M, 10:00-11:00 AM; T, 9:00-10:00 AM

Kai Nethercott  
Office hours (Zoom): Th, 3:00-4:00 PM; F, 10:00-11:00 AM

Daryn Short  
Office hours (Zoom or in person): T, 3:00-4:00 PM; W, 4:00-5:00 PM

Course Description:

This is the first course of a two-semester sequence covering the chemistry of organic chemicals. Students will gain an understanding of the physical properties, nomenclature, stereochemistry, and chemical reactivities of organic molecules, and will be able to describe chemical reactions and step-wise reaction mechanisms.

Course Format:

Due to the continued threat of COVID-19 and the high enrollment of this course all course content will be delivered online. Online learning requires a significant amount of time and self-motivation. You will have work due every week. The course content is made accessible to you through the text book, lecture videos, practice problems, and other supplemental materials. Course content will also be discussed through posted discussion topics. Comprehension of the course materials often occurs independent of the instructor. If you struggle to keep up with assigned readings or to understand the course content in traditional classes, you may struggle even more in this course. You must hold yourself accountable for making sure you keep track with the course schedule. All materials are posted on Canvas and the instructor is
available to answer questions and provide feedback. To help you be successful in this course, take a look at some web resources [http://www.usnews.com/education/online-education/articles/2013/01/14/5-tips-to-succeed-in-an-online-course] that provide suggestions for taking online courses.

Course Learning Objectives:

Upon successful completion of this course, you will be able to:

1. Describe atomic and molecular structure and bonding, and properly illustrate organic molecules as Lewis, Kekulé, and skeletal structures.
2. Classify organic compounds by structure, employ IUPAC rules for naming, and identify conformational effects in organic compounds.
3. Predict chemical properties for various compounds, on the basis of their structures.
4. Identify the types of isomerism in organic compounds, recognize and classify chiral centers, and compare the differences in chemical and physical properties among these molecules.
5. Apply concepts of resonance and inductive effects to predict the chemical and physical properties for different functional groups and the reactivity of molecules containing these functional groups.
6. Draw and interpret reaction coordinate diagrams, relate the energetic changes associated with chemical reactions to equilibrium constants and rate, and differentiate kinetic versus thermodynamic control of reactions.
7. Propose electron-pushing mechanisms for chemical reactions, and use the concepts of resonance effect, inductive effect, steric hindrance, leaving group effect, nucleophilicity, and solvation to explain the chemo-, regio-, and stereoselectivity of the reactions.
8. Identify aromatic and antiaromatic compounds and discuss the chemical consequences of aromaticity.

Course Prerequisites:

Coursework prerequisite: CHEM 1220

Technology: You must have a computer with reliable high speed internet access to complete this course. Late assignments will not be accepted because of unreliable internet access.

- You will need Microsoft Office applications (Word, Power Point, and Excel), Adobe Acrobat, or a PDF viewer to open some of the course materials.
- If you do not have a computer at home with the necessary software or high speed internet access, use the computers available to you on campus.
- Please check your browser at the beginning of each semester and download appropriate software and plugins.

The Technical Requirements [https://community.canvaslms.com/docs/DOC-10720-67952720329] page identifies the browsers, operating systems, and plugins that work best with Canvas. If you are new to Canvas quickly review the Canvas Student Orientation materials.

Course Materials:

- **Auto Access eBook: Solution Manual for Organic Chemistry w/Biological Topics eBook, 6e by Smith**
  This course requires all-inclusive digital materials that are provided to you at a lower price than traditional printed materials. These materials are paid for through an "Auto Access Digital Materials" charge placed on your student account when you registered for the course. **To access the materials, visit the Canvas course site.** For more details, including dates, deadlines, and opt-out info, visit your student Auto Access Portal: [https://portal.verba.io/usu/login](https://portal.verba.io/usu/login)

  The eText and homework system for this course is provided as "Auto Access Digital Materials" that are provided to you at a significantly lower price than traditional printed materials. These materials are paid for through your student tuition/fee account and are accessed through the Canvas course site. You may choose to opt-out of the all-inclusive materials and associated charges, but you will lose access to the required materials, which will have a negative effect on your performance in the course.

- The Study Guide and Student Solutions Manual for Organic Chemistry with Biological Topics, 6th Edition, can be accessed via the "Bookshelf" link in the left menu. Here you can find study materials and answers to all of the problems in the eText.

- Molecular model kit (optional, but helpful). The Andrus kit is available in Chem Stores (on the first floor of Widtsoe) and costs $24.58.
## Course Schedule:

<table>
<thead>
<tr>
<th>Module</th>
<th>Dates</th>
<th>Reading in SmartBook</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1 – Structure and Bonding</td>
<td>8/30 – 9/7</td>
<td>Sections 1.1-1.13</td>
<td>SB1, AP1, HL1.1-HL1.4 ¹</td>
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<tr>
<td>Chapter 2 – Acids and Bases</td>
<td>9/8 – 9/13</td>
<td>Sections 2.1-2.8</td>
<td>SB2, AP2, HL2.1-HL2.3</td>
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<td>Chapter 3 – Introduction to Organic Molecules and Functional Groups</td>
<td>9/14 – 9/17</td>
<td>Sections 3.1-3.8</td>
<td>SB3, AP3, HL3.1-HL3.4</td>
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<td>Chapter 4 – Alkanes</td>
<td>9/18 – 9/26</td>
<td>Sections 4.1-4.5, 4.8-4.14</td>
<td>SB4, AP4, HL4.1-HL4.4</td>
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<tr>
<td>Exam 1</td>
<td>9/27 – 9/28</td>
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<tr>
<td>Exam 1-2</td>
<td>9/29 – 10/3</td>
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<td>Chapter 5 – Stereochemistry</td>
<td>9/27 – 10/5</td>
<td>Sections 5.1-5.13</td>
<td>SB5, AP5, HL5.1-HL5.3</td>
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<td>Chapter 6 – Understanding Organic Reactions</td>
<td>10/6 – 10/11</td>
<td>Sections 6.1-6.11</td>
<td>SB6, AP6, HL6.1-HL6.3</td>
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<tr>
<td>Chapter 7 – Alkyl Halides and Nucleophilic Substitution</td>
<td>10/12-10/21</td>
<td>Sections 7.1-7.18</td>
<td>SB7, AP7, HL7.1-HL7.5</td>
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<td>Chapter 8 – Alkyl Halides and Elimination Reactions</td>
<td>10/22 – 11/3</td>
<td>Sections 8.1-8.11</td>
<td>SB8, AP8, HL8.1-HL8.4</td>
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<td>11/4 – 11/5</td>
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<tr>
<td>Exam 2-2</td>
<td>11/6 – 11/10</td>
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<td>Chapter 10 – Alkenes and Alkynes</td>
<td>11/13-12/1</td>
<td>Sections 10.1-10.4, 10.7-10.21</td>
<td>SB10, AP10, HL10.1-HL10.8</td>
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<tr>
<td>Exam 3-2</td>
<td>12/4 – 12/8</td>
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<tr>
<td>Chapter 11 – Oxidation and Reduction</td>
<td>12/2 – 12/10</td>
<td>Sections 11.1-11.12</td>
<td>SB11, AP11, HL11.1-HL11.4</td>
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<td>Final Exam</td>
<td>12/13-12/17</td>
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Assignments and Grading Scheme:

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<tr>
<th>Assignment Type</th>
<th>Points</th>
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<tbody>
<tr>
<td>Three one-hour exams (3 x 200 pt)</td>
<td>600 pt</td>
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<tr>
<td>SmartBook assignments (best 10 x 20 pt)</td>
<td>200 pt</td>
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<tr>
<td>Application problems (best 10 x 20 pt)</td>
<td>200 pt</td>
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<tr>
<td>Highlight video questions (1 pt ea; up to 125 pt)</td>
<td>125 pt</td>
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<tr>
<td>On-line discussion topics (12 weeks x 10 pt)</td>
<td>120 pt</td>
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<tr>
<td>Comprehensive Final (300 pt)</td>
<td>300 pt</td>
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<tr>
<td><strong>Total Points:</strong></td>
<td><strong>1545 pt</strong></td>
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Grade Breakdown:

The grade received in the course is based on your performance on the exams, highlight videos, application problems, and discussion assignments. Grades are guaranteed as given below, following the standard USU curve, for overall percentage score. Actual grade ranges may be curved somewhat lower, depending on the overall class average.

A  100% to 93%
A- < 93% to 90%
B+ < 90% to 87%
B  < 87% to 83%
B- < 83% to 80%
C+ < 80% to 77%
C  < 77% to 73%
C- < 73% to 70%
D+ < 70% to 67%
D  < 67% to 60%
F  < 60% to 0%

Procedures:

- Exams: The exams are meant to test your understanding of the topics covered in lecture, not your ability to repeat memorized problems. Expect some questions that require you to apply your understanding to new problems. Ultimately, because you are in this course to learn organic chemistry, exams are meant to offer learning opportunities.

The format of the exams is a combination of two formats of online exams: 1) a Canvas-based portion, composed of 25 multiple choice, multiple answer, short answer, and pull-down menu questions (50%), and 2) a Connect-based portion, composed of around 12 questions that will require you to draw chemical structures using an online drawing palette (50%). You will take both exam on your own, using the Proctorio remote proctoring program. You will be expected to work independently. Proctorio will record you and your environment during the exam, flagging suspicious activities.
A self-correcting approach to the Canvas-based portion of the exam will be used. You will have the opportunity, after consulting your notes, textbook, even classmates, to repeat this portion of the exam by 11:59 PM on the designated day. The average of your two attempts will apply toward your grade.

There will be no planned make-up exams. It is possible to take an exam in advance, but only with a valid excuse and prearrangement with me. If you miss an exam without prearrangement, then you will receive a zero.

Any grading corrections should be discussed with me within one week of the exam completion. No point adjustments will be made after this time.

- Assignments: You will be assigned three types of assignments within each module. Each assignment will typically be available from 8:00 AM on the first day scheduled for a module, until 11:59 PM on the due date. Note, the number of days allotted varies for each module. It is your responsibility to be aware of due dates.

  SmartBook reading and in-chapter problems. As you read the assigned pages in the eText, you will periodically be asked questions to demonstrate your comprehension. The number and type of questions that you are asked will depend on your responses. If your responses demonstrate that you understand to topic, you will be sent back for more reading. If your responses show a lack of understanding, you will be presented with additional questions to help you increase your grasp of the content. Each LearnSmart assignment is worth 20 pt, awarded for completion.

  Application problems. These problems, also administered through McGraw-Hill Connect, will be a combination of structure drawing, matching, and fill-in. You will have an unlimited number of attempts at each homework assignment before the closing date. Only the best score will be counted. After the closing date practice problems will be opened for ungraded practice.

For Application problems there are several types of assistance provided, which can be used as you complete the problems:

  eBook and resources: Clicking on the eBook Link icon within a question will show you relevant readings. There is no point penalty for using this.

  Hint: The View Hint link will offer a direct suggestion but incurs a 5% deduction from the question score (the deduction is only applied once per question).

  Check my work: You can click the “check my work” icon to see if your answer is correct before submitting it for grading. This can only be used once per question.

Highlight videos. For each chapter, there are between three and eight highlight videos that focus on the most important concepts. Examples of exam-type problems are analyzed and solved. Each video includes an average of three inserted questions, each worth 1 pt. Highlight videos can be re-watched, and up to 125 pt can be applied to your grade. On each Module/Chapter page, you will find links to the videos, followed by links that will allow you to download the slides, as pdf files. This will help you take notes, as you watch the videos.

Highlight videos are available on a website called PlayPosit. To access them, you will need to establish a free account and enroll in our course. To do this, follow this link to the PlayPosit website. Be sure to sign up with your name as it is listed in Canvas and enter your A-number where it asks for an email/student ID. Our class code is: 1230743-1090406. During the semester, if you run into issues when you login, please do not simply make a new account. Multiple accounts per person make the grade book a nightmare! All videos contain captioning. You can turn captions on or off by clicking on the small gear in the lower right-hand corner of the video, where you can select the captions file (same name as video) or select none. You can increase the speed, rewind, and rewatch the videos.

- Discussion Board: Almost every week, there will be a posted discussion topic. Posting an intelligent, substantive (as judged by our teaching team) contribution to the discussion will be rewarded with 6 pt. Two thoughtful, content-related comments on classmates' posts will be worth another 2 pt each. Most often, the initial post will be due by Thursday at 11:59 PM and the follow-up posts will be due by Sunday at 11:59 PM, though there will be some discussions that follow different schedules. All posts are expected to be unique (not a repeat of someone else's post), thoughtful, respectful, and topic related. Please follow the general rules of Netiquette.

- Molecule of Interest: Each exam will include an extra credit question worth 5 pt pertaining to the "Molecule of Interest." A link will be provided to a molecule of special interest.

Teaching Assessment:
Assessment involves measuring student progress as well as teaching effectiveness. The following assessment strategies have been incorporated into this course.

- A pre-test/post-test approach will be used to measure comprehension and teaching of important concepts. The pre-test will be administered through Canvas and must be taken on your own time. The ten multiple choice questions of the pre-test will reappear in the final, in slightly altered form, to assess teaching and learning progress during the semester. If weaknesses are observed in specific subject areas, teaching methods will be reevaluated. If you take the pre-test, you will receive 5 points.

- IDEA Evaluations: Student evaluations will be used to evaluate course/instructor strengths and weaknesses. Constructive suggestions are welcome anytime. The on-line IDEA evaluation system provides a way for you to self-assess how well the course has helped you achieve the following general objectives.

  1. Have you gained factual knowledge about Organic Chemistry, including terminology, methods, and trends, as further described in the Detailed Learning Objectives, shown below?
  2. Have you learned fundamental principles, generalizations, and theories that describe and explain chemical reactions and chemical properties?
  3. Have you further developed your ability to analyze and critically evaluate ideas, arguments, and scientific models.

University Policies and Procedures:

COVID-19 Classroom Safety Protocols

While not mandated, USU encourages and welcomes the wearing of masks in all university building, especially within 6 feet of others. Furthermore, it is strongly encouraged to take measures to mitigate risk as recommended by federal and state public health officials. These measures include getting fully vaccinated, staying home if you are sick (even with mild symptoms), and maintaining good hygiene including frequent hand washing. Testing will be provided, without charge, throughout the semester and the USU COVID Webpage (https://www.usu.edu/covid-19/) will provide up-to-date information. Please remember; COVID can have significant impact on the health and safety of those around you so remain vigilant and respectful.

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. USU Policy 403 (http://www.usu.edu/hr/files/uploads/Policies/403.pdf) further defines academic freedom and professional responsibilities.

Academic Integrity - "The Honor System"

The University expects that students and faculty alike maintain the highest standards of academic honesty. The Code of Policies and Procedures for Students at Utah State University (Student Conduct (https://studentconduct.usu.edu/studentcode)) addresses academic integrity and honesty and notes the following:

**Academic Integrity**: Students have a responsibility to promote academic integrity at the University by not participating in or facilitating others’ participation in any act of academic dishonesty and by reporting all violations or suspected violations of the Academic Integrity Standard to their instructors.

**The Honor Pledge**: To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge: "I pledge, on my honor, to conduct myself with the foremost level of academic integrity". Violations of the Academic Integrity Standard (academic violations) include, but are not limited to cheating, falsification, and plagiarism.

**Plagiarism**

Plagiarism includes knowingly "representing by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials." The penalties for plagiarism are
severe. They include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, denial or revocation of degrees, and referral to psychological counseling.

Course Fees

Instructors that utilize course fees should identify the amount and explain the purpose of the course fee on the syllabus. Course fees are listed in the catalog.

Grievance Process

Students who feel they have been unfairly treated [in matters other than discipline, admission, residency, employment, traffic, and parking - which are addressed by procedures separate and independent from the Student Code] may file a grievance through the channels and procedures described in the Student Code: Article VII Grievances (https://studentconduct.usu.edu/studentcode/article7)

Sexual Harassment

Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and USU Policy 339 (https://www.usu.edu/policies/339) address sexual harassment in the workplace and academic setting.

The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU’s Affirmative Action/Equal Opportunity (AA/EO) Office (http://aaeo.usu.edu) for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment (USU Policy 305) (https://www.usu.edu/policies/305), and has designated the AA/EO Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.

Students with Disabilities

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, 435-797-2444, drc@usu.edu (mailto:drc@usu.edu)). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

Withdrawal Policy, "I" Grade Policy and Dropping Courses

If a student does not attend a class during the first week of the term or by the second class meeting, whichever comes first, the instructor may submit a request to have the student dropped from the course. (This does not remove responsibility from the student to drop courses which they do not plan to attend.) Students who are dropped from courses will be notified by the Registrar’s Office through their preferred e-mail account.

Students may drop courses without notation on the permanent record through the first 20 percent of the class. If a student drops a course following the first 20 percent of the class, a W will be permanently affixed to the student’s record (check General Catalog (https://catalog.usu.edu/misc/catalog_list.php?catoid=12) for exact dates).

Students with extenuating circumstances should refer to the policy regarding Complete Withdrawal from the University and the Incomplete (I) Grade policy in the General Catalog.

No-Test Days Policy

For classes that meet for a full semester, a five-day period designated as "no-test" days precedes final examinations. During this time, no major examinations, including final examinations will be given in order that students may concentrate on classwork, the completion of special assignments, writing projects, and other preparation for duly scheduled final examinations. Approved exceptions include final papers, weekly chapter quizzes, quizzes, projects, and examinations associated with a lab that does not meet during final examinations. This policy does not apply to classes that meet only during the second 7-week session of the semester or to classes offered during the summer term. Complete
information related to Final Examination Policies (https://catalog.usu.edu/content.php?catoid=12&navoid=3311) can be reviewed in the General Catalog.

Assumption of Risk

All classes, programs, and extracurricular activities within the University involve some risk, and some involve travel. The University provides opportunities to participate in these programs on a voluntary basis. Therefore, students should not participate in them if they do not care to assume the risks. Students can ask the respective program leaders/sponsors about the possible risks a program may generate, and if students are not willing to assume the risks, they should not select that program. By voluntarily participating in classes, programs, and extracurricular activities, students do so at their own risk. General information about University Risk Management policies, insurance coverage, vehicle use policies, and risk management forms can be found at http://www.usu.edu/riskmgmt/ (http://www.usu.edu/riskmgmt/).

Mental Health

Mental health is critically important for the success of USU students. As a student, you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. Utah State University provides free services for students to assist them with addressing these and other concerns. You can learn more about the broad range of confidential mental health services available on campus at Counseling and Psychological Services (CAPS) (https://counseling.usu.edu/).

Students are also encouraged to download the ‘SafeUT App’ (https://healthcare.utah.edu/uni/programs/safe-ut-smartphone-app), to their smartphones. The SafeUT application is a 24/7 statewide crisis text and tip service that provides real-time crisis intervention to students through texting and a confidential tip program that can help anyone with emotional crises, bullying, relationship problems, mental health, or suicide related issues.

### Course Summary:

<table>
<thead>
<tr>
<th>Date</th>
<th>Details</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fri Sep 3, 2021</td>
<td>Introduction to Connect Assignments (extra credit)</td>
<td>due by 11:59pm</td>
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<td>(<a href="https://usu.instructure.com/courses/676323/assignments/3409848">https://usu.instructure.com/courses/676323/assignments/3409848</a>)</td>
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<td>Pre-Test (extra credit)</td>
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<td>Sun Sep 5, 2021</td>
<td>Discussion 1-Introduction</td>
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<tr>
<td>Tue Sep 7, 2021</td>
<td>Chapter 1. Application Problems</td>
<td>due by 11:59pm</td>
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<td>Chapter 1: Structure and Bonding</td>
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<tr>
<td>Sun Sep 12, 2021</td>
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<tr>
<td>Mon Sep 13, 2021</td>
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<td>Chapter 2: Acids and Bases</td>
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<td>Fri Sep 17, 2021</td>
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